FINAL REPORT

TENNESSEE LONG-RANGE TRANSPORTATION PLAN

FINANCIAL PLAN

DECEMBER 2005

TDOT

PLAN Go.

A Long-Range Multimodal Strategy

Prepared by
The PBS&J Consultant Team

10179 | GT | 05

TDOT

PLAN Go.

A Long Range Multimodal Strategy

Tennessee Long-Range Transportation Plan

Financial Plan
Final Report

December 2005

Executive Summary

Meeting Tennessee's transportation requirements over the next 25 years is a major challenge. The infrastructure demands associated with building and maintaining the state's aviation, bicycle and pedestrian, rail, water, highway, and public transportation systems will be driven by Tennessee's distribution-focused industry, projected population growth that exceeds the national average, and by the aging of the existing infrastructure already in use.

Traditional funding, combined with new, innovative financing mechanisms and revenue sources, complemented by responsive planning will be needed to meet the transportation expectations of Tennessee's growing population and business community. Assuring that Tennessee will have sufficient funds when it is time to make strategic investments in the state's multimodal transportation system is a critical step in making this Long-Range Transportation Plan (LRTP) a reality in coming years.

To that end, this executive summary reports on financing options for the LRTP by:

- Reviewing existing funding sources that support Tennessee's program.
- Describing revenue sources used to support transportation in neighboring states by which to benchmark policy options considered by state policymakers.
- Describing the development of revenue projections for the Tennessee Department of Transportation's (TDOT) existing sources.
- Comparing the sources and uses of funds to identify whether and to what degree a funding gap exists.
- Outlining financing options that could be used to address the funding gap.

This executive summary highlights the key findings described in the report.

ES.1 Existing Funding Sources

TDOT's FY 2004-05 budget is just over $1.6 billion. As shown on Table ES-1, highway user fees and federal funds account for the bulk of TDOT revenues. Although individual shares will vary slightly from year to year, the relative magnitudes of these revenue sources are stable.

User fees are comprised of the state's gasoline and motor fuel taxes, special petroleum taxes, vehicle registration fees, and beer and bottle fees. Collections from these sources are split among the Highway Fund, the Sinking Fund, the General Fund, and Tennessee's cities and counties. About 66 percent (Highway Fund plus Sinking Fund) of all user fee revenues are distributed to TDOT.

Fuel-related revenues (gasoline, motor fuel, and special petroleum taxes) represent 69 percent of the revenues supporting the Highway Fund. Table ES-2 is a breakdown of the Highway Fund user fee components.

Table ES-1. Total TDOT Budget for FY 2004-05 by Major Source of Revenue

	Amount ($M)	Share of Total (%)	Share of Subtotal (%)
Highway User Taxes	650,400	40.2	38.7
Miscellaneous Revenues	28,600	1.8	1.7
Fund Balance and Reserves	12,000	0.7	0.7
Bond Authorization	159,000	9.8	9.4
Transportation Equity Fund	21,600	1.3	1.2
Federal	777,173	48.0	46.2
Local	36,872	2.3	2.1
Subtotal	1,685,645	104.1	100.0
Transfer to General Fund	(65,800)	-4.1	
Total	1,619,845	100.0	

Source: TDOT Budget Documents

Table ES-2. Composition of User Fees Supporting the Highway Fund

	Amount ($M)	Share of Total (%)
Gasoline Tax (20 cpg)	297,900	45.8
Motor Fuel Tax (17 cpg)	120,300	18.5
Special Petroleum Tax	33,000	5.1
Motor Vehicle Registration Fee	193,900	29.8
Beer and Bottle Tax	5,300	0.8
Total	650,400	100.0

Source: TDOT Finance Division

Each fee is described below.

Gasoline Tax. The Tennessee gasoline tax is 20 cents per gallon (cpg) excluding federal taxes. The state levies an additional 1.4 cpg in taxes. The aggregate 21.4 cpg collected is actually three separate taxes: a 20 cpg tax on gasoline, a 1 cpg special petroleum tax, and a 0.4 cpg environmental fee used to regulate underground storage tanks. In aggregate, in FY 2004-05 each penny generates $30.88 million per year.

TDOT does not receive the full amount collected from taxes on gasoline purchases. For example, the 0.4 cpg environmental fee is distributed to the General Fund and does not support TDOT's program in any way. The gasoline tax and special petroleum tax receipts are distributed among the General Fund, the Highway Fund, the Sinking Fund, and cities and counties.

The gasoline tax was last raised in 1989, increasing the base rate from 16 cpg to the current 20 cpg.

Motor Fuel Tax. The Tennessee motor fuel tax is 17 cpg, excluding federal taxes. (The rate for special fuels is lower; liquefied gas is 14 cpg; compressed natural gas is 13 cpg.) The state levies an additional 1.4 cpg tax on motor fuels. Thus, the rate is composed of three parts: the base rate of 17 cpg for diesel, a 1 cpg special petroleum tax, and a 0.4 cpg environmental fee. In aggregate, in FY 2004-05 each penny generates $9.8 million per year.

TDOT does not receive the full amount collected from the motor fuel tax. The 0.4 cpg environmental fee is distributed to the General Fund and does not support TDOT's program in any way. The 17 cpg motor fuel tax and 1 cpg special petroleum tax are split among the General Fund, the Highway Fund, the Sinking Fund, and cities and counties.

The motor fuel tax was last raised in 1990, increasing the base rate from 16 cpg to the current 17 cpg.

Special Petroleum Tax and Environmental Fee. As noted above, both gasoline and motor fuels are subject to a 1.4 cpg special petroleum tax (1 cpg plus the 0.4 cpg environmental fee). Of the $63.7 million in revenues raised by this tax (which is levied on all petroleum products), the Highway Fund is projected to receive $33.0 million in FY 2004-05. The 0.4 cpg tax is distributed to the General Fund and is used to regulate underground storage tanks.

Vehicle Registration Fees. Registration fees vary by vehicle. Registration fees across all classes of vehicles and license plate types are expected to generate $247.7 million in revenue for Tennessee in FY 2004-05, of which the Highway Fund will receive $193.9 million, or 78.3 percent.

Beer and Bottle Taxes. Tennessee imposes a 1.9 percent gross receipts tax on soft drink bottlers. Of these revenues, 21 percent goes to the Highway Fund and is earmarked for litter control. The state also imposes a $4.29 per barrel (31 gallons) privilege tax on beer manufactured or sold in the state. Of this revenue, 12.8 percent goes to the Highway Fund for litter control. In total, dedicated beer and bottle taxes generated $5.3 million in FY 2004-05 for litter control.

As outlined in Table ES-1, the balance of TDOT's budget comes from a sales tax on fuel sales to aviation, rail, and waterway travelers in the state as part of the Transportation Equity Fund, from TDOT's use of unissued bond authorizations as a cash flow management tool developed to accelerate projects, federal and local sources, fund balances and reserves, and miscellaneous revenues. Of these remaining sources, federal funds are the largest single source, accounting for nearly half of TDOT's budget.

ES.2 Benchmarking Tennessee to Its Neighbors

Tennessee's eight neighboring states are Alabama, Arkansas, Georgia, Kentucky, Mississippi, Missouri, North Carolina, and Virginia. The primary sources of state transportation revenue for Tennessee and many of its neighboring states are fuel taxes and registration and license fees. The rates and fees for those two revenue sources for Tennessee and each of its neighboring states are compared below.

In all states in the study area, a tax is levied on both gasoline and special fuel, which typically includes diesel fuel and liquefied petroleum gas. Gasoline tax rates vary by state; however, Tennessee's rate of 21.4 cpg is relatively high. In fact, Arkansas and North Carolina are the only neighboring states with higher gasoline tax rates. Georgia's base rate of 7.5 cpg was significantly lower than Tennessee's rate, although that rate does not include Georgia's "second motor fuel tax," which levies a 3 percent tax on the sale of all motor fuel[1]. The second motor fuel tax rate, reported to be equal to 3.8 cpg in 2004, has been added to Georgia's tax rate for comparison. Gasoline tax rates for Tennessee and its neighboring states are shown on Figure ES-1.

Tennessee's special fuel tax rate of 18.4 cpg is more closely aligned with rates found in neighboring states. North Carolina and Arkansas levy significantly higher special fuel tax rates, while Georgia levies a significantly lower rate. Special fuel tax rates for Tennessee and its neighboring states are shown on Figure ES-2. Georgia's second motor fuel tax, reported to be 3.6 cpg for special fuel, has been added to the base rate for comparison.

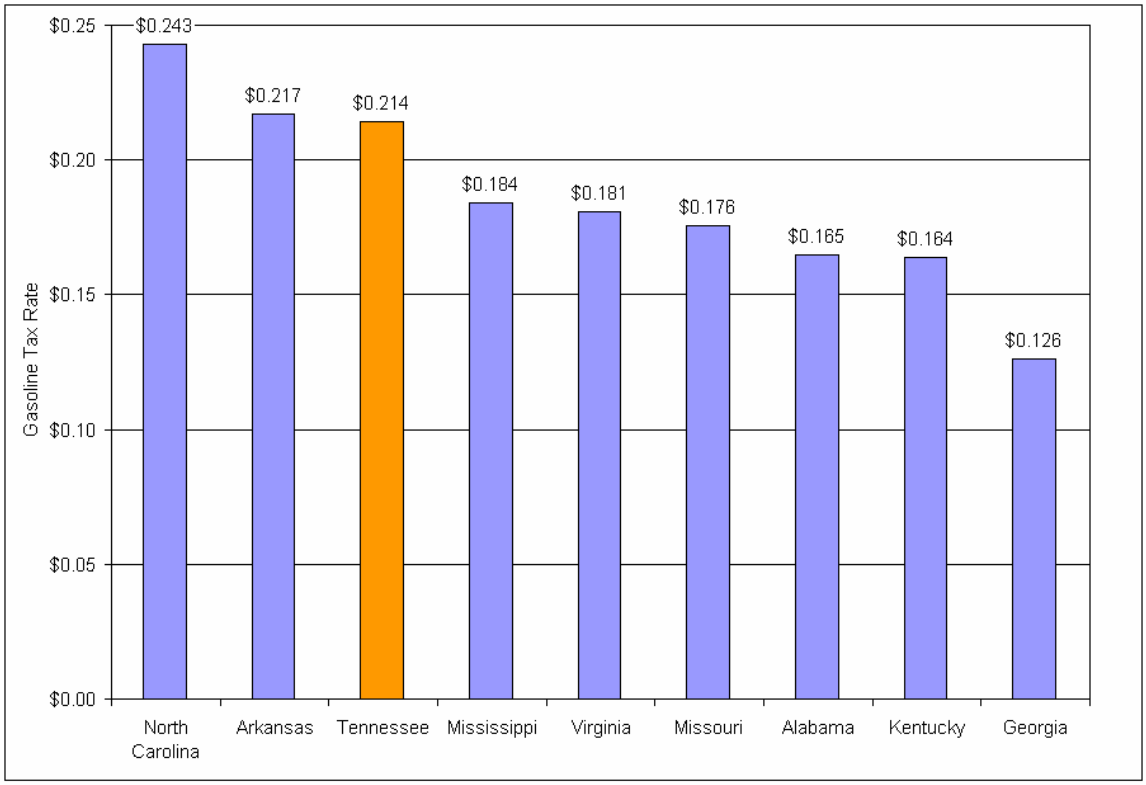
Georgia, Kentucky, and North Carolina each include a variable component in their fuel tax rates. Georgia's second motor fuel tax rate, discussed above, adds a 3 percent sales tax to fuel purchases, thereby fluctuating with fuel prices. In Kentucky, the gasoline tax rate is 9 percent of wholesale price, not to fall below 10 cpg, plus an additional fixed rate of 6.4 cpg. In North Carolina, the base fuel tax rate is 17.5 cpg, with an additional component that is tied to the inflation rate. In 2004, that component was estimated to be 6.8 cpg. In each case, the variable rate is adjusted semiannually. States with variable components are less likely to have losses in real fuel tax revenue due to inflation.

Vehicle registration and license fees are other sources of transportation funding in all states in the study area, with the exception of Georgia[2]. The types of fees and taxes levied vary across states. Tennessee and each of its neighboring states levy a title fee and registration fee. Also, some states levy a fixed tax, such as Mississippi's privilege tax. Some Tennessee counties also levy a wheel tax. In other states, a highway use, or motor vehicle use, tax is levied. The costs for these taxes and fees have been estimated for the purchase of a $20,000 automobile in each state in the study area; these costs are shown Figure ES-3.

[1] Effective in FY 2004, Georgia no longer levies a second motor fuel tax. That tax has been replaced by the Prepaid State Tax on Motor Fuels. The Prepaid State Tax on Motor Fuels did not change the tax rate but instead changed its method of collection.

[2] Georgia levies comparable registration and license fees; however, those funds are allocated to Georgia's General Fund.

Figure ES-1. Gasoline Tax Rates in Tennessee and Neighboring States, 2004[3]



Source: State Departments of Revenue or Taxation

The total cost of registration, title, and all other fees varied significantly between Tennessee and its neighbors. The cost in Tennessee was estimated to be $44 in 2004 and was relatively low among states in the study area.[4] Total registration and license fees in states levying a highway use or motor vehicle use tax were significantly higher, as shown on Figure ES-3.

Sales tax is levied on the purchase of automobiles in Tennessee and other neighboring states; however, the revenue generated by those taxes is not allocated to transportation purposes, and it was therefore not included on Figure ES-3. States levying a sales tax on automobiles were Alabama, Arkansas, Georgia, Mississippi, and Tennessee. For example, in Tennessee, the sales tax rate for an automobile is 7.4 percent[5]. In Georgia, the sales tax for automobiles is 7 percent, which includes a 4 percent state rate and a 3 percent local option. In both Arkansas and

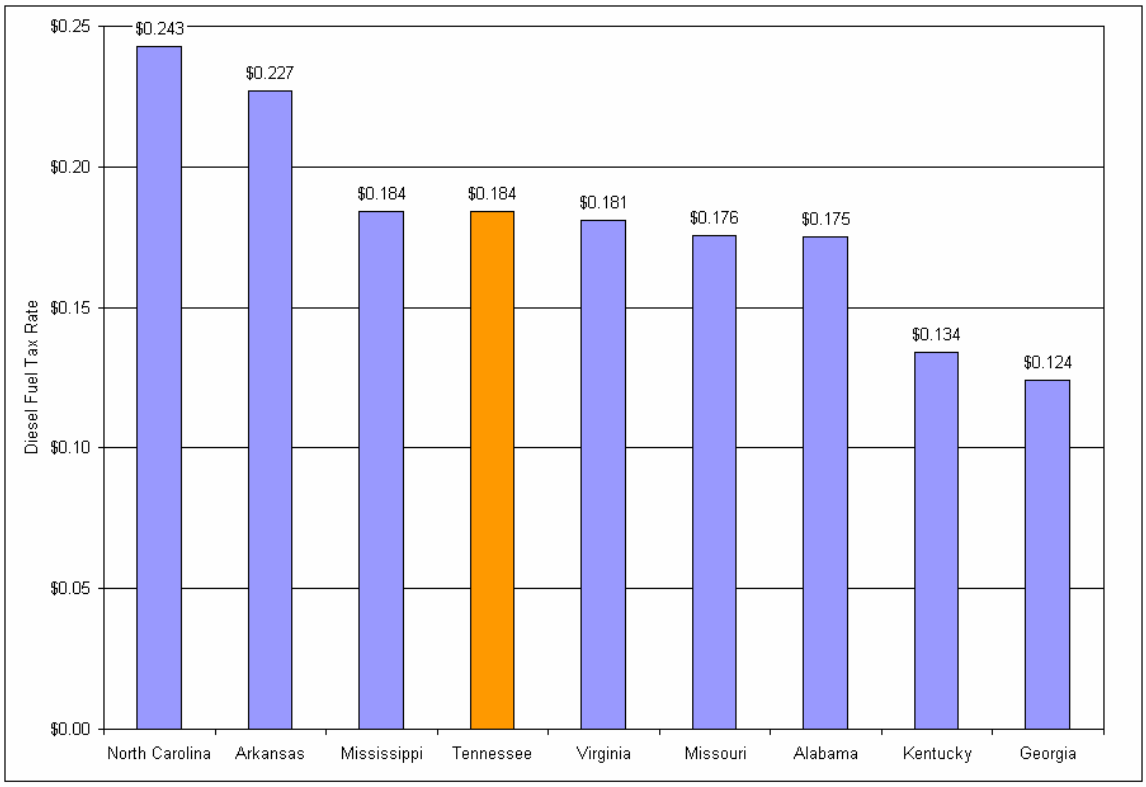
[3] The following notes apply to the gasoline and special fuel tax rates shown on Figures ES-1 and ES-2. The gasoline tax rate reported for Alabama excludes local levies, which varied between 1 cpg and 6 cpg. The gasoline tax rate reported for Mississippi does not include local tax levied in three counties (Seawall Tax). The rate reported for Missouri includes agricultural inspection and load fees (combined levy of $0.0055 per gallon). Rates reported for Georgia, Kentucky, and North Carolina include a variable component effective through June 2004. Reported rates include environmental fees, if levied.

[4] The actual cost of registration, title, and all other fees for a $20,000 vehicle in Tennessee was $51. To fairly compare the costs for states shown on Figure ES-3, all one-time taxes and fees, such as use taxes and title fees, were divided by the estimated ownership period of an automobile, which was 7.5 years, as reported by the *Chicago Tribune* (September 24, 2002).

[5] The actual sales tax rate in Tennessee is 7 percent plus 2.25 percent on the first $1,600 plus 2.75 percent on the value between $1,601 and $3,200.

Kentucky, the sales tax rate is 6 percent; however, Kentucky assesses vehicles at 90 percent of their sale value. In Mississippi, the sales tax rate is 4.7 percent. Inclusion of those taxes in the calculation of total registration fees would have resulted in significantly higher registration fees for those states.

Figure ES-2. Special Fuel Tax Rates in Tennessee and Neighboring States, 2004



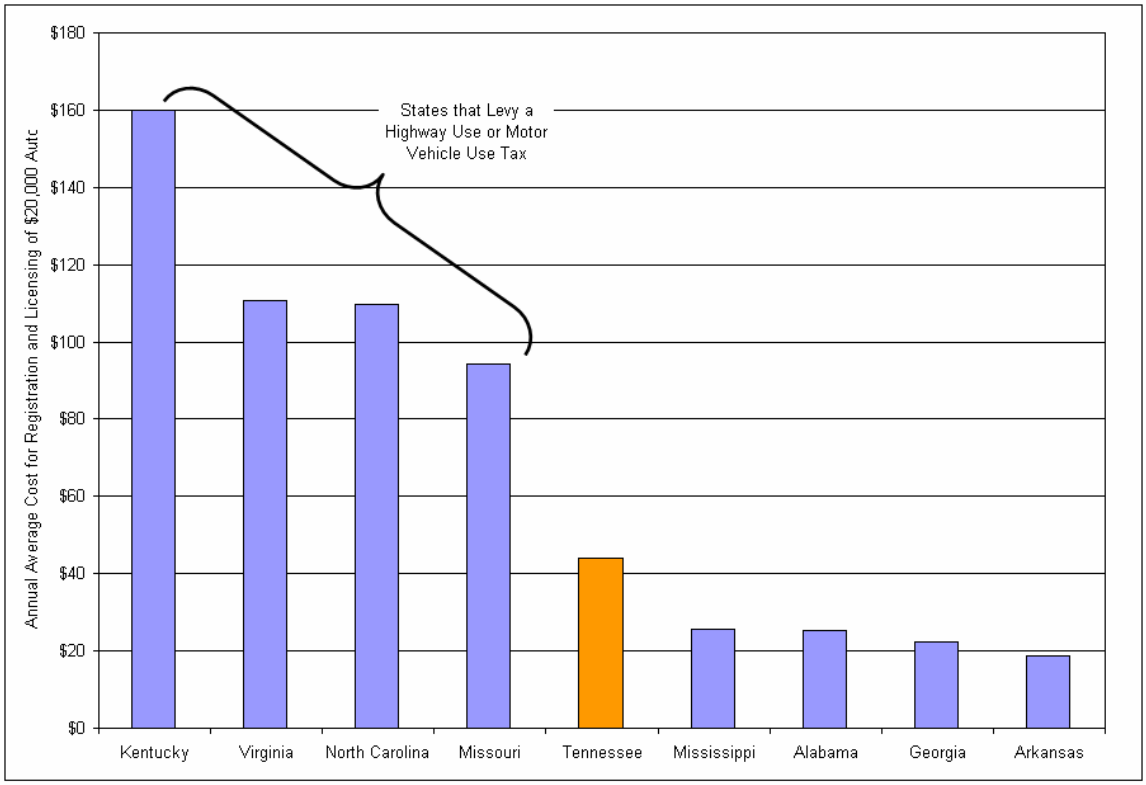
Source: State Departments of Revenue or Taxation

ES.3 Revenue Projections

To assess the potential of current funding sources to meet Tennessee's future transportation infrastructure needs, projections of the future revenues collected from these sources were developed. Growth over time reflects expectations for Tennessee's population growth, as well as anticipated economic growth. For example, motor vehicle registration revenues are tied to expectations for future employment and per capita income growth. The beer and bottle tax revenues are driven by projections for population growth.

The summary of the baseline forecast of state, federal, and local revenues is estimated to be $69.4 billion for the 25-year period of Tennessee's LRTP. These revenues grow from $1.6 billion in 2005 to approximately $3.8 billion in 2030. The 25-year baseline total revenue forecast is summarized on Table ES-4.

Figure ES-3. Estimated Cost of Registration and License Fees for a $20,000 Auto in Tennessee and Neighboring States



Source: State Departments of Revenue, Taxation, or Transportation and AECOM Consult, Inc.

Table ES-4. 25-Year Total Revenue Forecast In Millions of Year of Expenditure Dollars

Revenue Source	2015 ($M)	2030 ($M)	25-year Total ($M)
State	978.71	1,343.36	26,101.33
Federal	1,502.24	2,340.44	41,557.43
Local Match	62.40	97.21	1,726.12
Total	2,543.35	3,781.01	69,384.88

Source: AECOM Consult, Inc.
Note: The state total revenue forecast also includes annual transfers from the Highway Fund to the General Fund between 2006 and 2011 as projected by the TDOT Finance Division.

Given no changes in tax rates and expectations for trends in future economic activity, existing revenues are likely to grow at or below the inflation rate. In other words, the forecast is driven by expected growth in Tennessee's economy, not by changes in policy. The projections answer the question of how TDOT's revenues will grow with an expansion of the underlying tax base, but in the absence of any change to policy.

- Fuel taxes are cpg-based and are not protected from inflation.

- Equity Fund revenues are sales tax-based and therefore capture price effects; however, consumption of rail and water services is expected to be weak, offsetting price gains.
- Federal funding received by TDOT, the so-called "Federal Funds Released," is assumed to grow at 3 percent annually over the long term. Even with this modest growth rate, federal funds account for more than 60 percent of TDOT's total program by 2030. The implication is that a rising share of state/local funds will be required to match federal funds, meaning less for discretionary state spending.

ES.4 Projected Funding Gap

To assess the amount of investment needed to meet the state's future transportation infrastructure demands, three alternative expenditure scenarios were developed.

The **status quo investment scenario** projects the amount of expenditures that would be required to maintain the current level of performance across the transportation system for Tennessee's growing population.

The **balanced investment scenario** maintains the current performance for the state's highways and bridges, improves the maintenance for bicycle/pedestrian, public transportation, and rideshare facilities, and reduces some backlogged needs.

The **optimistic investment scenario** increases maintenance efforts for all modes, significantly reduces backlogged modal needs, and expands transportation options in Tennessee.

The summary of the expenditures associated with the three investment scenarios ranges from $75 to $105 billion in year of expenditure dollars for the 25-year LRTP. All three investment scenarios include total expenditures that are less than the 25-year modal needs but greater than the $69.4 billion baseline forecast of TDOT revenues, resulting in funding shortfalls for all three investment scenarios.

Table ES-5 summarizes the funding gaps for each investment scenario.

Table ES-5. 25-Year Revenue Requirements and Funding Gaps In Billions of Year of Expenditure Dollars

Funding Gaps	Status Quo Scenario ($B)	Balanced Scenario ($B)	Optimistic Scenario ($B)	25-Year Recommended Vision Plan ($B)
Program Cost	75	85	105	85
Revenue Forecast	69	69	69	69
Funding Gap	(6)	(16)	(36)	(16)

Source: PBS&J

Through the LRTP public involvement program and internal TDOT analytical review, a recommended 25-Year Vision Plan for transportation program development has been proposed. The Vision Plan most closely reflects the Balanced Scenario described above, and if implemented, will achieve the following objectives:

- Continue high levels of transportation infrastructure investment.
- Reduce the backlog of highway capacity needs to improve safety and reduce delay.
- Expand TDOT support of both urban and rural transit programs to increase mobility options.
- Increase attention to transportation system management to obtain greater efficiency from existing systems.
- Improve freight systems by investing TDOT funds where clear public benefit is predicted.
- Continue strong support of regional and community airports.

To have a reasonable financial plan, additional measures must be taken to eliminate the funding gap shown on Table ES-5. These measures may include alternative financing approaches such as introducing new revenue sources, increasing existing revenue sources, and debt financing. A portion of the gap will be covered by funding historically provided by TDOT's transportation partners and not accounted for in the TDOT budget; however, these complementary sources generally address only a small share of the funding gaps. Alternative financing approaches and the closure of the funding gap is discussed below.

ES.5 Approaches to Closing the Funding Gap

Fuel taxes and registration fees are the largest contributors supporting the non-federal portion of TDOT's program. Accordingly, strategies to close the anticipated multi-billion dollar funding gap have focused on these revenue sources.

Table ES-6 summarizes the incremental revenue that would be gained from a menu of tax and fee increases. The assumption throughout the analysis is that the tax or fee change takes place in 2008. Revenue estimates are provided for three forecast periods: (1) the next 10 years (2006 to 2015) corresponding to the Strategic Investment Program (SIP) planning period, (2) the next 15 years (2016 through 2030), and (3) the full 25-year period (2006 to 2030).

In changing the current structure of taxes and fees, policymakers are not restricted to just one source. In other words, the entire increase needed to generate sufficient revenue to close the funding gap does not have to be loaded onto a single source, as doing so could lead to an onerous increase. Rather, policymakers may find it more equitable and politically palatable to distribute tax or fee increases across several sources. Moreover, the increase need not be uniform across sources; a 4 cent gas tax increase can be combined with a 2 cent motor fuels tax increase, for example. Additionally, taxes and fees can be increased in any increment preferred by policymakers.

Given the variety of tax and fee increments, as well as the numerous combinations that policymakers may select, Table ES-6 presents the revenue yield for a variety of policy options in easily scaleable units: 1 cent fuel tax increase, indexing fuel taxes for inflation (assumed at 3 percent per year), 1 cent fuel tax increase combined with indexing (assumed at 3 percent per year), and a 10 percent increase in registration fees.

Even this simple approach to a fuel tax and registration fee increase leads to numerous policy options:

1. Increase the gasoline or motor fuel tax by 1 cent and divide the revenue among TDOT and other recipients of the tax revenue in the same proportion; that is, keep the current split among recipients.
2. Increase the gasoline or motor fuel tax by 1 cent and dedicate the entire penny to TDOT.
3. Increase the gasoline or motor fuel tax by 1 cent (keep the current split among recipients) and index the additional penny at a 3 percent increase per year.
4. Increase the gasoline or motor fuel tax by 1 cent (dedicate the entire proceeds of the penny to TDOT) and index the penny at a 3 percent increase per year.
5. Index the entire gasoline or motor fuel tax at a 3 percent increase per year and direct all proceeds from indexing to TDOT.
6. Index only the portion of the gasoline or motor fuel tax currently directed to the Highway Fund at a 3 percent increase per year.

The revenue gain to TDOT from each policy option is shown for gasoline in the first section of Table ES-6, for motor fuels in the second section of the table, and for both (combined for ease of reference) in the third section. The final section of the table shows the revenue yield for a 10 percent increase in registration fees.

Some key findings highlighted in Table ES-6 are described below.

- The key policy decisions required in determining the increase required to close the funding gap are whether policymakers choose to index all or part of the fuel tax, and whether the additional increment of revenue received is dedicated 100 percent to TDOT or split among other parties (i.e., cities and counties).
- Over a 25-year period, a 1 cent increase in gasoline tax yields just over $435 million, and a 1 cent increase in the motor fuels tax yields about $260 million to TDOT if the revenues are divided among recipients in the same manner as current revenues. Assuming the rate increase was applied equally to both the gasoline and motor fuels tax, a 22.94 cent increase in *each* tax would be required to yield the $16 billion needed to close the funding gap for the balanced investment scenario and 25-Year Vision Plan. This would more than double the existing tax rate and would place Tennessee well above its neighboring states in terms of fuel tax burden.
- By contrast, if the proceeds of the 1 cent increase are not shared with other parties and are dedicated 100 percent to TDOT, only a 12.6 cent increase in *both* the gasoline and motor fuels tax would be required to close the $16 billion funding gap and achieve the goals of the Vision Plan. Tennessee's gasoline tax is currently higher than six of its eight neighboring states. A 12.6 cent increase would place it almost 10 cents higher than North Carolina, which currently has the highest rates among the neighboring states, and over 21 cents higher than Georgia, which currently has the lowest rates. Additionally, gasoline taxes in Tennessee are below the national average; a 12.6 cent increase would place Tennessee near the highest of all states.

Table ES-6. Summary of Incremental Revenue Gain for Alternative Funding Options In Millions of Year of Expenditure Dollars

	10 Years (SIP) 2006-2015 ($)	15 Years 2016-2030 ($)	25 Years (LRTP) 2006-2030 ($)
Gasoline Tax			
1 cent gas tax increase, with current split	130.50	304.82	435.32
1 cent gas tax increase, 100 percent to TDOT	270.75	632.40	903.16
1 cent gas tax increase indexed, with current split	145.49	483.76	629.25
1 cent gas tax increase indexed, 100 percent to TDOT	301.84	1,003.66	1,305.49
Gas tax indexed at 3 percent, 100 percent to TDOT	802.76	8,027.21	8,829.97
Gas tax directed to Highway Fund indexed at 3 percent, 100 percent to TDOT	386.93	3,869.12	4,256.05
Motor Fuel Tax			
1 cent motor fuel tax increase, with current split	70.43	191.72	262.16
1 cent motor fuel tax increase, 100 percent to TDOT	97.96	266.65	364.61
1 cent motor fuel tax increase indexed, with current split	78.69	306.30	384.99
1 cent motor fuel tax increase indexed, 100 percent to TDOT	109.44	426.01	535.45
Motor fuel tax indexed at 3 percent, 100 percent to TDOT	251.05	2,926.28	3,177.33
Motor fuel tax directed to Highway Fund indexed at 3 percent, 100 percent to TDOT	180.50	2,104.00	2,284.50
Gasoline and Motor Fuel Tax			
1 cent gas and motor fuel tax increase, with current split	200.94	496.54	697.48
1 cent gas and motor fuel tax increase, 100 percent to TDOT	368.71	899.06	1,267.77
1 cent gas and motor fuel tax increase indexed, with current split	224.17	790.06	1,014.24
1 cent gas and motor fuel tax increase indexed, 100 percent to TDOT	411.28	1,429.66	1,840.94
Gas and motor fuel tax indexed at 3 percent, 100 percent to TDOT	1,053.81	10,953.50	12,007.31
Gas and motor fuel tax directed to Highway Fund indexed at 3 percent, 100 percent to TDOT	567.43	5,973.12	6,540.55
Registration Fees			
10 percent increase in registration fees, 100 percent to TDOT	182.34	474.62	$656.96

Source: AECOM Consult, Inc.

- Nearly every state is facing the same transportation funding challenges as Tennessee. Over the next few years, many states will likely consider the types of transportation revenue increases described here. The result may somewhat mitigate the impact on Tennessee's position relative to its neighbors.

- An additional option that would require a lower tax rate increase to close the funding gap would be to combine indexing with a tax rate increase. Because the incremental rise in the tax rate would be indexed over time, a smaller initial rise in the tax rate would be required. This would permit funding of the $16 billion Vision Plan with a smaller increase in the tax rate.
- If the fuel tax was simultaneously increased and indexed, a 1 cent increase in the gasoline tax yields about $630 million if the current sharing arrangement with other recipients is maintained. A similar 1 cent increase in the motor fuels tax generates $385 million. Assuming the rate increase was applied equally to both the gasoline and motor fuels tax, a 15.8 cent increase in *each* tax would be required to close the $16 billion funding gap. This again places Tennessee well above its neighboring states. It does have the advantage, however, of allowing the proceeds to be shared among other funding recipients, specifically Tennessee's cities and counties.
- By contrast, if the proceeds of the one-cent indexed tax increase are not shared with other recipients and are dedicated 100 percent to TDOT, only a 8.7 cent increase in *both* the gasoline and motor fuels tax would be required to close the $16 billion funding gap and achieve the Vision Plan.
- An alternative strategy would be to index the current tax rate to inflation (assumed at 3 percent per year). If both the gasoline and motor fuels tax were indexed to inflation, it would raise between $6.5 billion and $12 billion over the 25-year period, depending on whether the revenue gain was dedicated to TDOT or shared with other parties.
- Indexing the entire current tax rate on gasoline and motor fuels to inflation (assumed at 3 percent per year) *and* adding a 2.2 cent tax on gasoline and motor fuel that is also indexed and 100 percent dedicated to TDOT would close the $16 billion funding gap.
- Registration fees are another possible option. Each 10 percent increase in registration fees raises revenues by just over $655 million over the 25-year period of the LRTP.

ES.6 Leveraging TDOT Revenues with Alternative Financing

An additional consideration is the timing with which new revenues are received. Distributing the $16 billion funding shortfall over the 25-year planning period, the first 10 years between 2006 and 2015 (corresponding to the SIP) will require $4.7 billion in new revenues, and the remaining 15 years will require another $11.3 billion.

- 2006 to 2015 (SIP) $4.7 billion
- 2016 to 2030 $11.3 billion
- 2006 to 2030 (LRTP) $16.0 billion

A comparison of Table ES-6 with the values shown above highlights that even though a policy option generates sufficient revenue to close the funding gap by the end of the 25-year forecast period, the revenue may not be received quickly enough to cover expenses in the early years included in the SIP.

For example, as noted above, indexing the entire current tax rate on gasoline and motor fuels to inflation (assumed at 3 percent per year) *and* adding a 2.2 cent tax on gasoline and motor fuel that is also indexed and 100 percent dedicated to TDOT would close the $16 billion funding gap. This is tempered by the observation that only $2 billion of that total will be received in the first 10 years of the period, not nearly enough to cover the expected $4.7 billion shortfall expected during that period. Because the timing of needed expenditures may not align with the receipt of expected revenues, TDOT's policymakers may choose to consider innovative financing or debt financing in addition to a tax or fee increase in order to accelerate the availability of funds to meet modal needs.

The positive aspect of this approach is that it allows program initiatives and projects to be advanced, which generates transportation and economic benefits for Tennessee residents in the near term. This financing alternative does, however, have a downside. Accelerating future revenues for near-term funding means that the revenue generated in out-years would not be available to TDOT, because by bonding, that future revenue would be required for debt service.

ES.7 Risks

A financial plan and financing alternatives that are predicated on achieving results in the future have a number of risks. Risk considerations frequently have both positive and negative elements. The major risk elements that have an influence on a financial plan are described below.

- Gasoline tax, fuel tax, and registration fee revenues are related to employment, population, and income growth. Historical data indicate that Tennessee has performed above the national average across these demographic/economic measures. The future direction of measures will largely determine whether the positive or negative risk results in increases or decreases in revenues.
- Federal participation levels were assumed to increase to 60 percent of the TDOT program. At the current level of tax effort at the federal level, this will be difficult to achieve over the long term. Conversely, the federal government may choose to add tax capacity to the transportation program or create demonstration programs using non-transportation-related funds.
- Recently, SUVs and light-duty trucks have been added to the vehicle fleet. These vehicle types have below-average fuel economy, thus increasing gasoline tax revenues. Currently, hybrid vehicles are attaining a market presence, and automobile manufacturers are developing models across categories (including SUVs) that will lead to fuel displacement and decreases in gasoline tax revenues.
- Inflation risk has potential negative effects. The modal needs element of a financial plan, which is the expenditure or uses of funds component, is assumed to increase at an annual inflation rate of 3 percent. This rate of inflation is assumed to extend to 2030. Should inflation exceed this rate, funding shortfalls would worsen because revenue sources are not responsive to inflation (e.g., the gasoline tax is based on gallons, not price).

ES.8 Conclusion

Meeting Tennessee's transportation requirements over the next 25 years is a major challenge that will require thoughtful planning and innovative approaches to funding. The information in this *Financial Plan* provides a framework to critically assess the policy options available to TDOT. Funding the state's future transportation needs is essential to competing in the intensely competitive global economy and sustaining the state's economic prosperity. Assuring that Tennessee will have sufficient funds when it is time to make strategic investments in the state's multimodal transportation system is a critical step in making the vision outlined in the Long-Range Transportation Plan (LRTP) a reality.

Contents

Figures

Tables

Tables (continued)

Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
cpg	Cents per gallon
DOT	Department of Transportation
FHWA	Federal Highway Administration
FY	Fiscal year
GARVEE	Grant Anticipation Revenue Vehicle
ISTEA	Intermodal Surface Transportation Efficiency Act
MOE	Maintenance of effort
S&P	Standard & Poor's
SH	State Highway
SIB	State Infrastructure Bank
SR	State Route
SUV	Sport utility vehicle
TDOR	Tennessee Department of Revenue
TDOT	Tennessee Department of Transportation
TE-045	Innovative Finance Program Test and Evaluation Project
TEA-21	Transportation Equity Act for the 21st Century
TEF	Transportation Equity Fund
TIFIA	Transportation Infrastructure Finance and Innovation Act
WMATA	Washington [D.C.] Metro Area Transit Authority
YOC	Year of collection

Chapter 1

Introduction

1.1 Purpose of Report

This *Financial Plan* identifies and forecasts public funding sources available to the Tennessee Department of Transportation (TDOT). The plan integrates capital and operating and maintenance costs from the modal needs task to develop financially feasible solutions. A key element in the *Financial Plan* is the development of alternative funding sources and financing tools to increase the financial capacity of TDOT. This information is then input to the Strategic Investments Program (SIP), which provides a basis for comparison among investment and service alternatives regarding financial performance and the needs and goals identified by each modal team.

1.2 Organization and Content

This financial plan includes chapters that discuss the topics described below.

- Chapter 2, Profile of TDOT's Financial Structure, describes the current revenue sources available to TDOT and expenditures by mode.
- Chapter 3, Benchmark Analysis, compares Tennessee to its eight neighboring states with regard to taxes and fees, burden on residents, and gross expenditures.
- Chapter 4, Funding Strategies and Financing Mechanisms, discusses innovative financing techniques that depart from traditional pay-as-you-go financing and funding sources intended to supplement fuel taxes and registration fees.
- Chapter 5, Financial Forecast, presents the baseline forecast of TDOT revenue to 2030 and intermediate time points (2015).
- Chapter 6, Financial Analysis Model, describes the sources and uses of funds to 2015 and 2030.
- Chapter 7, Financial Plan Preparation, offers alternative financing approaches.

Chapter 2

Profile of TDOT Financial Structure

This chapter describes TDOT's major revenue sources and uses. It describes what the major revenue sources are, how they are collected and distributed, and their relative share in TDOT's overall FY 2004-05 budget. Major uses are also described in terms of TDOT's budget, including the relative burden of federal, state, and local support.

The TDOT program is run on a pay-as-you-go basis; thus, the program does not have surpluses or deficits that many other programs have. Most of the program is funded through highway user taxes. A portion of TDOT's budget is funded through bond authorizations rather than the selling of bonds. This program is described below.

2.1 Inventory of Current Revenue Sources

TDOT's FY 2004-05 budget is just over $1.6 billion. As shown on Table 2-1, highway user fees and federal funds account for the bulk of TDOT revenues. Transportation Equity Fund (TEF) revenues, those dedicated to aviation, rail, and waterways, account for 1.3 percent of the total budget. The $65.8 million transfer of TDOT revenues to the state's General Fund reflects the state's continued fiscal distress. Although not regular budget items, four such transfers have occurred in recent years as the state works to balance its budget: $30 million in FY 2001-02, $30 million in FY 2002-03, $65.8 million in FY 2003-04, and this fiscal year's transfer of $65.8 million. Although individual shares will vary slightly from year to year, the relative magnitudes are stable.

Table 2-1. Total TDOT Budget for FY 2004-05 by Major Source of Revenue

	Amount ($M)	Share of Total (%)	Share of Subtotal (%)
Highway User Taxes	650,400	40.2	38.7
Miscellaneous Revenues	28,600	1.8	1.7
Fund Balance and Reserves	12,000	0.7	0.7
Bond Authorization	159,000	9.8	9.4
TEF	21,600	1.3	1.2
Federal	777,173	48.0	46.2
Local	36,872	2.3	2.1
Subtotal	1,685,645	104.1	100.0
Transfer to General Fund	(65,800)	-4.1	
Total	1,619,845	100.0	

Source: TDOT Budget Documents

Each major revenue source is described below. The sections generally describe the revenue source, how it works, whether it is dedicated to a particular mode, and implications (if any) of using the source to support the current program.

2.1.1 Highway User Fees

User fees are comprised of the state's gasoline and motor fuel taxes, special petroleum taxes, vehicle registration fees, and beer and bottle fees. Collections from these sources total $1,101.7 million in FY 2004-05 and are split among the Highway Fund, the Sinking Fund, the General Fund, and Tennessee's cities and counties. About 66 percent (Highway Fund plus Sinking Fund) of all user fee revenues are distributed to TDOT. Table 2-2 summarizes the revenues and how they are distributed.

Table 2-2. Estimated Distribution of Highway User Taxes, FY 2004-05 In Millions of Dollars

	Gasoline 20 cents				Motor Fuels 17 cents						
	3 cent	6 cent	11 cent	Total	5 cent	12 cent	Total	Special Petroleum	Motor Vehicle Registrations	Beer and Bottle	Total
General Fund	$0.9	$5.8	$3.6	$10.3	$1.0	$2.2	$3.2	$18.7	$53.8		$86.0
Highway Fund		$105.5	$192.4	$297.9	$48.2	$72.1	$120.3	$33.0	$193.9	$5.3	$650.4
Sinking Fund		$74.0		$74.0			$0.0				$74.0
Cities	$30.6		$48.0	$78.6		$14.6	$14.6	$7.4			$100.6
Counties	$61.1		$95.7	$156.8		$29.3	$29.3	$4.6			$190.7
Total	$92.6	$185.3	$339.7	$617.6	$49.2	$118.2	$167.4	$63.7	$247.7	$5.3	$1,101.7

Source: TDOT Finance Division

Fuel-related revenues (gasoline, motor fuel, and special petroleum taxes) represent 69 percent of the revenues supporting the Highway Fund. Table 2-3 shows a breakdown of the components.

Table 2-3. Composition of User Fees Supporting the Highway Fund

	Amount ($M)	Share of Total (%)
Gasoline Tax (20 cpg)	297,900	45.8
Motor Fuel Tax (17 cpg)	120,300	18.5
Special Petroleum Tax	33,000	5.1
Motor Vehicle Registration Fee	193,900	29.8
Beer and Bottle Tax	5,300	0.8
Total	650,400	100.0

Source: TDOT Finance Division

Each fee is described below.

Gasoline Tax. The Tennessee gasoline tax is 20 cents per gallon (cpg) excluding federal taxes. The state levies an additional 1.4 cpg in taxes. The aggregate 21.4 cpg collected is actually three separate taxes: a 20 cpg tax on gasoline, a 1 cpg special petroleum tax, and a 0.4 cpg environmental fee used to regulate underground storage tanks. In aggregate, in FY 2004-05 each penny is worth $30.88 million per year.

As shown on Table 2-2, however, TDOT does not receive the full amount collected from taxes on gasoline purchases. For example, the 0.4 cpg environmental fee is distributed to the General Fund and does not support TDOT's program in any way. The gasoline tax and special petroleum tax receipts are distributed among the General Fund, the Highway Fund, the Sinking Fund, and cities and counties.

The gasoline tax was last raised in 1989, increasing the base rate from 16 cpg to the current 20 cpg.

Motor Fuel Tax. The Tennessee motor fuel tax is 17 cpg, excluding federal taxes. (The rate for special fuels is lower; liquefied gas is 14 cpg; compressed natural gas is 13 cpg.) The state levies an additional 1.4 cpg tax on motor fuels. Thus, the rate is composed of three parts: the base rate of 17 cpg for diesel, a 1 cpg special petroleum tax, and a 0.4 cpg environmental fee. In aggregate, in FY 2004-05 each penny is worth $9.8 million per year.

As shown on Table 2-2, however, TDOT does not receive the full amount collected from the motor fuel tax. The 0.4 cpg environmental fee is distributed to the General Fund and does not support TDOT's program in any way. The 17 cpg motor fuel tax and 1 cpg special petroleum tax are split among the General Fund, the Highway Fund, the Sinking Fund, and cities and counties.

The motor fuel tax was last raised in 1990, increasing the base rate from 16 cpg to the current 17 cpg.

Special Petroleum Tax. As noted above, both gasoline and motor fuels are subject to a 1.4 cpg special petroleum tax (1 cpg plus the 0.4 cpg environmental fee). Of the $63.7 million in revenues raised by this tax (which is levied on all petroleum products), the Highway Fund is projected to receive $33.0 million in FY 2004-05. The 0.4 cpg tax is distributed to the General Fund and is used to regulate underground storage tanks.

Vehicle Registration Fees. Registration fees vary by vehicle. Registration fees across all classes of vehicles and license plate types are expected to generate $247.7 million in revenue for Tennessee in FY 2004-05, of which the Highway Fund will receive $193.9 million, or 78.3 percent.

Beer and Bottle Taxes. Tennessee imposes a 1.9 percent gross receipts tax on soft drink bottlers. Of these revenues, 21 percent goes to the highway fund and is earmarked for litter control. The state also imposes a $4.29 per barrel (31 gallons) privilege tax on beer manufactured or sold in the state. Of this revenue, 12.8 percent goes to the Highway Fund for litter control. In total, dedicated beer and bottle taxes generated $5.3 million in FY 2004-05 for litter control.

2.1.2 Miscellaneous Revenues

Miscellaneous revenues are a diverse grouping of sources comprising railroad inspection fees (dedicated to TDOT's Rail Inspection Program), outdoor advertising fees, permit and logo fees, rents, sales from maps and property, and toll service charges, among other miscellaneous revenues. In total, these sources combine to yield $28.6 million in the FY 2004-05 budget.

2.1.3 Transportation Equity Fund

Established in 1987, the TEF generates revenue for projects in Tennessee's aviation, rail, and waterway transportation modes. TEF revenues are derived from a sales tax on petroleum products used in these modes of transportation. Distributors file reports with the Tennessee Department of Revenue (TDOR) listing how many gallons of fuel were sold and at what price. The TDOR then calculates the amount of sales tax on the level of sales and transfers that revenue amount to the TEF.

Aviation and jet fuel is taxed at a rate of 4.5 percent. Fuel sold for locomotives or use on barges is taxed at a rate of 5.5 percent. In FY 2004-05, $21.6 million is anticipated in sales tax revenues for the TEF.

The budget for the aviation, rail, and waterway programs is based on the actual annual individual collection percentage for each mode. This collection percentage is applied to the total estimated budget for the TEF in order to determine the amount available for projects in each of the three programs. Aviation accounts for the largest share, followed by rail and waterways.

The TDOT Aeronautics Division receives just over 75 percent of the TEF disbursements. These funds are used to support the state's 6 commercial service airports and 69 general aviation airports.

All rail funds were spent on the state's 19 shortline railroads. These rail lines serve 33 counties and account for 828 miles of track. In addition to funds received from the TEF, the TDOT Rail Program receives a $3.5 million annual transfer from user fees collected in the state. These funds are used primarily to support the state's shortline railroads.

Waterway funds are used to pay Tennessee's dues to the Tennessee-Tombigbee Waterway Development Authority.

2.1.4 Bond Authorizations

TDOT's use of unissued bond authorizations is a cash flow management tool developed by the state to accelerate projects in anticipation of expected revenues over a project's horizon. The benefit of this financing method is that projects can begin earlier than if they were held until sufficient funds had accrued to cover their cost. Thus, Tennessee residents have a better transportation system sooner than they would otherwise, and at lower cost. The use of authorized and unissued bonds *does not generate revenue itself*; it is a cash management tool.

Background. This financing method was first used in 1986 when the Tennessee State Legislature passed a $3.3 billion road program to construct 288 projects across the state. Additional projects have been added to the program in subsequent years, and the estimated total cost of the program is now $6.6 billion. Using TDOT's cash balance (in excess of $300 million in 1987) and this cash flow financing technique, TDOT has been able to finance the road program for the past 18 years without selling bonds.

How it Works. The legislature allows TDOT to authorize bonds to fund the transportation program. The bonds are authorized but remain unissued. The authorization allows TDOT to obligate projects and get them started. Project costs are then paid throughout the year using TDOT's current cash flow.

TDOT manages the project costs and has developed a model to project the cumulative cash requirement of multiple projects at different stages of construction and maintenance. For example, TDOT has determined that the payout for construction projects on a 4-year basis is 15 percent in year one, 39 percent in year two, 29 percent in year three, and 17 percent in year four. The model projects TDOT's cash balance and indicates when additional bonds can be authorized or—if expected revenue failed to meet targets—whether the bonds must be sold to cover expenses.

Because project obligations are based on bond authority, TDOT is required to pay debt service to the state as if the bonds had been sold. At the end of each year, the state cancels a portion of the bond authority, in effect retiring that authorization, and issues a new bond authorization.

Thus, the bond authority is a sliding window of bond obligations of varying vintage. In sum, these obligations total approximately $726 million, which is about what TDOT can cover on a pay-as-you-go basis with the current tax base without actually selling the bonds. If TDOT were to cease operations, its cash balance could cover all expenses, with the exception of the $726 million rolling window of obligated expenses.

Implications for the Current Program. By using unissued bond authorizations, as described above, TDOT has the following constraints in its ability to expand the program:

- The requirement for debt service payments limits TDOT's cash flow.
- Because TDOT is managing so much bond authorization, expanding the program would require the identification of a new revenue source.
- Without a new revenue source, TDOT would have to reduce the current highway program in order to permanently cancel the rolling window of bond authorization.

Table 2-4 shows TDOT's bond authorization history, from 1987 until the present.

2.1.5 Local Revenues

Local revenues reflect the local match required of cities and counties in order to qualify for federal funds. Some state programs also require local funds; for example, state aid requires a 75/25 match, and bridge grants require a similar 80/20 match. The interstate connector category requires a 50/50 state/local match.

In the TDOT budget, local funds account for slightly more than 2 percent of the total; however, this share can vary over time with the mix of federal programs (and thus match requirements). In FY 2004-05, local funds are expected to exceed $36 million.

Table 2-4. TDOT Bond Authorization History, FY 1987 to Present

Fiscal Year	Amount Authorized ($M)	Amount Cancelled ($M)	Cumulative Authorization Outstanding ($M)
1987	190.0	0.0	190.0
1988	52.0	0.0	242.0
1989	31.8	0.0	273.0
1990	87.7	0.0	361.5
1991	0.0	0.0	361.5
1992	225.0	75.0	511.5
1993	115.0	115.0	511.5
1994	233.8	83.8	661.5
1995	87.7	87.7	661.5
1996	77.0	87.0	651.5
1997	148.0	158.0	641.5
1998	75.0	75.0	641.5
1999	90.0	90.0	641.5
2000	83.8	83.8	641.5
2001	87.7	87.7	641.5
2002	80.0	80.0	641.5
2003	77.0	77.0	641.5
2004	74.0	74.0	641.5
2005	159.0	74.0	726.5
Total	1,974.5	1,333.0	726.5

Source: TDOT Finance Division

2.1.6 Federal Funds

Federal funds account for $777 million of TDOT's budget, spread across modes as shown on Table 2-5. Public transportation funding accounts for 2.3 percent of the federal contribution; federal support for aviation, rail, and waterways accounts for 1.9 percent of federal monies invested in Tennessee's transportation system. The remainder is divided across highway, road, and bridge programs, with the bulk supporting state highway investments.

2.2 Revenue Spending by Mode

Revenue is distributed across programs. Public transportation programs receive $56 million through TDOT and a combination of federal, state, and local funds. The combined budget for the aviation, rail, and waterway modes is nearly $45 million when federal, state, and local sources are totaled. The remaining budget supports system maintenance, administrative functions, and road and bridge modes.

Table 2-5. Summary of TDOT Expenses by Federal, State, and Local Source, FY 2004–05

Description	Federal ($M)	State ($M)	Local ($M)	Total ($M)	% of Total
DOT Headquarters	0	14,271	0	14,271	0.88
Bureau of Administration	0	32,840	0	32,840	2.03
Bureau of Engineering	0	25,900	0	25,900	1.60
Bureau of Environment and Planning	0	7,174	0	7,174	0.44
Field of Engineering	0	26,630	0	26,630	1.64
Insurance Premiums	0	10,282	0	10,282	0.63
Total Administration	0	117,097	0	117,097	7.23
Equipment Purchases and Operations	0	21,431	0	21,431	1.32
Highway Maintenance	0	253,428	1,100	254,528	15.71
Highway Betterments	0	5,700	100	5,800	0.36
State Aid	0	28,922	8,759	37,681	2.33
State Industrial Access	0	10,815	200	11,015	0.68
Local Interstate Connectors	0	1,475	1,475	2,950	0.18
Capital Improvements	0	10,055	0	10,055	0.62
Total 100% State Construction	0	56,967	10,534	67,501	4.17
Public Transportation	17,573	38,546	238	56,357	3.48
State Planning and Research	12,100	5,100	0	17,200	1.06
Interstate	133,700	14,825	1,500	150,025	9.26
Forest	700	200	0	900	0.06
State Highway Construction	511,700	267,821	14,200	793,721	49.00
Bridge	87,000	5,000	4,100	96,100	5.93
Aviation, Rail, and Waterways	14,400	25,385	5,200	44,985	2.78
Total Federal Construction	777,173	356,877	25,238	1,159,288	71.57
Total DOT	777,173	805,800	36,872	1,619,845	100.00

Source: TDOT Budget

Chapter 3

Benchmark Analysis of Transportation Finance in Tennessee and Neighboring States

This chapter discusses selected characteristics of transportation finance in Tennessee and its eight neighboring states. In this chapter, fuel tax rates and motor vehicle registration and license fees and the total revenues generated from those sources in each of the states in the study area are compared[1]. Then, differences in the state disbursements of those revenues are discussed. Specifically, the extent to which fuel tax and registration and license fee revenues are dedicated to transportation purposes in each state are compared. Some states divert a significant share of their revenues away from transportation. This chapter also compares the extent to which each state is dependent on fuel tax and registration and license fee revenue to generate state transportation funds. Finally, the burden that fuel taxes and registration and license fees impose on residents of each state is discussed. The discussion compares effective transportation-related tax rates for each state. The use of effective tax rates allows a comparison of the burdens of taxes and fees across states despite differences in tax and fee structures.

3.1 Tennessee's Neighboring States

Tennessee's eight neighboring states are Alabama, Arkansas, Georgia, Kentucky, Mississippi, Missouri, North Carolina, and Virginia. In 2004, Tennessee' population was 5.7 million; total employment was 2.7 million, including full- and part-time jobs. Among neighboring states, Tennessee was ranked fourth in total population and fourth in total employment in 2004. Tennessee's per capita income of $27,611 ranked fifth among neighboring states in 2002. These characteristics are shown on Table 3-1.

Tennessee's population increased by 8.8 percent between 1994 and 2004, a rate that outpaced all neighboring states, with the exception of Georgia and North Carolina. Employment growth in Tennessee was 11.5 percent in the latest decade and exceeded that of four neighboring states. Tennessee's per capita income growth, adjusted for inflation, was 15.9 percent between 1992 and 2002, exceeding neighboring states, with the exception of Georgia, Mississippi, and Virginia.

3.2 Fuel Tax and Vehicle Registration and License Fees

The primary sources of state transportation revenue for Tennessee and many of its neighboring states are fuel taxes and registration and license fees. The rates and fees for those two revenue sources for Tennessee and each of its neighboring states are compared below.

[1] Unless otherwise noted, vehicle registration and license fees include motor vehicle registrations, motor vehicle license or tag fees, International Registration Plan fees, miscellaneous tag fees, auto license fees, title registration and title transfer fees, highway use tax, motor vehicle use tax, and privilege tax. In this chapter, these revenue sources are referred to as registration and license fees.

Table 3-1. Selected Characteristics of Tennessee and Neighboring States

	Population		Total Employment		Per Capita Income	
State	2004	% Change 1994–2004	2004	% Change 1994–2004	2002 ($)	% Change 1992–2002
Alabama	4,447,100	4.4	1,902,000	8.1	25,548	15.0
Arkansas	2,673,400	7.2	1,159,000	12.1	23,556	13.3
Georgia	8,186,453	14.4	3,890,000	19.1	28,821	17.8
Kentucky	4,041,769	5.0	1,796,000	12.5	25,494	15.8
Mississippi	2,844,658	5.8	1,125,000	6.6	22,550	20.8
Missouri	5,595,211	5.1	2,693,000	9.0	28,512	14.9
North Carolina	8,049,313	12.0	3,830,000	10.7	27,785	15.0
Tennessee	5,689,283	8.8	2,701,000	11.5	27,611	15.9
Virginia	7,078,515	7.4	3,584,000	19.3	32,793	17.3

Source: Census Bureau, Bureau of Labor Statistics, and Bureau of Economic Analysis
Note: Total employment is total non-farm employment. Per capita income is adjusted for inflation and is the latest data available.

3.2.1 Fuel Tax Rates

In all states in the study area, a tax is levied on both gasoline and special fuel, which typically includes diesel fuel and liquefied petroleum gas. Gasoline tax rates vary by state; however, Tennessee's rate of 21.4 cpg is relatively high. In fact, Arkansas and North Carolina are the only neighboring states with higher gasoline tax rates. Georgia's base rate of 7.5 cpg was significantly lower than Tennessee's rate, although that rate does not include Georgia's "second motor fuel tax," which levies a 3 percent tax on the sale of all motor fuel[2]. The second motor fuel tax rate, reported to be equal to 3.8 cpg in 2004, has been added to Georgia's tax rate for comparison. Gasoline tax rates for Tennessee and its neighboring states are shown on Figure 3-1.

Tennessee's special fuel tax rate of 18.4 cpg is more closely aligned with rates found in neighboring states. North Carolina and Arkansas levy significantly higher special fuel tax rates, while Georgia levies a significantly lower rate. Special fuel tax rates for Tennessee and its neighboring states are shown on Figure 3-2. Georgia's second motor fuel tax, reported to be $3.6 cpg for special fuel, has been added to the base rate for comparison.

[2] Effective in FY 2004, Georgia no longer levies a second motor fuel tax. That tax has been replaced by the Prepaid State Tax on Motor Fuels. The Prepaid State Tax on Motor Fuels did not change the tax rate but instead changed its method of collection.

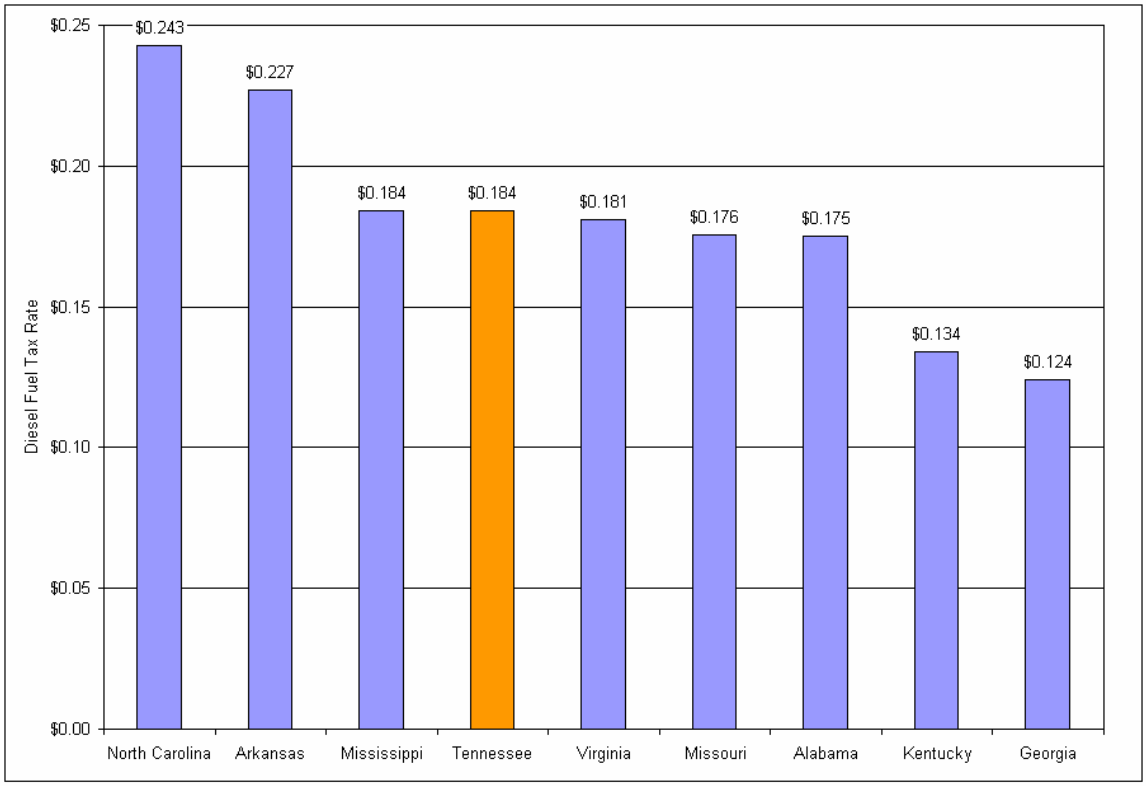
Figure 3-1. Gasoline Tax Rates in Tennessee and Neighboring States, 2004[3]

Source: State Departments of Revenue or Taxation

It is important to note that Georgia, Kentucky, and North Carolina each include a variable component in their fuel tax rates. Georgia's second motor fuel tax rate, discussed above, adds a 3 percent sales tax to fuel purchases, thereby fluctuating with fuel prices. In Kentucky, the gasoline tax rate is 9 percent of wholesale price, not to fall below 10 cpg, plus an additional fixed rate of 6.4 cpg. In North Carolina, the base fuel tax rate is 17.5 cpg, with an additional component that is tied to the inflation rate. In 2004, that component was estimated to be 6.8 cpg. In each case, the variable rate is adjusted semiannually. States with variable components are less likely to have losses in real fuel tax revenue due to inflation.

[3] The following notes apply to the gasoline and special fuel tax rates shown on Figures 3-1 and 3-2. The gasoline tax rate reported for Alabama excludes local levies, which varied between 1 cpg and 6 cpg. The gasoline tax rate reported for Mississippi does not include local tax levied in three counties (Seawall Tax). The rate reported for Missouri includes agricultural inspection and load fees (combined levy of $0.0055 per gallon). Rates reported for Georgia, Kentucky, and North Carolina include a variable component effective through June 2004. Reported rates include environmental fees, if levied.

Figure 3-2. Special Fuel Tax Rates in Tennessee and Neighboring States, 2004



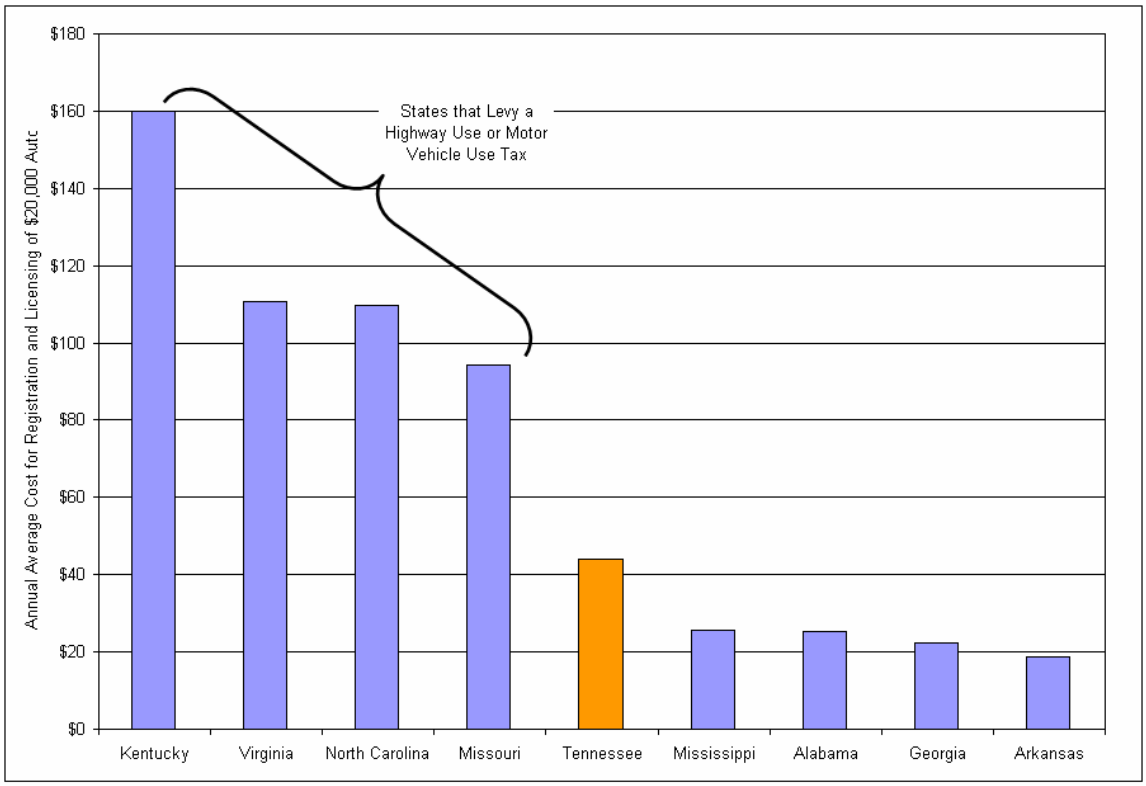
Source: State Departments of Revenue or Taxation

3.2.2 Vehicle Registration and License Fees

Vehicle registration and license fees are other sources of transportation funding in all states in the study area, with the exception of Georgia[4]. The types of fees and taxes levied vary across states. Tennessee and each of its neighboring states levy a title fee and registration fee. Also, select counties in some states levy a fixed tax, such as Mississippi's privilege tax and Tennessee's wheel tax. The wheel tax revenues do not support TDOT's program. In other states, a highway use or motor vehicle use tax is levied. The costs for these taxes and fees have been estimated for the purchase of a $20,000 automobile in each state in the study area and are shown Figure 3-3.

[4] Georgia levies comparable registration and license fees; however, those funds are allocated to Georgia's General Fund.

Figure 3-3. Estimated Cost of Registration and License Fees for a $20,000 Automobile in Tennessee and Neighboring States



Source: State Departments of Revenue, Taxation, or Transportation and AECOM Consult, Inc.

The total cost of registration, title, and all other fees varied significantly between Tennessee and its neighbors. The cost in Tennessee was estimated to be $44 in 2004 and was relatively low among states in the study area[5]. Total registration and license fees in states levying a highway use or motor vehicle use tax were significantly higher, as shown on Figure 3-3.

It is important to note that sales tax is levied on the purchase of automobiles in Tennessee and other neighboring states; however, the revenue generated by those taxes is not allocated to transportation purposes, and it was therefore not included on Figure 3-3. States levying a sales tax on automobiles were Alabama, Arkansas, Georgia, Mississippi, and Tennessee. For example, in Tennessee, the sales tax rate for an automobile is 7.4 percent[6]. In Georgia, the sales tax for automobiles is 7 percent, which includes a 4 percent state rate and a 3 percent local option. In both Arkansas and Kentucky, the sales tax rate is 6 percent; however, Kentucky assesses vehicles at 90 percent of their sale value. In Mississippi, the sales tax rate is 4.7 percent. Inclusion of those taxes in the calculation of total registration fees would have resulted in significantly higher registration fees for those states.

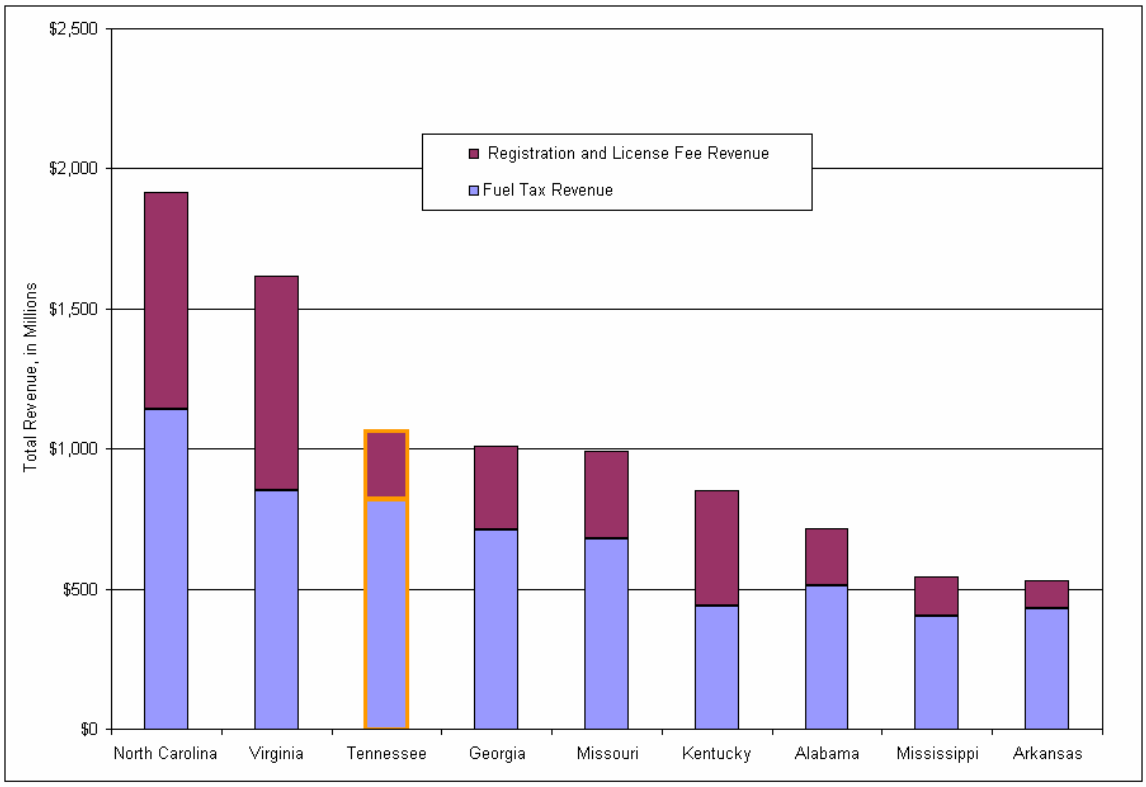
[5] The actual cost of registration, title, and all other fees for a $20,000 vehicle in Tennessee was $51. To fairly compare the costs for states in Figure 3-3, all one-time taxes and fees, such as use taxes and title fees, were divided by the estimated ownership period of an automobile, which was 7.5 years as reported by the *Chicago Tribune* (September 24, 2002).

[6] The actual sales tax rate in Tennessee is 7 percent plus 2.25 percent on the first $1,600 plus 2.75 percent on the value between $1,601 and $3,200.

3.2.3 Revenue from Fuel Tax and Registration and License Fees

Wide variations in fuel tax rates and registration and license fees resulted in significant differences in the amount of revenue generated in each state in the study area[7]. North Carolina led all states in the study area in its revenue generation from these sources, with $1,914.4 million. Total revenue generated in Tennessee was $1,063.7 million, ranking it third among neighboring states. Fuel tax and registration and license fee revenue generated in Tennessee and in each neighboring state is shown on Figure 3-4.

Figure 3-4. Total Revenue from Fuel Taxes and Registration and License Fees in Tennessee and Neighboring States



Source: State Departments of Revenue, Taxation, or Transportation.

In all states in the study area, fuel tax revenue (represented in purple on Figure 3-4) was the largest single source of state transportation funds. Only North Carolina and Virginia exceeded Tennessee in total revenues collected through fuel tax. High revenues in those states were the result of large populations and relatively high fuel tax rates.

The total revenues generated through registration and license fees (represented in red on Figure 3-4) also varied significantly between Tennessee and its neighboring states. North Carolina led all states, with nearly $775 million in revenue from that source. Virginia's

[7] These data were typically collected through each state's Department of Revenue or Taxation, or their Department of Transportation. In all cases, the most recent year data available were collected. Data for all states are from FY 2003, with the exception of Tennessee and Alabama, for which data are from FY 2004 and FY 2002, respectively.

registration and license fees generated $770 million. Kentucky and Missouri also generated significant amounts of revenue from registration and license fees. Relatively high registration and license fee revenue generation in those four states was partly a result of the levying of a highway or motor vehicle use tax. In Kentucky, a 6 percent motor vehicle usage tax, levied on 90 percent of the automobile price, contributed $389 million to their road fund. Missouri's sales and use tax contributed $215.8 million to transportation funding. North Carolina's highway use tax, levied at 3 percent, contributed $311.7 million to the Highway Trust Fund in FY 2003. Virginia's motor vehicle sales and use tax, also 3 percent, contributed $539.6 million to transportation funding in that year.

3.3 Comparison of Tennessee and Neighboring States Regarding the Disbursement of and Dependence on Fuel Tax and Fee Revenue

This section compares the disbursement of revenues generated by fuel tax and registration and license fees in Tennessee to that in neighboring states. In many of those states, a large portion of those revenues is dedicated to fund transportation programs. Many states, however, divert some share of those revenues away from transportation purposes. The share of revenues from those sources dedicated to transportation is compared for each state in the study area. Some states divert a significant share of fuel tax and registration and license fee revenue away from transportation purposes.

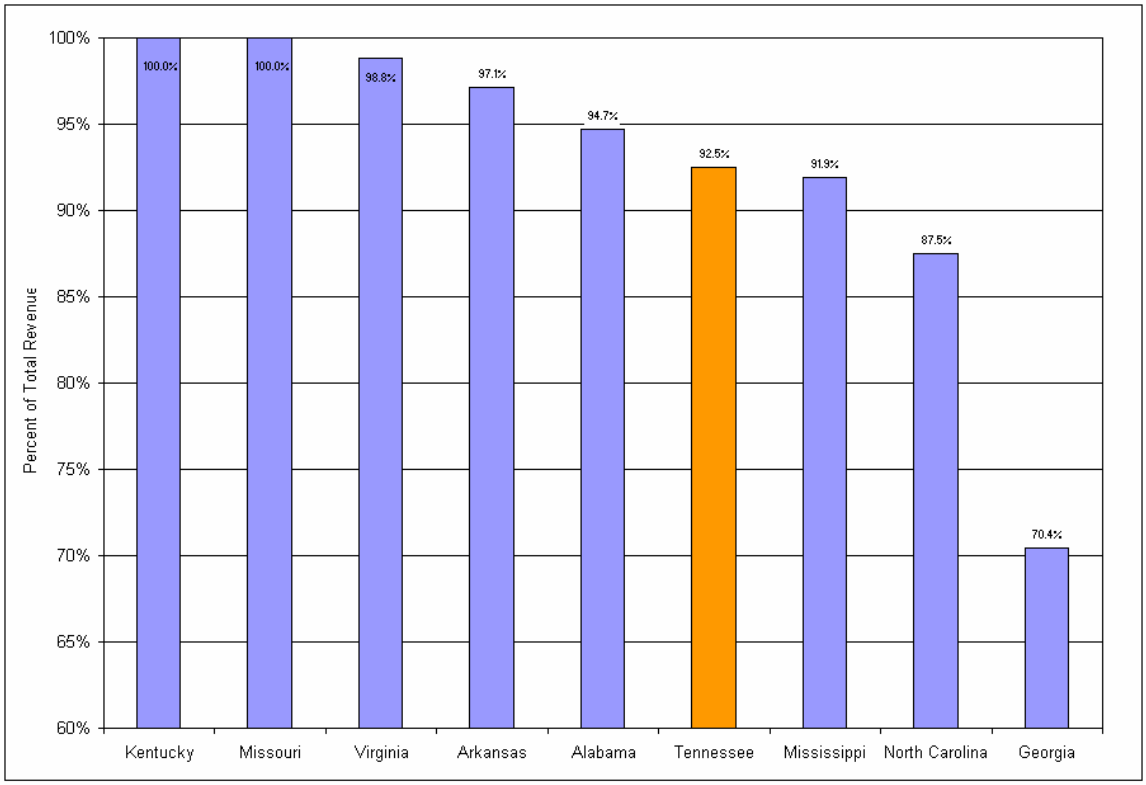
It has been observed that many states in the study area supplement transportation funding by levying taxes and fees other than fuel tax and registration and license fees. Examples include general sales tax, gaming tax, weight distance tax, and others. The extent to which each state is dependent on fuel tax revenue and registration and license fees to fund transportation projects is also compared.

3.3.1 Revenue Disbursement

Tennessee and neighboring states generate transportation revenue through fuel tax and registration and license fees. Each state, however, has its own method of allocating the various revenues. In some cases, states dedicate all revenue generated by the fuel tax and registration and license fees to transportation purposes. In other cases, states may divert some of the revenues to fund other programs.

In FY 2004, approximately 8 percent of Tennessee's fuel tax and registration and license fee revenue was diverted away from transportation purposes. Tennessee's neighbors varied; however, most states dedicated a higher share of their revenues to transportation purposes than did Tennessee. In Kentucky and Missouri, all fuel tax and license fee revenues were allocated to transportation. Virginia, Arkansas, and Alabama also exceeded Tennessee in revenues dedicated to transportation. The share of revenues dedicated to transportation in Tennessee and its neighboring states is shown on Figure 3-5.

Figure 3-5. Share of Total Fuel Tax and Registration and License Fee Revenue Dedicated to Transportation in Tennessee and Neighboring States



Source: State Departments of Revenue, Taxation, or Transportation and AECOM Consult, Inc.

A review of fuel tax and registration and license fee revenue allocation demonstrates that Tennessee diverts a relatively large share of that revenue to purposes other than transportation. Only in Mississippi, North Carolina, and Georgia was a larger share of revenue diverted away from transportation.

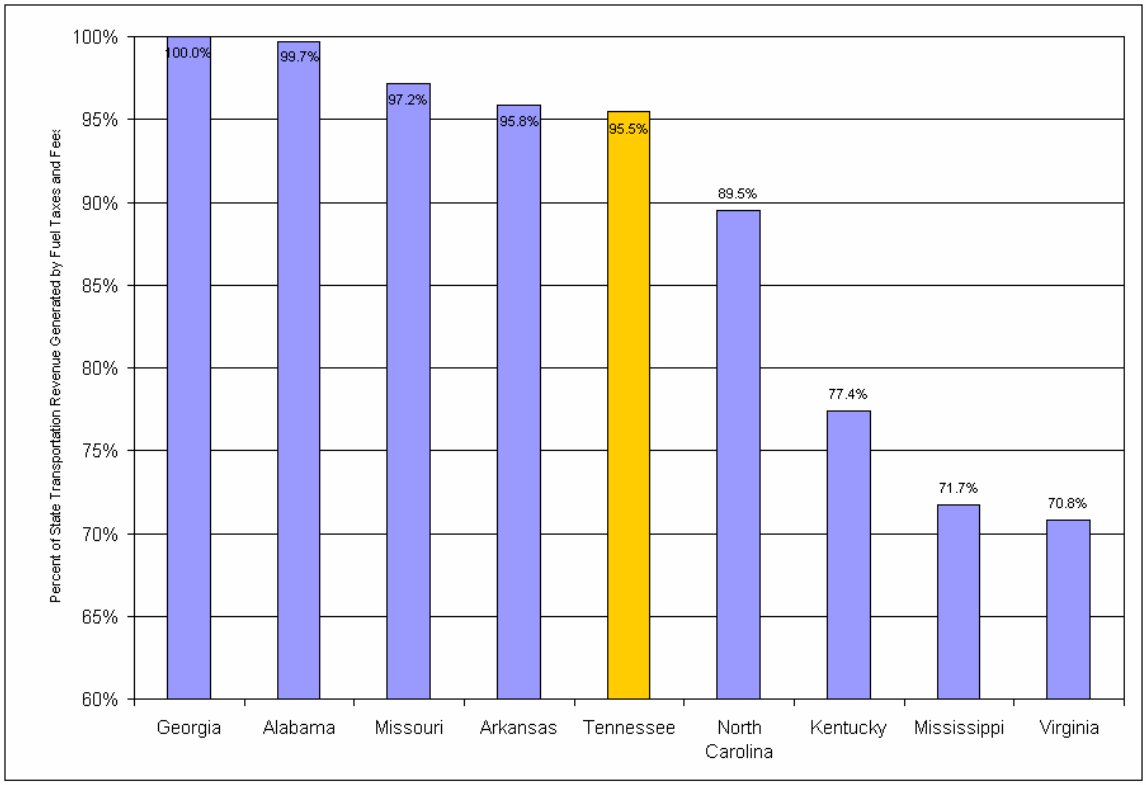
It is important to note that Tennessee allocates approximately 25 percent of its revenue from fuel taxes and registration and license fees to local governments. Those revenues are dedicated for transportation purposes and were therefore included on Figure 3-5. The distinction is important, however, because the allocation of a share of fuel tax and registration and license fee revenue to local governments would diminish any positive fiscal impact that an increase in fuel tax rates or registration fees may have on state transportation revenue. Kentucky, Mississippi, and Missouri also divert a share of fuel tax and registration and license fee revenue to local government for the purpose of transportation; however, each state dedicates a smaller portion of those revenues to local governments than does Tennessee. Among neighboring states, only Alabama and Arkansas allocate a larger share of those revenues to local government.

3.3.2 Dependency on Fuel Tax and Registration and License Fees

Some states in the study area rely almost entirely on fuel tax revenue and registration and license fees to generate state transportation revenue. Compared to its neighboring states, the extent to which Tennessee's state transportation revenue is dependent on fuel tax and registration and

license fees is relatively high. In FY 2004, about 96 percent of Tennessee's state transportation revenue came from those sources[8]. Additional transportation revenue in that year was generated through the beer and bottle tax. Georgia, Alabama, Missouri, and Arkansas were also heavily dependent on fuel tax and registration and license fees for state transportation revenue. Tennessee's remaining neighboring states were less dependent on those revenues for transportation finance. Alternate sources of revenue for neighboring states included permitting fees, vehicle rental fees, weight distance tax, gaming tax, sales tax, restoration fees, and penalties. The estimated share of state transportation revenue generated from fuel tax and registration and license fees in Tennessee and its neighboring states is shown on Figure 3-6.

Figure 3-6. Dependence on Fuel Tax and Registration and License Fee Revenue for Transportation Revenue



Source: State Departments of Revenue, Taxation, or Transportation, and AECOM Consult, Inc.

A broadening of the portfolio of taxes and fees that generate transportation revenue would likely offer an opportunity to increase revenue. That broadening would also likely stabilize revenue streams over time as Tennessee's strong dependence on a smaller number of revenue sources diminished.

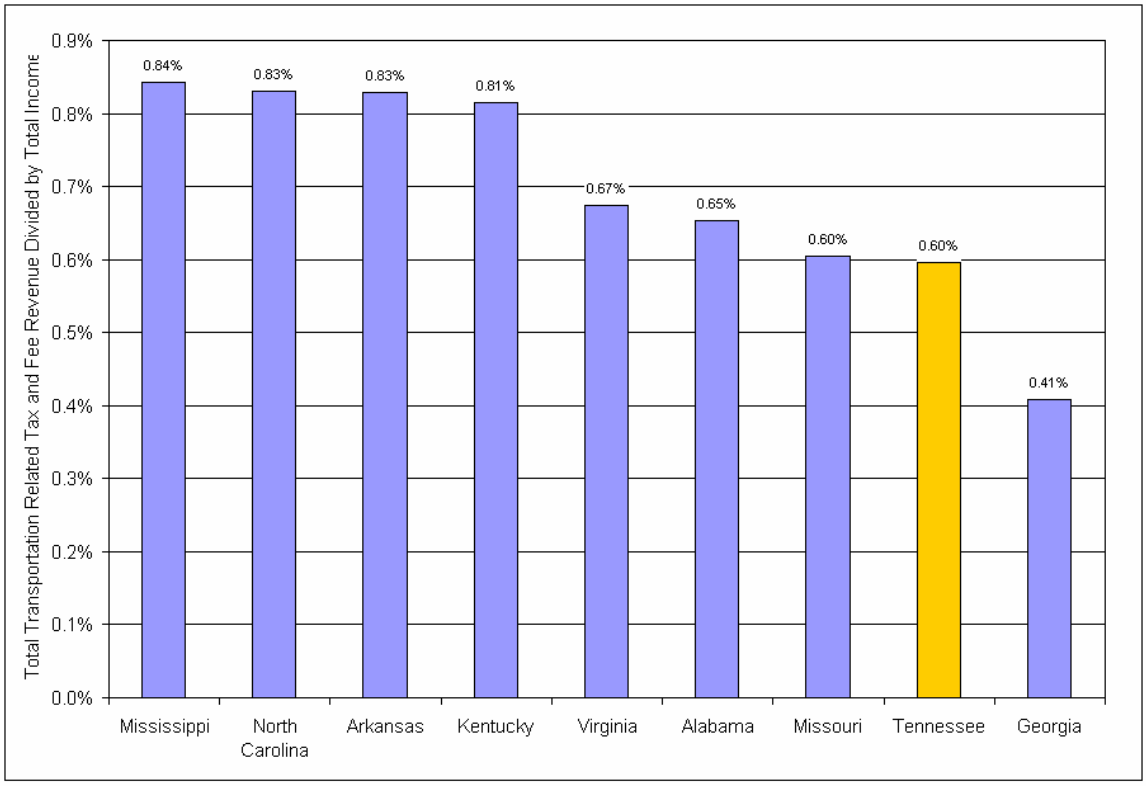
[8] Ignores the TEF, which is dedicated to aviation, rail, and waterway transportation. Those funds comprise a small portion of total transportation revenue.

3.3.3 Comparing the Burden of Transportation-Related Taxes and Fees

Comparing state tax structures is often problematic because of differences in the types of taxes and fees levied. However, a comparison of those taxes and fees is desirable because it may offer insight into tax capacity and tax competitiveness. One way to compare tax rates and fees across states with different structures is to compare the burden of those taxes. The burden that each state's transportation-related taxes and fees imposes on its taxpayers can be calculated by adding the total amount of revenue generated by transportation-related taxes and fees in each state and dividing that by total personal income earned in that state. The result represents the share of residents' income that was spent on those particular taxes and is referred to as the effective tax rate. Those calculations were made using state tax and fee revenues allocated to transportation and total personal income as reported by the Bureau of Economic Analysis.

It is important to note in some instances a state may export some portion of its taxation to other areas, thereby lowering the effective tax rate. Unfortunately, that occurrence is difficult to control and was ignored in this analysis. It is believed that the extent to which these taxes and fees are exported in any state in the study area is not sufficiently large to alter the conclusions reported here. The burden of all transportation-related taxes and fees was calculated for each state in the study area and is shown on Figure 3-7.

Figure 3-7. Effective Burden of Fuel Taxes and Registration and License Fees in Tennessee and Neighboring States



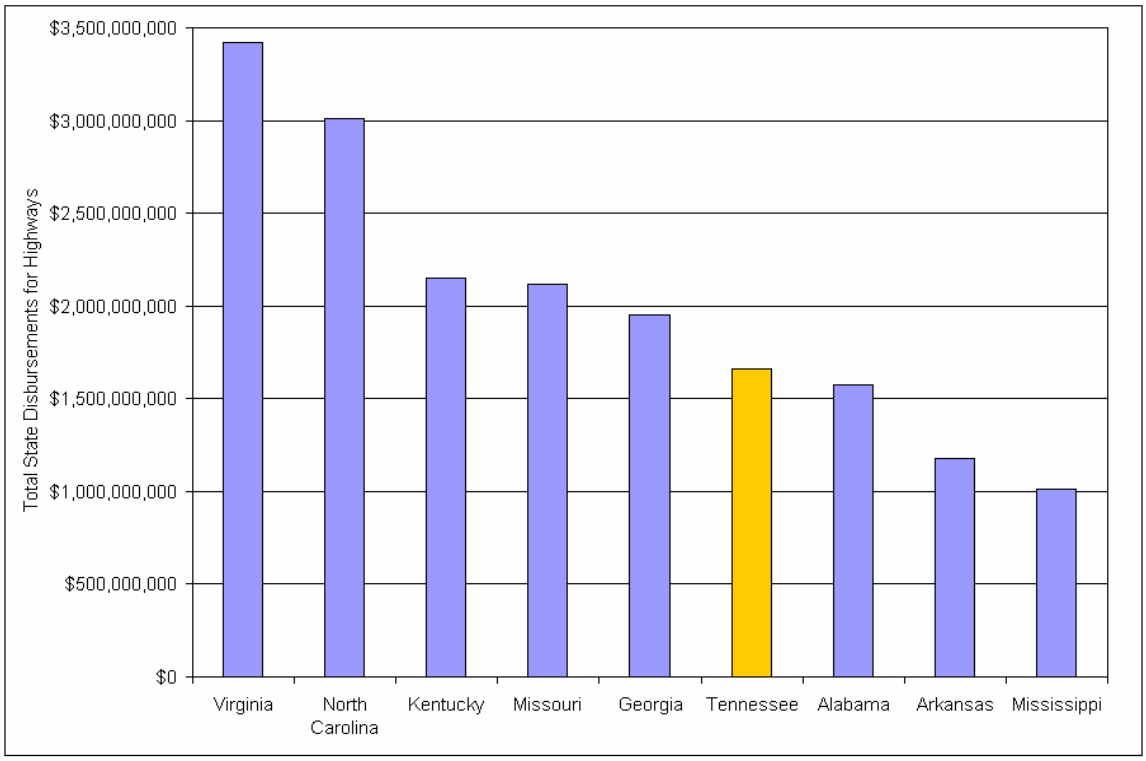
Source: State Departments of Revenue, Taxation, or Transportation, Bureau of Economic Analysis, and AECOM Consult, Inc.

As shown on Figure 3-7, the burden of transportation-related taxes and fees in Tennessee is relatively low compared to neighboring states. In fact, the burden of those taxes and fees is higher in seven of Tennessee's eight neighboring states. In Tennessee, about six-tenths of a cent of every dollar of income was paid to transportation-related taxes and fees in FY 2004. Comparable rates were significantly higher in Mississippi, North Carolina, Arkansas, and Kentucky, where the effective burden of transportation-related taxes and fees was in excess of eight-tenths of a cent per dollar of income. Only Georgia had an effective burden lower than Tennessee's, due to a lower fuel tax rate and the fact that registration and license fees are not allocated to transportation purposes and therefore are not considered part of the burden.

3.4 Assessment of State Responsibilities

Compared to neighboring states, Tennessee's highway spending is relatively low. In 2003, total highway spending in Tennessee was approximately $1.7 billion, including grants-in-aid to local governments. Comparable figures for five of Tennessee's eight neighboring states were higher. In both Virginia and North Carolina, total spending on highways exceeded $3 billion. Only in Alabama, Arkansas, and Mississippi were state disbursements for highways lower than in Tennessee in that year. Total state disbursements for highways in 2003 in Tennessee and neighboring states are shown on Figure 3-8.

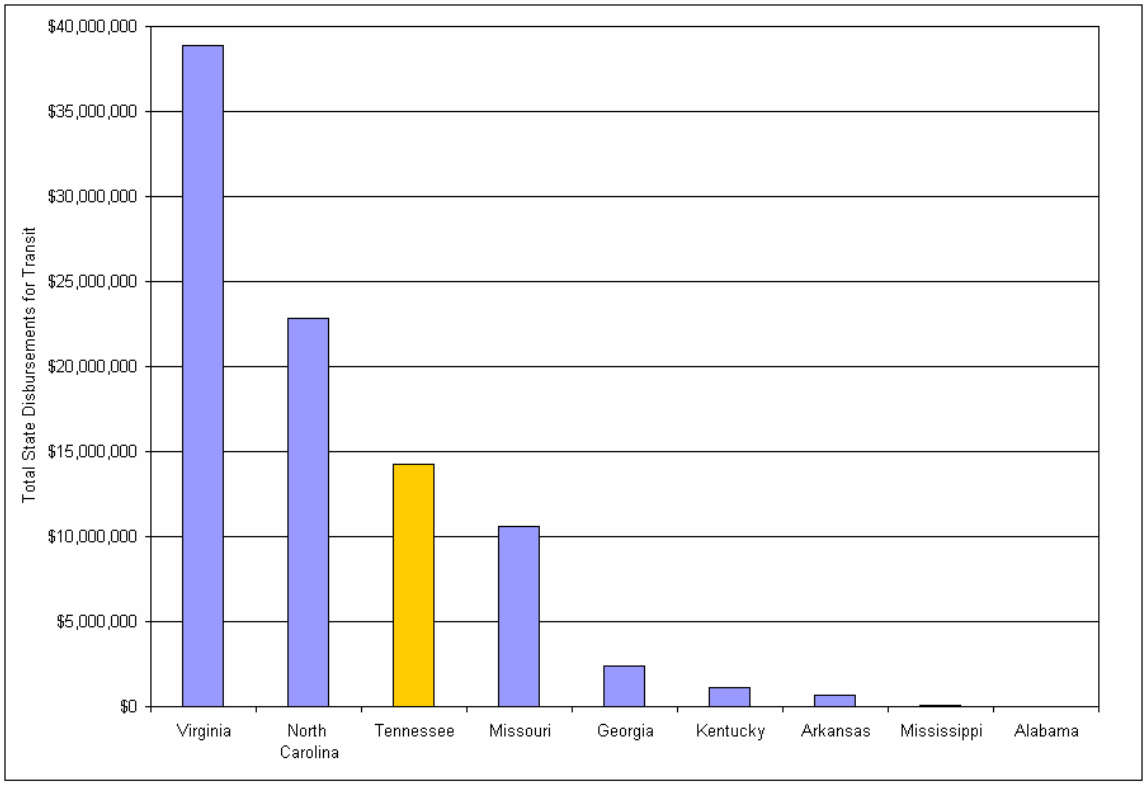
Figure 3-8. State Disbursements for Highways, 2003



Source: Highway Statistics, 2003, Federal Highway Administration (FHWA)
Note: State disbursements for highways include grants-in-aid to local governments.

State disbursements for public transportation in Tennessee are higher than in many neighboring states. In 2002, Tennessee's total state spending on public transportation, including capital outlays and operations, was $14.2 million. Only in Virginia and North Carolina were comparable figures higher. In Virginia, relatively high levels of state spending on public transportation resulted from contributions to the Washington Metro Area Transit Authority (WMATA) Compact, which funds the Washington, D.C., Metrorail System. In North Carolina, relatively high levels of public transportation funding are the result of an extensive operating assistance program for rural public transportation, elderly, and disabled and funding for planning studies. State disbursements for public transportation in Tennessee and neighboring states are shown on Figure 3-9.

Figure 3-9. State Disbursements for Public Transportation, 2002



Source: Highway Statistics, 2003, FHWA

3.5 Conclusions

A review of Tennessee's transportation tax and fee structure and that of its neighboring states reveals that each state has a unique method for generating state transportation funds. Similarities include the fact that all states in the study area depend heavily on fuel tax revenue to generate state transportation funds. Also, all states except Georgia depend on registration and license fee revenue to generate state transportation funds. Except Georgia, all states supplement those funds with other taxes and fees. The review, however, also reveals many differences between Tennessee's approach to generating state transportation funds and the approaches of its neighboring states. Some of the differences are highlighted below.

Tennessee diverts a larger share of its fuel tax and registration and license fee revenues away from transportation programs than do most neighboring states. As the largest source of state transportation funds, any allocation of those revenues toward non-transportation purposes can significantly reduce total transportation funding.

State transportation revenue in Tennessee is more dependent upon fuel tax and registration and license fees than in many neighboring states. In North Carolina, more than 10 percent of state transportation funds are generated through other taxes and fees. In Kentucky, Mississippi, and Virginia, comparable figures are higher. It is believed that a state that generates revenue from a broader portfolio of sources can generate higher revenues and is more likely to withstand fluctuations in any one source of revenue.

Finally, the burden that transportation-related taxes and fees impose on its citizens is relatively low in Tennessee as compared to neighboring states. In fact, only in Georgia is that burden lower. Several circumstances contribute to the relatively low burden in Tennessee. First, the sales tax on motor vehicles is not allocated to transportation and is therefore not included in the burden. Second, Tennessee does not supplement its state transportation revenue with many additional sources of revenue, as do many neighboring states. A relatively low transportation tax-related burden in Tennessee results in transportation spending that is lower than comparable neighboring states. In fact, despite being fourth in population and employment among neighboring states, Tennessee ranked sixth in highway spending in that group.

Chapter 4

Funding Strategies and Financing Mechanisms

This chapter discusses funding and financing from an innovative financing viewpoint and features techniques that depart from the traditional pay-as-you-go sources intended to supplement fuel taxes and registration fees. While the opportunity also exists to merely raise the rates on existing funding sources, the focus in this discussion is on innovative finance strategies. The first step in reviewing funding expansion options was the previous "benchmarking analysis" in Chapter 3 to assess how Tennessee compares to its eight neighboring states in terms of existing funding techniques. A second step in reviewing the potential for raising rates on existing funding sources was the burden analysis discussed in Chapter 3. In this discussion, further steps are examined for additional innovative finance mechanisms that focus on highway applications. Public transportation agencies pursuing Federal Transit Authority New Starts funding also have financing tools that would be used by project sponsors (for example, the Memphis Area Transit Authority), not TDOT.

4.1 Financing Techniques

Traditionally, state departments of transportation (DOT) have funded highway capital projects by leveraging available Federal-Aid Highway Trust Fund monies with designated state and local transportation funds on a pay-as-you-go basis, or through the legislative earmarking of Federal-Aid Highway Trust Funds to specific projects. These approaches to highway infrastructure funding worked so long as ample federal funds were available to support the states' highway capital programs. Little need existed for finance strategies because states relied on an increasing flow of federal and state transportation funds.

However, since the early 1970s, the Federal-Aid Highway Program has had a growing disparity between the costs of essential transportation improvements and preservation and the available revenues to fund these activities. As a result, the Federal-Aid Highway Trust Fund has neither kept pace, nor is expected to keep pace, with the growth in surface transportation needs.

To close the funding gap, efforts have been made to augment traditional public funding sources by using innovative financing strategies and tapping private sector resources. Since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA), the National Highway System Act, and TEA-21 (including the Transportation Infrastructure Finance and Innovation Act [TIFIA]), Congress and the Executive Branch of the federal government have encouraged state and local transportation agencies to adopt new approaches to finance infrastructure projects.

The FHWA announced the Innovative Finance Program Test and Evaluation Project (TE-045) in a *Federal Register* notice dated April 8, 1994 (in response to Executive Order 12893 and in recognition of the need to explore new financing strategies). The TE-045 program permits the FHWA to engage in a wide range of research projects, including those related to highway finance. As part of this research effort, FHWA was able to waive selected policies and procedures so that specific transportation projects could be advanced through the use of non-traditional financing approaches.

Traditional financing relies on federal grants that generally cover 80 percent of project costs. Innovative financing *supplements*, rather than replaces, traditional financing methods. Innovative financing is used to achieve a set of non-mutually exclusive objectives for project implementation. The financing techniques shown on Table 4-1 are classified by four broad categories that employ specific strategies.

Table 4-1. Financing Techniques

Classification	Strategies
Innovative Management of Federal Funds	Advance Construction
	Partial Conversion of Advance Construction
	Tapered Match
	Flexible Match
	Toll Credits
Debt Financing	Grant Anticipation Revenue Vehicles (GARVEE)
Credit Assistance	Section 129 Loans
	State Infrastructure Banks (SIB)
	TIFIA
Tolling	General Toll Provisions
	Interstate Reconstruction and Rehabilitation Program
	Value Pricing Pilot Program

Source: FHWA

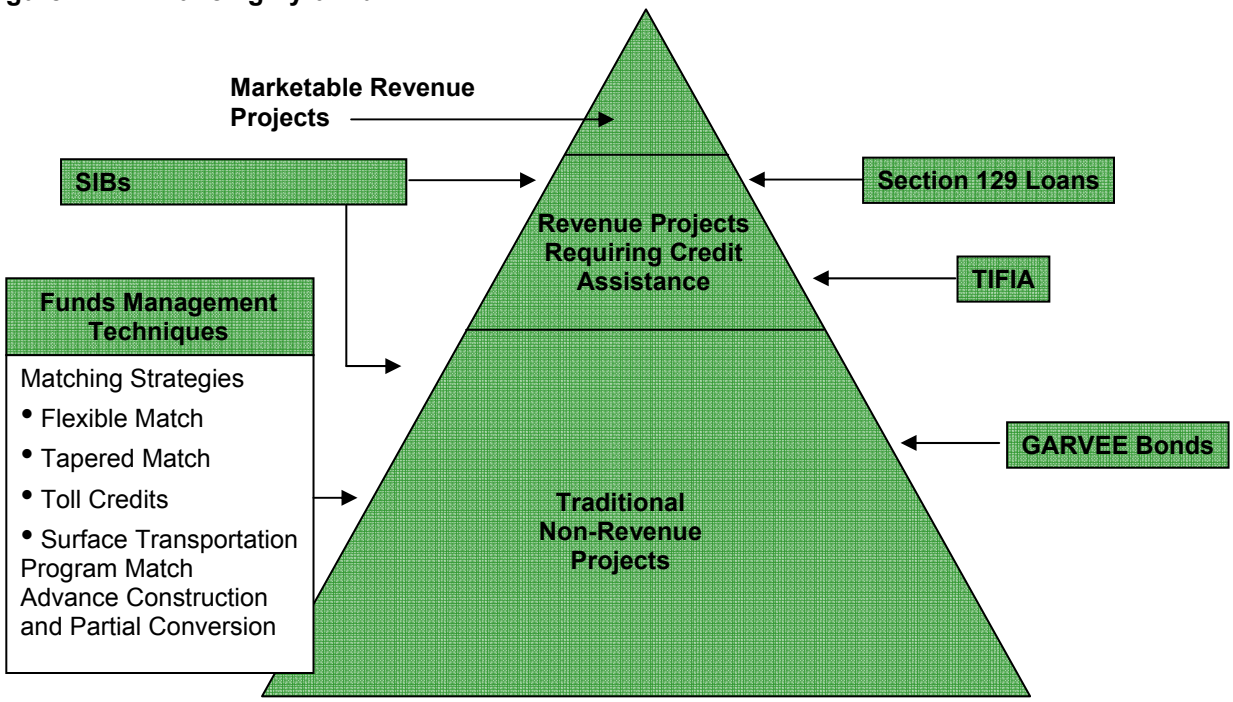
The techniques below exemplify what has been referred to as innovative financing, techniques that supplement traditional transportation financing methods.

- Establish SIBs to pool available public funding resources for needed transportation programs and projects at both the state and local levels.
- Enable state and local transportation agencies to issue GARVEE bonds against future expected Highway Trust Fund receipts to speed the flow of funds, particularly to fund larger projects.
- Use TIFIA-enabled credit enhancements and loan guarantees to reduce the costs of borrowing to pay for needed transportation investments.
- Tap local developers to make contributions in land or funds to expedite needed transportation projects through impact fees, land contributions, and funding contributions.
- Apply tolls (direct user fees) to pay for the costs of projects paid up-front by revenue bonds.
- Use public-private partnerships to expedite major transportation projects through the cooperative involvement (such as design-build project development) and contributions by both public and private sector project sponsors.

These project management tools may be depicted by a financing pyramid (see Figure 4-1) that shows the current application of financing tools based on the extent to which a project may generate revenue. At the apex of the financing pyramid would be projects that may be completely financed from revenue generated by the project. Typically, these would be toll

facilities. At the base of the financing pyramid are projects that have been traditionally financed through the combination of state and federal funds.

Figure 4-1. Financing Pyramid



Source: FHWA

The potential of federal innovative finance tools can provide benefits across four dimensions:

- Accelerate project implementation.
- Attract private investment.
- Expand revenue sources.
- Provide cost savings to project sponsor.

Table 4-2 categorizes the benefits on a scale of no benefit (none) to high.

Ohio issued the first GARVEE bond in May 1998. Since that time, states have issued more than $5 billion in GARVEEs. This tool effectively uses future federal appropriations as the security for debt financing; this permits project acceleration by providing immediate revenue from pledging future federal revenues for bond debt service. Additional benefits may result from project cost savings due to savings in inflation and earlier project delivery, which adds to system performance. GARVEEs generate up-front capital for major highway projects that a state would be unable to construct in the near term using traditional pay-as-you-go funding sources. GARVEEs are typically used in conjunction with advance construction to enable using future federal-aid funds beyond the current authorization period for debt service payments. The GARVEE bond technique enables a state to accelerate construction timelines and spread the cost of a transportation facility over its useful life rather than over the construction period. Table 4-3 summarizes GARVEE transactions.

Table 4-2. Benefits of Financing Tools

Tool	Acceleration Benefits	Attraction of Private Investment	Expansion of Revenue Sources	Cost Savings to Project Sponsor
GARVEEs	High	None	None	Moderate (when projected interest and inflation rates render borrowing more cost-effective than pay-as-you-go financing)
SIBs	Moderate	Low	Moderate	N/A
TIFIA	High	Moderate	High (when credit instruments enhance credit-worthiness of senior debt issuance)	High (when credit instrument enhances credit-worthiness of senior debt issuance and when alternative but higher-cost borrowing options are available)
Flexible Match	Moderate	Moderate	Low	Low
Tapered Match	High	Low	Low	Low
Toll Credits	High	Low	Low	Low
Partial Conversion of Advance Construction	High	Low	Low	Low
Multi-Authorization Advance Construction	High (especially as a support to GARVEE issuance)	Low	Low	Low
Section 129 Loans	Moderate	Moderate	Moderate	High (when loan serves as credit enhancement and when alternative but higher-cost borrowing options are available)

Source: FHWA

Table 4-3. Grant Anticipation Revenue Vehicle Transactions

State	Date of Issue	Face Amount of Issue ($M)	Rating Moody's/ S&P/Fitch	Projects Financed	Backstop
AK	2003	102.8	Aa2/AA/AA	Eight road and bridge projects	Full faith and credit of state
AL	2002	200.0	Aa3/A/na	County Bridge Program	All federal construction reimbursements; also insured
AR	2000-02	575.0	Aa2/AA/na	Interstate highways	Full faith and credit of state, plus state motor fuel taxes
AZ	2000-04	358.5	Aa3/AA-/AA-	Maricopa Freeway projects; Hoover Dam Bypass Bridge	Certain sub-account transfers; only 2004 issue insured
CA	2004	615.0	Aa3/AA-/AA-	Eight road projects	Insured except 2005 series
CO	2000-04	1,486.3	Aa3/AA/AA	Any project financed wholly or in part by federal funds	Highway users tax fund and other state funds
NM	1998-04	818.7	Aa2/AA+/na	SR 44; US 70 project; Other statewide projects	No backstop issues insured; issues insured
OH	1998-03	438.8	AA3/AA-/AA-	Projects including Spring-Sandusky and Maumee River improvements	Other available funds, including gas taxes, subject to appropriations
OK	2004	47.6	AA3/na/A	Projects in 12 corridors	None
PR	2004	136.0	A2/A/na	Transportation projects	No backstop; debt service reserve
RI	2003	217.0	Aa3/A+/AA-	Freeway, bridge, and freight rail improvement projects	None
VI	2002	20.8	na/na/AAA	Enighed Pond Port Project; Red Hook Passenger Terminal Building	Insured
Total		5,016.5			

Source: FHWA

A SIB is a state revolving fund that, much like a private bank, uses "seed" money provided in this case by federal-aid funds matched with non-federal funds. Projects are then selected for SIB financial assistance, which can include loans, loan guarantees, standby lines of credit, letters of credit, certificates of participation, debt service reserve funds, and bond insurance.

SIBs enable states to leverage additional transportation resources, accelerate construction timelines for projects with dedicated revenue sources, and recycle assistance to traditional non-revenue-generating projects. Further, the credit enhancement techniques offered through SIBs demonstrate public acceptance for projects, enhance the coverage margin on outstanding debt, and improve the credit quality of projects receiving SIB assistance.

Five states (Arizona, Florida, Ohio, Texas, and South Carolina) have most often used SIBs (see Table 4-4); their participation in 183 agreements has resulted in loan agreements totaling $4.3 billion.

Table 4-4. State Infrastructure Bank Agreements

State	Number of Agreements	Loan Agreement Amount ($M)	Disbursements to Date ($M)
Arizona	45	521.4	406.8
Florida	45	747.2	246.9
Ohio	41	185.1	138.1
South Carolina	8	2,605.0	1,765.0
Texas	44	257.9	250.7
Other States	190	483.1	402.2
Total	373	4,799.7	3,209.7

Source: FHWA

The TIFIA authorizes the U.S. DOT to provide direct (secured) loans, loan guarantees, and standby lines of credit to public and private sponsors of eligible transportation projects. TIFIA provides the following benefits to project financings:

- Minimizes development risk through increased financing capacity
- Improves access to capital markets with competitive financing sources
- Enables a project sponsor to gain access to more capital due to flexible repayment features of debt issued by the federal government
- Allows for greater security where the owners of the publicly sold debt are guaranteed to receive scheduled principal and interest payments.

Examples of projects using direct federal credit are shown on Table 4-5. This federal participation has resulted in about $18 billion in project investment.

Table 4-6 summarizes information on the project inventory by innovative finance category.

4.1.1 Conventional Versus Innovative Interpretations of the Federal-Aid Program

Table 4-7 summarizes the principal financing tools under the TE-045 initiative. The table indicates the impact of TE-045 financing concepts on funding practices that typified the federal-aid program before the creation of TE-045.

Table 4-5. Federal Credit Examples

Project Name	Project Cost ($M)
California Toll Facilities (CA)	3,718.0
Alameda Corridor (CA)	2,432.0
WMATA (DC)	2,432.0
Miami Intermodal Center (FL)	1,349.0
Reno Transportation Corridor (NV)	241.0
New Pennsylvania Station (NY)	748.0
Tren Urbano Transit Project (PR)	1,747.0
Central Texas Turnpike (TX)	3,220.0
Tacoma Narrows Bridge (WA)	888.0

Source: FHWA

Table 4-6. Innovative Financing Examples

Innovative Finance Category	Number of Projects	Project Cost ($M)
Federal Credit	13	17,784
GARVEEs	5	3,313
SIBs	163	4,063
TE-045	62	4,019
Total	243	29,179

Source: FHWA

Table 4-8 summarizes the use of TE-045 financing tools.

4.1.2 Benefits Associated with Innovative Financing Tools

The principal financing concepts pioneered under TE-045 have produced significant quantitative and qualitative benefits that align closely with the initiative's four principal objectives. The benefits have been realized in two primary categories: increasing investment levels and accelerating project delivery. Generally, investment tools such as flexible match and Section 129 loans have played the greatest role in attracting new sources of capital to transportation projects, although certain tools (e.g., ISTEA Section 1044 toll credits) have ultimately proven at least as effective in helping states administer their programs as in increasing investment levels. Cash flow tools, such as partial conversion of advance construction, have offered the primary benefit of accelerating projects by permitting states to alter the timing and/or administration of federal funds to better match project timetables. At the same time, the benefits associated with investment and cash flow tools are not mutually exclusive, as powerful synergies have resulted in several instances where states have combined investment and cash flow tools on a single project.

Table 4-7. Impacts of TE-045 Financing Concepts on Aspects of the Conventional Federal-Aid Highway Program

TE-045 Tool	Conventional Federal-Aid Program	TE-045 Financing Innovation
Flexible Match	Private and certain local contributions to highway projects come off the top of total project cost, with the standard federal-state matching ratio (usually 80/20) being maintained on the balance of project costs; this means that the state must still provide matching funds no matter how large the contribution by the private entity.	The value of private and certain local contributions directly offsets the state share. As a result, it is possible for a private contribution to entirely satisfy the non-federal matching requirement. Because the benefits of private contributions accrue wholly to the state, flexible match can increase a state's incentive to actively seek private partners.
ISTEA Section 129 Loans	Section 1012(a) of ISTEA amended Section 129 of Title 23 of the U.S. Code to permit states to obtain federal reimbursement for loans they make to toll projects. ISTEA Section 1012 placed restrictions on the terms of the loans and eligible uses of loan repayments.	States may initiate reimbursable loans to any project with a dedicated revenue stream (i.e., not necessarily tolls). Other flexibilities related to loan terms and institutional arrangements also expand the utility of Section 129 loans.
ISTEA Section 1044 Toll Credits	ISTEA Section 1044 permits states to apply the value of certain highway expenditures funded with toll revenues toward the required state match on current federal-aid projects. States may only substitute toll credits for state match if they demonstrate a maintenance of effort (MOE). The MOE test requires that a state's prior-year highway spending equaled or exceeded the average of the previous 3 years' expenditures.	The MOE requirement is relaxed such that states may offset state match with Section 1044 toll credits so long as they meet the test prospectively (e.g., anticipated current-year expenditures meet an average of the previous 3 years' expenditure levels). States may elect to have the MOE test extend as much as 1 year into the future. In addition, credits earned in prior years no longer lapse.
Reimbursement of Bond Financing Costs	Federal-aid funds may be used to reimburse the cost of retiring the principal component of project debt for certain projects. Interest, issuance, and administrative costs are not eligible for federal reimbursement, except for interest costs on interstate construction projects.	Interest, issuance, and administrative costs (in additional to principal payments) are now eligible for reimbursement.
Post-ISTEA Advance Construction	Under advance construction, states may use state and local funds to construct projects while still preserving those projects' eligibility for future federal-aid reimbursement. However, all conversions to federal-aid must be made by the end of the ISTEA authorization period.	Reimbursement of advance construction expenditures may extend into the next authorization period, assuming that federal-aid apportionments continue beyond the end of the ISTEA authorization period. States must limit their use of advance construction to their unobligated balance of apportioned funding and 3 years of anticipated funding.
Partial Conversion of Advance Construction	When projects are converted from advance construction, a state DOT must obligate the entire cost of the project at once, regardless of the expected pattern of actual expenditures and resulting federal reimbursement.	States may obligate funds for advance construction projects in phases, such that amounts obligated approximate the amounts actually expended. No federal funds are committed until their obligation.

Table 4-7. Impacts of TE-045 Financing Concepts on Aspects of the Conventional Federal-Aid Highway Program (Continued)

TE-045 Tool	Conventional Federal-Aid Program	TE-045 Financing Innovation
Phased Funding	States must obligate the entire cost of a project all at once, regardless of how many years it will take for the project to be constructed and thus translate into expenditures.	States may obligate funds over time, such that amounts obligated approximate the amounts actually expended. Federal funds are committed to the project, subject to availability of contract authority.
Tapered Match	A standard matching ratio must be maintained throughout the life of a project's construction. Every voucher a state submits for federal reimbursement must be limited to a set standard (usually 80%) of the actual expenses incurred by the state.	The matching ratio is permitted to vary over time. Federal reimbursement of state expenditures can be as high as 100% in the early phases of a project, so long as by the time the project is complete, the overall federal contribution does not exceed the federal-aid limit.
Surface Transportation Program Simplification	All individual federal-aid projects must be approved, administered, and tracked separately.	States may bundle together individual projects to be funded through the Surface Transportation Program. In this way, numerous projects may be treated as a single project for the purposes of approval and administration.

Source: FHWA

Table 4-8. TE-045 Projects by Tool

TE-045 Tool	Number of Projects	Project Cost ($M)
Flexible Match	25	443.8
ISTEA Section 129 Loans	2	947.2
ISTEA Section 1044 Toll Credits	1	1.0
Advance Construction	8	493.7
Multiple Tools	9	1,106.4
Partial Conversion of Advance Construction	9	810.4
Present Value Match	1	1.1
Tapered Match	7	215.0
Total	62	4,018.6

Source: FHWA

4.2 Alternative Funding Sources

Financing techniques are most useful to achieve project acceleration. Financing mechanisms do not generate revenue. Instead, in some cases (all debt financings) future revenues are pledged for debt service, which enables bond issuance that effectively pays for current projects with future dollars. This has the downside where less revenue is available in the future because it has been

pledged for debt service. This may require an infusion of revenues from "new" sources, which requires consideration of alternative funding sources.

Over the past 15 years, a number of alternative funding approaches have been authorized for use in federally funded highway projects through succeeding federal and state legislation, policies, and regulations, on either a trial or mainstreamed basis over the past 15 years. These alternative methods augment more traditional approaches, serving as complementary ways to stretch scarce public resources. These alternative funding approaches include the following:

- Toll revenues (direct user charges)
- Shadow tolls (indirect user-based charges)
- Joint development
- Developer contributions
- Special assessment districts
- Tax increment financing
- Local impact fees
- Specialized funding sources

Each of these alternative funding sources, except for specialized state program funding, is a form of "value capture," by which a sponsoring agency is able to secure resources from stakeholders who directly benefit from a new or improved transportation facility, proportionate to their benefits. When used in combination, these alternative funding sources enable project sponsors to expedite needed projects that demonstrate strong beneficiary support through commitments of project financial support (either monetary or in-kind resources). The greater the participation of additional project stakeholders in a project's finance plan, the greater the potential to attract more traditional public funds due to the ability to leverage these scarce funds.

4.2.1 Toll Revenues

Toll revenues result from toll fees charged to facility users. Used by independent toll authorities and toll agencies to fund their facilities on a dedicated basis, including operations and maintenance, preservation, debt service associated with revenue bonds, and capital improvements. Until the passage of TEA-21 in 1997, federal funds were prohibited from being used to convert untolled interstate highways to toll facilities. TEA-21 permitted up to three toll projects on a pilot basis, provided the funds were used for highway expansion or rehabilitation and other public funds were not available. One proposed project, the widening of I-81 in western Virginia, plans to use tolls collected on dedicated truck lanes to help fund the project.

4.2.2 Shadow Tolls

Shadow tolls are a specialized form of indirect tolling whereby the facility owner (usually a public sector transportation agency) reimburses the facility developer (usually a private sector firm or team of firms) for project costs (including both cost of capital and rate of return on developer investment), based on the volume of traffic using the facility. This method of cost reimbursement requires monitoring traffic volumes, but no direct tolling of users. All project revenues come from the project sponsor/facility owner. Shadow tolls are used by Florida's

Turnpike Enterprise to fund interchanges or additional on/off ramps that serve specific sponsors (such as developers or facility owners).

4.2.3 Joint Development

Joint development includes coordinated project development activities involving private developers, transit agencies, railroads, and local communities. Applications include constructing related facilities on the same or adjacent rights-of-way, such as parking facilities, multimodal facilities, intermodal facilities, and air rights development over highway facilities.

4.2.4 Developer Contributions

Developer contributions include contributions of right-of-way, technical support, and/or cash by private developers to expedite highway projects desired by the developers, especially when such projects significantly improve accessibility to and the value of commercial property or development.

4.2.5 Special Assessment Districts

Special assessment districts impose special local fees or taxes that are applied to businesses and/or residents in a specified geographic area to pay for highway development or expansion serving those businesses and/or communities.

4.2.6 Tax Increment Financing

Tax increment financing is a value capture approach that uses a portion of future increases in property taxes in a community served by a new or improved transportation facility to help defray the costs of the improvement over a period of time.

4.2.7 Local Impact Fees

Local impact fees are collected from developers by local governments to help pay for transportation and other public works resulting directly from the new development, including schools and fire and police facilities. These are typically applied as a per-unit or ad valorum charge when the development units are sold.

4.2.8 Specialized Funding Sources

Specialized funding sources include revenues earned from such specialized sources as advertising (allowed on certain toll highways), naming rights (facility branding such as service plazas on tollways), and utility access fees (electric transmission lines, fiber optic cables, microwave towers, and cell towers) along highway corridors. These can be in the form of one-time or annual payments, or the provision of in-kind services (such as access to a fiber optic network along highway rights of way). The latter is an example of what is referred to as “shared resources,” whereby state or local governments receive access to and/or services from utility infrastructure in exchange to private use of highway right-of-way.

4.3 Case Study Projects and Finance Plans

The application of alternative funding and financing methods to major highway improvement projects can be best demonstrated by reviewing actual projects that use or plan to use these techniques, often in combination with more traditional approaches. This provides some context for TDOT as the planning phase moves from programmatic considerations to individual projects.

For this review, nine large highway expansion projects were selected to demonstrate how alternative financing methods can be combined to leverage available funding and expedite needed projects. The selected candidate projects involved the expansion of highway capacity through widening or extension, required large capital investments that would be difficult to fund under pay-as-you-go financing, provided a wide geographic spread, and used one or more alternative finance approaches to leverage available federal and state highway program funds. Table 4-9 lists the principal characteristics of the nine highway expansion projects selected for this review. The projects range in value from $314,000 to $9.9 billion; the average value of the projects is $2.4 billion.

Table 4-10 lists finance methods that helped move the projects identified on Table 4-9 forward.

The most frequently used finance methods include:

- *Grant anticipation revenue vehicles bonds/notes*. To expedite the availability of federal and/or state funds.
- *Local taxes, fees, and funds*. Value capture approaches that tap the resources of direct local project beneficiaries.
- *TIFIA loans and credit enhancement*. To lower the cost of debt associated with the projects.
- *Tolls*. Where highly congested facilities lack suitable alternatives and traditional funding cannot be obtained to expand highway system capacity or better manage travel demand.

Many of these projects also used such alternative project delivery approaches as design-build and long-term performance warranties. Without the inclusion of multiple funding sources, financing approaches, and expedited project delivery, many of the projects would have remained on the shelf, awaiting the gradual accumulation of pay-as-you-go funding.

Table 4-11 lists key features of each representative project that promoted the applicability and use of innovation in finance and project delivery. Common features among the case study projects that promote alternative approaches in funding and finance included:

- Strong state desire to expedite the project to address current and future needs.
- State transportation agency willingness to apply alternative approaches to project finance and delivery.
- Legislative authority to apply alternative approaches to project finance and delivery.
- Involvement of multiple stakeholders in project funding, including multiple levels of government and the private sector.
- Private sector willingness to share both project risks and benefits.

Alternative funding sources are used to generate revenue to augment traditional revenue sources such as fuel taxes and registration fees. While financing techniques are most useful for project acceleration, ultimately alternative funding sources become a necessity for program expansion.

Table 4-9. Case Study Projects

Project	Characteristics				
	Location	Public Sponsor(s)	Physical Description	Cost ($B)	Opening Date
Colorado T-REX Highway Expansion/Light Rail Transit Expansion	Along I-25 corridor in metro Denver	Colorado DOT and Denver Regional Transportation District	25-mile corridor expansion; 19-mile Light Rail Transit extension	1.700	2006 (est.)
Texas SH 130 Toll Highway	Metro Austin	Texas Turnpike Authority and Texas DOT	65-mile toll highway bypass in east Austin	3.600	2007 (est.)
New Mexico SR 44 (now US 550) Rehabilitation and Expansion	From Bernalillo northwest to the Colorado border	New Mexico State Highway and Transportation Department and New Mexico Finance Authority	Widening (from two to four lanes) of 120 miles of SR 44. Completed as four separate project sections.	0.314	Nov. 2001
Virginia I-81 Rehabilitation and Expansion	From West Virginia border southwest to Tennessee border	Virginia DOT	Add four truck-only travel lanes and associated interchanges and tolling facilities to 325-mile interstate	9.900	15-year project; Tier I environmental impact statement mid-2005
Massachusetts Route 3 North Rehabilitation and Expansion	From Burlington north to New Hampshire border	Mass Executive Office of Trans-portation and Construction MassHighway	21-mile limited access highway: lane addition, shoulder, 40 bridge replacements	0.385	Scheduled May 2004; delayed; near completion
Utah I-15 Upgrade/Expansion	Metro Salt Lake City	Utah DOT	16-mile interstate reconstruction; structure replacement; lane expansion; traffic mgmt. system	1.600	May 2001
South Carolina Highway Improvement Program	Statewide	Counties and municipalities, South Carolina DOT, and State SIB	Six bridge/ roadway projects (including Conway Bypass, Carolina Bays Parkway, Cooper River Bridge)	2.300	2004-2010
Colorado E-470 Toll Highway	Metro Denver	E-470 Public Highway Authority; local municipalities	47-mile toll beltway in east metro Denver	1.200	Four-phase development program: Jan. 2003 (widenings continue)
Virginia Route 28 Expansion	Northern Virginia	Ph. I: Fairfax and Loudoun counties, Virginia DOT, local landowners; Ph. II: Under Public-Private Transportation Ventures Act	Widenings and interchange replacements in 14-mile corridor	Ph. I: 0.185; Ph. II, 0.2	Ph. I: 1991 Ph. II: Fall 2006

Source: AECOM Consult, Inc.

Table 4-10. Summary of Alternative Finance Approaches Used by Case Study Projects

Project	Innovative Finance Methods									
	Grant Anticipation Notes/ Bonds	TIFIA Loans	SIB	63-20 Corp.	Tolling	Local Taxes/ Funds	Land Donations	Pavement Warranty	Develop-ment Rights	Federal Earmarks
Colorado T-REX Highway Expansion/Light Rail Transit Expansion	✓					✓				
Texas SH 130 Toll Highway	✓	✓			✓		✓			
New Mexico SR 44 (now US 550) Rehabilitation and Expansion	✓							✓		
Virginia I-81 Rehabilitation and Expansion	✓	✓		✓	✓			✓		✓
Massachusetts Route 3 North Rehabilitation and Expansion				✓					✓	
Utah I-15 Upgrade/Expansion						✓				✓
South Carolina Highway Improvement Program		✓	✓							
Colorado E-470 Toll Highway					✓	✓				
Virginia Route 28 Expansion						✓				

Source: AECOM Consult, Inc.

Table 4-11. Key Features Underlying the Use of Alternative Finance Methods by Representative Highway Expansion Projects

Project	Expansion or Reliever	Key Features Supporting Innovative Finance Methods
Colorado T-REX Highway Expansion and LRT Expansion	Expansion (and transit extension)	Inventive partnership between highway and transit to attract significant federal funds. Ability and willingness to leverage future funds through GARVEEs.
Texas SH 130 Toll Highway	Reliever	Strong metropolitan growth (congestion) and inclusion in larger Central Texas Tollway Project makes tolling feasible. Private stakeholders able to make non-cash contributions through right-of-way donation
New Mexico SR 44 (now US 550) Rehabilitation and Expansion	Expansion	Ability and willingness to leverage future federal funds through GARVEEs. Use of 20-year pavement warranty to control life-cycle preservation costs. Long-term private sector commitment through 20-year pavement performance warranty.
Virginia I-81 Rehabilitation and Expansion	Expansion	State legislative environment specifically allows for unsolicited proposals for public-private partnerships. Heavy truck use provides substantial base for tolling (few diversion options) and generates public support for physical separation from autos.
Massachusetts Route 3 North Rehabilitation and Expansion	Expansion	State highway funds being consumed by Central Artery/Tunnel project in Boston, so new financing mechanism was needed to advance projects. Strong economics in corridor provided significant development opportunities for private partner.
Utah I-15 Upgrade and Expansion	Expansion	One-time large regional event (2002 Winter Olympics) generated federal earmark funding as well as special intelligent transportation system corridor investments.
South Carolina Highway Improvement Program	Expansion and Reliever	Sufficient funding from multiple sources (federal, state, local) were available to seed infrastructure bank at high level.
Colorado E-470 Toll Highway	Reliever	Strong growth and geographic expansion produced congestion sufficient for residents to support bypass road funded by tolls and special taxes.
Virginia Route 28 Expansion	Expansion	State legislative environment allowed county-level innovation. Strong housing and business growth mitigated impact of new taxation district.

Source: AECOM Consult, Inc

4.4 Conclusions

The two major categories of what is commonly termed innovative financing are financing techniques and alternative funding. Financing techniques are used as project management tools that can provide benefits across four dimensions:

- Acceleration of project implementation
- Attraction of private investment
- Expansion of revenue sources
- Cost savings to project sponsors

These techniques supplement and in some cases replace traditional pay-as-you-go financing (e.g., the South Carolina “20 in 7” Program).

Chapter 5

Financial Forecast

This chapter describes the development of long-term trend projections of the major sources of revenue available to TDOT based on existing sources. As baseline projections, they represent the most likely outcome if current trends are extended into the future. The projections presented below incorporate revisions made at the suggestion of TDOT's Finance Division and data updates made throughout the forecast process.

Revenue sources are projected by major type. In some cases, such as the TEF, the projections are broken out one step further in order to identify the individual sources that are dedicated to particular modes: aviation, rail, and waterways. Projections are presented in the following order to reflect their importance in TDOT's budget: federal revenues, highway user fees (gasoline and motor fuel taxes, special petroleum taxes, motor vehicle registration fees, beer and bottle taxes), bond authorizations, local revenues, the TEF and its components, miscellaneous revenues, and the fund balance and reserves. The remainder of this chapter provides the following information for each revenue source:

- Historical data
- Forecast method used (regression, trend, other)
- Evaluation of forecast
- Summary of baseline projection result

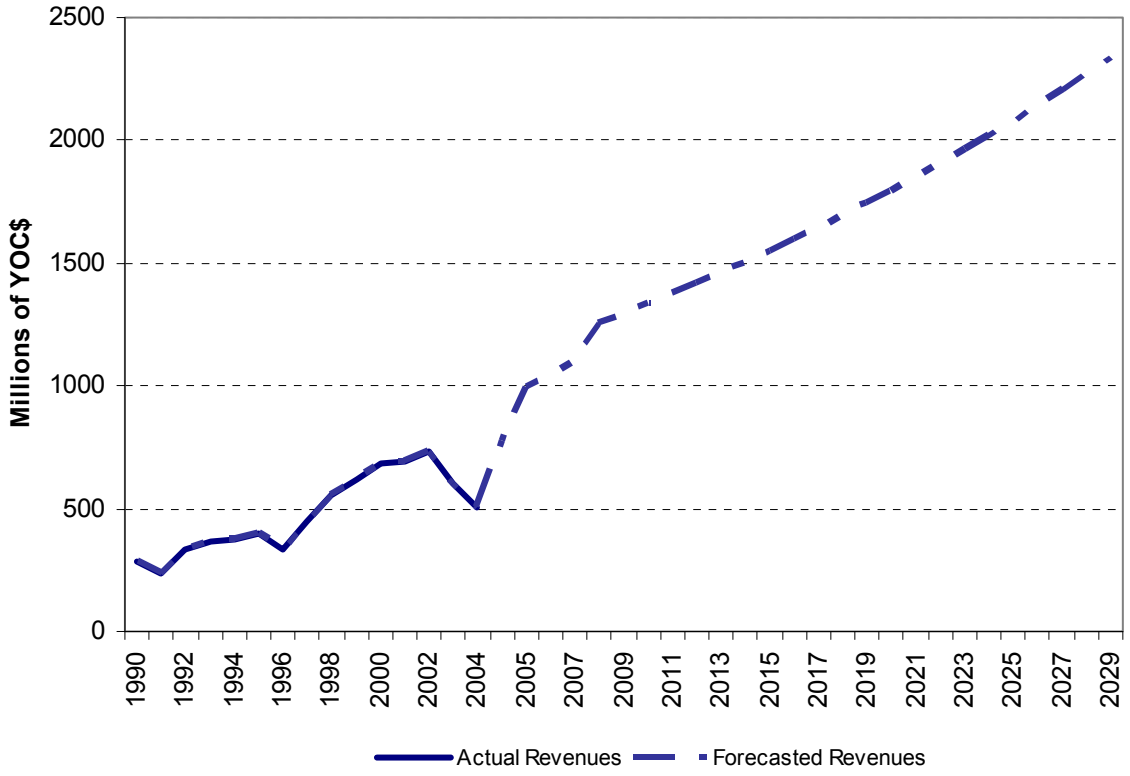
5.1 Federal Revenues

Historical revenues were provided by the TDOT Finance Division and represent federal funds released each year (see Figure 5-1). The forecast assumes no change in the federal motor fuels tax rates, currently at 18.4 cpg for gasoline and 24 cpg for diesel. The forecast is broken into a near-term forecast and a longer-term forecast. The near-term forecast for the 2005 to 2009 period, which will be strongly influenced by the next federal reauthorization legislation still pending in Congress, was developed by TDOT. It is based on information TDOT receives internally from legislative staff as well as the American Association of State Highway and Transportation Officials (AASHTO) and other organizations.

Beginning in 2010, the federal revenue forecast is projected to increase by 3 percent annually, based on expectations for long-term growth of the U.S. economy and lack of information about subsequent federal reauthorizations. Without information about national funding priorities, the forecast assumes that federal transportation revenues grow with the national economy and that Tennessee maintains its share of these funds. Even with this modest growth rate, federal funds account for more than 60 percent of TDOT's total program by 2030. For the current year, federal funds account for about 48 percent of TDOT's total program.

Why Forecast Was Selected. Federal funding for Tennessee's transportation program is driven by political variables and the health of the national economy. The near-term forecast developed by TDOT was included here because it incorporates analysis from legislative staff as well as information from AASHTO and other organizations that specialize in assessing the federal funding outlook.

Figure 5-1. Historical and Forecasted Federal Revenues



Source: AECOM Consult, Inc.

When examining the average annual long-term growth rate of the forecast of TDOT's federal revenues (see Table 5-1), it is evident that the forecast is conservative relative to the proceeding reauthorization cycles; this is because with each past federal authorization there has been a substantial increase in available funding for transportation. While additional future increases are possible, it would not be prudent to develop the baseline projections of the financial plan on this optimistic assumption. The forecast assumes that federal gasoline and diesel tax rates will not increase.

Table 5-1. Average Annual Growth in Federal Revenues

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
2.93%	19.54%	9.28%	-7.44%	10.77%	3.00%	3.00%

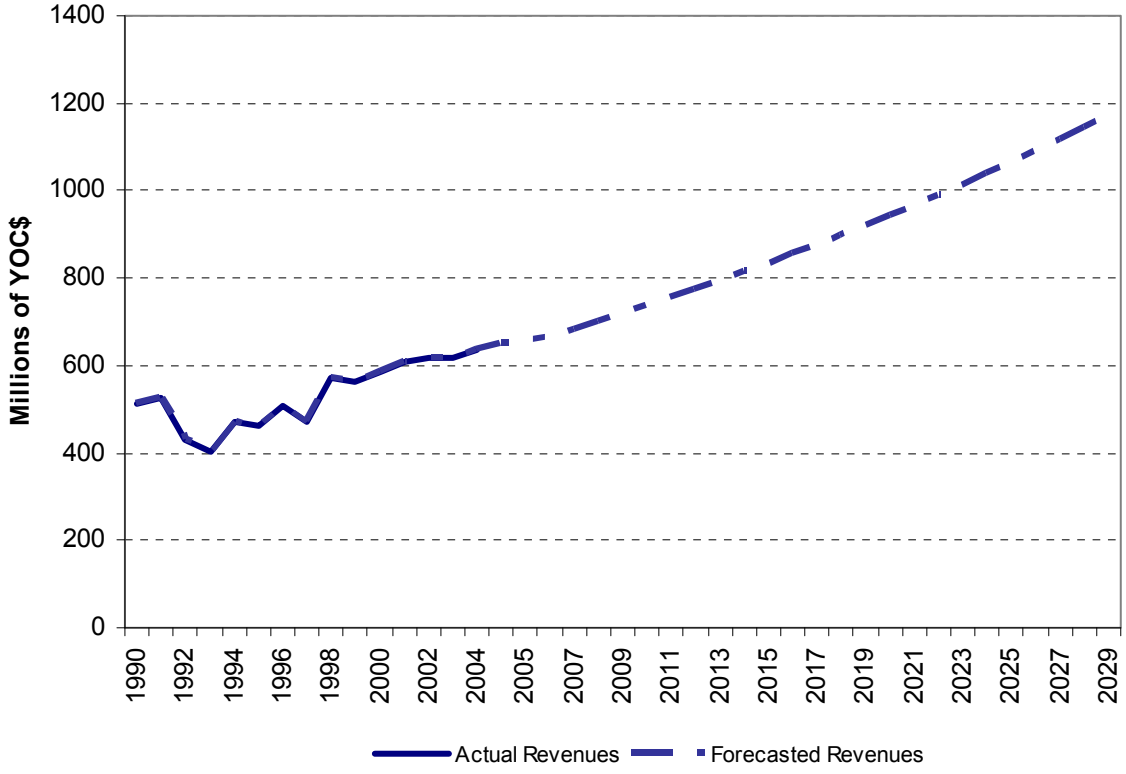
Source: AECOM Consult, Inc.

5.2 Highway User Fees

The historical revenues (see Figure 5-2) are TDOT-budgeted highway user fee revenues for 1990 through 2001. The 2002-2005 revenues are actual TDOT revenues; the FY 2006 values are TDOT's budget; and the 2007 to 2030 revenues are projections. The highway user fee forecast is based on the sum of the forecasts for the gasoline tax, motor fuel tax, special petroleum tax,

motor vehicle registration fee, and the beer and bottle tax. See each component of the highway user fees for details on the individual forecasts.

Figure 5-2. Historical and Forecasted Highway User Fee Revenues



Source: AECOM Consult, Inc.

Why Forecast Was Selected. The forecast of highway user fees was selected because it resembles the historical growth seen in highway user fee revenues, while keeping the tax rates for the largest components of the user fees (gasoline and motor fuel taxes) constant. As shown on Table 5-2, the forecast's average annual growth of 2.49 percent (2010-2025) and 2.44 percent (2020-2030) reasonably falls in between the average annual historical growth of 1.33 percent (1990-2000), 3.57 percent (1996-2000), and the historical budget forecast of 2.02 percent (2000-2005). The slight negative average annual growth (-0.14 percent) during the 1990-1996 period reveals that the decline caused by the recession during the early 1990s was stronger than the recovery period at the end of the 1990-1996 period.

Table 5-2. Average Annual Growth in Highway User Fee Revenues

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
-0.14%	3.57%	1.33%	2.09%	2.02%	2.49%	2.44%

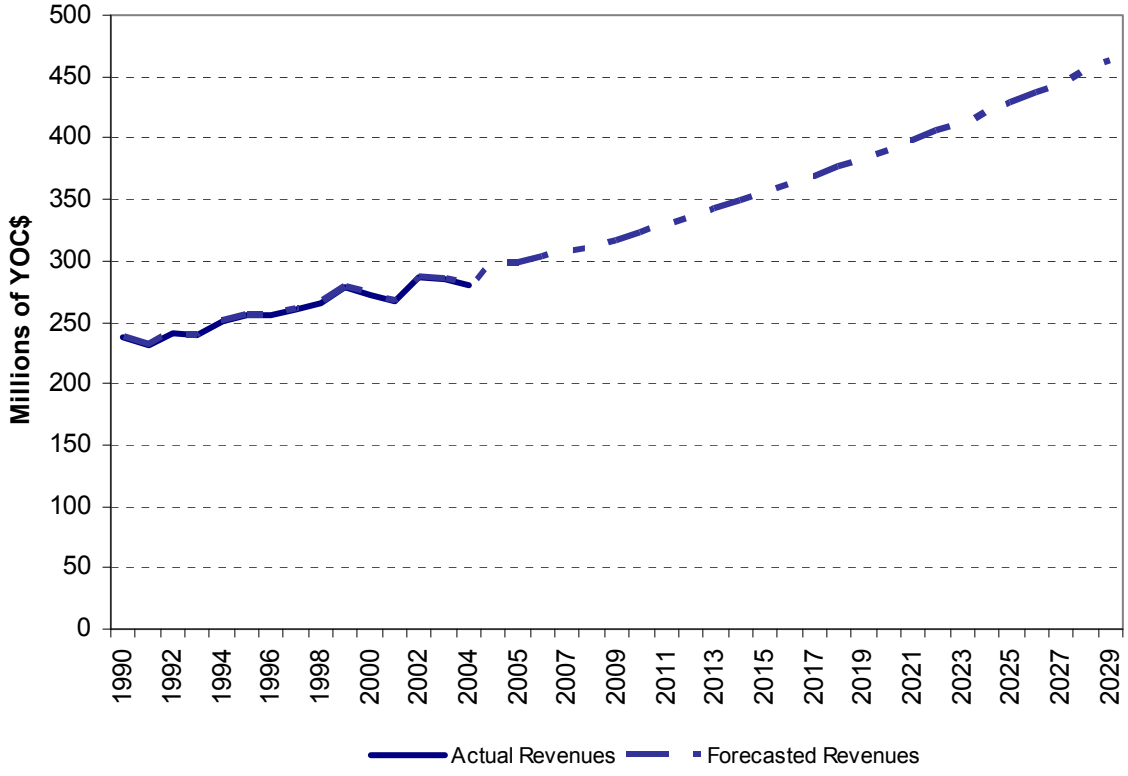
Source: AECOM Consult, Inc.

5.2.1 Gasoline Tax

The historical gasoline tax revenues received by TDOT between 1990 and 2003 were estimated by the consultant based on historical TDOR collections[1]. The forecast of gasoline tax revenues includes TDOT's budget for FY 2005-06 and the consultant's forecast for 2007 through 2030. Tennessee's historical gasoline tax revenues per cent were regressed with employment to forecast the state's gasoline tax revenues per cent. Because the gasoline tax rate has varied over time, the historical gasoline tax collections were analyzed as gasoline tax revenues per cent in order to capture the revenue growth that resulted from increases in consumption rather than increases in the tax rate. Figure 5-3 compares the historical state gasoline tax collections per cent to the forecast equation's projection of revenues between 1980 and 2002.

Once the tax revenues per cent were forecasted, the forecast of TDOT's share of gasoline tax revenue receipts was developed by multiplying the revenues per cent by TDOT's portion of the state's 20 cent gasoline tax, 12.16 cents according to TDOT.

Figure 5-3. Historical and Forecasted TDOT Gasoline Tax Revenues



Source: AECOM Consult, Inc.

Why Forecast Was Selected. The employment equation was selected as the basis for forecasting Tennessee's gasoline tax revenues because it best matched the historical annual

[1] Data on actual collections were not available.

fluctuation of gasoline tax revenues per cent and the average annual growth in gas tax revenues per cent.

Table 5-3 demonstrates that the average annual change in TDOT's gasoline tax revenues closely follows the growth pattern of the economy. The peak of the 1990s growth occurred between 1996 and 2000, the height of the economic boom. In contrast, the historical and forecasted growth for the 2000 to 2004 period is largely during a period of economic recession, which is reflected in the 0.68 percent annual growth.

Table 5-3. Average Annual Growth in TDOT Gasoline Tax Revenues

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
1.21%	1.66%	1.39%	0.68%	1.96%	1.91%	1.91%

Source: AECOM Consult, Inc.

5.2.2 Motor Fuel Tax

The historical motor fuel tax revenues received by TDOT between 1990 and 2003 were estimated by the consultant based on historical collections from TDOR (see Figure 5-4). The forecast of motor fuel tax revenues includes TDOT's budget for FY 2005-06 and the consultant's forecast for 2007 through 2030. Tennessee's historical motor fuel tax revenues per cent were regressed with employment to forecast the state's motor fuel tax revenues per cent.

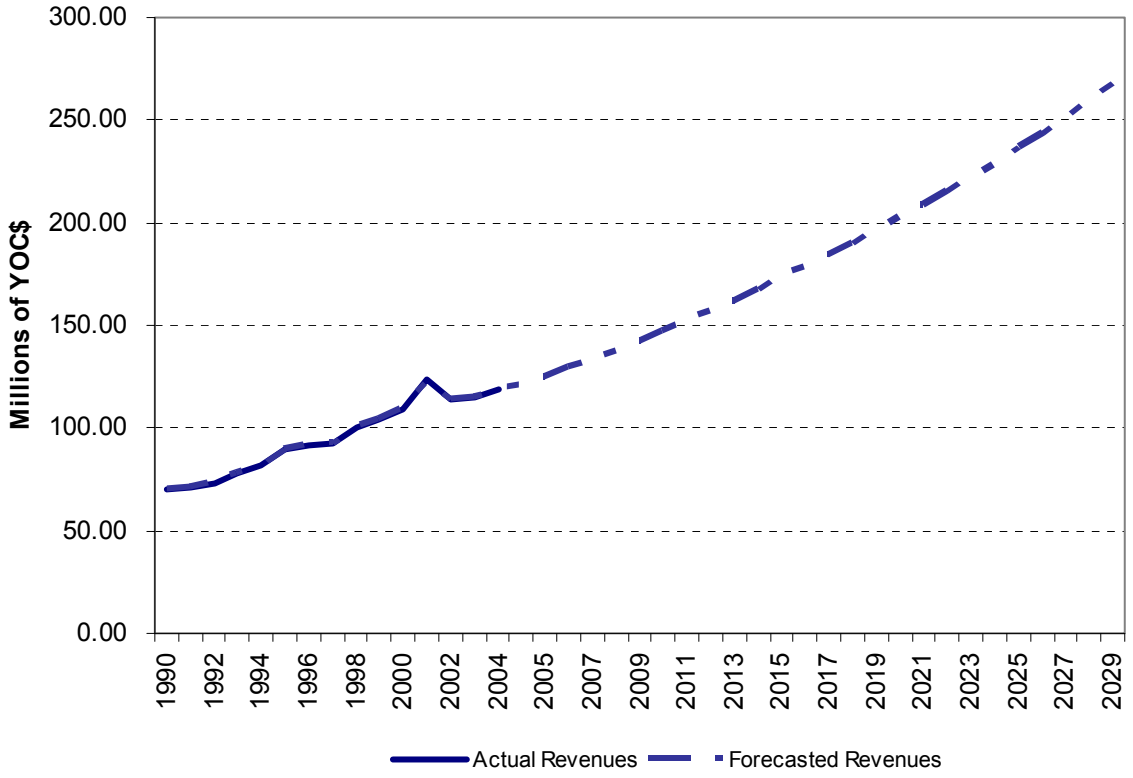
Because the motor fuel tax rate has varied over time, the historical motor fuel tax collections were analyzed as motor fuel tax revenues per cent in order to capture the revenue growth that resulted from increases in consumption rather than increases in the tax rate.

Once the tax revenues per cent were forecasted, the forecast of TDOT's share of motor fuel tax revenue receipts was developed by multiplying the revenues per cent by TDOT's portion of the state's 17 cent tax, 12.35 cents according to TDOT.

Why Forecast Was Selected. The employment equation was selected as the basis for forecasting Tennessee's motor fuel tax revenues because it best matched the historical annual fluctuation of motor fuel tax revenues per cent and the average annual growth in motor fuel tax revenues per cent.

Figure 5-4 and Table 5-4 demonstrate that the average annual change in TDOT's motor fuel tax revenues are more resilient to economic recessions than its gasoline tax revenues. The historical average annual motor fuel tax growth is fairly consistent between 1990 and 2000, a period of economic recession and strong growth. The historical and forecasted growth for the 2000 to 2004 period is largely during a period of economic recession, which is reflected in the drop to 2.12 percent annual growth; however, the annual growth for the motor fuel tax revenues is still more than twice that of TDOT's gasoline tax revenues.

Figure 5-4. Historical and Forecasted TDOT Motor Fuel Tax Revenues



Source: AECOM Consult, Inc.

Table 5-4. Average Annual Growth in TDOT Motor Fuel Tax Revenues

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
4.58%	4.40%	4.51%	2.12%	3.27%	3.24%	3.15%

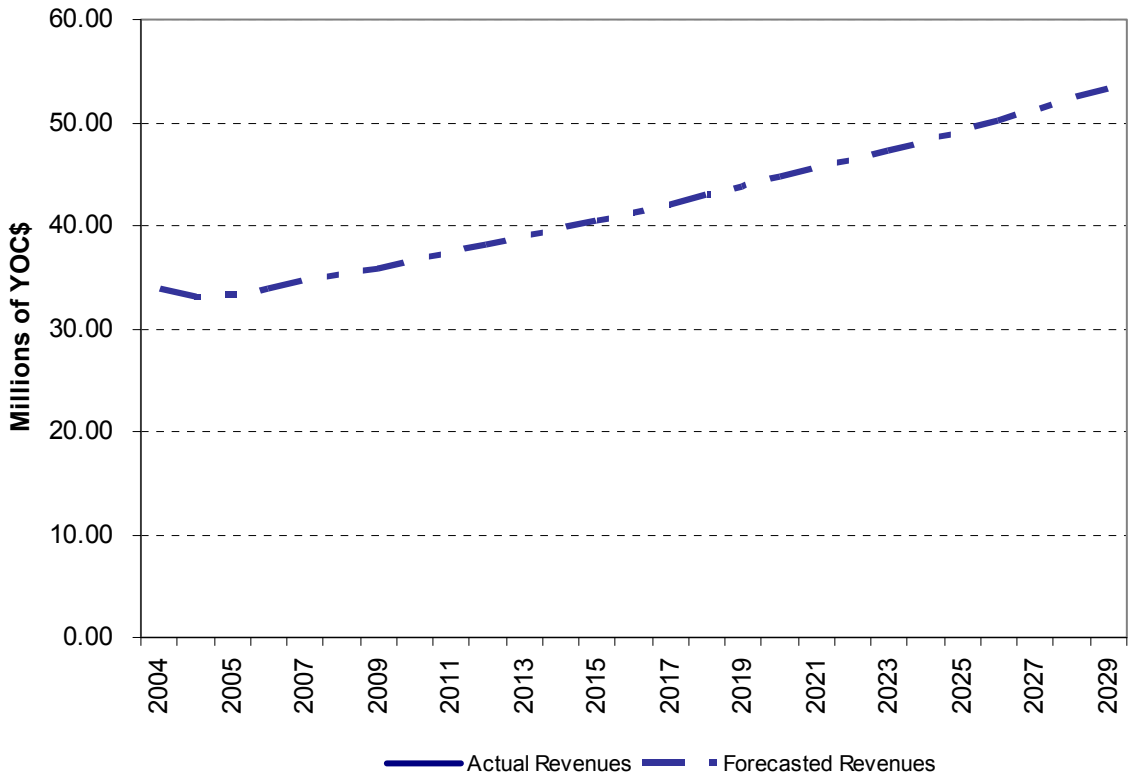
Source: AECOM Consult, Inc.

5.2.3 Special Petroleum Tax

The forecast of special petroleum tax revenues includes TDOT's budget for FY 2003-06 and the consultant's forecast for 2007 through 2030 (see Figure 5-5). The forecast is driven by the forecasts of gasoline and motor fuels.

The forecast of special petroleum tax revenues is based on the forecast of Tennessee's gasoline and motor fuel tax revenues per cent. Because only a portion of the 1 cpg special petroleum tax is dedicated to TDOT's Highway Fund, the gasoline and motor fuel tax revenues generated per cent are multiplied by the percentage of special petroleum tax revenues dedicated to the Highway Fund. The percentage is based on TDOT's FY 2003-04 budget special petroleum tax revenues dedicated to the Highway Fund divided by the sum of the 2004 gasoline tax revenues generated per cent and motor fuel tax revenues generated per cent, 89.9 percent. The analysis assumes that the special petroleum tax rate remains at its current level throughout the forecast period.

Figure 5-5. Forecasted Special Petroleum Tax Revenues



Source: AECOM Consult, Inc.

Why Forecast Was Selected. The forecast (see Table 5-5) is based on the forecasts for Tennessee's gasoline and motor fuel tax revenues per cent because the portion of the special petroleum tax dedicated to TDOT is a cent per gallon tax.

Table 5-5. Average Annual Growth in TDOT Special Petroleum Tax Revenues

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
-	-	-	-	0.86%	2.00%	1.99%

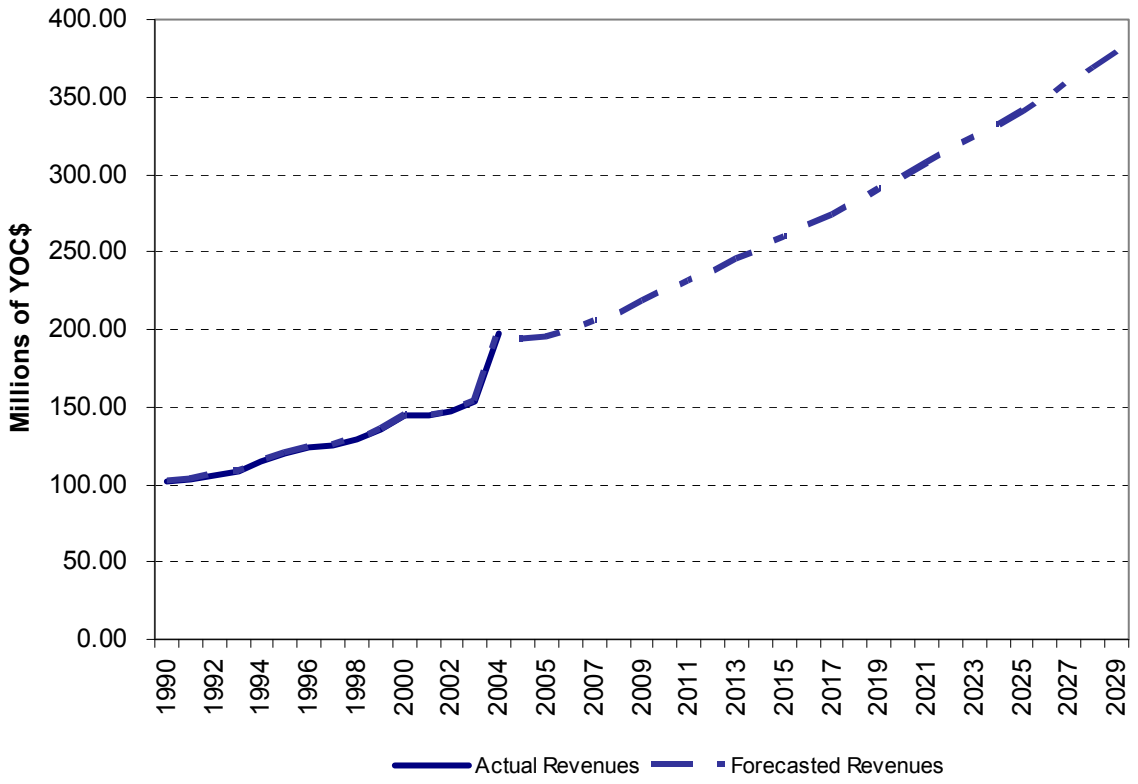
Source: AECOM Consult, Inc.

5.2.4 Motor Vehicle Registration Fees

Historical data isolating the portion of motor vehicle registration fee revenues (see Figure 5-6) dedicated to TDOT were not available, only total TDOR collections were. The consultant's forecast is based solely on the registration fee portion of the fee collections, which is also composed of fines, miscellaneous, personalized license plates, and other revenues.

The registration fee component is the most stable of the revenues; therefore, the total state registration fees regression was estimated using per capita income and employment (Bureau of Economic Analysis), indicators of the public's ability to purchase and register motor vehicles.

Figure 5-6. Historical and Forecasted Motor Vehicle Registration Fee Revenues



Source: AECOM Consult, Inc.

Once the registration fee component was projected, the forecast of TDOT's share of motor vehicle registration fee revenue receipts was developed by adjusting the forecast upward to account for the additional registration fee revenues dedicated to TDOT.

Why Forecast Was Selected. The per capita income and Bureau of Economic Analysis employment equation was selected as the basis for forecasting Tennessee's motor vehicle registration tax revenues (see Table 5-6) because it best matched the historical annual fluctuation of the registration fee revenues and the average annual growth in registration fee revenues. Expansion of the state's stock of motor vehicles is driven by the expansion of the economy and the ability to purchase those vehicles.

Table 5-6. Average Annual Growth in TDOT Motor Vehicle Registration Fee Revenues

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
3.36%	3.86%	3.56%	8.18%	1.51%	2.86%	2.70%

Source: AECOM Consult, Inc.

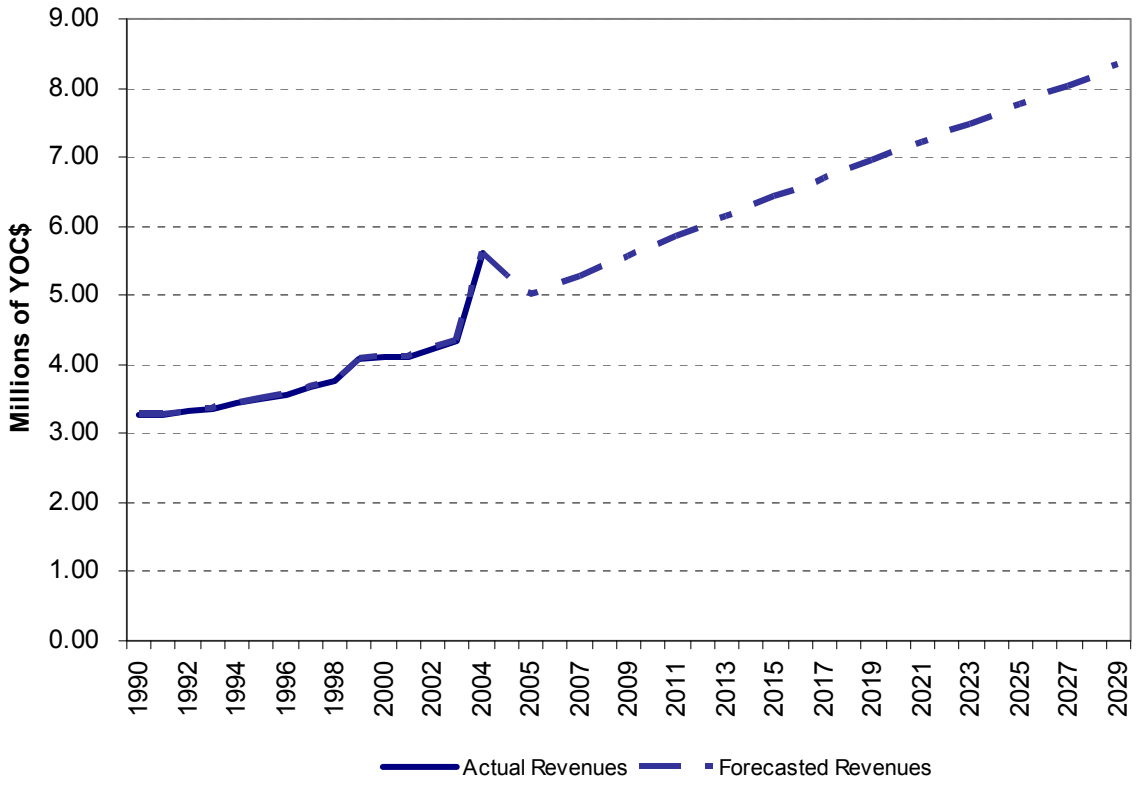
The average annual growth rates for the forecast periods are lower than the state's historical growth in collections; however, the forecast growth attempts to reflect only increases in revenues

collected due to the numbers and types of motor vehicles registered in Tennessee, not increases in the registration fees charged.

5.2.5 Beer and Bottle Tax

The beer and bottle tax revenues are consultant estimates based on TDOR historical collections of the beer privilege tax and the gross receipts tax on soft drink bottlers (see Figure 5-7). The forecast revenues for 2007 through 2030 are consultant projections. To prepare the forecast, the consultant regressed Tennessee's historical beer and bottle tax revenues with population.

Figure 5-7. Historical and Forecasted Beer and Bottle Tax Revenues



Source: AECOM Consult, Inc.

Once the beer privilege and bottlers' gross receipt tax revenues were forecasted, the forecast of TDOT's share of the beer and bottle tax was developed by taking the 12.8 percent share of the beer privilege tax and the 21 percent of the soft drink bottlers' gross receipts tax (which is 4.55 percent of the total bottlers' gross receipts revenues shown on Figure 5-7).

Why Forecast Was Selected. The population regression equations were selected as the basis for forecasting Tennessee's beer privilege tax and soft drink bottlers' gross receipts tax because it best matched the historical annual fluctuation of the tax revenues and its average annual growth. (See Table 5-7.)

Table 5-7. Average Annual Growth in TDOT Beer and Bottle Tax Revenues

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
1.49%	3.68%	2.36%	8.00%	2.89%	2.11%	1.81%

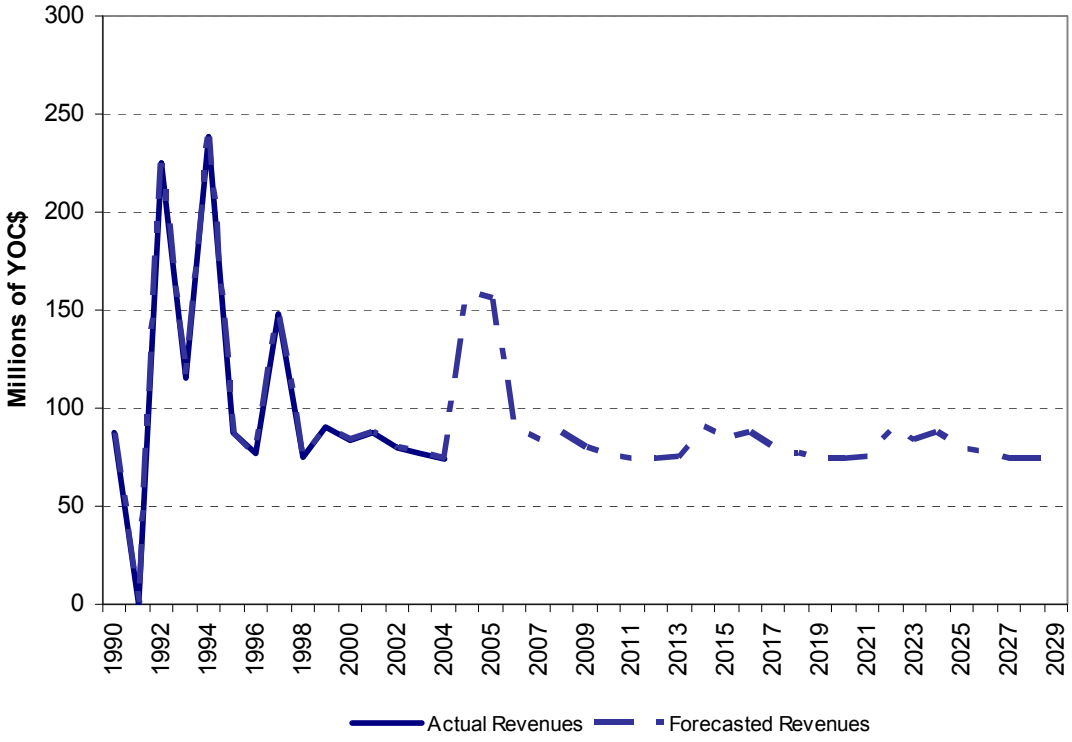
Source: AECOM Consult, Inc.

The average annual growth rates for the two forecast periods, 2005-2010 and 2010-2025, fall in between the higher annual growth during the economic boom of the late 1990s and the recessionary period of the early 1990s. The larger growth associated with the 2000-2005 period, reflects the growth associated with the recovery economy during 2004 and 2005. Based on these historical average annual growth rates, the forecast appears to be reasonable.

5.3 Bond Authorizations

TDOT's use of unissued bond authorizations (see Figure 5-8) is a cash flow management tool developed by the state in order to accelerate projects in anticipation of expected revenues over a project's horizon. The benefit of this financing method is that it permits projects to begin earlier than they would if projects were held until sufficient funds had accrued to cover the project's cost. The use of authorized and unissued bonds *does not generate revenue itself*. It is a cash management tool. At the end of each year, the state cancels a portion of the bond authority, in effect retiring that authorization, and issues a new bond authorization. Thus, the bond authority is a sliding window of bond obligations of varying vintages. In sum, these obligations total about $641 million, which TDOT estimates to be close to the maximum that it can cover on a pay-as-you-go basis with the current tax base without actually having to sell the bonds.

Figure 5-8. Historical and Forecasted Unissued Bond Authorizations



Source: AECOM Consult, Inc.

The historical authorizations and projections for the entire forecast period were provided by TDOT, based on TDOT's assessment of the maximum amount that its program can support.

Why Forecast Was Selected. By using unissued bond authorizations, TDOT is constrained in its ability to expand the program (see Table 5-8). The annual authorized amount is approaching the maximum amount that their current cash flow can pay back annually, and the forecast follows the historical pattern of projections. The forecast shows a peak during 2005 and 2006, which accounts for the increase in bond authorizations for the Knoxville Project.

Table 5-8. Average Annual Growth in Bond Authorizations

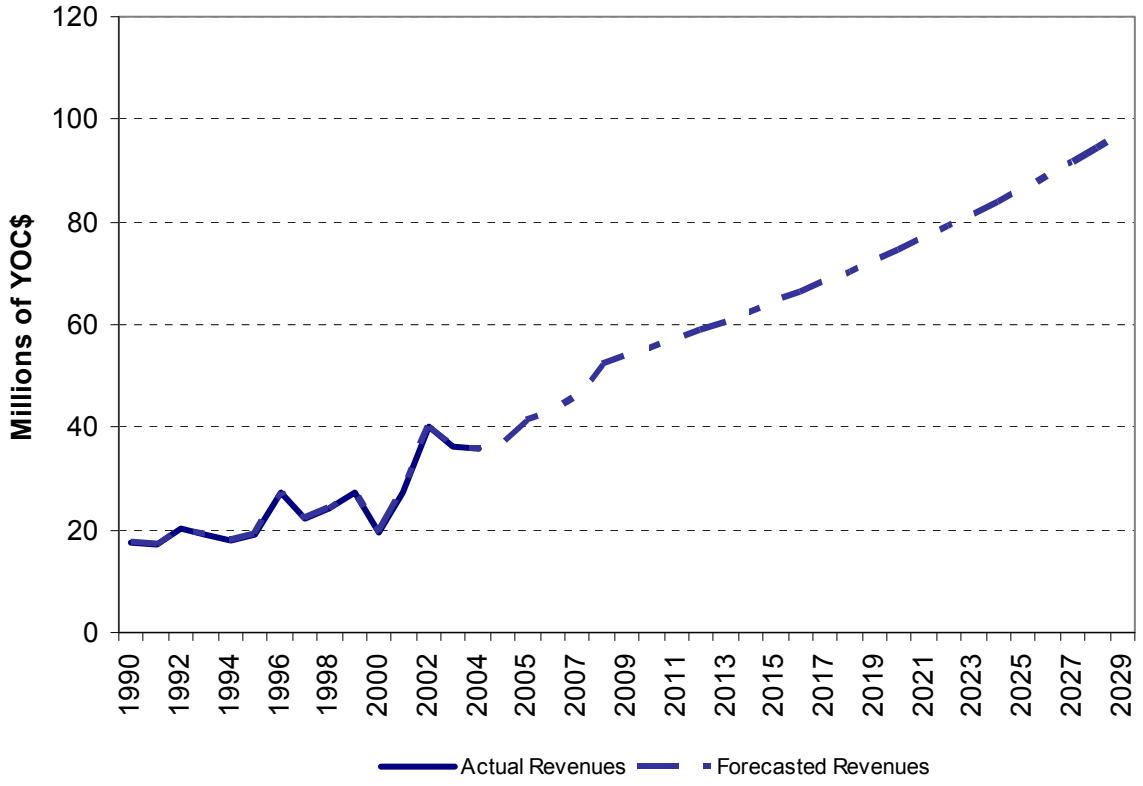
1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
-2.15%	2.14%	-0.45%	-3.06%	-12.84%	0.61%	0.13%

Source: AECOM Consult, Inc.

5.4 Local Revenues

The historical local revenues for 1990 through 2003 were provided by TDOT (see Figure 5-9). Because local funds vary from year to year based on project needs and advancement, the forecast of local revenues is based on the forecast of total federal revenues to be received by TDOT.

Figure 5-9. Historical and Forecasted Local Revenues



Source: AECOM Consult, Inc.

Why Forecast Was Selected. The forecast of local revenues assumes that these funds are largely going to the federal match and they are projected at the same rate as the federal program in the outyears (see Table 5-9).

Table 5-9. Average Annual Growth in Local Revenues

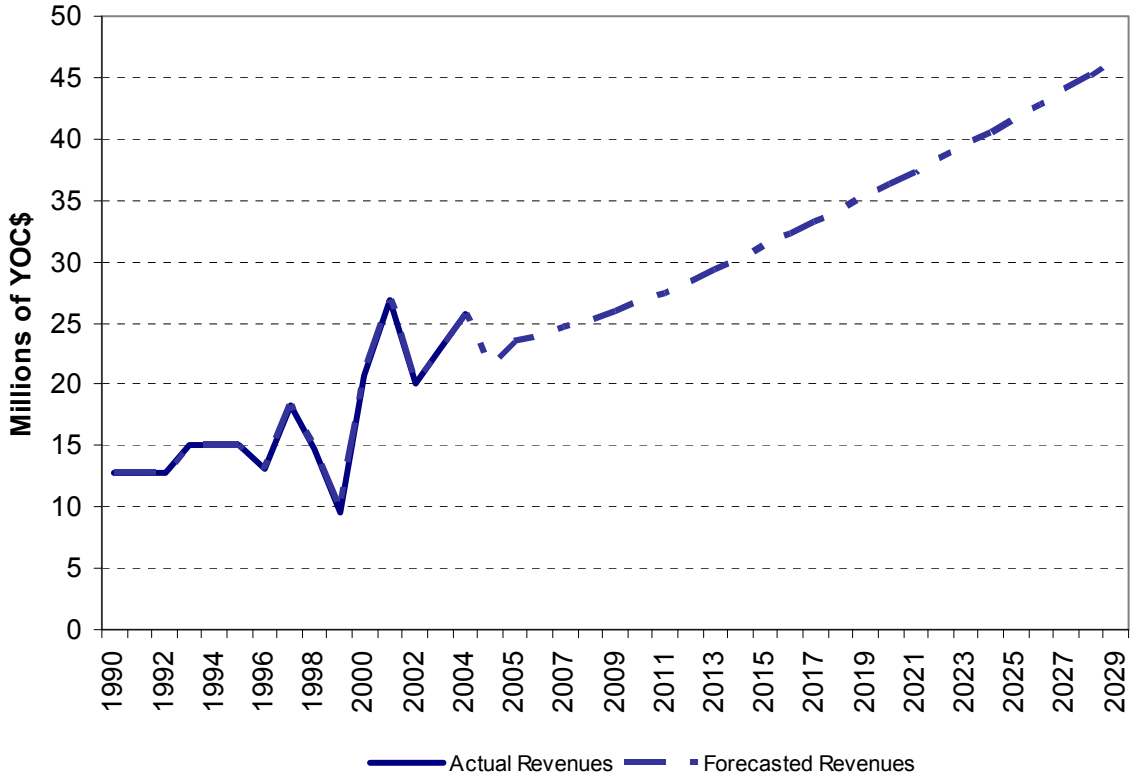
1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
7.67%	-8.01%	1.10%	16.32%	3.75%	3.00%	3.00%

Source: AECOM Consult, Inc.

5.5 Transportation Equity Fund

The historical TEF revenues for 1990 through 2004 were provided by TDOT (see Figure 5-10). The 2005 and 2006 values are budget figures. The 2007 through 2030 revenues are based on consultant projections. The TEF forecast is based on the sum of the forecasts for the aviation, rail, and waterway sales tax components. See each component of the TEF for individual forecast summaries.

Figure 5-10. Historical and Forecasted Transportation Equity Fund Revenues



Source: AECOM Consult, Inc.

Why Forecast Was Selected. As shown on Table 5-10, the TEF revenues have been historically volatile. Years of strong growth are followed by years of strong decline. The forecast of TEF revenues for Tennessee's Long-Range Transportation Plan does not project this volatility, but it does consider it by using a growth rate that averages the historical highs and lows.

Table 5-10. Average Annual Growth in Transportation Equity Fund Revenues

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
0.49%	11.98%	4.93%	5.53%	2.62%	3.03%	2.80%

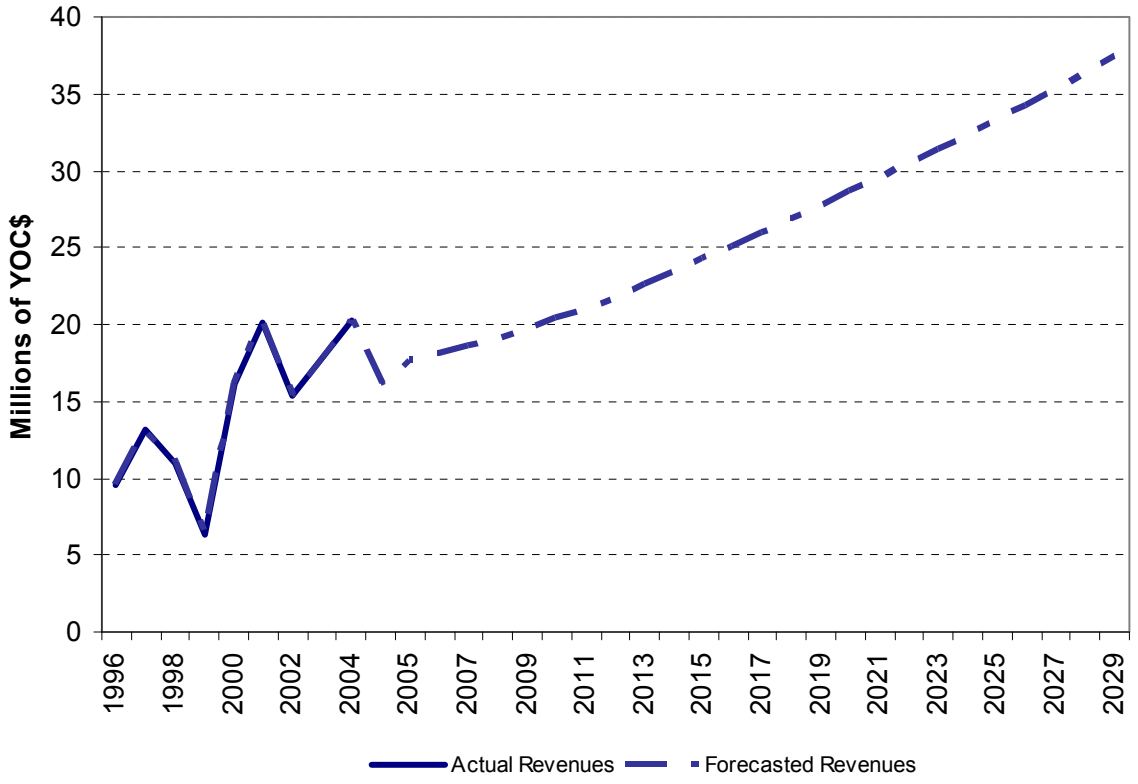
Source: AECOM Consult, Inc.

Essentially, the forecasted average annual growth rates have the TEF increasing slightly faster than inflation, which is reasonable given the forecasted growth for Tennessee's aviation, rail, and waterway activity (discussed in each component's forecast summary).

5.5.1 Aviation

To prepare the forecast, the consultant regressed Tennessee's historical aviation TEF revenues (see Figure 5-11) with the national price of jet fuel per gallon and airport operations (number of takeoffs and landings), excluding military, at Tennessee's commercial and general aviation airports.

Figure 5-11. Historical and Forecasted Aviation Transportation Equity Fund Revenues



Source: AECOM Consult, Inc.

Why Forecast Was Selected. The national price of jet fuel per gallon and airport operations equation at Tennessee airports was selected as the basis for forecasting TDOT's aviation TEF revenues because it best matched the historical annual fluctuation of the aviation TEF revenues (see Table 5-11).

Table 5-11. Average Annual Growth in Aviation Transportation Equity Fund Revenues

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
-	14.13%	-	5.90%	2.85%	3.35%	3.04%

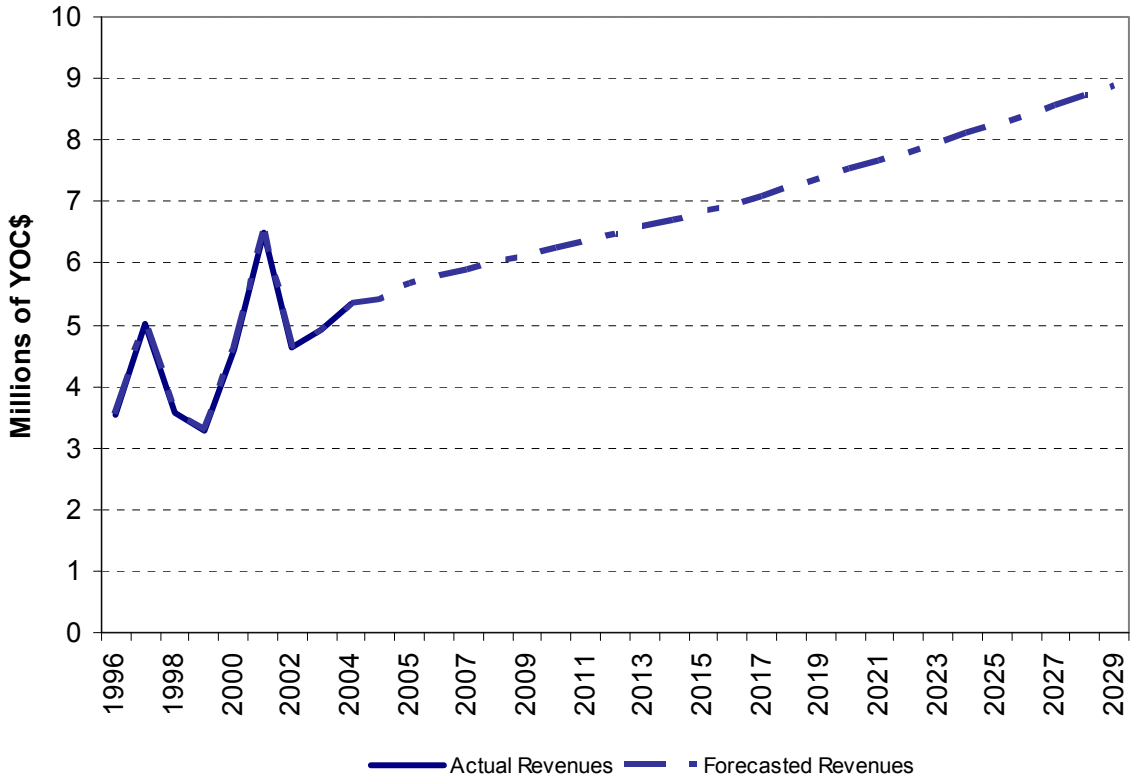
Source: AECOM Consult, Inc.

The aviation TEF revenue forecast is weaker than the historical trend might otherwise suggest; however, this is due largely to the forecasts of slower future growth in aviation operations at Tennessee airports than in the past.

5.5.2 Rail

The 1996 through 2004 historical TEF revenues for rail were provided by TDOT (see Figure 5-12). The forecast revenues for 2005 are based on TDOT's budget, while 2006 through 2030 are consultant projections. To prepare the forecast, the consultant used a trend line analysis of the historical rail TEF revenues.

Figure 5-12. Historical and Forecasted Rail Transportation Equity Fund Revenues



Source: AECOM Consult, Inc.

Why Forecast Was Selected. The trend line forecast equation was selected as the basis for forecasting TDOT's rail TEF revenues because historical revenues since 1996 were volatile and regression results were not significant or did not show correlation between the variables and rail TEF revenues (see Table 5-12).

Table 5-12. Average Annual Growth in Rail Transportation Equity Fund Revenues

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
-	6.65%	-	3.87%	1.90%	1.88%	1.87%

Source: AECOM Consult, Inc.

The forecast is weaker than the historical trend might otherwise suggest; however, this is in large part because the historical revenues included some expansion of service, while no forecasts were available that projected continued increases in rail service in Tennessee. Recognizing the volatility of this source, this forecast is conservative.

5.5.3 Waterways

The 1996 through 2004 historical TEF revenues for waterways were provided by TDOT (see Figure 5-13). The forecast revenues for 2005 through 2030 are consultant projections. The baseline forecast for the waterway transportation component of the TEF is based on conservative expectations for price. The U.S. Army Corps of Engineers Waterway Commerce Statistics project Tennessee river tonnages to remain steady, posting growth of just 0.9 percent annually, indicating this is a mature mode with little upside potential for an expansion of the tax base. Moreover, the tax base is small and volatile, and the historical period prior to the forecast shows outright declines in revenues.

Why Forecast Was Selected. The forecast for the waterway TEF revenues assumes that consumption is unlikely to rise. Growth in the price of fuel is offset by weak consumption.

Table 5-13 reflects the "negative change" (nc) trend in waterway TEF revenues since 1996, including negative revenues in 2000 due to a refund of waterway revenues during the second quarter.

Table 5-13. Average Annual Growth in Waterway Transportation Equity Fund Revenues

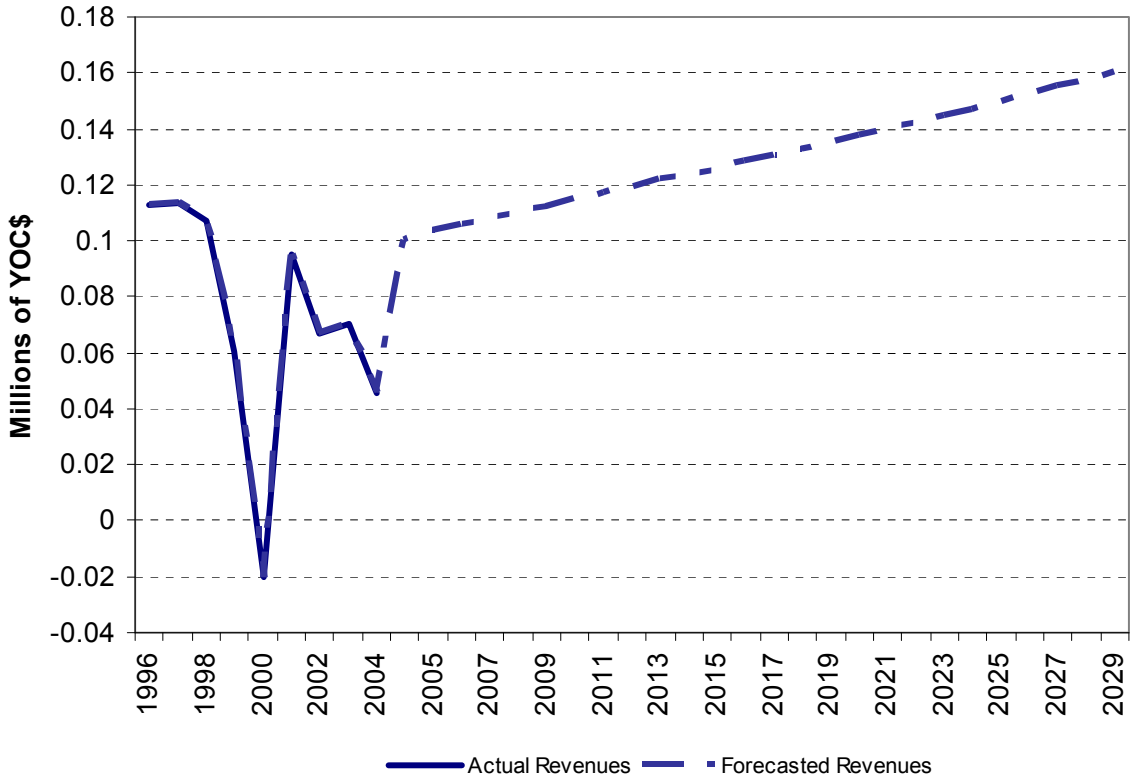
1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
-	nc	-	nc	1.96%	1.82%	1.74%

Source: AECOM Consult, Inc.

5.6 Miscellaneous Revenues

The historical miscellaneous revenues were provided by TDOT (see Figure 5-14). The values for 2006 through 2030 are consultant projections. The revenues have fluctuated widely since 1965, ranging from as low as $6.9 million in 1975 to as high as $49.4 million in 1995.

Figure 5-13. Historical and Forecasted Waterway Transportation Equity Fund Revenues



Source: AECOM Consult, Inc.

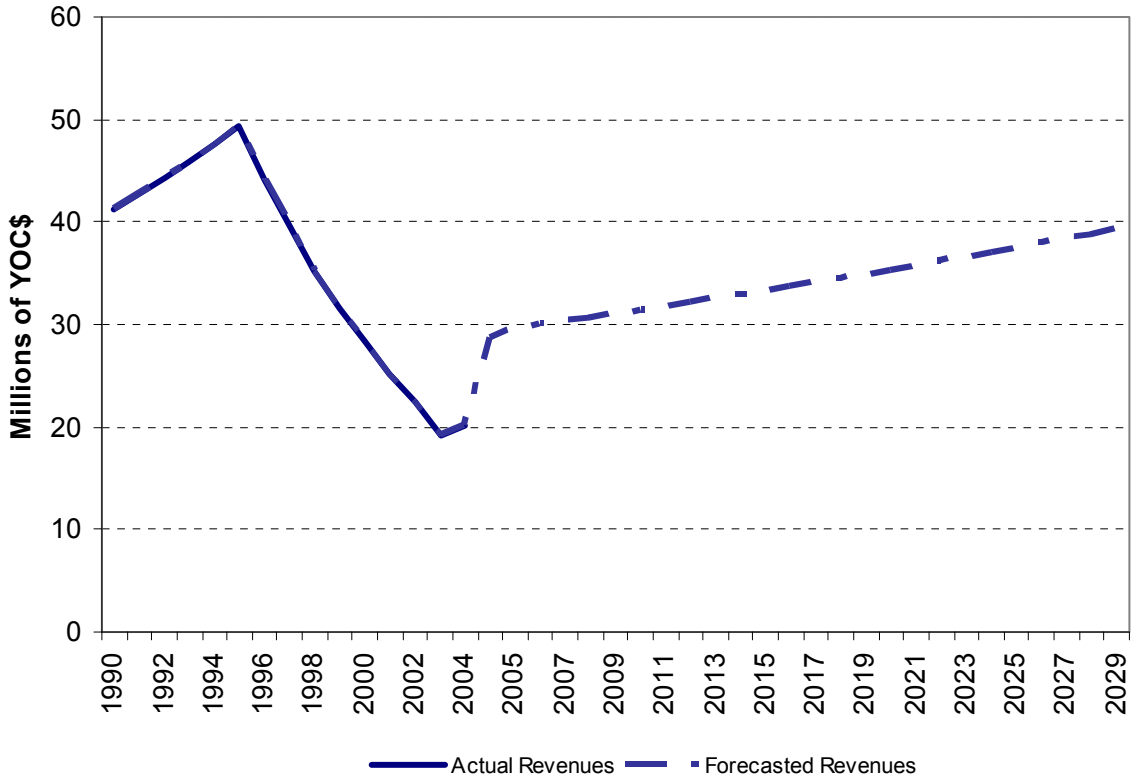
Why Forecast Was Selected. Because the miscellaneous revenues are composed of such varied sources and have had significant fluctuations in historical revenues, the forecast of these revenues is problematic. A reliable regression analysis cannot be performed because there is no correlation between the historical revenues and Tennessee's demographic or economic history. As a result, the closest estimation of future miscellaneous revenues is to use the average annual growth for the existing history (1965-2003), 1.18 percent, and apply it to the current TDOT budget forecast for 2004 (see Table 5-14).

Table 5-14. Average Annual Growth in Miscellaneous Revenues

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
1.17%	-10.61%	-3.72%	-8.07%	8.76%	1.18%	1.18%

Source: AECOM Consult, Inc.

Figure 5-14. Historical and Forecasted Miscellaneous Revenues



Source: AECOM Consult, Inc.

Due to the wide range and volatility of historical revenues, the consultant forecast miscellaneous revenues based on the average annual historical growth between 1965 and 2003, 1.18 percent, in order to capture as much of the historical growth in revenues as possible in the forecast.

5.7 Fund Balance and Reserves

The fund balance and reserves figure reflect revenues that have been budgeted but remain unused during the year (see Table 5-15 and Figure 5-15). An example is staff salary for a position that remains unfilled for a portion of the year. This portion of the budget is driven more by administrative decisions than economic fundamentals.

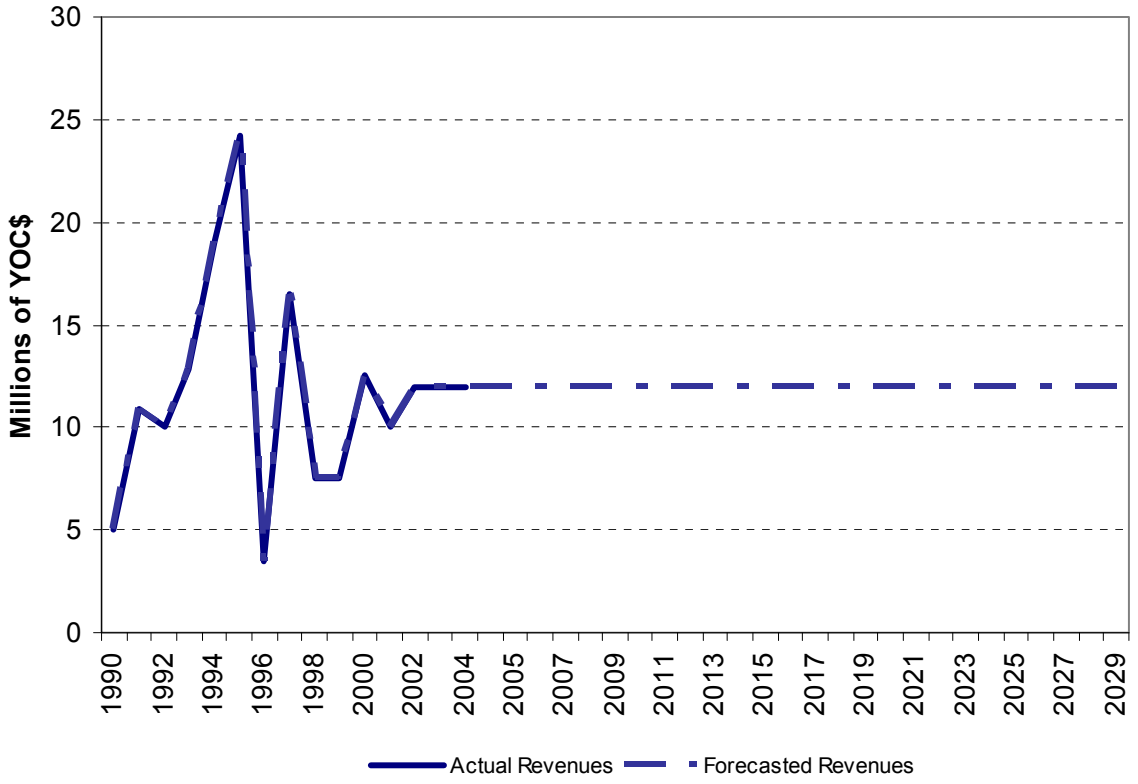
Table 5-15. Average Annual Growth in Fund Balance and Reserves

1990-1996	1996-2000	1990-2000	2000-2004	2005-2010	2010-2025	2020-2030
-5.77%	37.47%	9.60%	-1.02%	-0.36%	0.00%	0.00%

Source: AECOM Consult, Inc.

Guidance from the TDOT Finance Division indicated that this figure was likely to remain steady over the forecast horizon. Thus, the forecast is benchmarked to the value of the last 3 years, and the same value budgeted in TDOT's most recent FY 2005 budget.

Figure 5-15. Historical and Forecasted Fund Balances and Reserves



Source: AECOM Consult, Inc.

Chapter 6

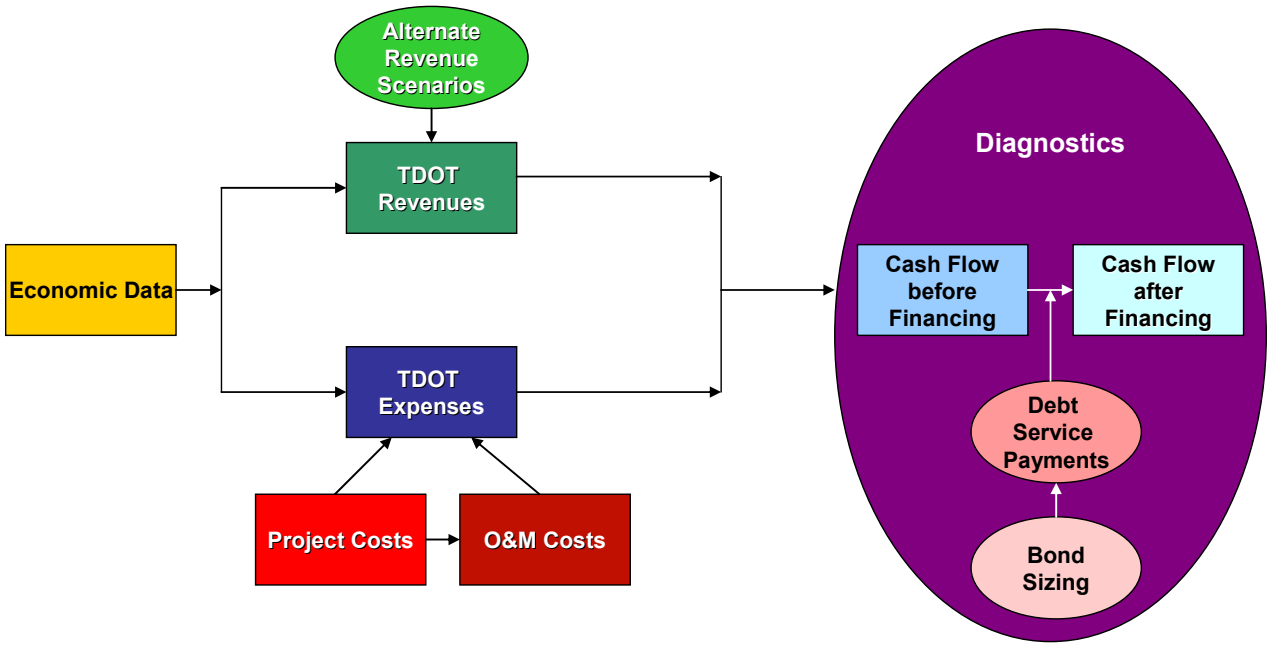
Financial Analysis Model

The financial analysis model developed for the Tennessee Long-Range Transportation Plan forecasts the annual TDOT revenues and expenditures for the three investment scenarios during the 25-year period of the plan, with particular focus on forecasts for 2015 (intermediate year) and 2030 (last year). The financial analysis model uses the annual revenue and expenditure scenario forecasts to produce a sources and uses of funds analysis, which identifies any funding gaps between the revenues and expenditures for each of the three investment scenarios. This chapter summarizes the financial analysis model's capabilities and the baseline TDOT revenue forecast, modal needs, investment scenario expenditures based on modal needs, and funding gaps.

6.1 Prototypical Sources and Uses of Funds Model to 2015 and 2030

The sources and uses of funds analysis produced by the financial analysis model incorporates the baseline revenue forecast and the expenditures associated with three investment scenarios that are based on modal needs to identify possible funding gaps in the 25-year multimodal plan. The financial analysis model was developed with the flexibility to test alternative financing solutions to close any funding gaps including the introduction of new revenue sources, changing tax rates for existing revenue sources, and debt financing. The framework and capabilities of the financial analysis model are summarized on Figure 6-1 and in the text that follows.

Figure 6-1. Financial Analysis Model Framework



Source: AECOM Consult, Inc.

The historical and forecasted economic data underlie the projections of TDOT's baseline revenue forecast, as described in detail in Chapter 5 of this report. The baseline revenue forecast is developed in the TDOT Revenues section of the financial analysis model. In addition to the baseline revenue forecast, the financial analysis model provides an opportunity to evaluate different revenue forecast scenarios (optimistic and pessimistic), which allows the impacts of different tax rate and tax base growth assumptions on TDOT's revenues to be analyzed in Alternative Revenue Scenarios.

The first section of the financial analysis model, *Economic Data*, involves collecting historical and forecasted economic data for Tennessee. These data include population, employment, personal income, per capita income, vehicle registrations, vehicle miles of travel, fuel consumption, inflation, and other economic factors that influence the forecast of TDOT revenues. These data are collected from the U.S. Census, Bureau of Labor Statistics, Bureau of Economic Analysis, FHWA, State of Tennessee, TDOT Finance Division, and the Center for Business and Economic Research at the University of Tennessee at Knoxville.

The historical and forecasted economic data underlie the projections of TDOT's baseline revenue forecast, as described in detail in Chapter 5 of this report. The baseline revenue forecast is developed in the *TDOT Revenues* section of the financial analysis model. In addition to the baseline revenue forecast, the financial analysis model provides an opportunity to evaluate different revenue forecast scenarios (optimistic and pessimistic), which allows the impacts of different tax rate and tax base growth assumptions on TDOT's revenues to be analyzed.

The historical and forecasted economic data also are used in the projections of TDOT's expenditures for three investment scenarios based on TDOT modal needs. Because the investment scenarios are programs of projects, the expenditures are assumed to be spread evenly over the 25-year analysis period. The costs input into the *TDOT Expenses* section of the financial analysis model are based on the three investment scenarios developed from the modal needs analysis.

The *Cash Flow Before Financing* section of the financial analysis model combines the annual revenue and expenditure data from *TDOT Revenues* and *TDOT Expenses* in the form of an annual sources and uses of funds table for the 25-year period. This summary table compares the annual and total revenues and expenditures to identify funding shortfalls in the plan. Once the funding shortfalls are identified, methods to close the funding gaps can be examined, including the use of new revenue sources, changing tax rates or tax bases for existing revenue sources, and debt financing.

If debt financing is considered as a potential solution to the funding shortfall, the *Bond Sizing* and *Debt Service Payments* sections of the financial analysis model may be used to evaluate the impacts of debt financing on the financial plan. The financial analysis model has the ability to size and issue debt to cover annual funding shortfalls based on various terms of the debt (interest rates, length of borrowing, issuance costs, and surety premiums). If the use of debt financing is not being considered, these sections of the financial analysis model may be ignored.

The *Cash Flow After Financing* section of the financial analysis model shows the summary table updated with the additional revenues and costs associated with using debt financing to close the funding shortfalls identified in the *Cash Flow Before Financing* section. This summary table also provides the ability to evaluate whether TDOT's annual revenues are sufficient to meet the debt service payments for any bond issues required to close funding gaps. If the use of debt financing is not being considered, the *Cash Flow After Financing* section of the financial analysis model may be ignored.

6.2 Model Adapted for Tennessee Revenue Sources

The baseline revenue forecast for Tennessee's Long-Range Transportation Plan was developed in the *Economic Data* and *TDOT Revenues* sections of the financial analysis model. This section summarizes TDOT's baseline revenue forecast of state and local sources for 2015 (mid-point of the plan), 2030 (last year of the plan), and the 25-year total revenues in year of collection dollars. For additional details on the forecast of revenue sources, see Chapter 5 of this report.

6.2.1 Highway User Fees

Highway user fees are comprised of Tennessee's gasoline and motor fuel taxes, special petroleum tax, vehicle registration fees, and beer and bottle tax. Revenues collected from these sources are divided between Tennessee's Highway Fund, Sinking Fund, General Fund, and cities and counties. As a result, about 66 percent of all user fee revenues are distributed to TDOT through the Highway Fund and Sinking Fund. The baseline forecast of total highway user fee revenues dedicated to TDOT is shown on Table 6-1. The total highway user fee revenues shown are the sum of the gasoline and motor fuel taxes, special petroleum tax, vehicle registration fees, and beer and bottle tax revenues.

Table 6-1. Baseline Highway User Fee Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Highway User Fees	813.61	1,170.72	22,208.27

Source: AECOM Consult, Inc.

Gasoline Tax

Tennessee's gasoline tax is 20 cpg, excluding federal taxes, and the baseline revenue forecast conservatively assumes that the tax rate will remain 20 cpg throughout the 25-year period of the Long-Range Transportation Plan. The gasoline tax revenue forecast is based on a regression analysis of historical revenues per cent and employment. The portion of the gasoline tax revenue forecast dedicated to TDOT is summarized on Table 6-2.

Table 6-2. Gasoline Tax Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Gasoline Tax	348.32	462.42	9,306.89

Source: AECOM Consult, Inc.

Motor Fuel Tax

The current motor fuel tax in Tennessee is 17 cpg, excluding federal taxes, and the baseline revenue forecast conservatively assumes that the tax rate will remain 17 cpg throughout the 25-year period of the Long-Range Transportation Plan. Like the gasoline tax revenue forecast, the motor fuel tax baseline revenue forecast is based on a regression analysis of historical revenues per cent and employment. The portion of the motor fuel tax revenue forecast dedicated to TDOT is shown on Table 6-3.

Table 6-3. Motor Fuel Tax Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Motor Fuel Tax	167.40	267.81	4,710.24

Source: AECOM Consult, Inc.

Special Petroleum Tax

Both gasoline and motor fuel sales are subject to a 1.4 cpg special petroleum tax, which includes a 0.4 cpg environmental fee distributed to Tennessee's General Fund. The baseline forecast assumes that the tax rate will remain 1.4 cpg. The baseline forecast of the special petroleum tax revenues is based on the forecast of gasoline and motor fuel tax revenues per cent. The portion of the special petroleum tax revenue forecast dedicated to TDOT is summarized on Table 6-4.

Table 6-4. Special Petroleum Tax Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Special Petroleum Tax	39.61	53.21	1,060.91

Source: AECOM Consult, Inc.

Motor Vehicle Registration Fees

Registration fees vary by vehicle, ranging from $13.50 for motorcycles and $20.50 for passenger cars, to more than $1,000 for trucks. Because vehicle registration fees vary by vehicle type, and because detailed records on Tennessee's vehicle fleet are not readily available, the forecast of registration revenues is based on total TDOR registration fee collections. The baseline forecast of motor vehicle registration fee revenues is based on a regression analysis of historical TDOR vehicle registration collections, employment, and per capita income. The portion of the motor vehicle registration fee revenue forecast dedicated to TDOT is shown on Table 6-5.

Table 6-5. Motor Vehicle Registration Fee Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Motor Vehicle Registration Fees	252.00	378.96	6,963.61

Source: AECOM Consult, Inc.

Beer and Bottle Tax

Tennessee imposes of 1.9 percent gross receipts tax on soft drink bottlers and a $4.30 per barrel (31 gallons) privilege tax on beer manufactured or sold in the state. The baseline forecast of the beer and bottle tax revenues is based on a regression analysis of historical TDOR beer and bottle tax collections and population. The portion of the beer and bottle tax revenue forecast dedicated to TDOT is shown below on Table 6-6.

Table 6-6. Beer and Bottle Tax Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Beer and Bottle Tax	6.28	8.32	166.63

Source: AECOM Consult, Inc.

6.2.2 Bond Authorization

TDOT's use of unissued bond authorizations is a cash management tool developed by the state to accelerate projects in anticipation of expected revenues over a project's horizon. The use of authorized and unissued bonds does not generate revenue itself. The bond authorization projection is provided by the TDOT Finance Division. The projection is based on their historical experience with the pattern of project expenditures as well as their assessment of what the program's cash flow can accommodate. Table 6-7 summarizes the bond authorizations included in TDOT's baseline revenue forecast.

Table 6-7. Bond Authorization Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Bond Authorization	90.00	75.00	2,080.50

Source: AECOM Consult, Inc.

6.2.3 Transportation Equity Fund

Established in 1987, the TEF generates revenues for projects in Tennessee's falling within the aviation, rail, and waterway modes. The TEF revenues are derived from a sales tax on petroleum products used by these modes. Aviation and jet fuel is taxed at a rate of 4.5 percent, while fuel sold for locomotives or barges is taxed at a rate of 5.5 percent. The total TEF revenue forecast is summarized on Table 6-8. The total revenues shown are the sum of the aviation, rail, and waterway TEF revenue forecast.

Table 6-8. Transportation Equity Fund Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
TEF	30.22	46.43	842.64

Source: AECOM Consult, Inc.

Aviation

The baseline forecast for the aviation transportation component of the TEF is based on a regression analysis of the historical price of jet fuel per gallon and airport activity at Tennessee airports. The revenue forecast is shown on Table 6-9.

Table 6-9. Aviation Transportation Equity Fund Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Aviation	23.39	37.40	660.37

Source: AECOM Consult, Inc.

Rail

The baseline forecast for the rail transportation component of the TEF is based on a trend line forecast equation because the tax base is small and historical revenues are volatile. Over the 1997 to 2004 period, revenues have grown about 1 percent per year, with several years posting stronger growth, in accordance with an expansion of rail service (the revenue source's tax base) within the state. This is a conservative forecast in recognition of the volatility of this source. The revenue forecast is shown on Table 6-10.

Table 6-10. Rail Transportation Equity Fund Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Rail	6.70	8.87	178.99

Source: AECOM Consult, Inc.

Waterway

The baseline forecast for the waterway transportation component of the TEF is based on conservative expectations for price. The U.S. Army Corps of Engineers Waterway Commerce Statistics project Tennessee river tonnages to hold steady, posting just growth of 0.9 percent annually, indicating this is a mature mode with little upside potential for an expansion of the tax base. Moreover, the tax base is small and volatile, and the historical period prior to the forecast shows outright declines in revenues. The revenue forecast is shown on Table 6-11.

Table 6-11. Waterway Transportation Equity Fund Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Waterways	0.12	0.16	3.27

Source: AECOM Consult, Inc.

6.2.4 Miscellaneous Revenues

Miscellaneous revenues are a diverse group of sources comprised of railroad inspection fees (dedicated to TDOT's Rail Inspection Program), outdoor advertising fees, permit and logo fees, rents, sales from maps and property, and toll service charges among other miscellaneous revenues. Because the miscellaneous revenues include such varied sources and because they

have had significant fluctuations in historical revenues, the baseline forecast is based on long-term historical experience. Average annual growth for the existing history (1965-2003) was 1.18 percent; without a clear and demonstrated connection to economic trends in the state, history is the next best guide of future performance. Table 6-12 shows the baseline revenue forecast for TDOT's miscellaneous revenues.

Table 6-12. Miscellaneous Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Miscellaneous Revenues	32.89	39.21	854.72

Source: AECOM Consult, Inc.

6.2.5 Fund Balances and Reserves

The fund balances and reserves figures reflect revenues that have been budgeted but remain unused during the year. An example is staff salary for a position that remains unfilled for a portion of the year. This portion of the budget is driven more by administrative decisions than economic fundamentals. Guidance from the TDOT Finance Division indicated that this figure is likely to remain steady over the forecast horizon. Thus, the forecast is benchmarked to the value of the last 3 years, and the same value budgeted in TDOT's most recent FY 2005 budget. Table 6-13 shows the baseline revenue forecast for TDOT's miscellaneous revenues.

Table 6-13. Fund Balance and Reserves Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Fund Balance and Reserves	12.00	12.00	300.00

Source: AECOM Consult, Inc.

6.2.6 Local Revenues

Local revenues represent the local match required of cities and counties in order to qualify for federal funds. Some state programs also require local funds. Because local funds vary from year to year based on project needs and advancement, the baseline forecast of local revenues is based on the forecast of total federal revenues to be received by TDOT. The baseline forecast assumes that the local revenues will grow at the same rate as federal revenues. The local baseline revenue forecast is summarized on Table 6-14.

Table 6-14. Local Revenue Forecast In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Local Revenues	62.40	97.21	1,726.12

Source: AECOM Consult, Inc.

6.2.7 Federal Program Revenues

Federal revenues account for more than half of TDOT's annual budget for all modes. The baseline federal revenue forecast for 2005 through 2009 is provided by the TDOT Finance Division and is based on information TDOT receives internally from legislative staff as well as AASHTO and other organizations. Beginning in 2010, the federal revenue forecast is projected to increase by 3 percent annually, based on expectations for long-term growth of the national economy and lack of information about future federal reauthorizations. Even with this modest growth rate, federal funds account for more than 60 percent of TDOT's total program by 2030. The baseline forecast for federal revenues is shown on Table 6-15.

Table 6-15. Federal Revenue Forecast
In Millions of Year of Collection Dollars

	2015 ($M)	2030 ($M)	25-year Total ($M)
Federal	1,502.24	2,340.44	41,557.43

Source: AECOM Consult, Inc.

6.2.8 Summary of Revenues

The summary of baseline forecast of state, federal, and local revenues is estimated to be $69.4 billion for the 25-year period of Tennessee's Long-Range Transportation Plan. These revenues grow from $1.6 billion in 2005 to approximately $3.8 billion in 2030. While these revenues may appear substantial, with no changes in tax rates and expectations for trends in future economic activity, existing revenues are likely to grow at or below the rate of inflation. TDOT's baseline revenue forecast achieves this modest growth rate because this is a trend forecast that assumes no increases in Tennessee's current tax rates. The largest state revenue sources for TDOT (gasoline and motor fuel taxes) are not protected from inflationary impacts because these taxes are cpg rather than based on price. The 25-year baseline total revenue forecast is summarized on Table 6-16.

Table 6-16. 25-Year Total Revenue Forecast
In Millions of Year of Collection Dollars

Revenue Source	2015 ($M)	2030 ($M)	25-year Total ($M)
State	978.71	1,343.36	26,101.33
Federal	1,502.24	2,340.44	41,557.43
Local Match	62.40	97.21	1,726.12
Total	2,543.35	3,781.01	69,384.88

Source: AECOM Consult, Inc.
Note: The state total revenue forecast also includes annual transfers from the Highway Fund to the General Fund between 2006 and 2011 as projected by the TDOT Finance Division.

6.3 Investment Scenario Expenditures as Available from Model Needs

The three investment scenarios for the Tennessee's Long-Range Transportation Plan are based on the modal needs assessment and are included as expenditures in the *TDOT Expenses* section of the financial analysis model. This section summarizes the modal needs development,

investment types, and the three expenditure investment scenarios included in the sources and uses of funds analysis for the Long-Range Transportation Plan.

The first element in estimating the expenditures associated with each of the investment scenarios involved establishing TDOT's modal needs for the next 25 years. The modal needs were developed based on the following Guiding Principles:

- Preserve and manage the existing transportation system
- Move a growing, diverse, and active population
- Support the state's economy
- Maximize safety and security
- Build partnerships for livable communities
- Promote stewardship of the environment
- Emphasize financial responsibility

These Guiding Principles led to the development of investment policies for each of TDOT's modes that focused on preserving the existing system and expanding transportation options in both rural and urban areas; identifying multimodal options to relieve congestion and to improve movement of people and freight; and targeting high-risk, strategic locations to improve safety. To meet these investment policies, the modes focused on three types of investments: (1) maintenance and preservation, (2) safety and modernization, and (3) expansion and enhancement. Maintenance and preservation investments include projects that repair, replace, or operate existing infrastructure and services, such as road resurfacing, existing public transportation operations and bus/van replacement, as well as bridge repair and replacement. Safety and modernization investments include projects such as pedestrian sidewalk ramp retrofitting, railroad crossing upgrades, turn lanes, and lane widenings. Expansion and enhancement investments include projects that add capacity to Tennessee's transportation system, such as adding lanes, increasing freight capacity, adding new airport runways and hangars, and expanding public transportation services.

The 25-year modal needs developed for these investment categories for all modes are shown on Table 6-17. It is noted that these are total modal needs, regardless of funding source (federal, state, local, other). TDOT historically has had differing levels of funding participation for the various types of modal improvements, using funds channeled through its budget.

Table 6-17. 25-Year Needs by Investment Category In Billions of Year of Collection Dollars

Investment Category	25-Year Cost ($B)
Maintenance/Preservation	30.70
Safety/Modernization	26.80
Expansion/Enhancement	72.40
Total	129.90

Source: PBS&J

The 25-year needs also are estimated for each mode. Table 6-18 summarizes the 25-year investment needs for each transportation mode. It is important to note that these needs are not

tied to a specific yearly distribution of expenditures. The expenditures represent programs of expenditures for each mode.

Table 6-18. 25-Year Needs by Mode
In Billions of Year of Collection Dollars

Mode	25-Year Cost ($B)
Highways and Bridges	91.30
Aviation	4.60
Bicycle/Pedestrian	0.30
Intelligent Transportation Systems	4.40
Public Transportation	14.10
Rail (Including Intercity Passenger)	14.00
Travel Demand Management	0.20
Waterways	1.00
Total Forecasted Needs	129.90

Source: PBS&J

As shown on Tables 6-17 and 6-18, the 25-year needs are significantly greater than the 25-year baseline forecast of $69.4 billion in revenues. This is true even considering the funds historically available outside the TDOT budget from other agencies and jurisdictions for modal improvements. From this information, three alternative investment scenarios that potentially could be funded by TDOT and its transportation partners over the 25-year term of the Long-Range Transportation Plan were constructed. The scenarios addressed the identified modal needs to varying degrees. The three alternative investment scenarios are based on three system performance levels: status quo, balanced, and optimistic. Each scenario is described below.

6.3.1 Status Quo Investment Scenario

The status quo investment scenario is designed to maintain the current level of performance across the transportation system for Tennessee's growing population. It continues the excellent level of maintenance for Tennessee's highway and aviation infrastructure and includes a limited effort in public transportation, and bicycle/pedestrian maintenance. Because this is the least expensive scenario, it does not offer a change in backlogged needs and meets only the highest priority needs for safety. Additionally, there is limited or no state participation in major rail or new public transportation projects. The 25-year total expenditures included in the status quo investment scenario are summarized by investment category on Table 6-19.

Table 6-19. Status Quo Investment Scenario Expenditures In Billions of Year of Collection Dollars

Investment Category	Status Quo Investment 25-year Total ($B)
Maintenance	25
Modernization	15
Expansion	35
Total	75

Source: PBS&J

6.3.2 Balanced Investment Scenario

The balanced investment scenario attempts to balance desired system performance with financial responsibility. This scenario maintains the high standards for highways and bridges and improves the maintenance for bicycle/pedestrian, public transportation, and rideshare facilities. This scenario also provides some reduction in backlogged needs and more funding for safety and modernization than the status quo investment scenario. Additionally, this scenario seeks to expand multimodal programs and transportation options in Tennessee. The 25-year total expenditures included in the balanced investment scenario are summarized by investment category on Table 6-20.

Table 6-20. Balanced Investment Scenario Expenditures In Billions of Year of Collection Dollars

Investment Category	Balanced Investment 25-year Total ($B)
Maintenance	24
Modernization	20
Expansion	41
Total	85

Source: PBS&J

6.3.3 Optimistic Investment Scenario

The optimistic investment scenario reflects public input for desired system performance and better addresses the extent of identified modal needs. This scenario increases maintenance efforts for all modes and significantly reduces backlogged modal needs. The optimistic investment scenario also expands transportation options in Tennessee and increases the focus on multimodal options. Additionally, the scenario builds expanded partnerships with local government and the private sector. The 25-year total expenditures included in the optimistic investment scenario are summarized by investment category on Table 6-21.

Table 6-21. Optimistic Investment Scenario Expenditures In Billions of Year of Collection Dollars

Investment Category	Optimistic Investment 25-year Total ($B)
Maintenance	24
Modernization	25
Expansion	56
Total	105

Source: PBS&J

6.3.4 Vision Plan Scenario

Through the LRTP Public Involvement program and internal TDOT analytical review, a recommended 25-Year Vision Plan for transportation program development has been proposed. The Vision Plan most closely reflects the Balanced Scenario described above, and if implemented, will achieve the following objectives:

- Continued high levels of transportation infrastructure investment
- Reduction in the backlog of highway capacity needs to improve safety and reduce delay
- Expanded TDOT support of both urban and rural transit programs to increase mobility options
- Increased attention to transportation system management to get greater efficiency from existing systems
- Improved freight systems by investing TDOT funds where clear public benefit is predicted
- Continued strong support of regional and community airports.

6.3.5 Summary of Costs

The summary of the expenditures associated with the three investment scenarios and Vision Plan range from $75 to $105 billion in year of collection dollars for the 25-year Long-Range Transportation Plan. All investment scenarios include total expenditures that are less than the 25-year modal needs but greater than the $69.4 billion baseline forecast of TDOT revenues, resulting in funding shortfalls for all investment scenarios. Table 6-22 summarizes the funding gaps for each investment scenario.

Table 6-22. 25-Year Revenue Requirements and Funding Gaps In Billions of Year of Collection Dollars

Funding Gaps	Status Quo Scenario ($B)	Balanced Scenario ($B)	Optimistic Scenario ($B)	25-Year Recommended Vision Plan ($B)
Total	75	85	105	85
Revenue Forecast	69	69	69	69
Funding Gap	6	16	36	16

Source: PBS&J

In order to have a reasonable financial plan, additional measures must be taken to eliminate the funding gaps shown on Table 6-22. These measures may include alternative financing approaches such as the introduction of new revenue sources, increases for existing revenue sources, and debt financing. A portion of the gaps will be covered by funding historically provided by TDOT's transportation partners and not accounted for in the TDOT budget; however, these complementary sources generally address only a small share of the funding gaps. The alternative financing approaches and the closure of the funding gaps is discussed in Chapter 7 of this report.

Chapter 7

Financial Plan Preparation

This chapter describes alternative measures to close the funding gap identified in the 25-Year Vision Plan. Given current expectations for TDOT's revenues over the next 25 years, TDOT will face a funding shortfall over the coming 25 years of $16 billion in year-of-collection dollars as the Vision Plan is implemented unless some type of revenue enhancement strategy is identified.

This chapter contains two sections: a discussion of tax and fee increases applied to TDOT's existing revenue sources and a discussion of alternative approaches that TDOT could pursue should increasing existing revenue sources prove undesirable for policy reasons. Such alternatives include debt financing or the introduction of new revenue sources.

7.1 Closing the Funding Gap with Existing Revenue Sources

As discussed in Chapter 2, fuel taxes and registration fees are the largest contributors supporting the non-federal portion of TDOT's program. Accordingly, strategies to close the anticipated multi-billion dollar funding gap have focused on these revenue sources.

Table 7-1 summarizes the incremental revenue that would be gained from a menu of tax and fee increases. The assumption throughout the analysis is that the tax or fee change occurs in 2008. Revenue estimates are provided for three forecast periods: (1) the next 10 years (2006 to 2015) corresponding to the SIP planning period, (2) the next 15 years (2016 through 2030), and (3) the full 25-year period (2006 to 2030).

In changing the current structure of taxes and fees, policymakers are not restricted to one source. In other words, the entire increase needed to generate sufficient revenue to close the funding gap does not have to be loaded onto a single source as doing so could lead to an onerous increase. Rather, policymakers may find it more equitable and politically palatable to distribute tax or fee increases across several sources. Moreover, the increase need not be uniform across sources; a 4 cent gas tax increase can be combined with a 2 cent motor fuels tax increase, for example. In addition, taxes and fees can be increased in any increment preferred by policymakers.

Given the variety of tax and fee increments, as well as the numerous combinations that policymakers may select, Table 7-1 presents the revenue yield for a variety of policy options in units that are easily scaleable: 1 cent fuel tax increase, indexing fuel taxes for inflation (assumed at 3 percent per year), 1 cent fuel tax increase combined with indexing (assumed at 3 percent per year), and a 10 percent increase in registration fees.

Even this simple approach to a fuel tax and registration fee increase leads to numerous policy options:

- Increase the gasoline or motor fuel tax by 1 cent and divide the revenue among TDOT and other recipients of the tax revenue in the same proportion; that is, keep the current split among recipients.
- Increase the gasoline or motor fuel tax by 1 cent and dedicate the entire penny to TDOT.

Table 7-1. Summary of Incremental Revenue Gain for Alternative Funding Options In Millions of Year of Collection Dollars

	10 Years (SIP) 2006-2015 ($)	15 Years 2016-2030 ($)	25 Years (LRP) 2006-2030 ($)
Gasoline Tax			
1 cent gas tax increase, with current split	130.50	304.82	435.32
1 cent gas tax increase, 100 percent to TDOT	270.75	632.40	903.16
1 cent gas tax increase indexed, with current split	145.49	483.76	629.25
1 cent gas tax increase indexed, 100 percent to TDOT	301.84	1,003.66	1,305.49
Gas tax indexed at 3 percent, 100 percent to TDOT	802.76	8,027.21	8,829.97
Gas tax directed to Highway Fund indexed at 3 percent, 100 percent to TDOT	386.93	3,869.12	4,256.05
Motor Fuel Tax			
1 cent motor fuel tax increase, with current split	70.43	191.72	262.16
1 cent motor fuel tax increase, 100 percent to TDOT	97.96	266.65	364.61
1 cent motor fuel tax increase indexed, with current split	78.69	306.30	384.99
1 cent motor fuel tax increase indexed, 100 percent to TDOT	109.44	426.01	535.45
Motor fuel tax indexed at 3 percent, 100 percent to TDOT	251.05	2,926.28	3,177.33
Motor fuel tax directed to Highway Fund indexed at 3 percent, 100 percent to TDOT	180.50	2,104.00	2,284.50
Gasoline and Motor Fuel Tax			
1 cent gas and motor fuel tax increase, with current split	200.94	496.54	697.48
1 cent gas and motor fuel tax increase, 100 percent to TDOT	368.71	899.06	1,267.77
1 cent gas and motor fuel tax increase indexed, with current split	224.17	790.06	1,014.24
1 cent gas and motor fuel tax increase indexed, 100 percent to TDOT	411.28	1,429.66	1,840.94
Gas and motor fuel tax indexed at 3 percent, 100 percent to TDOT	1,053.81	10,953.50	12,007.31
Gas and motor fuel tax directed to Highway Fund indexed at 3 percent, 100 percent to TDOT	567.43	5,973.12	6,540.55
Registration Fees			
10 percent increase in registration fees, 100 percent to TDOT	182.34	474.62	$656.96

Source: AECOM Consult, Inc.

- An additional option that would reduce the tax rate increase necessary to close the funding gap would be to combine indexing with a tax rate increase. Because the incremental rise in the tax rate would be indexed over time, a smaller initial rise in the tax rate would be

required. This would permit funding of the $16 billion Vision Plan with a smaller increase in the tax rate.

- Increase the gasoline or motor fuel tax by 1 cent (keep the current split among recipients) and index the additional penny at a 3 percent increase per year.
- Increase the gasoline or motor fuel tax by 1 cent (dedicate the entire proceeds of the penny to TDOT) and index the penny at a 3 percent increase per year.
- Index the entire gasoline or motor fuel tax at a 3 percent increase per year and direct all proceeds from indexing to TDOT.
- Index only the portion of the gasoline or motor fuel tax currently directed to the Highway Fund at a 3 percent increase per year

The revenue gain to TDOT from each policy option is shown for gasoline in the first section of Table 7-1, for motor fuels in the second section of the table, and for both combined for ease of reference in the third section. The last section of the table shows the revenue yield for a 10 percent increase in registration fees.

Some key findings shown in Table 7-1 are described below.

- The key policy decisions required in determining the increase required to close the funding gap are whether policymakers choose to index all or part of the fuel tax, and whether the additional increment of revenue received is dedicated 100 percent to TDOT or split among other parties (i.e., cities and counties).
- Over a 25-year period, a 1 cent increase in gasoline tax yields just over $435 million, and a 1 cent increase in the motor fuels tax yields about $260 million to TDOT if the revenues are divided among recipients in the same manner as current revenues. Assuming the rate increase was applied equally to both the gasoline and motor fuels tax, a 22.94 cent increase in *each* tax would be required to yield the $16 billion needed to close the Vision Plan funding gap. This would more than double the existing tax rate and would place Tennessee well above its neighboring states in terms of fuel tax burden.
- By contrast, if the proceeds of the 1 cent increase are not shared with other parties and are dedicated 100 percent to TDOT, only a 12.6 cent increase in *both* the gasoline and motor fuels tax would be required to close the $16 billion funding gap and achieve the Vision Plan. Currently, Tennessee's gasoline tax is higher than six of its eight neighboring states. A 12.6 cent increase would place it almost 10 cents higher than North Carolina, which currently has the highest rates among the eight neighboring states and more than 21 cents higher than Georgia, which has the lowest rates among the neighboring states. Nationally, gasoline taxes in Tennessee are below the national average; a 12.6 cent increase would place Tennessee near the highest of all the states.
- An additional option that would require a lower tax rate increase to close the funding gap would be to combine indexing with a tax rate increase. Because the incremental rise in the tax rate would be indexed over time, a smaller initial rise in the tax rate would be required. This would permit funding of the $16 billion Vision Plan with a smaller increase in the tax rate.

- If the fuel tax was simultaneously increased and indexed, a 1 cent increase in the gasoline tax yields about $630 million if the current sharing arrangement with other recipients is maintained. A similar 1 cent increase in the motor fuels tax generates $385 million. Assuming the rate increase was applied equally to both the gasoline and motor fuels tax, a 15.8 cent increase in *each* tax would be required to close the $16 billion funding gap. This again places Tennessee well above its neighboring states. It does have the advantage, however, of allowing the proceeds to be shared among other funding recipients, specifically Tennessee's cities and counties.
- By contrast, if the proceeds of the 1 cent indexed tax increase are not shared with other recipients and are dedicated 100 percent to TDOT, only an 8.7 cent increase in *both* the gasoline and motor fuels tax would be required to close the $16 billion funding gap and achieve the Vision Plan.
- An alternative strategy would be to index the current tax rate to inflation (assumed at 3 percent per year). If both the gasoline and motor fuels tax were indexed to inflation, it would raise between $6.5 billion and $12 billion over the 25-year period, depending on whether the revenue gain was dedicated to TDOT or shared with other parties.
- Indexing the entire current tax rate on gasoline and motor fuels to inflation (assumed at 3 percent per year) *and* adding a 2.2 cent tax on gasoline and motor fuel that is also indexed and 100 percent dedicated to TDOT would close the $16 billion funding gap.
- Registration fees are another possible option. Each 10 percent increase in registration fees raises revenues by just over $655 million over the 25-year period under consideration.

7.2 Leveraging TDOT Revenues with Alternative Financing

An additional consideration is the timing with which new revenues are received. Distributing the $16 billion funding shortfall over the 25-year planning period, the first 10 years between 2006 and 2015 (corresponding to the SIP) would require $4.7 billion in new revenues, and the remaining 15 years would require another $11.3 billion.

- 2006 to 2015 (SIP) $4.7 billion
- 2016 to 2030 $11.3 billion
- 2006 to 2030 (LRTP) $16.0 billion

A comparison of Table 7-1 with the values shown above highlights that even though the policy options generate sufficient revenue to close the funding gap by the end of the 25-year forecast period, the revenue may not be received quickly enough to cover expenses in the early years included in the SIP.

As noted above, indexing the entire current tax rate on gasoline and motor fuels to inflation (assumed at three percent per year) *and* adding a 2.2 cent tax on gasoline and motor fuel that is also indexed and 100 percent dedicated to TDOT would close the $16 billion funding gap. This good news is tempered by the observation that only $2.0 billion, approximately, of that total will be received in the first 10 years of the period, not nearly enough to cover the expected $4.7 billion shortfall during that period. Because the timing of needed expenditures may not align with the receipt of expected revenues, TDOT's policymakers may choose to consider

innovative financing or debt financing as described in earlier chapters in addition to a tax or fee increase in order to accelerate the availability of funds to meet modal needs.

The positive aspect of this approach is that it allows program initiatives and projects to be advanced, which generates transportation and economic benefits for Tennessee residents in the near term. This financing alternative does, however, have a downside. Accelerating future revenues for near-term funding means that the revenue generated in out-years would not be available to TDOT, because by bonding that future revenue would be required for debt service.

A financial plan and financing alternatives that are predicated on achieving results in the future have a number of risks. Risk considerations frequently have both positive and negative elements. The major risk elements that have an influence on a financial plan are described below.

- Gasoline tax, fuel tax, and registration fee revenues are related to employment, population, and income growth. Historical data indicate that Tennessee has performed above the national average across these demographic/economic measures. The future direction of measures will largely determine whether the positive or negative risk results in increases or decreases in revenues.
- Federal participation levels were assumed to increase to 60 percent of the TDOT program. At the current level of tax effort at the federal level, this will be difficult to achieve over the long term. Conversely, the federal government may choose to add tax capacity to the transportation program or create demonstration programs using non-transportation-related funds.
- Recently, SUVs and light-duty trucks have been added to the vehicle fleet. These vehicle types have below-average fuel economy, thus increasing gasoline tax revenues. Currently, hybrid vehicles are attaining a market presence, and automobile manufacturers are developing models across categories, (including SUVs) that will lead to fuel displacement and decreases in gasoline tax revenues.
- Inflation risk has potential negative effects. The modal needs element of a financial plan, which is the expenditure or uses of funds component, is assumed to increase at an annual inflation rate of 3 percent. This rate of inflation is assumed to extend to 2030. Should inflation exceed this rate, funding shortfalls would worsen because revenue sources are not responsive to inflation (e.g., the gasoline tax is based on gallons, not price).

The *Strategic Investments Program* report has a more detailed discussion of the 10-year financing strategies.