



PENNSYLVANIA STATE
TRANSPORTATION ADVISORY COMMITTEE

TRANSPORTATION FUNDING STUDY

FINAL REPORT



MAY 2010

The Pennsylvania State Transportation Advisory Committee

The Pennsylvania State Transportation Advisory Committee (TAC) was established in 1970 by Act 120 of the State Legislature, which also created the Pennsylvania Department of Transportation (PennDOT). The Advisory Committee has two primary duties. First, the Committee "consults with and advises the State Transportation Commission and the Secretary of Transportation on behalf of all transportation modes in the Commonwealth." In fulfilling this task, the Committee assists the Commission and the Secretary "in the determination of goals and the allocation of available resources among and between the alternate modes in the planning, development and maintenance of programs, and technologies for transportation systems." The second duty of the Advisory Committee is "to advise the several modes (about) the planning, programs, and goals of the Department and the State Transportation Commission." The Committee undertakes in-depth studies on important issues and serves as a valuable liaison between PennDOT and the general public.

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1. Introduction

1.1 Background

Pennsylvania's transportation system impacts every resident, business, and visitor of the Commonwealth. However, it is becoming increasingly difficult for the Pennsylvania Department of Transportation (PennDOT), transit agencies, and local governments to deliver transportation services that meet transportation needs within current funding constraints. Travelers now confront an aging transportation system that is increasingly snarled with delays. Year after year, there are more infrastructure and service deficiencies than money to address them. The significant backlog of critical projects hinders the state's economic competitiveness and takes a toll on our people, businesses, and environment.

As the state Transportation Advisory Committee (TAC) developed this report, several key trends and issues were in play, affecting the ultimate outcome of the state's near- and long-term transportation funding picture:

- The future of the federal **Highway Trust Fund** is uncertain. To avert an immediate crisis, Congress in August 2009 approved a \$7 billion transfer from the General Fund to the Highway Trust Fund to ensure that state transportation departments continued receiving full reimbursements for federal projects through the end of federal fiscal year (FFY) 2009. In March 2010, Congress approved depositing \$19.5 billion into the Highway Trust Fund to reimburse the fund for interest not received since 1998. This ensures the trust fund's solvency for the next year. However, the long term ability of the Highway Trust Fund to support future federal transportation funding is uncertain. The Highway Trust Fund is currently supported by an 18.4-cent federal gasoline tax—a figure that has not been raised since 1993.
- The federal surface transportation authorization bill known as **SAFETEA-LU** provided \$286 billion nationally when Congress passed it in 2005, yet the bill expired in September 2009 without a clear picture of what any successor legislation would entail or even when it would be introduced. The federal program continues to advance under a series of short-term continuing resolutions.
- Governor Rendell in July 2007 signed **Act 44**, landmark legislation to increase state support for transportation by tolling Interstate 80 (I-80), raising tolls on the Pennsylvania Turnpike, and issuing revenue bonds. However, the Federal Highway Administration (FHWA) has not approved the Turnpike's application to toll I-80. Without toll revenues from I-80, there will be a significant gap in projected versus actual transportation funding, beginning in 2010.



- Impacted by volatile fuel prices and the national recession, overall vehicle miles of travel (VMT) in Pennsylvania declined for the first time in recent history. This affects traffic volumes and also reduces the revenue flowing into the state Motor License Fund, which is generated in part by a per-gallon tax on motor fuels. Analysts expect VMT to increase as the recession eases, but steady improvements in vehicle efficiency along with greater use of alternative fuels and electric vehicles are likely to more than offset any increases in VMT—especially as the federal government is moving forward with further increases in automobile fuel economy standards (CAFE).

Changes are needed in the way Pennsylvania funds its transportation system, as former ways of doing business will no longer be adequate to keep pace with future demands.

1.2 Study Purpose

With the increasing volatility and uncertainty surrounding Pennsylvania's transportation funding picture, the state TAC decided to examine how transportation is currently financed and evaluate alternatives that realistically account for changing economic conditions. This analysis focused primarily on highways, bridges and public transportation.

The magnitude of recent energy and financial trends has roiled all transportation sectors. Further, inadequate transportation funding—at all levels of government—jeopardizes the necessary maintenance and expansion of our system at the same time that it faces greater demands than ever before.

This TAC study quantifies the impact and extent of the problem, and offers findings and recommendations for consideration by PennDOT, the State Transportation Commission, and the state General Assembly in addressing this difficult issue.

1.3 Methodology/Report Organization

To guide the study process, the TAC appointed a task force composed of representatives of PennDOT, transportation organizations, and the state General Assembly, along with selected TAC members. The task force met several times throughout the course of the study process to review draft materials and offer direction.

The TAC organized the study process into five phases:

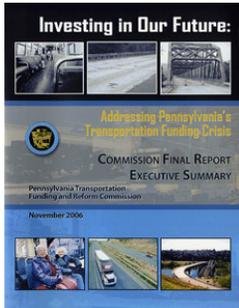
1. Stakeholder Engagement
2. Research and Data Collection
3. Base Condition Needs and Alternatives (Policy and Funding)
4. Evaluation and Testing

5. Findings, Implications, Strategies, and Recommendations

This study report is organized into the following chapters: i) Executive Summary, which summarizes the data analysis and results; 1) Introduction, which conveys the study's purpose and content; 2) Pennsylvania Transportation Funding, which outlines the trends and issues with the current funding system; 3) Highway and Transit Needs; 4) Inventory of Funding Mechanisms, which evaluates possible existing and new ways to fund transportation; and 5) Conclusions and Recommendations.



2. Pennsylvania Transportation Funding



There have been several studies in recent years that have highlighted the state's transportation funding challenges. Most notable was the Transportation Funding and Reform Commission report of November 2006. This landmark study recommended that an additional \$1.7 billion in revenues be dedicated to transportation. This report ultimately led to the passage of Act 44.

Act 44 of 2007 provided new revenues for both highways and transit. For the first time, toll proceeds from the Pennsylvania Turnpike Commission were designated for statewide use. Turnpike contributions have grown to \$900 million in state fiscal year 2009-10, with \$500 million going to highways and \$400 million for public transit. However, sustained revenues were predicated on the ability to toll I-80. In April 2010, the federal government rejected the application to toll this interstate highway. Without tolling I-80, funding contributions from the Turnpike will drop beginning in FY 2010-11 to \$200 million for highways and \$250 million for transit.

This section outlines the trends, issues, and challenges facing Pennsylvania's transportation funding picture.

2.1 Revenues

Every state levies a unique combination of taxes to fund its transportation projects. These can include state fuel taxes, registration and license fees, excise taxes, sales taxes, gross receipts taxes, county and local taxes, underground storage tank fees, and various environmental fees.

In Pennsylvania, transportation funding comes from a variety of sources, including

- federal funds (highway and transit),
- liquid fuels taxes,
- licenses and fees,
- transfers from the Pennsylvania Turnpike,
- sales tax,
- lottery proceeds,
- General Fund monies, and
- other, more minor sources.

2.1.1 Federal Funding

Pennsylvania relies on federal transportation funding for much of its annual highway program. During FFY 2008, Pennsylvania obligated a then-record \$1.55 billion in federal funds. Pennsylvania benefitted from the infusion of

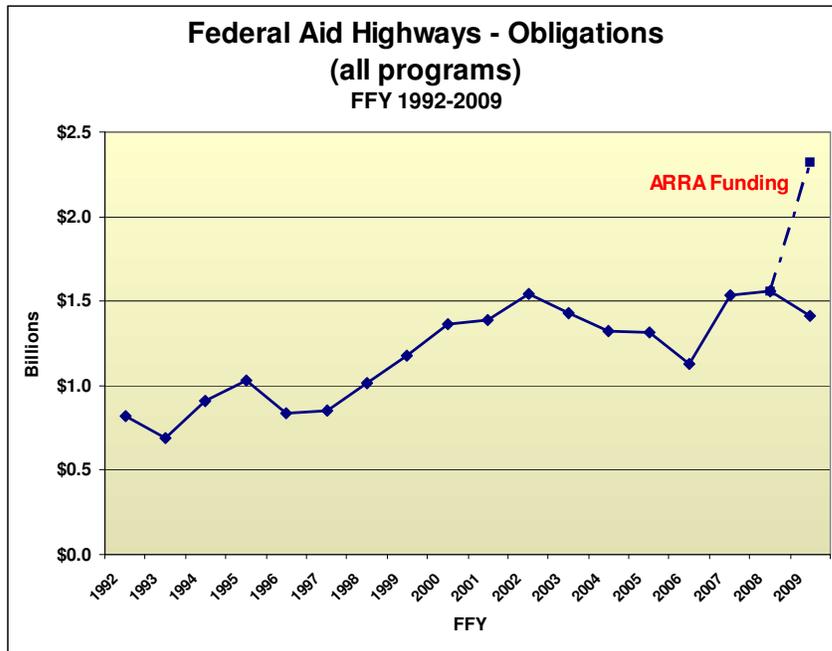
approximately \$1 billion in funding from the American Recovery and Reinvestment Act (ARRA), of which \$910 million was obligated in FFY 2009. This boosted Pennsylvania’s FFY 2009 federal total to a record \$2.32 billion. Were it not for the ARRA funds, the state’s federal aid total would have dropped to \$1.41 billion, as shown in Figure 1. The additional funding enabled PennDOT to move forward on 326 projects that were able to be implemented sooner.



Figure 1 also demonstrates how much Pennsylvania’s share of federal funds has varied. For example, from 1992 through 2002, the state’s share of federal funding increased from \$819 million to \$1.54 billion, an 88 percent rise. Since 2002, it has essentially been flat. Between 2002 and 2006, it actually declined each year to a low of \$1.1 billion, before rising again to its current level. Note that the introduction of ARRA funds into Pennsylvania’s transportation program is a one-time stimulus that is not indicative of past trends and cannot be used to predict future federal transportation funding levels.

Figure 1 shows historical trends in Federal Aid Highway Obligations to Pennsylvania since 1992. Values for FFY 2009 dramatically show the impact of ARRA funding compared to what the state would have originally received.

Figure 1: Federal Aid Highways – Obligations (all programs)



Source: PennDOT Center for Program Development and Management

Federal funds for transit are provided for a number of programs. The vast majority of federal funds are restricted to capital purposes. Federal funds provided

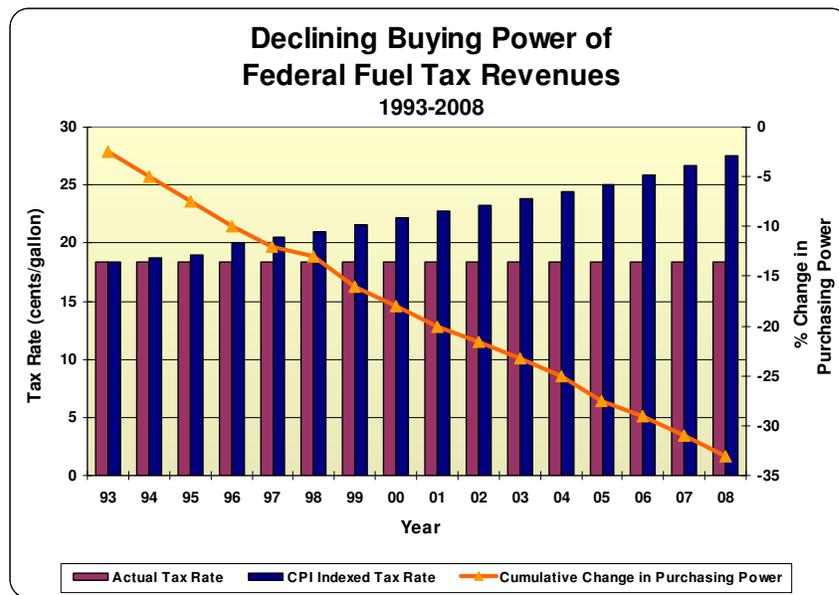


to Pennsylvania transit agencies in FFY 2009 totaled \$381 million. Transit is also benefitting from ARRA funding, with Pennsylvania transit agencies receiving an additional \$347 million in ARRA funds. As with highways, ARRA for transit is a one-time stimulus.

Most federal funding for highways and transit originates from the federal Highway Trust Fund (HTF). Since it was established in 1956, the HTF has generally provided stable, reliable, and substantial highway and transit funding. However, that stability and adequacy has diminished in recent years. The major sources of revenue to the Highway Trust Fund are the federal 18.4-cent per gallon tax on gasoline and the 24.4-cent per gallon tax on diesel fuel. These user fees have not been increased since 1993.

Figure 2 shows the federal fuel tax rate versus buying power. This chart originally appeared in a National Surface Transportation Infrastructure Financing Commission report entitled, “Paying Our Way.”

Figure 2: Declining Buying Power of Federal Fuel Tax Revenues (“Paying Our Way”)



Source: FHWA 2006 Highway Statistics, Table FE-21B, indexed using Consumer Price Index for all Urban Consumers (CPI-U) as reported by the Bureau of Labor Statistics.

Recent trends indicate that the future viability of the Trust Fund is in jeopardy, as revenues have not kept pace with outlays. In September 2008, Congress approved an \$8 billion transfer from the General Fund to the HTF in order to pay bills for ongoing state-administered highway projects. In August 2009, Congress provided another \$7 billion transfer to avoid halting projects in progress. In March 2010,

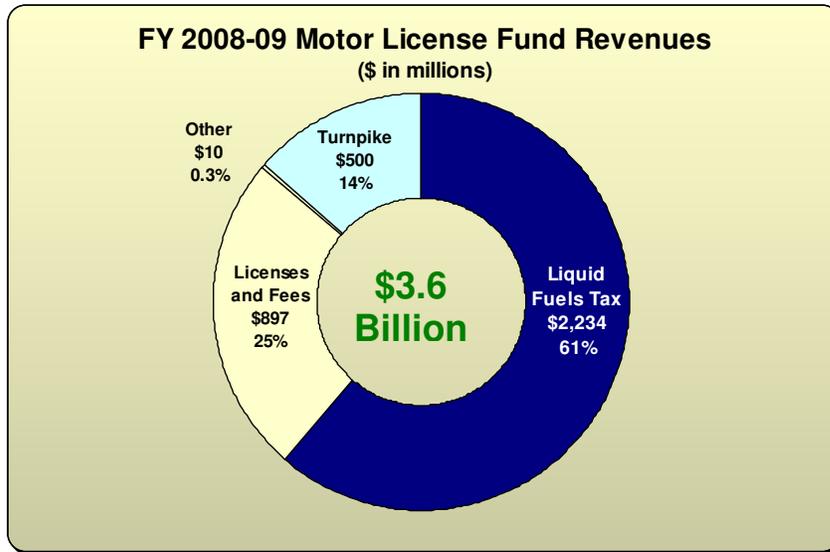
Congress approved depositing \$19.5 billion into the Highway Trust Fund to reimburse the fund for interest not received since 1998. Estimates show that future HTF revenues will not support a reasonable federal program in the longer term.

SAFETEA-LU, the current authorization bill for surface transportation programs, expired on September 30, 2009. Federal programs are currently operating under a continuing resolution to December 31, 2010. At this time, the timing and extent of the next transportation bill is uncertain.

2.1.2 State Highway Funding – Motor License Fund (MLF)

The Motor License Fund is a special state revenue fund that may be used only for the costs of construction, reconstruction, maintenance and repair of, and safety on highways and bridges in the Commonwealth. The sources of revenue to the Motor License Fund are motor fuels taxes, vehicle registration fees, operator’s license fees, and other miscellaneous fees – all of which are constitutionally restricted to highway use. Act 44 of 2007 mandated that the Pennsylvania Turnpike Commission make annual contributions to the Motor License Fund. Figure 3 shows the major sources for State Fiscal Year 2008-09.

Figure 3: Revenue Sources to Fund the FY 2008-09 Program



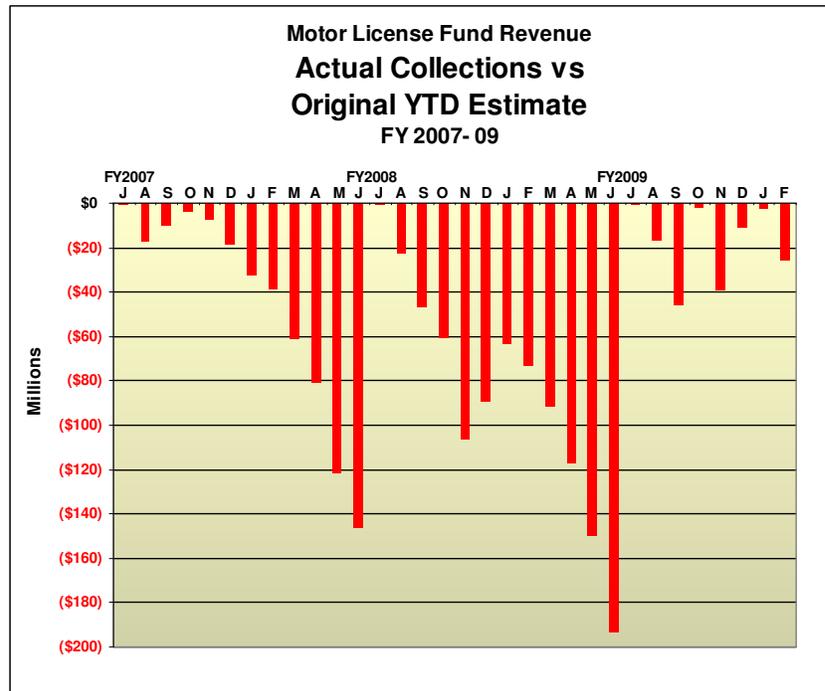
Source: PennDOT Bureau of Fiscal Management

Revenues to the Motor License Fund were below original estimates by as much as \$145 million during FY 2007-08 and \$193 million the following fiscal year, according to data from the State Department of Revenue. Total revenues to the fund in FY 2008-09 registered at \$3.42 billion. As of the end of February 2010,



actual collections for FY 2009-10 were cumulatively off \$25.8 million from original estimates, as shown in Figure 4.

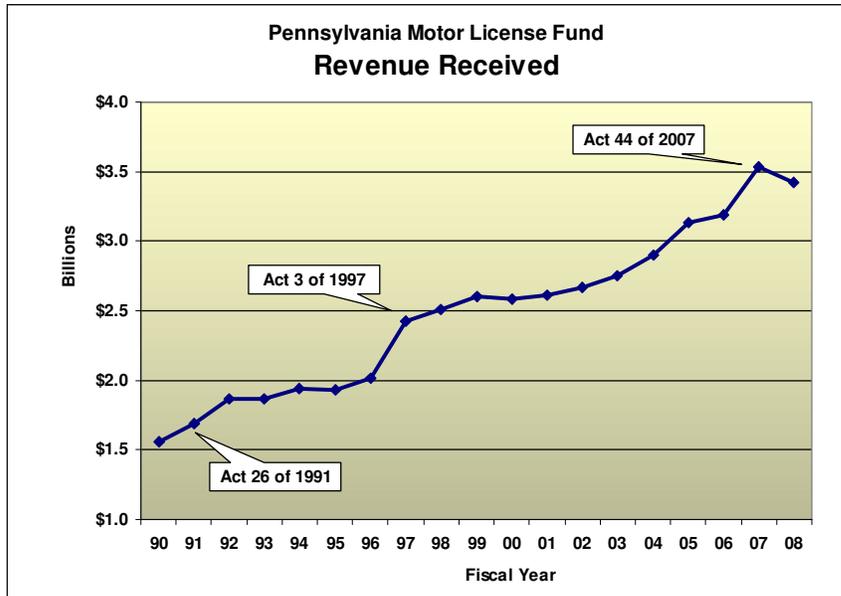
Figure 4: Motor License Fund Revenue: Actual Collections versus Original YTD Estimates



Source: PennDOT Bureau of Fiscal Management

The following chart provides a history of MLF growth. Traditionally, the MLF has only experienced major increases through increases in fuel taxes or registration fees as approved by the General Assembly (such as Act 26 of 1991 and Act 3 of 1997). The MLF did benefit from increased fuel taxes through the Oil Company Franchise Tax between 2003 and 2006. The effect these revenue enhancements had on the MLF is shown in Figure 5.

Figure 5: Pennsylvania Motor License Fund Revenue History

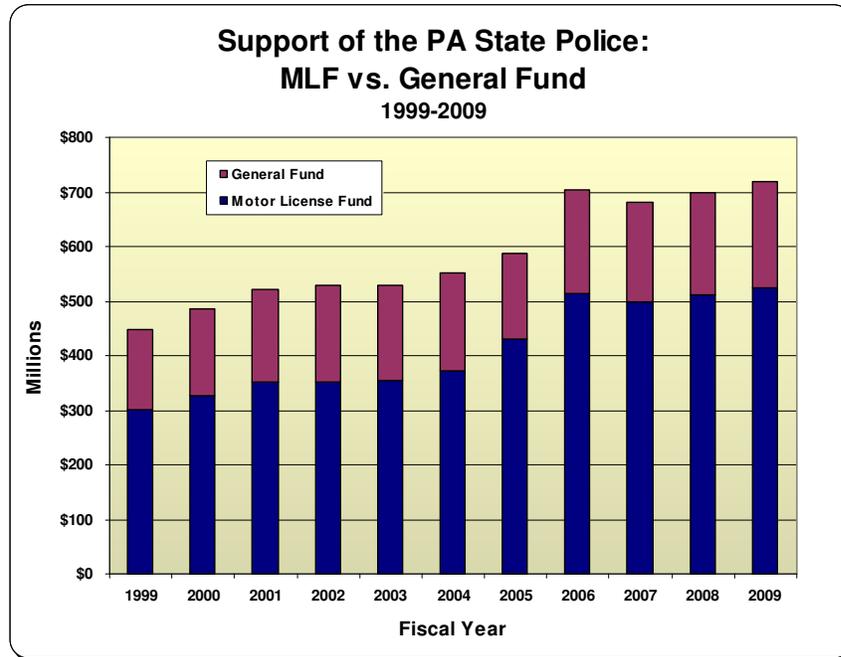


Source: Pennsylvania Department of Revenue

In FY 2008-09, the Commonwealth spent nearly \$2.3 billion in MLF revenues to build or maintain highways and bridges. A total of 67 percent of all MLF revenues was directed to maintenance and construction of state highways and bridges. The other major uses were enforcement activities by the State Police and payments to local governments for local roads (Liquid Fuels funds). MLF support of the State Police has increased nearly 75 percent over the past decade, from \$301 million in 1999 to \$504 million in 2009, as shown in Figure 6. Figure 7 shows the distribution of expenditures from the Motor License Fund for FY 2008-09.

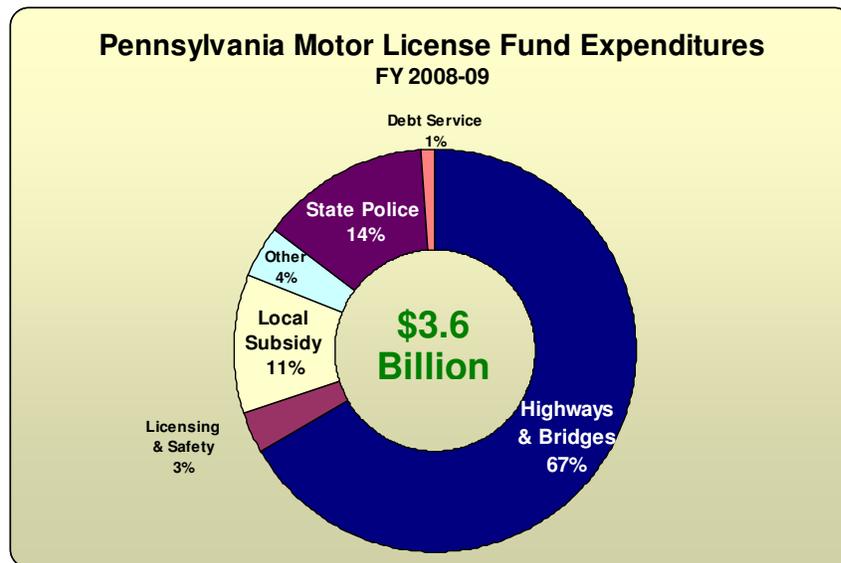


Figure 6: Support of the PA State Police: MLF vs. General Fund



Source: PennDOT Bureau of Fiscal Management

Figure 7: FY 2008-09 Pennsylvania Motor License Fund Expenditures

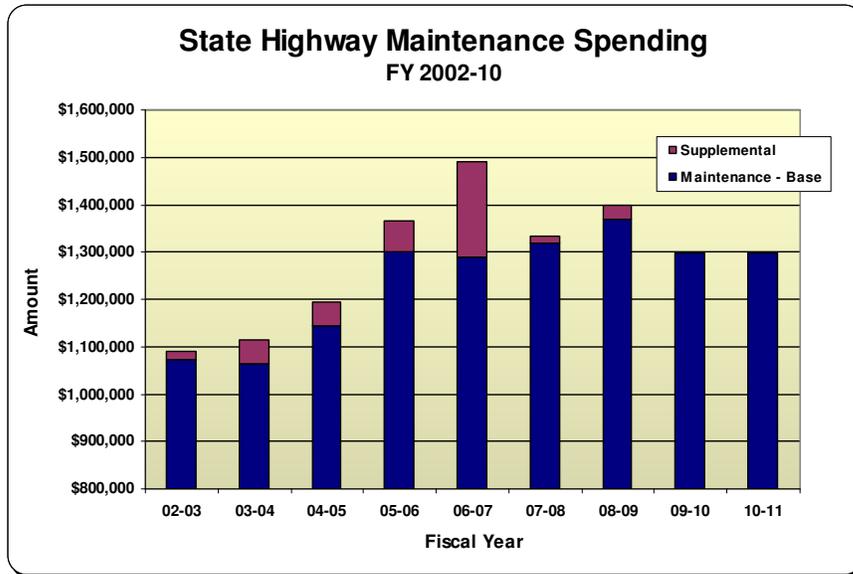


Source: PennDOT Bureau of Fiscal Management

Within the funding for highways and bridges, maintenance is Pennsylvania's first priority on its 40,000-mile highway network and consumes a large portion of the

funding. Figure 8 provides an historical overview of the history of maintenance spending dating back to FY 2002-03. The figure shows that when extra money was available, it was applied to roadway maintenance, but those dollars are not available over the longer term.

Figure 8: State Highway Maintenance Spending, FY 2002-10

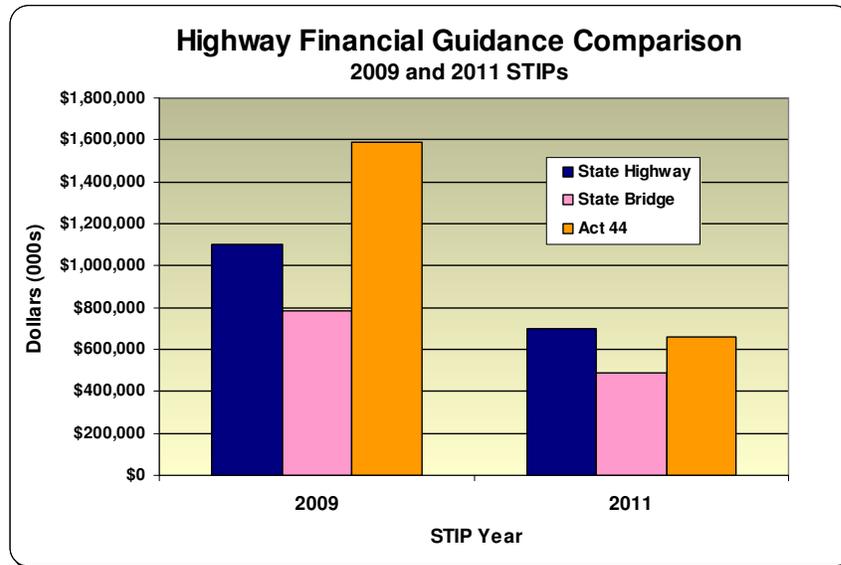


Source: PennDOT Bureau of Fiscal Management

Construction projects are programmed through the State Transportation Improvement Program (STIP). Highway and bridge improvement projects are paid for with federal funds and the remaining MLF funds (after paying for maintenance). Therefore, uncertainty or reductions in either federal funds or MLF funds translate to a reduction in the number of new projects that can be programmed. For example, Pennsylvania’s 2009-12 State Transportation Improvement Program (STIP) provided \$3.47 billion in state funding for Pennsylvania’s highway and bridge programs over the four-year period. For the 2011-14 STIP, currently under development, state funding availability is projected to decline by nearly half, to a total of \$1.63 billion. Much of the loss represents the expected reduction by \$932 million (or 60 percent) of Act 44 revenue because the application to toll I-80 was not approved. At the same time, lower MLF receipts have yielded lower estimates for other highway and bridge revenues—37 percent less. Figure 9 highlights the decline in available state highway and bridge revenues between the 2009 and 2011 STIP for Pennsylvania.



**Figure 9: Financial Guidance Comparison, 2009 and 2011
(State Funds Only)**



Source: PennDOT Center for Program Development and Management

2.1.3 State Transit Funding – Public Transportation Trust Fund

Prior to 2007, the state’s transit funding structure represented the culmination of a series of separate legislative initiatives that were enacted over approximately 30 years to address issues and funding needs at particular points in time. The result was a cumbersome and marginally effective program structure that was difficult for PennDOT to administer, difficult for grantees to navigate, and not conducive to additional incremental “fixes” to address current and projected needs. The pre-Act 44 funding structure, which was characterized by the Transportation Funding and Reform Commission (TFRC) as “unstable, unpredictable, and slow in growth,” relied upon a variety of specific revenue generators including annual general fund appropriations, a dedicated portion of the sales and use tax, bond proceeds, a portion of the public utility realty tax, fees from car rentals and leases, and excise taxes on tires. Following an exhaustive program review and “audits” of a representative sample of transit systems, the TFRC identified incremental annual state transit funding needs of \$760 million: \$258 million for operations and \$502 million for capital programs. The recommended increase was intended to be in addition to the 2006 base funding of approximately \$800 million.

Act 44 of 2007 attempted to address both the deficiencies of the funding structure and the identified funding needs. The act created the Public Transportation Trust Fund (PTTF) with a streamlined program structure and provided a portion of the additional transit funding recommended by the TFRC. The additional funding

was supported by several revenue sources that collectively were intended to be predictable and to grow with inflation.

The PTTF funding sources and eligible uses are illustrated in Figure 10.

Figure 10: Post Act 44 State Transit Funding Structure – Funding Structures, Sources and Uses

	Turnpike	Sales & Use Tax	Lottery	PTAF	Bonds
Sources	 Act 44 Payments (as proposed)	 4.4% of Total Tax Revenue Dedicated to Transit	 Annual Executive Authorization (excludes Shared Ride Program)	 PURTA Vehicle Lease Tax Vehicle Rental Tax Tire Tax	 Bonds Issued on an As-Needed Basis
	 <ul style="list-style-type: none"> • Fixed Amount for Operating • Balance for Asset Improvement, Capital Improvement, and New Initiatives 	 <ul style="list-style-type: none"> • 69.99% to Operating • 16.77% to Capital • 13.24% to Programs of Statewide Significance 	 <ul style="list-style-type: none"> • 100% to Operating Assistance 	 <ul style="list-style-type: none"> • First Priority is PTAF-secured Debt • Balance to Operating 	 <ul style="list-style-type: none"> • 100% for Capital Projects

Notes:

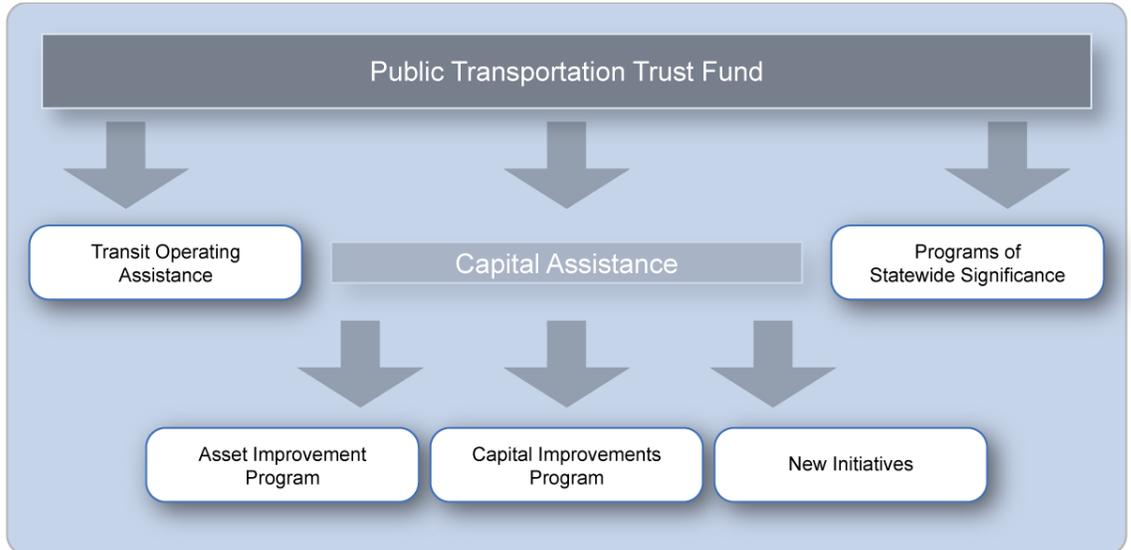
PTAF = Public Transportation Assistance Fund

PURTA = Public Utility Realty Tax Act

Figure 11 shows the high-level structure of the new Public Transportation Trust Fund and its five program accounts.



Figure 11: Dedicated Public Transportation Trust Fund with Five Program Accounts



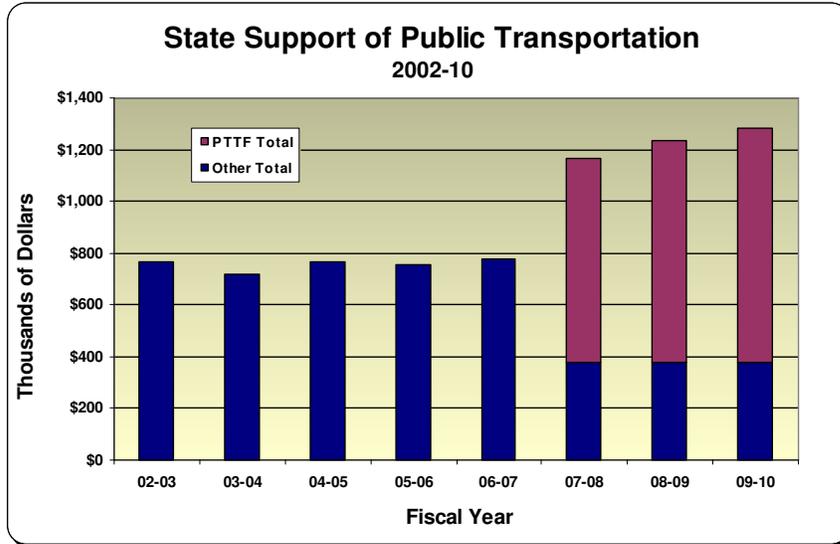
Source: PennDOT Bureau of Public Transportation

While the additional funding provided through Act 44 fell short of the \$760 million total annual transit funding needs identified by the TFRC, the additional funding (which totaled \$300 million in FY 2007-08 and has grown to a projected \$400 million in FY 2009-10) has allowed transit providers to

- preserve important existing services,
- provide new services where demand is warranted, and
- stabilize fares to keep transit affordable.

Figure 12 shows the impact of Act 44 by illustrating how public transportation assistance has greatly increased funding above previous FY amounts.

Figure 12: State Support of Public Transportation, 2002-2010



Source: PennDOT Bureau of Fiscal Management

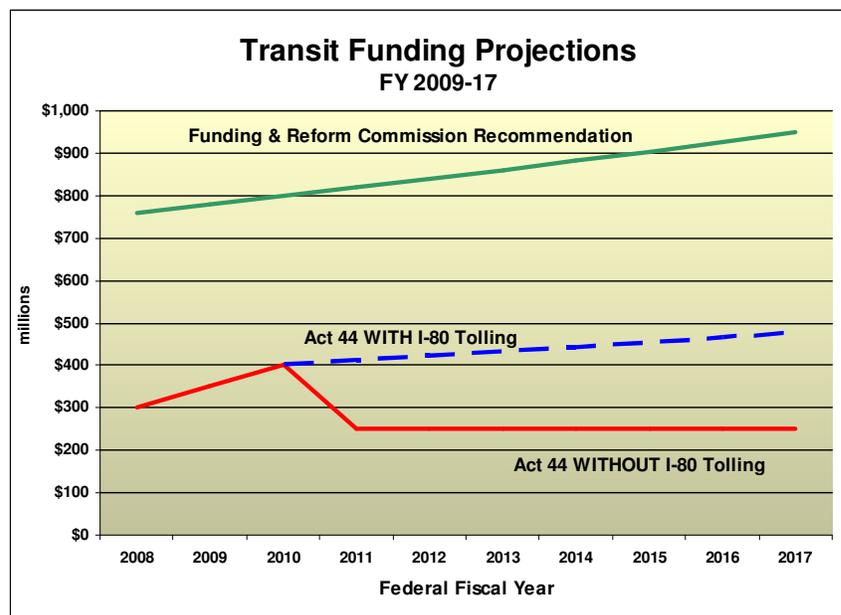
In addition to the fact that total Act 44 incremental transit funding only provided about 50 percent of the TFRC-recommended levels, the predictability that was envisioned is now in jeopardy. A key premise of Act 44’s finance strategy was that the revenue produced from the tolling of I-80 would become an important source of funding beginning in FY 2010-11. Because the Commonwealth’s most recent request to toll I-80 was not approved, there will be a significant gap in projected versus actual transit funding beginning in 2010. There is an even more significant gap between TFRC-identified needs and actual transit funding. The stability and gains of the past two years could be negated and fare increases, service cuts, and deferred maintenance could become the norm.

Act 44 and the associated funding sources were predicated on dedicated, initially sufficient, and growing funding. Beginning in FY 2010-11, the Turnpike funding (\$250 million for operating and \$150 million for Asset Improvement) was set to increase by 2.5 percent annually. The Sales and Use Tax historical trends indicated that a 2.5 percent annual growth factor was a conservative assumption. However, I-80 tolling was not approved and Sales and Use Tax receipts have run below projections. The result is level operating assistance in FY 2010-11—the third consecutive year. In addition, the lack of I-80 tolling approval eliminates the \$150 million in discretionary Asset Improvement beginning in FY 2010-11.



Figure 13 shows transit funding projections through 2017 and illustrates the impact of the I-80 tolling decision to the Act 44 funding package for transit. The total TFRC-identified transit needs are represented by the solid green line at the top of the chart. Also shown are the Act 44 transit funding projected to be available with tolling (dashed blue line) and without tolling (solid red line). With approval of I-80 tolling, Act 44 called for revenues from the Pennsylvania Turnpike to grow annually at 2.5 percent. Without tolling approval, not only does the funding drop, but it does not grow, further widening the gap between revenue and needs.

Figure 13: Pennsylvania Transit Funding Projections



Source: PennDOT Bureau of Public Transportation

2.1.4 Pennsylvania Fuel Taxes

Pennsylvania's fuel taxes are a combination of a flat tax, an Oil Company Franchise Tax (OCFT), and an Underground Storage Tank Indemnification Fund fee. It should be noted here that this last item is considered a surcharge and is not voted on by the General Assembly, nor does any of the money go towards transportation projects. It is controlled separately from the gas tax, and does not go into the Motor License Fund. Table 1 provides a breakdown of Pennsylvania's current tax rates for gasoline and diesel fuel.

Table 1: Pennsylvania Current Fuel Taxes

Type of Tax	Current Rate of Gas Tax (cents/gallon)	Current Rate of Diesel Tax (cents/gallon)
Flat Tax	12.0	12.0
Oil Company Franchise Tax	19.2	26.1
Underground Storage Tank Indemnification Fund (a fee)	1.1	1.1
Totals	32.3	39.2

Source: PennDOT Bureau of Fiscal Management

The flat tax on both gasoline and diesel is 12 cents/gallon, and has not been changed since 1987. The OCFT assesses a millage against the wholesale price of gasoline and diesel with a 90-cent floor and a \$1.25 ceiling. The OCFT was originally enacted in 1981 as a response to energy concerns. The legislation was predicated on the assumption that wholesale prices would rise steadily to the \$1.25 ceiling and offset reductions in fuel consumption. History showed that the wholesale price of fuel remained consistently below the 90-cent floor until 2003. Between 2003 and 2006, the wholesale price rose to the ceiling and has remained above that figure in subsequent years. This provided a boost to MLF revenues during those years. The average wholesale price over the past year (2009) averaged \$1.71. Without a change to the current OCFT ceiling, there will be no further growth.

Revenues from the state gas tax (32.3 cents/gallon) do not change with the price of fuel.

Information from the American Petroleum Institute compares fuel taxes in Pennsylvania with its counterparts across the nation and considers all state and local taxes on fuel. The Commonwealth currently ranks thirteenth nationally in state/local gasoline taxes (32.3 cents/gallon versus a US average of 29), and Pennsylvania ranks seventh

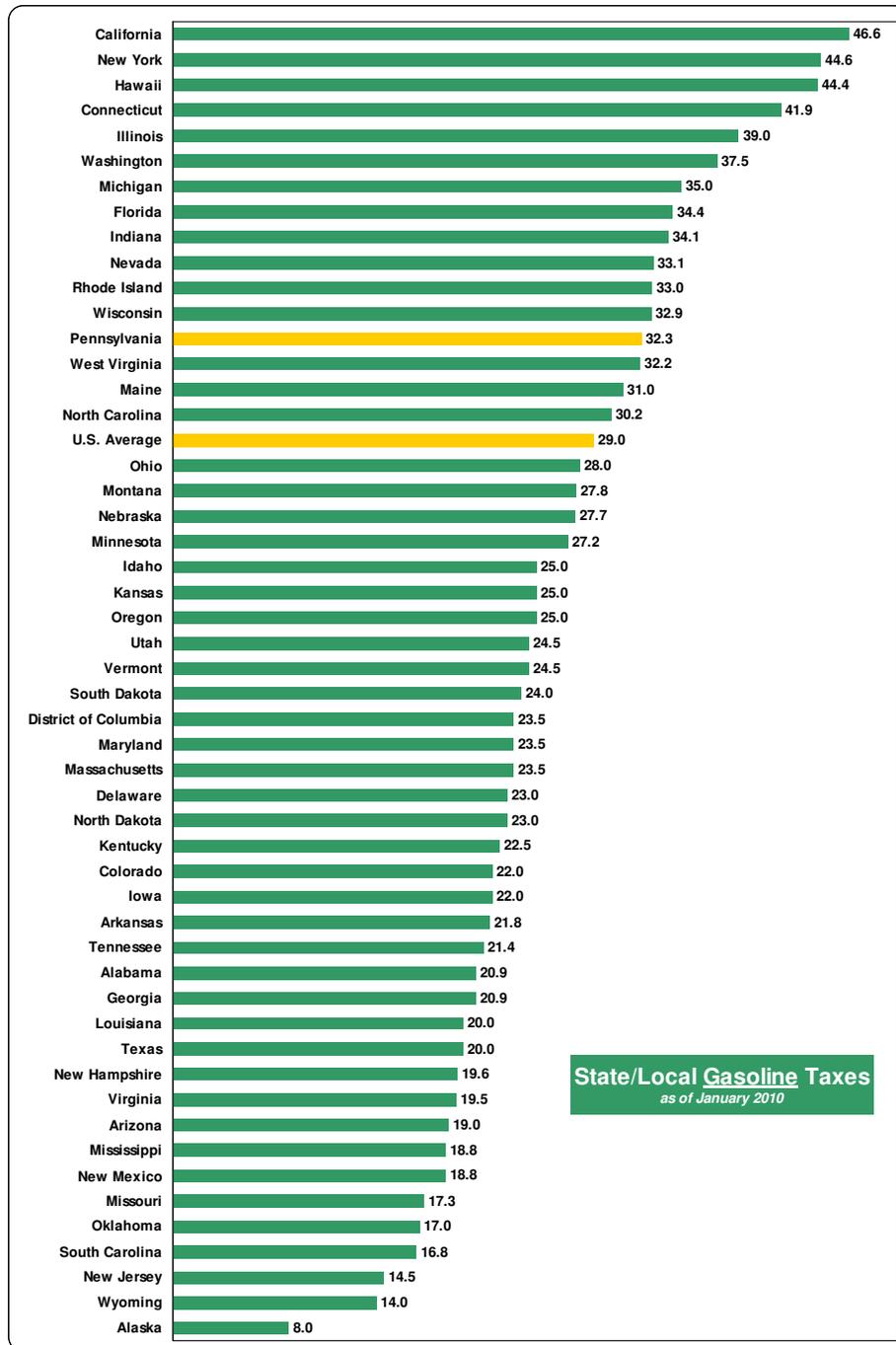


in diesel taxes (39.2 cents/gallon versus a national average of 27.8). Figure 14 and Figure 15 provide rankings of all states for gasoline and diesel taxes (this includes both state and local taxes on gasoline/diesel).

It should be noted that Pennsylvania’s highway and bridge program is solely supported by the Motor License Fund. Many states do not dedicate fuel taxes and other fees to transportation as Pennsylvania does. Also, Pennsylvania maintains the fifth-largest state highway system in the country.

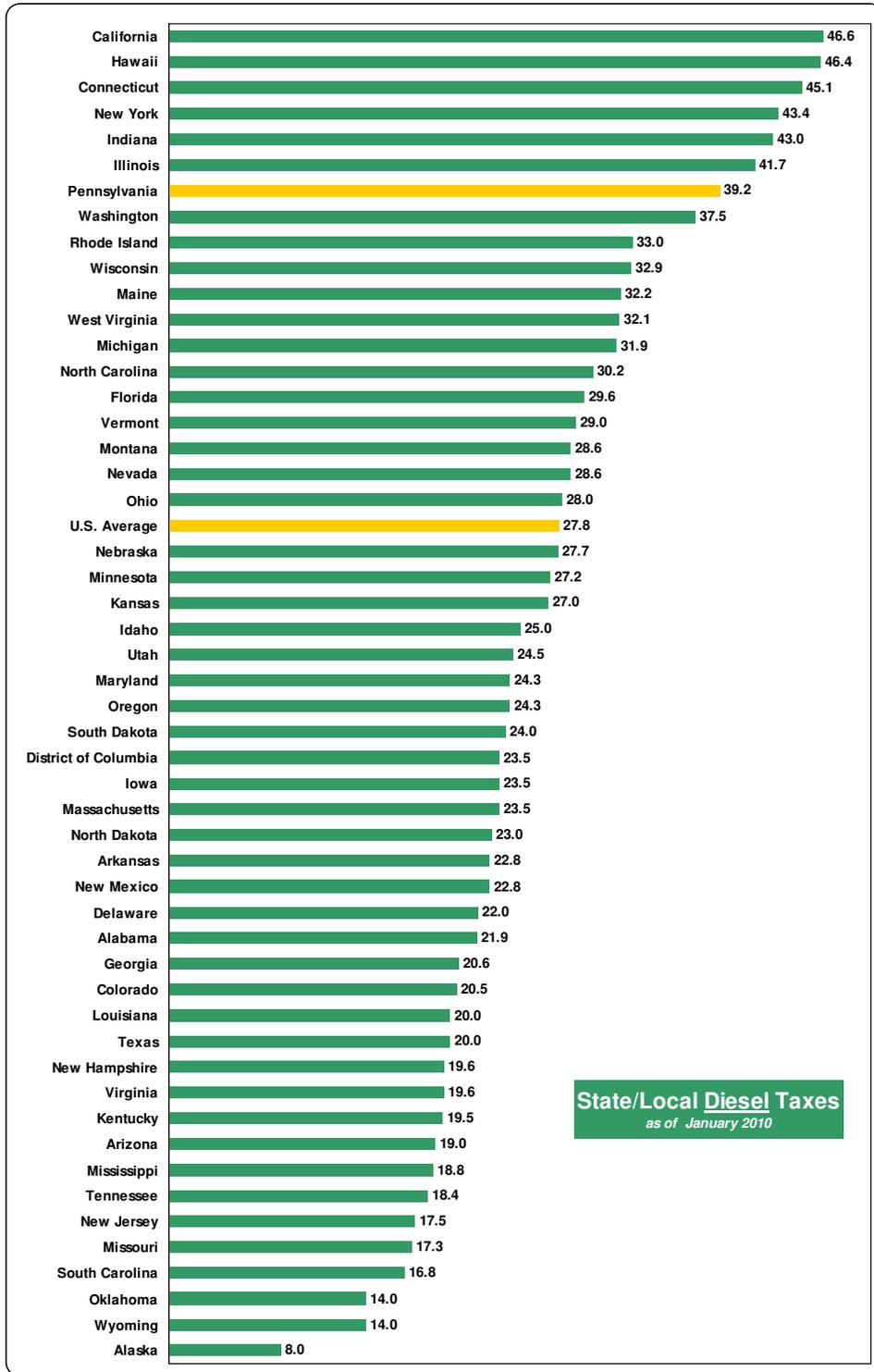


Figure 14: State/Local Gasoline Taxes (January 2010)



Source: American Petroleum Institute

Figure 15: State/Local Diesel Fuel Taxes (January 2010)



Source: American Petroleum Institute



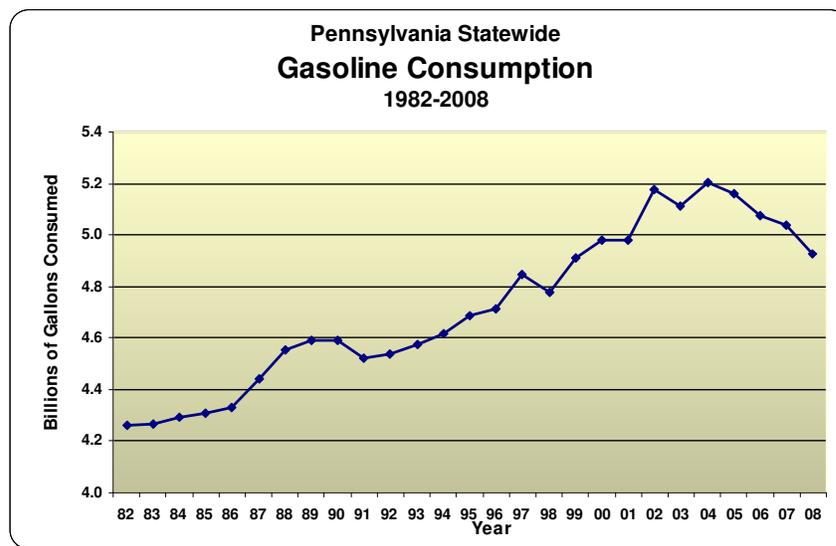
2.1.5 Declines In Gasoline and Diesel Fuel Consumption

Between 1984 and 2004, gasoline consumption increased annually at an average rate of 1 percent, reaching an historic peak of 5.2 billion gallons. Since that time however, that rate has reversed to minus 1.3 percent annually. This sustained decline in gasoline consumption—while admirable from an environmental standpoint—has tremendous implications for transportation funding, as it compounds the problem of inflation and overall insufficient funding. Even small changes in fuel consumption have a direct impact on MLF revenues.

Historically, declines in gasoline consumption were seen during the recession years of 1983, 1991, and 2001. The current slide can be attributed to the national recession, in addition to the motoring public's embrace of smaller, more fuel-efficient vehicles and increased use of alternative fuels. In marked contrast, consumption of diesel fuel has continued to rise, more than doubling between 1982 and 2004. This increase reflects the expansion of goods movement activity and reliance on motor carrier forms of moving freight. Motor carriers consumed 1.36 billion gallons of diesel fuel in 2008, down slightly from the previous year's all-time high of 1.42 billion.

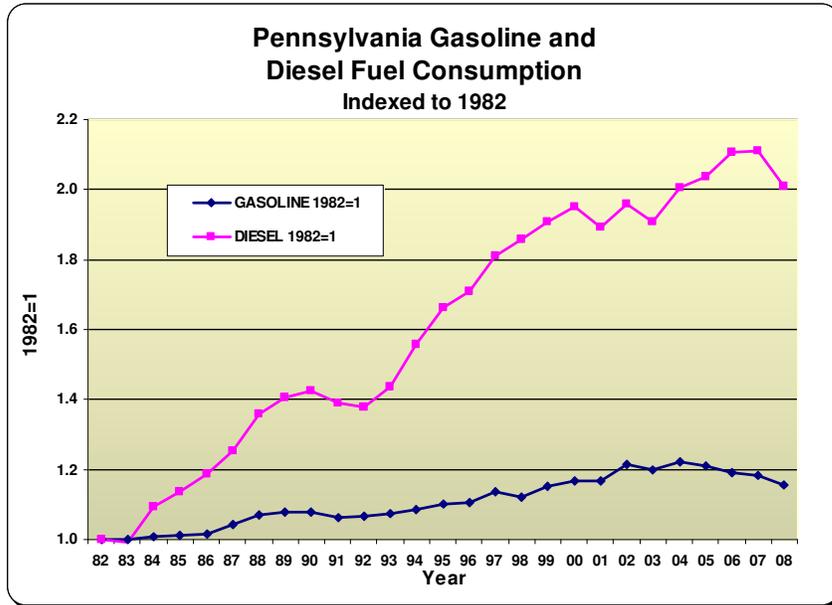
Figure 16 shows historic gasoline consumption trends in Pennsylvania since 1982, while Figure 17 compares this trend with that of diesel fuel consumption, using 1982 as a base year for comparison purposes.

Figure 16: Pennsylvania Total Gasoline Consumption



Source: PennDOT Bureau of Fiscal Management

Figure 17: Pennsylvania Gasoline and Diesel Fuel Consumption (1982 as base year)



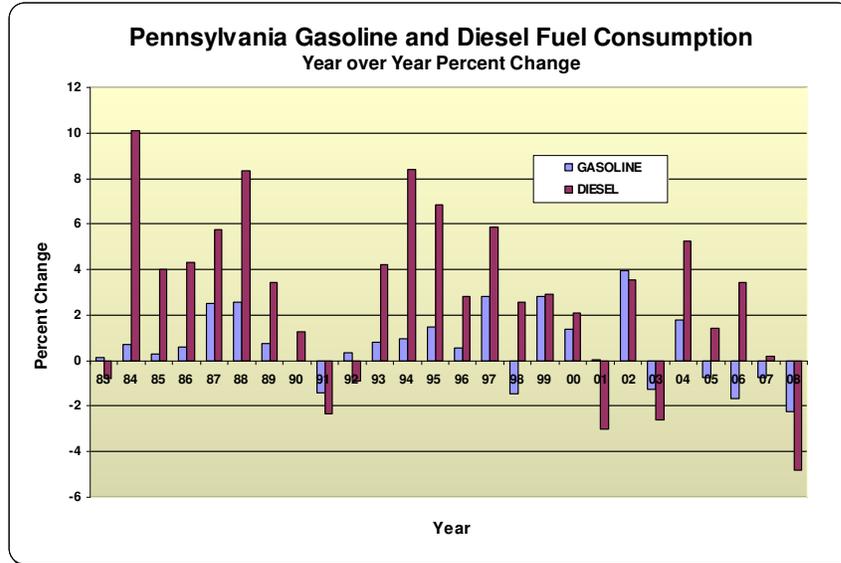
Source: PennDOT Bureau of Fiscal Management

Figure 18 expresses gasoline and diesel fuel consumption another way, showing year over year changes in consumption. While the record-breaking fuel prices of the summer of 2008 drew national attention for their impacts on VMT and mode choice, it is clear that declines in consumption began well before that phenomenon occurred.





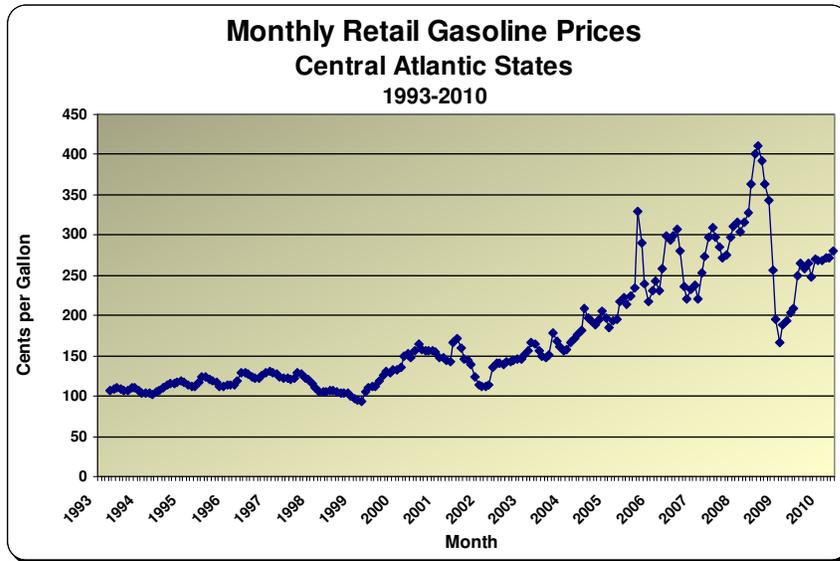
**Figure 18: Pennsylvania Year Over Year Change
in Gasoline and Diesel Fuel Consumption**



Source: PennDOT Bureau of Fiscal Management

While the rise in the cost of gasoline has not directly mirrored declines in VMT, it has played a significant role in the reduction in trips and associated fuel tax revenues. For years, Pennsylvania motorists enjoyed stable (and low) gasoline prices, particularly when factoring in for inflation. By November 2004, however, gasoline prices exceeded \$2.00 per gallon for the first time, marking the beginning of an unprecedented period of volatility. By December 2007, prices exceeded \$3.00 per gallon before eventually climbing to a peak of \$4.11 in July 2008. Prices have declined since then to levels slightly higher than the pre-2006 increase, as Figure 19 attests.

Figure 19: Monthly Retail Gasoline Prices

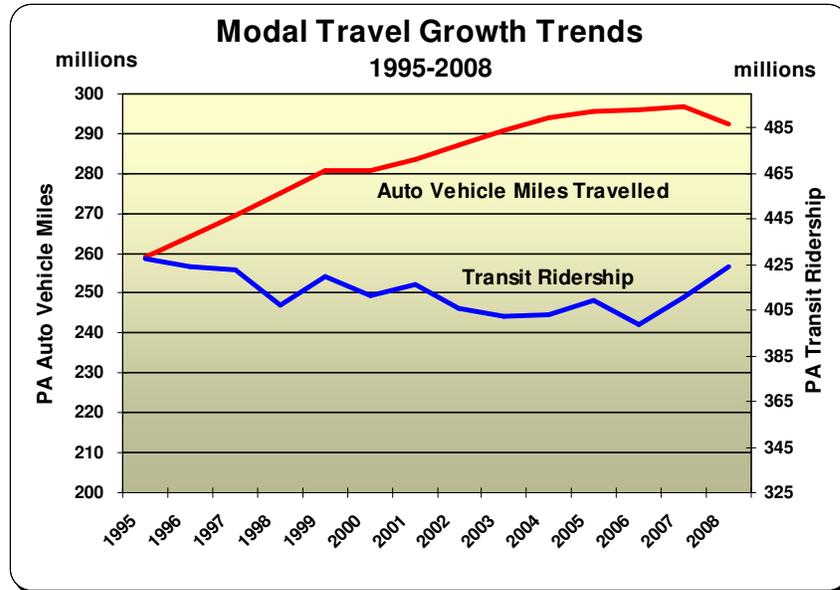


Source: Energy Information Administration

The shock of surging gasoline prices also played a role in moving Pennsylvanians from their motor vehicles to public transportation. For the past 60 years—since the introduction of the Interstate Highway System—few trends have been more predictable than the steady growth in the number of automobiles and the average annual mileage that those vehicles are driven. Throughout much of that period, public transportation provided a declining portion of total trips taken. In FY 2007-08, though, both trends were reversed, as shown in Figure 20.



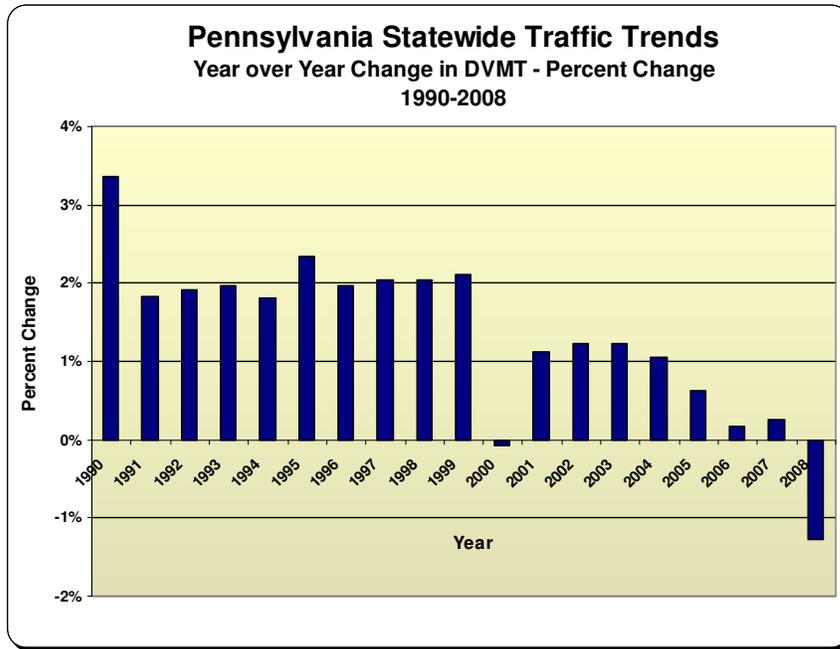
Figure 20: Modal Travel Growth Trends



Sources: PennDOT Bureau of Public Transportation; PennDOT Bureau of Planning and Research

While Figure 20 shows the historical changes in VMT over time, Figure 21 shows the year to year changes in overall VMT. Throughout the 1990s, VMT in Pennsylvania on average increased by 2 percent annually. After 2000, that trend gave way to smaller annual increases. By 2008, Pennsylvania motorists actually registered a year over year *decline* in VMT, driving a total of 293 million miles, or a 1.3 percent decrease from the year before. This decline is not expected to be sustained, although it is reasonable to assume that the historical 2 percent annual increases are no longer a guarantee. FHWA, in its monthly traffic volume trend report for December 2009, indicated that increases in VMT are already occurring nationally as gasoline prices have declined from their historic peak.

Figure 21: Pennsylvania Statewide Traffic Trends



Source: PennDOT Bureau of Planning and Research

2.2 Other Licenses and Fees

In addition to the Motor License Fund, there are various other licenses and fees levied that contribute toward the state’s transportation funding picture, including vehicle registrations and driver license fees. A summary of these and other funding mechanisms are discussed in this section.

2.2.1 Driver Licensing

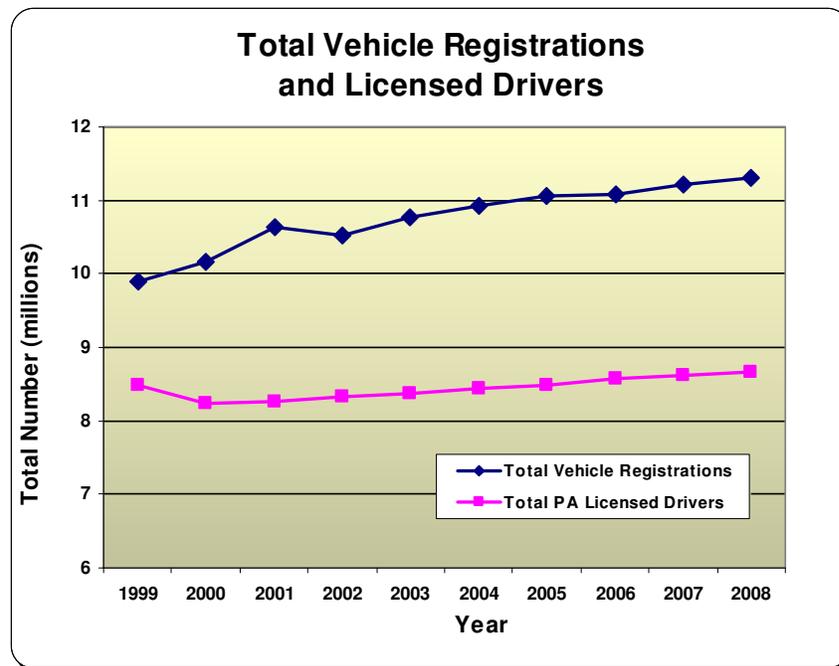
There are approximately 8.7 million licensed drivers in Pennsylvania, a figure that reached an all-time high in 2008 and has been increasing faster than the overall population growth rate.

While the number of licensed drivers in Pennsylvania has been increasing, there has been an even greater increase in the number of registered vehicles. For example, in 1999, there were 1.17 registered vehicles for every licensed driver. By 2008, that ratio had increased to 1.31.

Figure 22 shows trends in total numbers of licensed drivers against registered vehicles.



Figure 22: Total Vehicle Registrations and Licensed Drivers



Source: PennDOT Safety Administration

From a transportation funding perspective, licensed drivers are required to pay licensing fees of \$28 every four years (or an average of \$7.00 annually). This fee nets the Commonwealth an average of \$60 million annually for transportation. Pennsylvania ranks 32nd nationally in driver license fees. The national average is approximately \$19 per year versus Pennsylvania's \$7.00 annual fee.



2.2.2 Vehicle Registrations

A larger pool (and potential funding source) involves the state's more than 11.3 million registered vehicles. Pennsylvania's motor vehicle fleet has grown by approximately 15 percent since Act 3 of 1997. (The act provided for a revenue enhancement through an increase in the Oil Company Franchise Tax, and boosts to the state's vehicle and driver licensing fees. This is the last time these fees were raised.) Registration fees are paid by a vehicle owner for the privilege of driving a particular vehicle. At a \$36 flat fee for a passenger vehicle, Pennsylvania has one of the lowest annual registration fees in the nation (ranking 39th), as shown in Figure 23. (The national average is \$167 which includes all state, county and local fees

required to register a vehicle.) In FY 2008, the state collected approximately \$694 million in registration fees for all classes of vehicles.

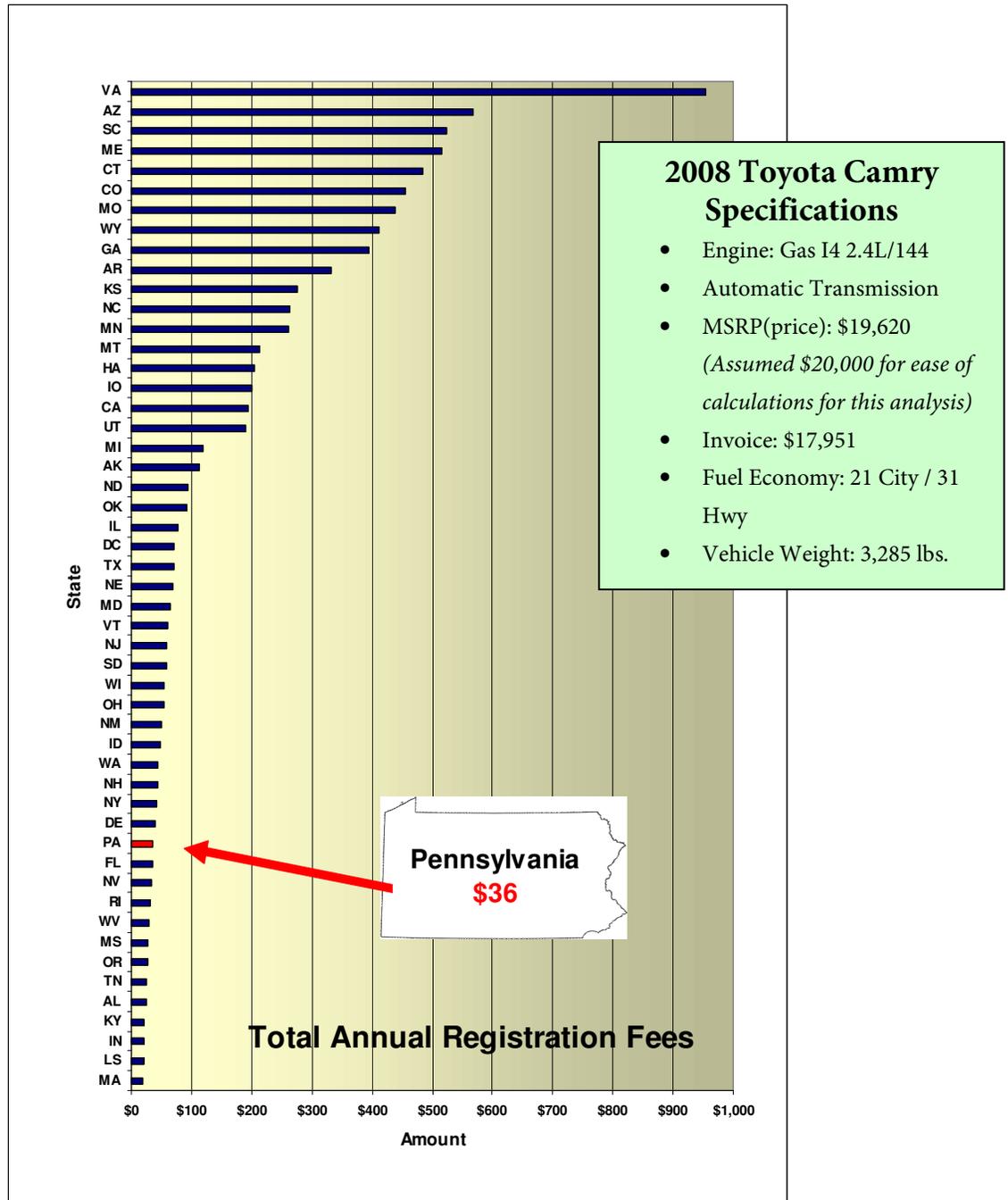
Many states vary their fees based on vehicle factors such as market value, weight, age, length of ownership, and even horsepower. Certain states or counties charge a personal property tax on vehicles, which can greatly increase the total cost to register a vehicle. A number of states also charge other add-on fees such as administrative fees, a highway beautification tax, clean air fees, or a luxury vehicle tax. Figure 23 shows how Pennsylvania compares to the rest of the nation with regard to vehicle registration fees. This takes into account all fees required to register a vehicle which may include county or local property taxes in some states. The data drawn in Figure 23 used a sample vehicle (2008 Toyota Camry) for comparison purposes.



Exhibit 1: A 2008 Toyota Camry was used as a sample vehicle in comparing registration fees across the 50 states



Figure 23: Annual State Registration Fees



Sources: AAA; contacts with states

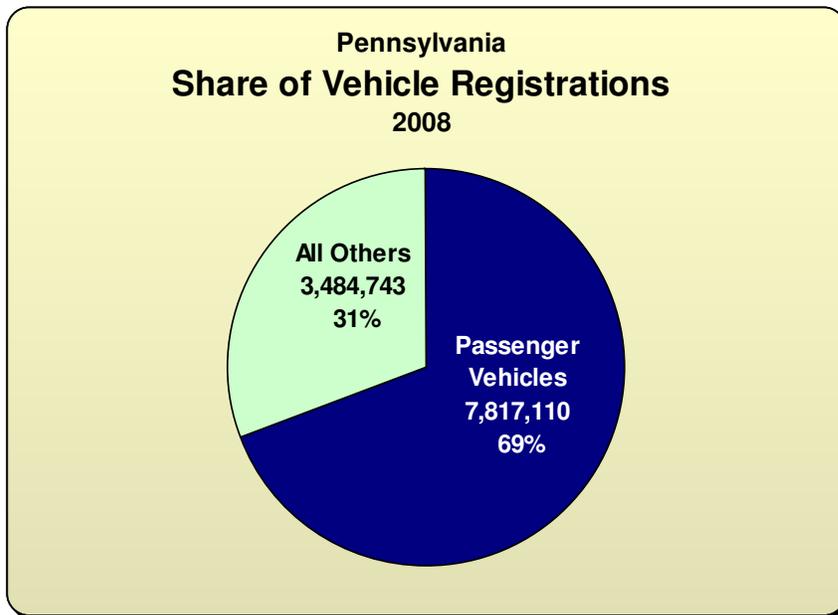
PennDOT's Bureau of Driver and Vehicle Services stratifies the state's fleet into an array of 45 categories of vehicle types, including 25 categories for trucks (based on weight). Of the Commonwealth's 11.3 million registered vehicles, more than 7.8

million, or 69 percent, are passenger vehicles. PennDOT currently segments the passenger vehicles by fuel type (e.g., gasoline, diesel, electric, propane, hybrid, and others) but not by segment type (e.g., compact, minivan, crossover, SUV, etc.). Currently, the only distinction that is made is the vehicle body type (sedan, coupe, station wagon and convertible).

Unlike many other states, Pennsylvania charges a flat registration fee for passenger vehicles, without regard to the vehicle's value, age, or weight. Pennsylvania does not levy a personal property tax on vehicles.

From the important standpoint of transportation funding, PennDOT's fee schedule does not take into account the many sub-vehicle types within the passenger vehicle bloc, with graduated fees for various vehicle types. For instance, in Pennsylvania, the driver of a 5,700-pound Cadillac Escalade SUV pays the same in vehicle registration fees as the driver of a 2,550-pound Chevrolet Aveo subcompact. Figure 24 graphically shows the ratio of passenger vehicles to all registered vehicles. This large vehicle segment represents an opportunity to possibly develop a sub-category fee structure for passenger vehicles, based on relative vehicle weights.

Figure 24: Pennsylvania Share of Vehicle Registrations, 2008

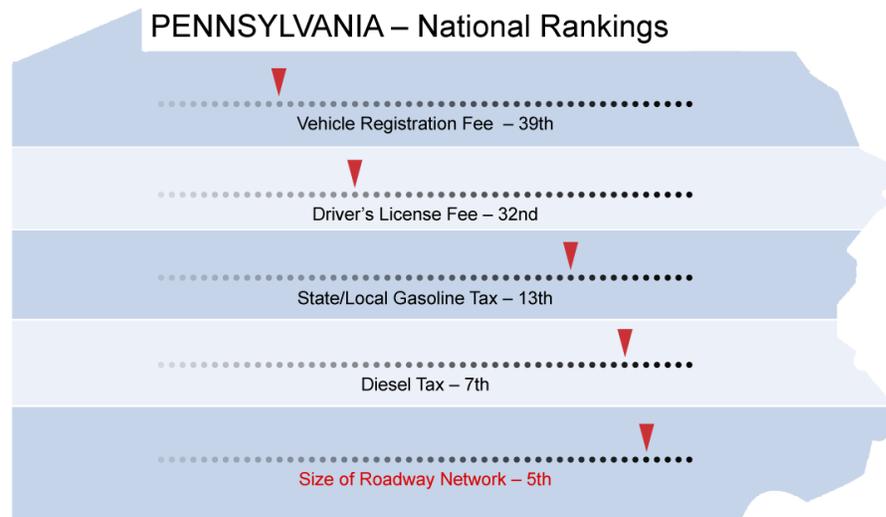


Source: PennDOT Safety Administration

In summary, as shown on Figure 25, Pennsylvania has the fifth largest roadway network in the nation, but fees and tax rates that help fund improvements to that network rank considerably lower.



Figure 25: Pennsylvania's National Rankings



2.3 The Impact of Inflation

Despite the revenue increases provided by Act 3 of 1997 and Act 44 of 2007, inflation continues to erode PennDOT's ability to make transportation improvements.

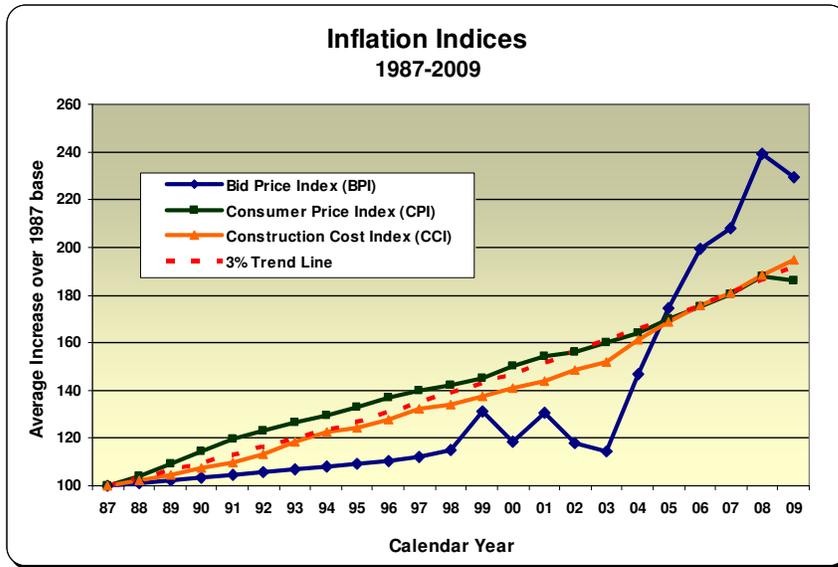
Three inflation indices that effectively make this point include

- the Construction Cost Index (CCI),
- the Consumer Price Index (CPI), and
- the Composite Bid Price Index (BPI).

The three indices point to rates of change among various sectors. The Construction Cost Index best reflects changes in maintenance costs, while the Consumer Price Index mirrors changes in wages (e.g., urban wage earners, consultant costs, etc.). Of the three, the Composite Bid Price Index is the best indicator for highway contract work. The BPI is also notable in that it has been the most volatile, increasing by more than 80 percent just since 2003 due to increases in the price of key materials needed for highway and bridge construction including asphalt, concrete, steel and diesel. During 2009, it appears that bid prices stabilized, as the worldwide economic conditions have reduced demand for products such as cement and steel.

Figure 26 shows the differing rates of change over the past two decades among the three inflation indices against a 3-percent trend line. The CCI and CPI track fairly close to the 3-percent trend, while the BPI has been erratic.

Figure 26: Inflation Indices



The Bid Price Index that measures construction contract costs has increased more than 80 percent just since 2003.

Source: PennDOT Bureau of Fiscal Management

2.4 Local Government

While PennDOT is responsible for meeting the state’s strategic mobility needs, local government is responsible for providing accessibility to local destinations. Throughout Pennsylvania, local government maintains a total of 6,300 bridges greater than 20 feet in length, an unknown number of bridges less than 20 feet, and approximately 77,000 linear miles of roadway. They also maintain and operate approximately 14,000 traffic signals. Given their more local function, these surface transportation facilities constitute 63 percent of the state’s total linear miles of highway, yet accommodate only 17 percent of the total vehicle miles of travel (VMT).

The state’s local municipalities rely on the disbursement of Liquid Fuels funding by PennDOT. Each municipality’s share of this funding is determined on a formula basis, expressly the municipality’s share of total population, as well as municipal roadway mileage. The formula for this disbursement is steady and the amount typically increases from year to year, based on the Daily Vehicle Miles of Travel (DVMT), which in turn generates the gas tax revenues that capitalize the Liquid Fuels amounts¹. In addition, local governments receive various state and federal reimbursements. In 2009, PennDOT disbursed over \$614 million in state and federal money to counties and municipalities statewide. A breakdown of this is shown in Table 2.

¹ While increases have been typical, this has not been the case over the past few years because of revenue shortfalls. Future growth will likely be impacted by improvements in fuel economy and use of alternate fuels.



**Table 2: Breakdown of Payments to Local Governments Statewide,
FY 2008-09**

Payments to Local Governments	Actual 2008-09 (000)
Local Road Maintenance and Construction Payments	\$200,451
Supplemental Local Road Maintenance and Construction Payments	\$5,000
Municipal Roads and Bridges	\$30,000
Maintenance and Construction of County Bridges	\$5,000
(R) County Bridges- Excise Tax (EA)	\$4,538
(F) Federal Aid - County Bridges	\$42
(R) Local Road Payments - Excise Tax (EA)	\$53,700
(R) Local Grants for Bridge Projects (EA)	\$25,000
(F) Federal Aid- Local Grants for Bridge Projects	\$955
(A) Reimbursements from Local Governments	\$1
(R) Annual Maintenance Payments - Highway Transfer (EA)	\$18,944
(R) Payments to Municipalities (EA)	\$38,044
(R) Restoration Projects - Highway Transfer (EA)	\$8,000
Reimbursements to Municipalities - Vehicle Code Fines	\$12,976
Federal Reimbursements- Bridge Projects	\$74,713
Federal Reimbursements- Political Subdivisions	\$105,712
Payments to Counties	\$30,197
Local Share Highway & Bridge Projects	\$777
TOTAL	\$614,050

Source: PennDOT Bureau of Fiscal Management

Other sources of funding for local surface transportation projects include:

- Local Funds from the municipal general funds
- Developer-based Funds (from impact fees and through negotiations with developers)

Actual road miles within one jurisdiction have a different demand on resources than in another. A notable example is that cities and boroughs are required to maintain transportation infrastructure, such as curbs and sidewalks, that are typically absent in a rural township. As such, higher transportation expenses may exist in more heavily-populated areas.

2.5 Revenue Projections out 20 Years

As part of the study process, a 20-year projection was developed for the major sources of highway revenues including federal funding and individual components of the Motor License Fund. In making such a long-term projection, a combination of factors was considered including the historical trends for each source, anticipated future changes in technology, and planning assumptions based on the most current information available. A critical assumption involves the anticipated change in the overall fleet-wide fuel economy based on the proposed federal CAFE standards. A comparison of the total projection was made against a 3 percent trend line, based on long-term inflation rates.

From the analysis, total transportation revenues are expected to increase from a FY 2008 base year amount of just over \$5.05 billion, to an eventual FY 2030 amount of almost \$6.3 billion. While this translates to an overall increase of 24.4 percent, it falls \$3.4 billion short of even meeting a modest average annual increase of 3 percent, when compounded annually for inflation. A list of planning assumptions used in calculating the forecasted revenues follows in Table 3 below.

Table 3: Revenue Projection Assumptions

Category	Percent Increase	Historical Basis	Notes
Federal			
Federal-aid	No increase in 2010. 1% in 2011 & 2012, then 4%.	1992-2009	Long-term trend is 4.4%; PennDOT's current financial guidance assumes 1% growth for 2011 and 2012, then 4%.
State			
Licenses and Fees	2%	1991-2008	Consistent long-term trend
Liquid Fuels			
• Total DVMT	1.06%	1994-2008	
• Heavy truck (diesel) DVMT	1.21%	1994-2008	
• Gasoline fuel economy	From 20.7mpg in 2007 to 35 mpg in 2030*		
• Diesel fuel economy	From 5.9 mpg in 2007 to 8 mpg in 2030		
Act 44 (Turnpike) without tolling	0%	n/a	Based on Act 44, this will remain at \$200 million annually through 2030.
Act 44 (Turnpike) with tolling	0%	n/a	If I-80 had become a toll road, payments to PennDOT from the PTC would have been \$500 M annually, with 2.5 percent annual increases.

* 35 mpg is supported by the following factors: (a) the Energy Independence and Security Act mandated a minimum CAFE standard of 35 mpg by 2020; (b) the turnover rate for the vehicle fleet fluctuates, but is approximately 15 years; (c) with a turnover rate of 15 years, two-thirds of the fleet will have been replaced by vehicles meeting or exceeding the 35 mpg CAFE standard by 2030; and (d) the 35 mpg is 10 mpg lower than forecast by Cambridge Systematics and the Texas Transportation Institute.

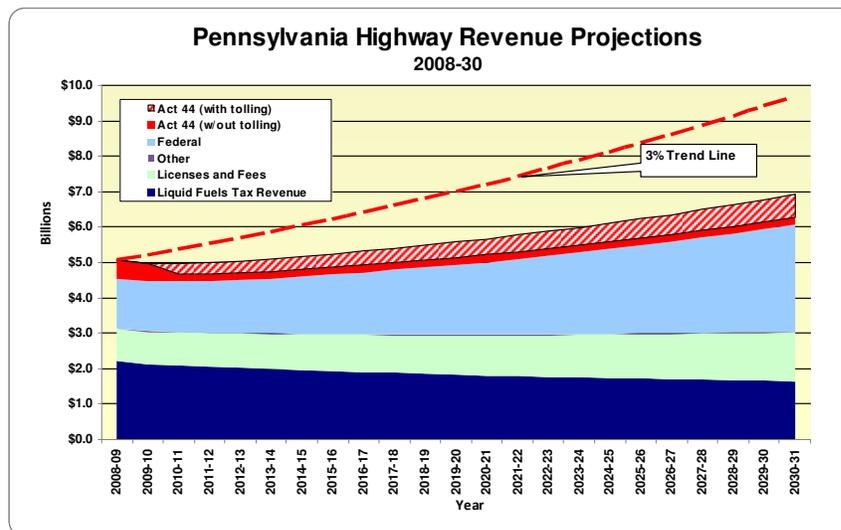
Source: Gannett Fleming analysis



Figure 27 below shows the various sources of transportation funding and their projected amounts over the 20-year period. The amounts are shown against a 3 percent line for inflation for comparative purposes. The figure shows that, despite an assumed 4 percent average annual increase in federal funding from 2012 onward, the combined ongoing and future impact of fleet fuel efficiency and inflation more than offsets those increases, translating into a net annualized growth rate of only 1.1 percent over the next 20 years. This revenue trend is clearly inadequate, given the expanding scope of transportation needs as documented in Chapter 3 of this report. The impact of the recent federal decision on I-80 tolling is shown. From the figure, the reader should understand that even the tolling of I-80 would yield only a small portion of overall needed revenue.

Revenues are forecasted to actually decline in the first several years of the planning period, and do not even break even with base year levels until FY 2015.

Figure 27: Pennsylvania Highway Revenue Projections



Source: Gannett Fleming

2.6 Summary

Pennsylvania's system of highways, bridges, and public transit provides the state's residents, visitors, and businesses with a high level of mobility. As the backbone that supports the state's economy, the surface transportation system provides for travel to work and school, visits with family and friends, and trips to tourist and recreation attractions while simultaneously providing businesses with reliable access for customers, suppliers, and employees.

As Pennsylvania looks to rebound from the current economic downturn, the state will need to improve its surface transportation network. The ARRA provided a

significant boost to the transportation system, while providing additional jobs for construction and transit. However, as we move to the future, the funding base is not available to maintain these jobs and the progress in improving the transportation system.

Motor License Fund and the Public Transportation Trust Fund revenues will be impacted by the inability to toll I-80. This, coupled with long-term trends that project declining revenues against needs, will make it difficult to even maintain—let alone improve—the system and provide needed public transit services.



3. Highway and Transit Needs

The passage of Act 44 at the state level and the infusion of stimulus funding from the federal government have been significant in addressing highway and transit needs in the short term. However, trends indicate that this cannot be sustained in the longer term.

This study is focused on defining bona fide transportation needs for present and future demand. The first priority is to define future requirements for maintaining, preserving, and operating the system. The second priority is to address the congestion issues that are expected to impact the future viability of the system.

To accomplish a needs identification, this study is built heavily on the analysis and methodology used in the Transportation Funding and Reform Commission report. The public transit needs are updated to reflect the events and shifts in programs that occurred since the 2006 report—most notably the passage of Act 44. For the highway and bridge needs, efforts were made to incorporate new methodologies into the needs analysis, in cooperation with PennDOT.

3.1 Baseline Highway Data

This section presents data in several highway categories to establish baseline data on the current condition or recent trends. These areas are further analyzed for future needs in the following sections.

3.1.1 System Size and Growth

The size of the PennDOT-owned highway network has declined slightly in recent years, yet it still one of the largest in the nation, with more than 39,861 linear miles of roadway. Pennsylvania ranks fifth in the nation in the size of its (PennDOT-owned) highway network. Only Texas, North and South Carolina, and Virginia maintain and operate more lane miles of roadway.²

Local government also maintains an extensive and growing network of roadways, totaling 77,325 linear miles. Altogether, there are a total of 121,770 miles of roadway in Pennsylvania, an increase of 1,348 miles over the past five years. Over that same time period, overall travel demand on PennDOT-owned roadways increased by 0.6 percent, while demand on local roadways rose by 4.1 percent.

3.1.2 Pavement Condition

PennDOT analyzes highway pavements based on a network stratification as follows:

² This includes only state-owned roadways. <http://www.fhwa.dot.gov/ohim/hs00/hm81r.htm>

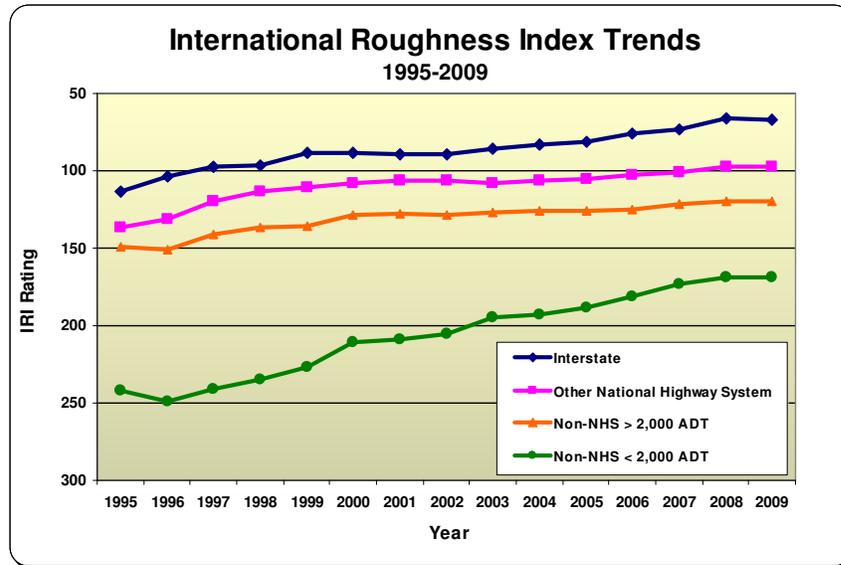
Network	Linear Miles	Lane Miles	Description
Interstate	1,320	5,700	Defined as the federally designated Interstate Network; includes PennDOT Interstates only, not Turnpike
National Highway System (NHS)	3,579	10,900	For this purpose, NHS is only the non-Interstate portion. The entire NHS is an identified national system that includes the Interstates and other major highways that connect our cities, airports, ports or intermodal facilities, or are important to national defense. In PA, this includes roads such as US 22, US 30 and US 202.
Non NHS > 2,000 ADT		28,900	Highways not on the NHS with Average Daily Traffic greater than 2,000/day
Non NHS < 2,000 ADT	34,962	43,900	Highways not on the NHS with Average Daily Traffic less than 2,000/day

PennDOT has made significant progress in improving the smoothness of Pennsylvania pavements over the past several years. The International Roughness Index (IRI) is a measure of highway roughness, with lower numbers indicating smoother pavements. Figure 28 shows that the smoothness of Pennsylvania pavements has been continually improving on all networks. In 2009, Pennsylvania’s 1,700-mile network of interstates carried 24 percent of all the state’s traffic on only 1.5 percent of the state’s total roadway network. As a unit, these roadways recorded the lowest (best) IRI ratings, successively followed by lower-order roadways, such as National Highway System (NHS) and non-NHS routes. Based on the IRI values shown in Figure 28, the interstates can be classified as in “excellent” condition, while the other networks garner a rating of “good”.

The smoothness of Pennsylvania’s roadways compares very favorably to other states as well. Our current IRI of 67 for interstates is significantly lower than the national average of 81. The Pennsylvania IRI for other roads on the NHS is 97, compared to 102 nationally.



Figure 28: IRI Trends on Various Pennsylvania Roadway Networks

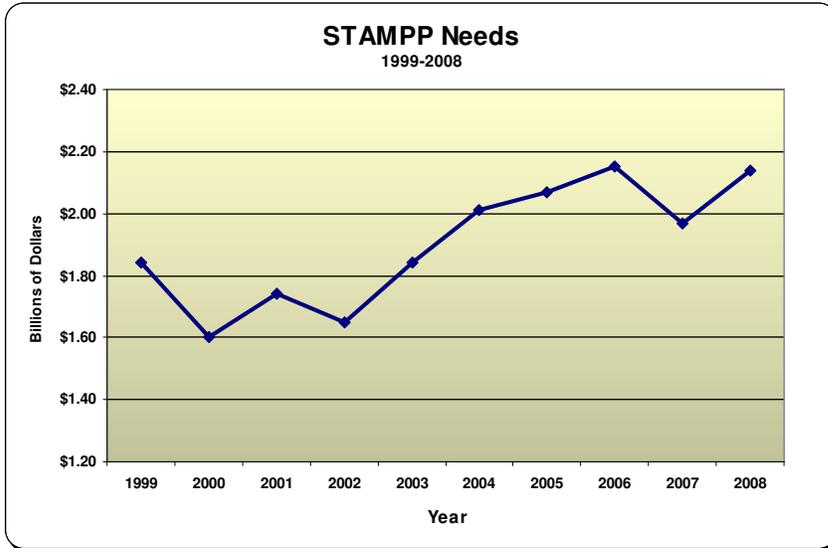


Source: PennDOT

However, smooth pavements may not translate into overall improvement of pavements. STAMPP (Systematic Techniques to Analyze and Manage Pennsylvania Pavements) is PennDOT’s pavement management system which calculates overall pavement needs. Figure 29 provides a historical look at total STAMPP needs from 1999 to 2008. STAMPP includes many needs other than smoothness, such as rutting, cracking, shoulder distress and guiderail. Therefore these other needs continued to grow over that period even as road surfaces became smoother.

PennDOT engineers have determined that the lack of funding to reconstruct roads on a cyclical basis is leading to underlying problems with the sub-base, drainage, and other highway elements. Funding has allowed treatment of the surface, but it has not been adequate to schedule the more costly full reconstruction. The ARRA funding has also been a boost to resurfacing work, but because of the requirement that projects be “shovel ready,” highway reconstruction projects have not been able to be funded.

Figure 29: STAMPP Needs

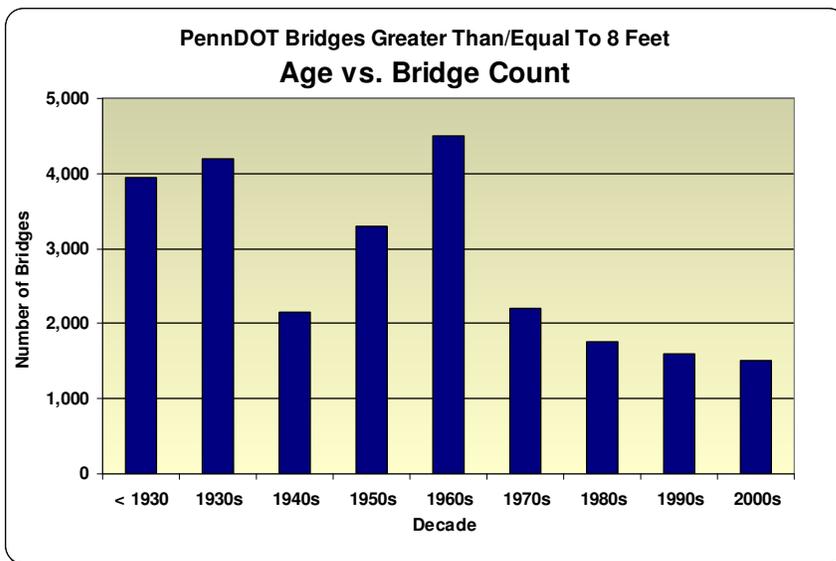


Source: PennDOT Bureau of Maintenance and Operations

3.1.3 Bridges

Bridge conditions in Pennsylvania have long been a concern. Since the passage of the original Bridge Bill in 1982, PennDOT has been trying to reduce bridge deficiencies. However, the age of Pennsylvania’s bridges has been working against improvement, as shown in Figure 30. The Commonwealth has the fourth-oldest bridge inventory in the nation.

Figure 30: PennDOT Bridges - Age vs. Bridge Count

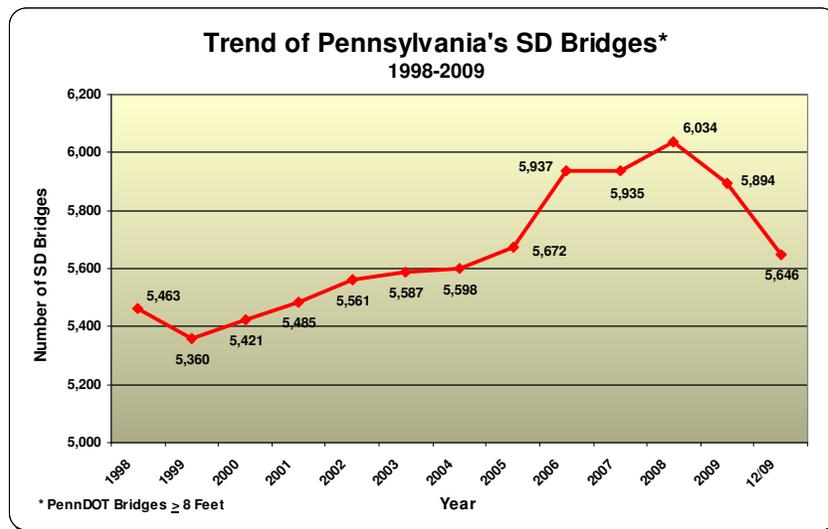


Source: PennDOT Bureau of Design, data as of March 2010.



Recent numbers from PennDOT reveal that Pennsylvania has shown improvement in the rate of structurally deficient bridges overall, as shown in Figure 31. Although the chart reflects the number of structurally deficient bridges, the Department utilizes bridge deck area for assessing maintenance needs and bridge repair/replacement costs. Despite this, Pennsylvania still ranks first in the nation in the total number of structurally deficient bridges, and second in the total deck area of structurally deficient bridges.

Figure 31: Pennsylvania's SD Bridges

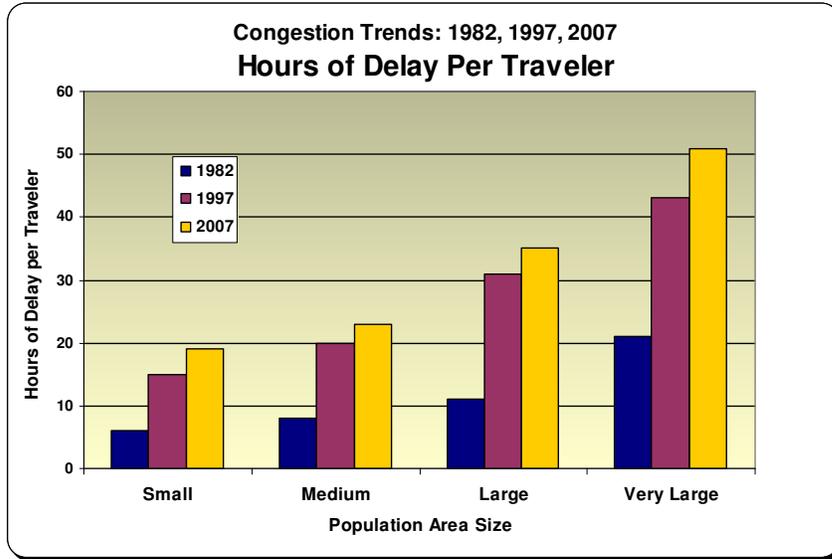


Source: PennDOT Bureau of Design, data as of March 2010.

3.1.4 Congestion

Congestion is a result of several root causes including physical bottlenecks, traffic incidents, traffic signals, work zones, weather, and special events. Nationally and in Pennsylvania, congestion has worsened over the past 20 years. Figure 32 shows the increase in hours of delay per traveler.

Figure 32: Congestion Trends



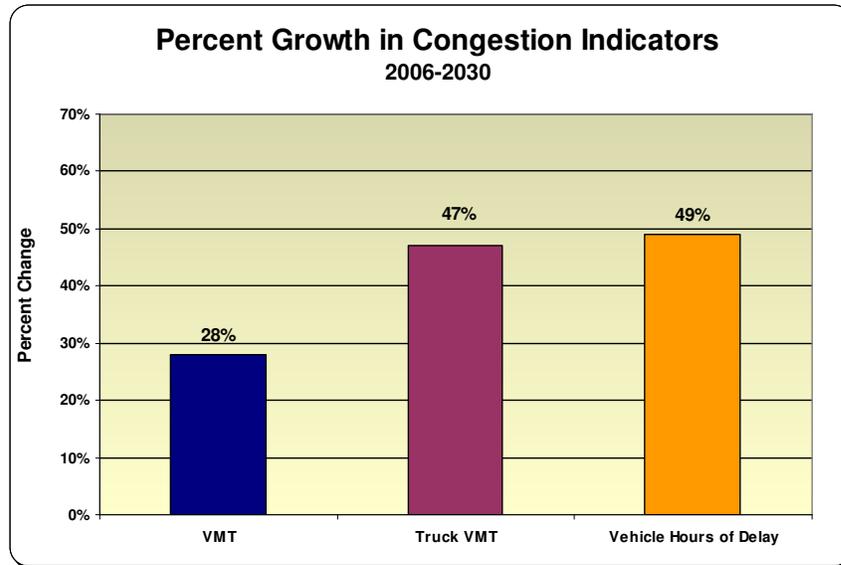
Source: Urban Mobility Report, Texas Transportation Institute, 2009

The underlying issue with congestion is that over the long term, travel continues to increase while the size of the transportation system is not growing. Travel is expected to continue to increase. Based on the Pennsylvania’s Statewide Travel Demand Model, vehicle miles of travel are forecast to increase by 27 percent by 2030, with truck travel increasing by 47 percent over the same period. Total vehicle hours of delay are projected to increase by 48 percent by 2030. This growth is shown in Figure 33.

Travel continues to increase while the size of the transportation system is not growing.



Figure 33: Percent Growth in Congestion Indicators, 2006-2030



Source: Pennsylvania Statewide Travel Demand Model

It is estimated that congestion costs Pennsylvanians \$2.7 billion each year³. Conservative estimates indicate that congestion will increase by 50 to 60 percent in Pennsylvania by 2035 unless a multifaceted congestion mitigation program is established.

Historically, the transportation industry has focused on building additional capacity to address congestion. More recently, the focus has shifted to managing and optimizing capacity as well as reducing demand by promoting alternative modes of travel and land use strategies.

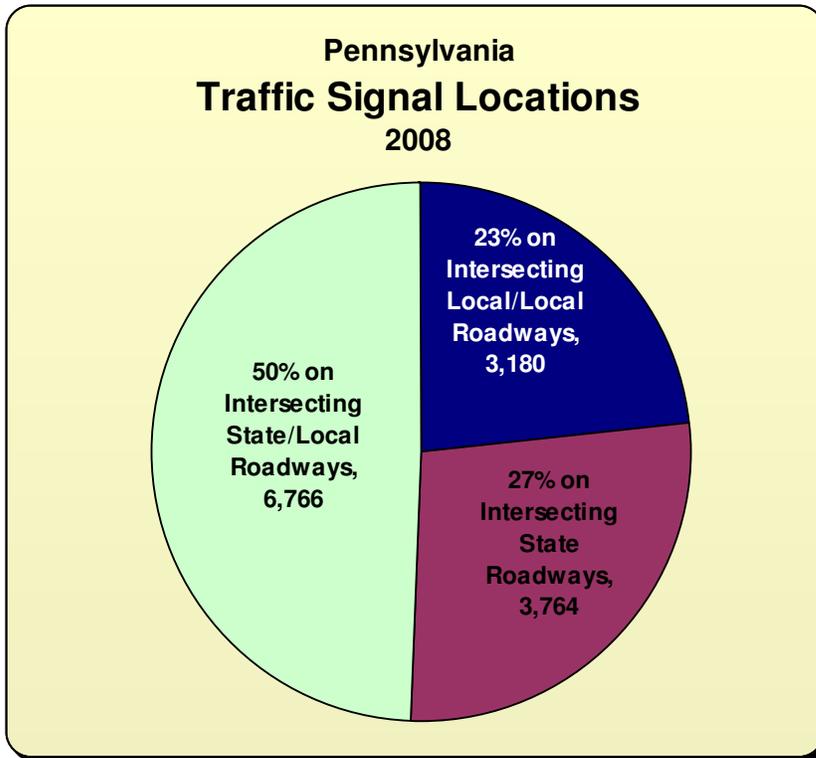
PennDOT has deployed ITS equipment on the heaviest travelled freeways. Great strides have been made in improved systems operations, but gaps remain. The 511PA system has recently been deployed to provide better information to travelers on roadway conditions and congestion points.

A major issue for Pennsylvania is the nearly 14,000 traffic signals that are owned and operated by approximately 1,200 of Pennsylvania's municipalities. A majority of these municipalities have neither the technical expertise nor the resources to adequately maintain and operate their traffic signals. There is minimal operational oversight at the state level after initial installation.

Figure 34 shows the distribution of the state's traffic signals, by type of intersecting facility.

³ Congestion Mitigation and Smart Transportation, Final Report, March 2009, Transportation Advisory Committee

Figure 34: Pennsylvania Traffic Signal Locations, 2008



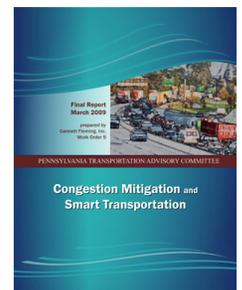
Even though 77 percent of the state's signals involve state highways, municipalities are responsible for costs of maintenance and operations.

Source: PennDOT Bureau of Highway Safety and Traffic Engineering

TAC has completed two studies over the last several years making recommendations to address congestion:

- Pennsylvania Traffic Signal Systems: A Review of Policies and Practices (2005)
- Congestion Mitigation and Smart Transportation (2009)

These studies made many recommendations for developing a more comprehensive congestion management program and taking a more aggressive role in managing traffic signals. However, due to funding constraints, many of these recommendations have not been addressed. Appendix B on page 107 includes a listing of the recommendations from both reports.



3.1.5 Safety

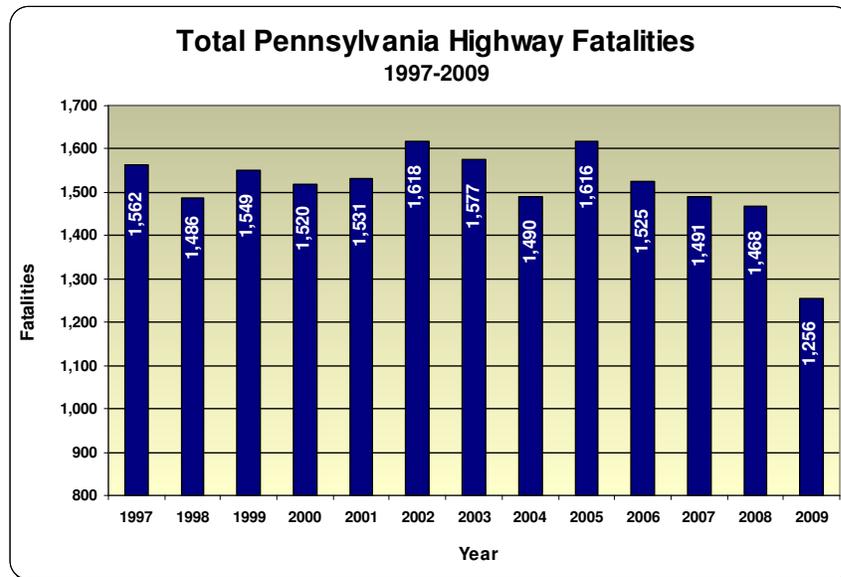
In 2008, Pennsylvania crashes and fatalities resulted in economic losses totaling an estimated \$15.4 billion, or \$926 for every person in Pennsylvania.⁴ PennDOT is committed to reducing these losses by a continuous emphasis on safety. This has many facets including encouraging seat belt use, reducing drunk driving, and

⁴ Summary Report, "The State of Highway Safety in Pennsylvania." (July 2008)



completing highway improvements which address high incident areas. Figure 35 shows highway fatalities for the past 13 years. There were 1,256 fatalities in 2009, the lowest number since record-keeping began in 1928.

Figure 35: Total Pennsylvania Highway Fatalities, 1997-2009



Source: PennDOT Bureau of Highway Safety and Traffic Engineering

3.2 Highway and Bridge Needs

For the highway and bridge analysis, the study team was able to use extensive information available on the state highway system. PennDOT used internal revenue, cost, and condition information to help forecast future need. For the purpose of this analysis, the following highway needs categories were used:

PennDOT Highways

- Pavements
- Bridges
- Congestion Management
- Safety
- Capacity

Local Highways

- Highways and Bridges
- Traffic Signals

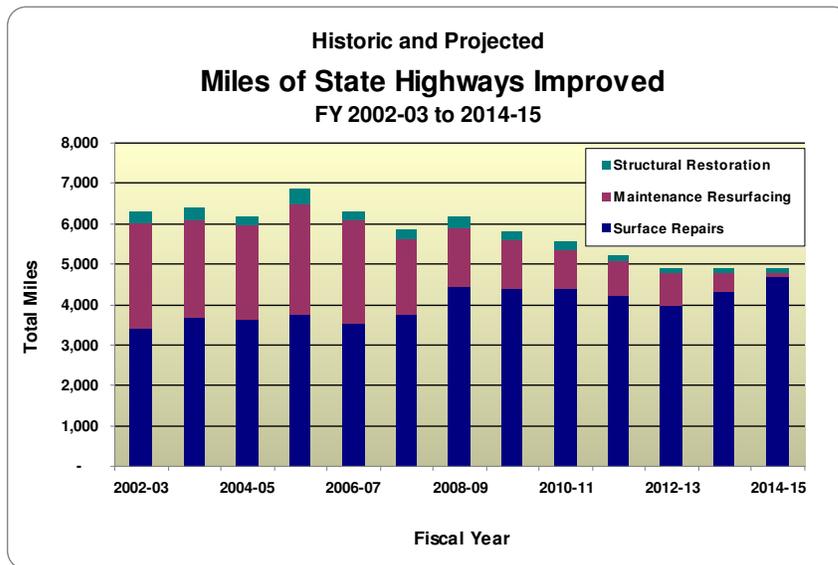
The following is an analysis of each category.

3.2.1 Pavements

Current Annual Program: PennDOT is currently spending about \$1.0 billion annually on pavement improvements. Trends have shown that pavement performance has continued to improve in terms of smoothness (lower IRI); however, overall pavement performance needs continue to increase. The issue is that limited funding has not allowed reconstruction of highways on any reasonable cycle. Current reconstruction equals just 1.4 percent of the program, which is expected to be further reduced due to inflation and increasing demands on the maintenance budget.

Figure 36 below demonstrates a remarkable fact: PennDOT work on projects related to maintenance resurfacing and structural restoration (such as complete reconstruction) is projected to diminish over the next few years, as less-expensive surface repair work is expected to continue to command a greater share of work in the future, from 79 percent in 2010 to an estimated 96 percent by 2014.

Figure 36: Miles of State Highway Improved



Source: PennDOT Bureau of Fiscal Management

The result is that subsequent preservation treatments are not as effective and do not last as long. Without additional funding, there will be more sealing and patching instead of resurfacing and reconstruction, resulting in further deterioration in overall pavement condition.

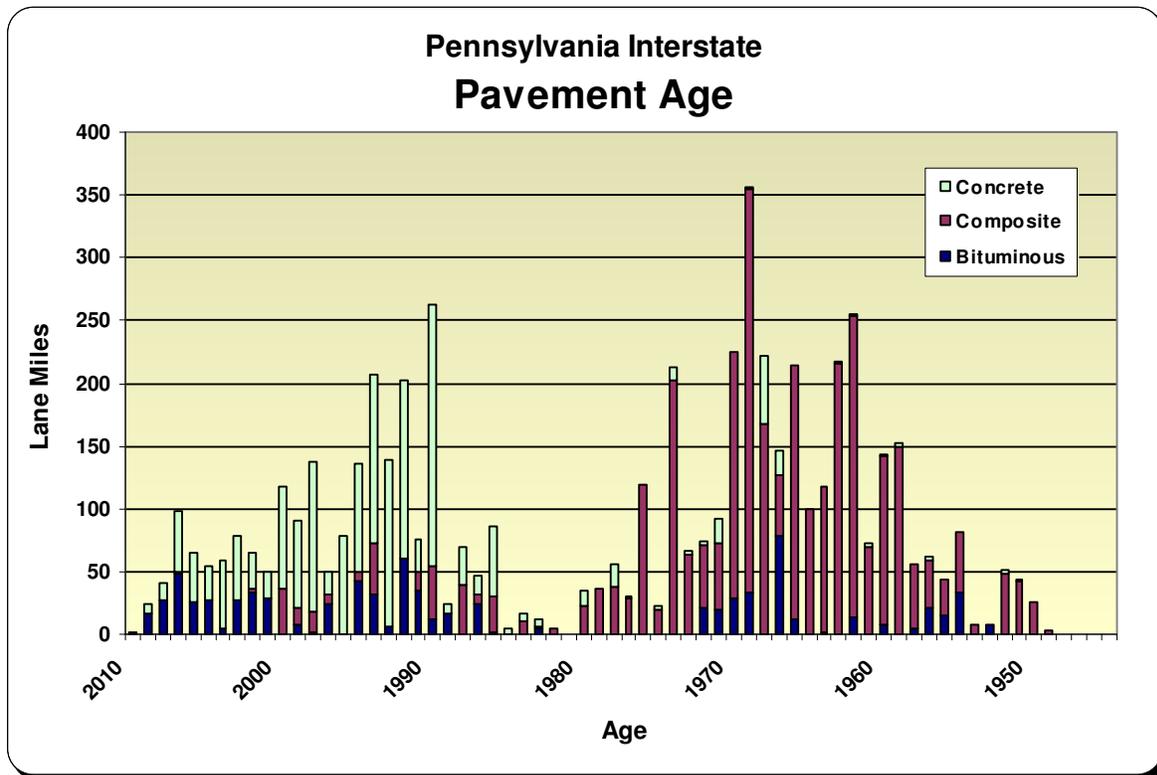
Goals for New Program: To improve the overall pavement condition, it is critical that pavements be addressed on a treatment cycle which includes eventual reconstruction of the pavement. PennDOT has proposed a cycle for Interstate and



NHS pavements that addresses pavement reconstruction at the 50 year mark with maintenance activities and interim treatments (such as resurfacing or crack sealing) at the appropriate points within the 50 year cycle. For the lower level networks, a similar cycle is proposed with a less expensive treatment such as a full betterment at the 50 year mark on Non-NHS roads > 2000 ADT or a continuous seal coat cycle with paving on the most critical portions of the Non-NHS roads < 2,000 ADT.

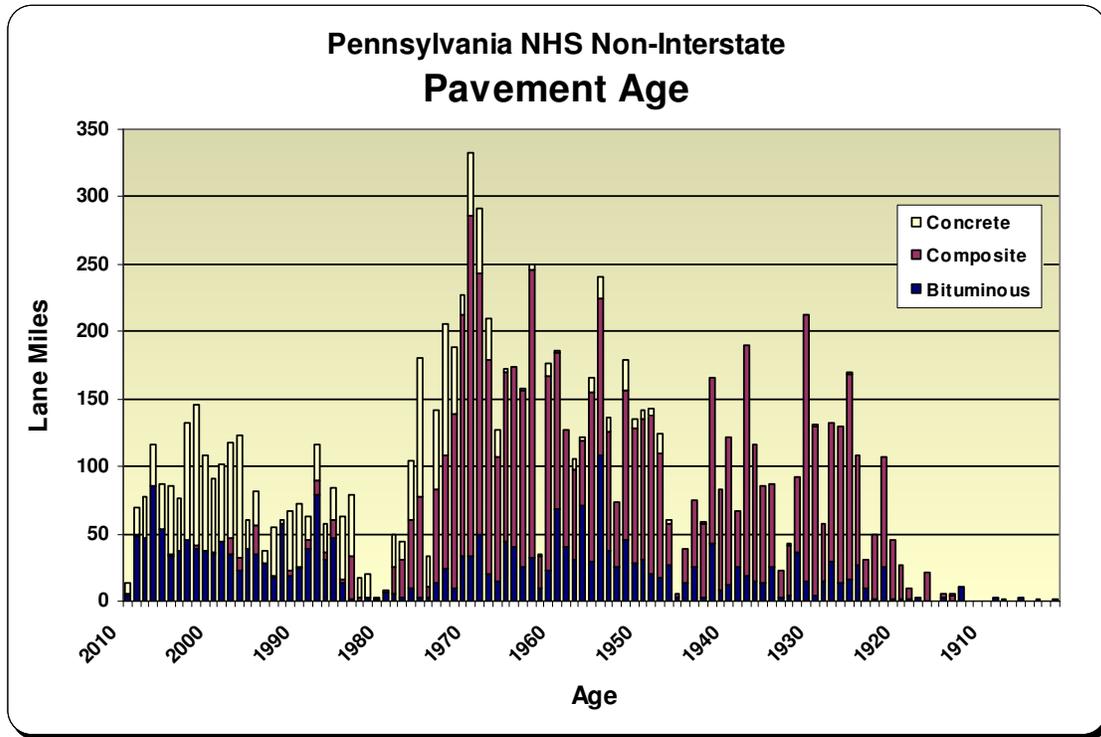
The following figures show the respective ages of the state’s pavements on Interstates as well as the NHS Non-Interstate roadways. Figure 37 shows the excess of Interstate lane miles that date back to the 1960s – important roadway surfaces that are now in need of reconstruction. An examination of the other NHS roadways reveal an inventory of roadway lane miles that are even older, as shown in Figure 38.

Figure 37: Pennsylvania Interstate Pavement Age



Source: PennDOT Bureau of Maintenance and Operations

Figure 38: Pennsylvania NHS Non-Interstate Pavement Age



Source: PennDOT Bureau of Maintenance and Operations

Additional Annual Funding Needs: Table 4 shows the annual required funding to address the proposed pavement cycles for each network. These figures include annual pavement needs based on the cycle plus a plan to reduce the backlog of reconstruction needs over a 25-year period. In addition, appurtenance needs were included for the non-NHS network. This would include items such as signs, guiderail, paint lines, delineators, retaining walls, lighting and drainage.



Table 4: Summary of Proposed Annual Funding for Pavements

Network	Lane Miles	Annual Pavement Needs (Millions)
Interstate	5,700	\$669
NHS	10,900	\$865
Non NHS > 2000 ADT	28,900	\$759
Non NHS < 2000 ADT	43,900	\$275
Subtotal Pavement Needs	89,400	\$2,568
Appurtenance Needs for Non-NHS Network ⁵		\$193
Total Pavement and Appurtenance Needs		\$2,761

Note: Needs in this table include requirements to maintain cycle plus backlog recovery plan
Source: PennDOT Bureau of Maintenance and Operations

As is shown, a total of \$2.761 billion is needed to address pavement maintenance and improvements. Therefore, an additional annual program of approximately \$1.761 billion, above the current expenditures of \$1.0 billion, is required to get Pennsylvania pavements on a 50-year cycle with periodic treatments in between.

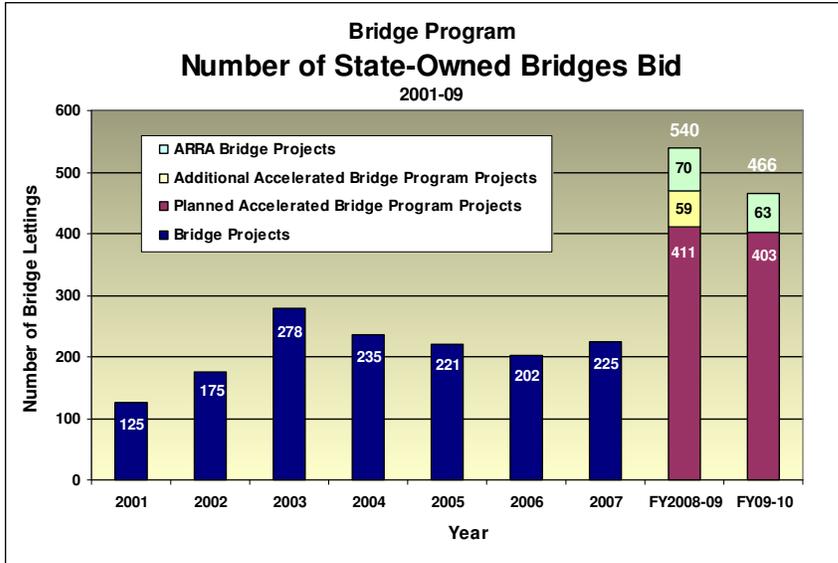
3.2.2 State-Owned Bridges

Current Annual Program: PennDOT has a current emphasis on addressing the enormous bridge problem across the state. PennDOT has increased its bridge program in recent years as part of Governor Rendell’s Rebuild PA initiative. The accelerated bridge program has reached a total of \$1.6 billion in needs annually. This includes bridge rehabilitations and replacements as well as preservation and maintenance to defer more bridges falling into the structurally deficient category each year. The progress has been possible by dedicating most Act 44 funds to bridges, using bond proceeds for bridges, and dedicating any available highway funds to bridges.

Figure 39 details PennDOT’s history of bridge lettings since 2001 and the progress made over the past two years through the accelerated bridge program.

⁵ This includes signs, guiderail, paint lines, delineators, retaining walls, lighting and drainage. These items are assumed to already be part of a full reconstruction for the Interstates and NHS.

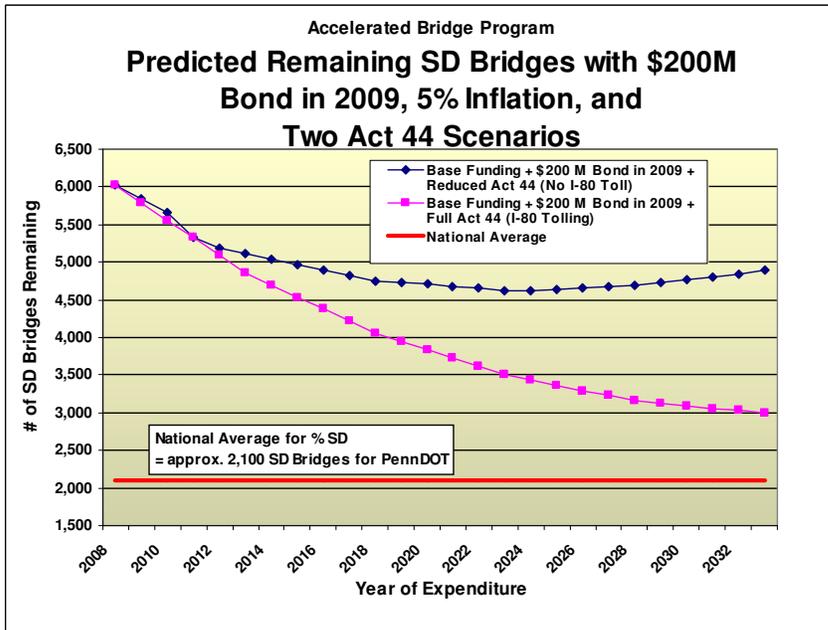
Figure 39: PennDOT State-Owned Bridge Bid History



Source: PennDOT Bureau of Design, data as of December 2009.

Based on continuing this program, Figure 40 shows the progress that can be expected in reducing SD bridges. However, an alternative scenario is also shown, based on lower Act 44 funds as a result of not tolling I-80.

Figure 40: Accelerated Bridge Program



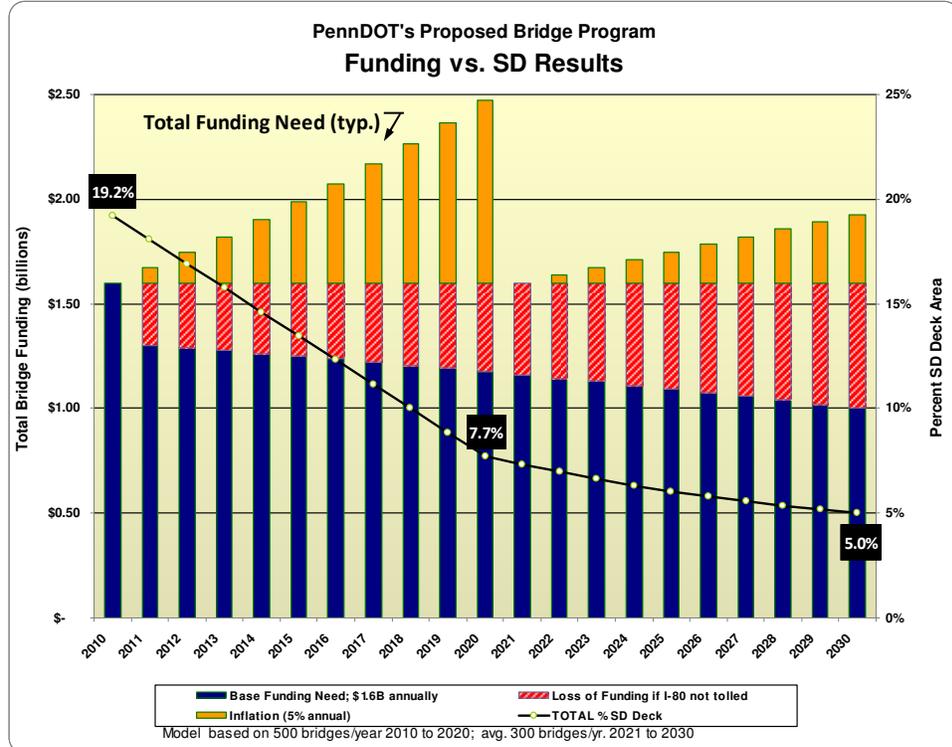
Source: PennDOT Bureau of Design, data as of January 2010.



Goals for New Program: PennDOT has proposed a new bridge initiative with the goal to reduce the percentage of structurally deficient bridge deck area to the national average within 10 years and to 5 percent over a 20 year period. It has been estimated that to accomplish this goal, 500 bridges would be rehabilitated or replaced annually for the first 10 years, with emphasis on the bridges on the National Highway System. This total could be reduced to 300 bridges for each of the following 10 years. This would assume that revenues to this program would keep pace with inflation.

Additional Annual Funding Needs: An annual program building on the \$1.6 billion in the current year and then growing with inflation is required to meet the goals of the Next Bridge Program. However, without the approval for the I-80 tolling, the reduction in Act 44 dollars will impact the funding available, leaving a \$370 million gap in FY 2010-11. As Figure 41 shows, the impact of inflation on top of the loss of Act 44 funds is substantial. The cost required for this program would need to grow from the initial \$1.6 billion to approximately \$2.47 billion annually by the end of the 10 year period, then could be reduced with the change to a level of 300 bridges per year.

Figure 41: PennDOT's Proposed Bridge Program



Source: PennDOT Bureau of Design, data as of February 2010.

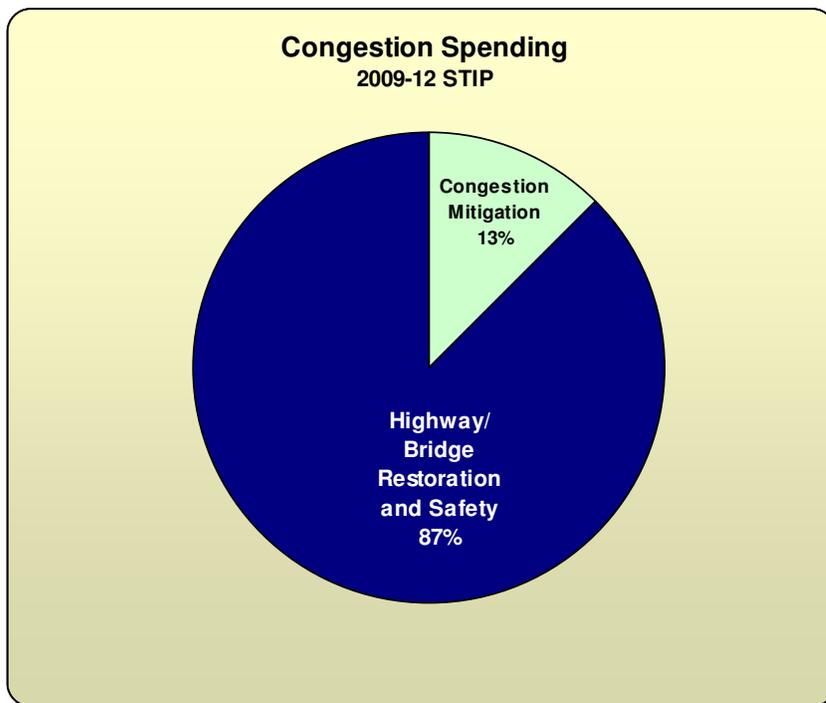
3.2.3 Congestion Management

Current Annual Program: With the overwhelming restoration needs across the state, the current Statewide Transportation Improvement Program allocates 87 percent of program dollars to highway and bridge restoration and safety improvements, as shown in Figure 42. That leaves 13 percent of transportation spending to address congestion through lane additions, corridor and intersection improvements, traffic signal upgrades, Intelligent Transportation Systems (ITS), and demand management strategies (such as ridesharing and park-and-ride facilities). Only about 5 percent of the program addresses new highway capacity.



Exhibit 2: Congestion on US 11/15 in Cumberland County

Figure 42: Congestion Spending in the 2009-12 STIP



Source: PennDOT Center for Program Development and Management



PennDOT has no existing program or targeted funding to address traffic signals.

PennDOT currently spends \$13.6 million annually to operate and maintain ITS equipment and traffic management centers across the state. In addition, specific projects are programmed across the state to add ITS equipment, either as stand-alone projects or as part of larger projects. A \$40-million project is approved to add cameras, highway advisory radios, and dynamic message signs to fill gaps at Interstate-to-Interstate connections. To provide traveler information, 511PA data is compiled from public sources including PennDOT, PA Turnpike traffic operations, Pennsylvania Emergency Management Agency, and Pennsylvania State Police. As part of the project, traffic speed data is purchased from a private supplier for 488 miles of Interstates and expressways.

PennDOT has no existing sustained program, asset management tool, or targeted funding to address traffic signals. There is limited funding of selected projects in some MPO programs to retime and modernize traffic signals. Both the Delaware Valley Regional Planning Commission (DVRPC) in Philadelphia and Southwestern Pennsylvania Commission (SPC) in Pittsburgh have established responsible programs to address traffic signals.

Two successful PennDOT programs have been suspended due to budget constraints: the Congestion Corridor Improvement Program (CCIP) funded low-cost congested corridor improvements, and the Traffic Signal Enhancement Initiative (TSEI) addressed signal modernization and signal retiming projects.

Goals for New Program: Advancement and deployment of new technology can continue to provide benefits for mitigating congestion. PennDOT has estimated that a 20-percent reduction in travel time and incident delay can be achieved through the implementation of additional ITS tools and operational improvements on major expressways⁶. In addition to ongoing maintenance of existing equipment, it is proposed that ITS coverage be expanded to fill gaps at all freeway connections and to ensure camera coverage at all interchanges on the interstate system. Other efforts would include implementation of a Statewide Traffic Management Center and expanded staffing at Regional Traffic Management Centers for better coordination of operations, a standardized ITS device control software package and connectivity of PennDOT's TMCs to improve efficiency and effectiveness, and the use of technology such as automatic vehicle location and a maintenance decision support system to improve maintenance operations. Although costs vary year-to-year depending on implementation schedules, yearly costs are estimated to be \$28 million to implement the various ITS initiatives, and to cover ongoing operations and maintenance costs.

Enhancements to the 511PA system will include the addition of all other major routes throughout the state. As part of this effort, PennDOT would like to

⁶ Intelligent Transportation Systems Benefits, Costs, Deployment and Lessons Learned. 2008 Update, USDOT, Research and Innovative Technology Administration

purchase additional real-time traffic data for other routes in the expanded 511 system. This would provide the public with an accurate assessment of current traffic conditions and would improve PennDOT's overall situational awareness. This real-time data is estimated to cost \$2 million per year.

With the growing amount of ITS equipment already deployed across the state, it is necessary to begin a replacement program for old or outdated equipment. This is expected to cost \$38 million annually in the current year. After 10 years, newly added equipment will fall into this replacement cycle which will double the need at that time.

Improved operation of traffic signals could have a significant impact on major arterials and other corridors throughout the state. Many municipalities do not properly maintain and operate their traffic signals. A statewide program to modernize and better time signals could improve congestion and assist local municipalities. Upgrading equipment on older signals would include the installation of new LED technology which could have the additional benefit of lowering energy costs for local municipalities by up to 90 percent.

Based on recommended practices by the FHWA, traffic signals should be retimed every 3 - 5 years⁷. Traffic signal retiming has been shown to be one of the most effective ways to improve traffic movement and make streets safer. Retiming has benefits to the traveling public through reducing delay, reducing motorist frustration, improving safety, and reducing fuel consumption and emissions. Studies have shown that signal retiming can produce benefit to cost ratios as high as 40:1⁸. It is proposed that PennDOT would develop a collaborative effort with local governments to address the retiming of signals across the state.

The proposed program to modernize all traffic signal equipment every 10 years and retime traffic signals every 5 years is estimated to cost approximately \$182 million annually in current dollars and continue beyond that point (see Table 5). The benefits are estimated at reduced delays and greenhouse gases on major signalized arterials by 15 and 22 percent⁹.

Additional Annual Funding Needs: The additional funding proposed to address traffic management totals \$70 million in the initial year, which includes \$32 million over the next 10 years for ITS initiatives and operations and maintenance, and an equipment replacement program which will cost \$38 million initially, but will double after 10 years due to the amount of equipment being deployed.

A collaborative traffic signal program is estimated to cost \$182 million annually in current dollars and continue beyond that point. This includes the cost to

⁷ FHWA Traffic Signal Timing Manual, <http://ops.fhwa.dot.gov/publications/fhwahop08024/>

⁸ The Benefits of Retiming Traffic Signals, Srinivasa Sunkari, P.E., ITE Journal, April 2004

⁹ Research and Innovative Technology Administration, <http://www.itsbenefits.its.dot.gov/its/benecost.nsf/0/03BDC39B85A6A78C8525725F00605A8A>



modernize all existing traffic signals and the cost to retime signals every 5 years. This cost is assumed to be a benefit to local governments and is assigned to local government as a need in the summary. Table 5 shows further detail on the costs for congestion management:

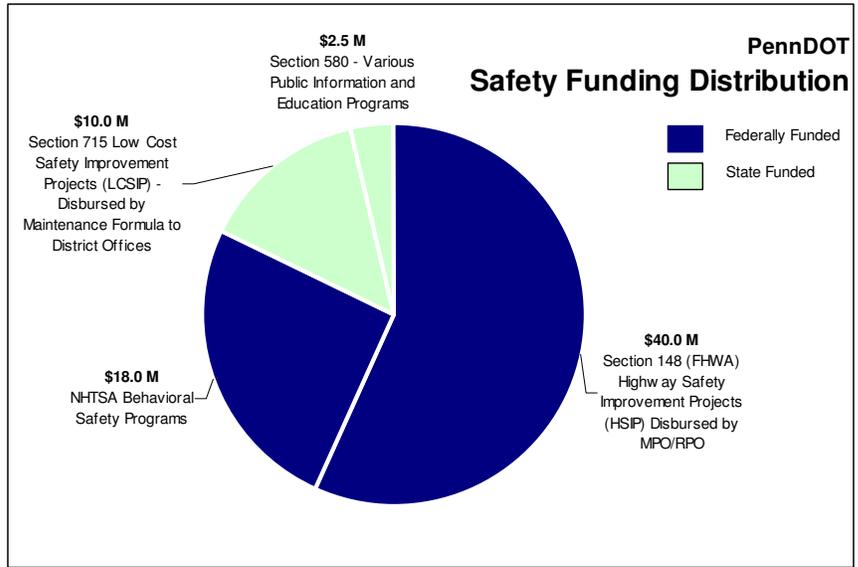
Table 5: Summary of Congestion Management Needs

Improvement	Annual Cost
Traffic Management:	
ITS initiatives, operations and maintenance (Includes completion of ITS coverage of Freeway Interchanges, ITS camera deployments at Interstate Interchanges, maintenance operations tools, and ITS device software)	\$28 million
511PA	\$2 million
Real-Time Traffic Data	\$2 million
Sub-total	\$32 million/year
	over next 10 years
ITS Equipment Replacements	\$38 million/year plus inflation
Total	\$70 million/year Initial year
Traffic Signal Management:	
Signal Modernization (Assumes all signals modernized over 10 years)	\$157 million
Signal Retiming Costs	\$25 million
Total	\$182 million/year Initial year

3.2.4 Safety

Current Annual Program: PennDOT currently receives \$70.5 million annually for highway safety improvements. This includes federal and state funding for medium to high-cost improvement projects (such as roadway curve realignments), lower cost safety improvements (such as center line rumble strips), behavioral safety programs and various public information and education programs. A breakout of PennDOT’s current level of safety funding is shown in Figure 43 .

Figure 43: PennDOT Safety Funding Distribution



Source: PennDOT Bureau of Highway Safety and Traffic Engineering

Goals for Safety Program:

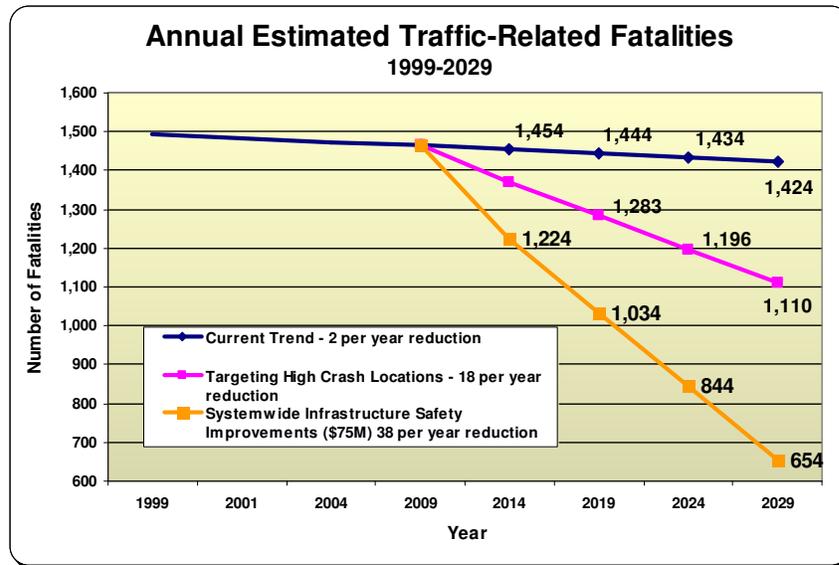
In 2008, leading national transportation organizations established the goal of halving motor vehicle related fatalities by 2029. This would translate to a reduction of 1,000 fatalities per year nationwide for each year until 2029. To meet this national goal, Pennsylvania must sustain a fatality reduction of 38 per year to reach 654 or lower by 2029. Pennsylvania can reach this goal by addressing systemwide infrastructure safety improvements with additional funds, as shown in Figure 44.

PennDOT expends approximately \$50 million (\$40M-Federal and \$10M-State) annually for infrastructure safety improvements, \$18 million in behavioral safety programs (DUI, Aggressive Driving, etc.) and \$2.5 million for public information and education programs. Based on past fatality numbers (since 1999 and excluding 2009 data as it is an anomaly due to the struggling economy) Pennsylvania is currently sustaining a 2 fatality per year reduction.

Starting in 2009, federal funds (\$40M) for infrastructure safety improvements have been reserved to address Targeted High Crash Locations. This is expected to reduce fatalities by 18 per year.



Figure 44: Annual Estimated Traffic Related Fatalities, 1999-2029



Source: PennDOT Bureau of Highway Safety and Traffic Engineering

Annual Funding Needs: \$75 million in additional annual funding is needed to address the top 5 system-wide infrastructure safety related crash types to meet the goal of reducing fatalities by 38 per year. By reducing these fatalities every year, major and moderate injury crashes will all be reduced by 276 per year. The economic loss recovered by preventing these fatalities and crashes could equal over \$4.8 billion dollars saved per year by 2029.



Table 6: System-wide Infrastructure Safety Improvements

Top 5 System-wide Infrastructure Related Crash Types	Current Funding (per year)				Additional Funding (per year)			
	Funding (millions)	Lives Saved	Major/Moderate Injuries Prevented	Economic Loss Recovered (millions)	Funding (millions)	Lives Saved	Major/Moderate Injuries Prevented	Economic Loss Recovered (millions)
Single Vehicle Run-Off-Road; Hit Fixed Object; Intersection; Head-On /Opposite Direction Side Swipe	\$10	2	24	\$21	\$65.5	20	240	\$210
Additional High Crash Locations	\$40	13	156	\$136	\$9.5	3	36	\$31
Total	\$50	15	180	\$157	\$75	23	276	\$241

3.2.5 Capacity

Current Annual Program: Less than 5 percent of the current program is dedicated to additional capacity improvements. Recent updates to the Statewide Transportation Improvement Program (STIP) have seen a number of capacity enhancing projects delayed or eliminated as PennDOT has maximized funding to address structurally deficient bridges and other existing system needs. This trend is likely to continue with even fewer new capacity projects moving ahead.

Goals for New Program: The congestion programs detailed earlier can assist in better moving traffic, clearing incidents sooner and better informing travelers. However, these measures alone will not address the fact that investment in new highways has not kept pace with the demands of modern, trade-driven supply chains. Growing volumes of freight that now move along our roads are increasingly choked by lack of adequate capacity. Commuters are frustrated daily when they are delayed by highway bottlenecks. Without improvements, Pennsylvania’s ability to compete in today’s global marketplace will be hampered.

The intent of a new program for capacity expansion is for new roadways, widening existing roadways by adding lanes, and rebuilding outdated interchanges. Capacity estimates were derived by prioritizing the extensive list of proposed expansion projects on the Core Highway System¹⁰ and updating prior estimates using current costs.

Additional Annual Funding Needs: Any estimate for new capacity far exceeds available resources. It is estimated that a reasonable program increase of \$300

¹⁰ Refers to an element of a 2006 TAC study which identified an illustrative Core Pennsylvania Transportation System as a component of the Department’s Long Range Transportation Plan – the PA Mobility Plan – implementation.



million annually could place many recently deferred projects on the Core Highway System back on schedule.

3.2.6 Local System

Current Annual Program: Local governments receive \$308 million in Liquid Fuels payments each year. With this and local tax dollars, local governments maintain over 77,000 miles of roadways. In addition, some state and federal aid is provided for local bridge improvements. All traffic signals in the state are maintained and operated by local governments. Based on national standards, the cost for properly maintaining all traffic signals across Pennsylvania is \$52.5 million per year, with another \$22.5 million in energy costs. This does not imply that municipal expenditures currently match these figures.

Goals for New Program: There is very limited information on the condition of the 77,000 miles of roads owned by local governments. All of the 6,400 local bridges over 20 feet in length are inspected every two years. About one-third of these bridges are currently structurally deficient, a much greater percentage than state bridges. There are also an unknown number of local bridges under 20 feet that require attention, as well.

Table 7: Status of Local Bridges > 20 Feet in Length

Element	Number
Number of bridges > 20 feet	6,301
Number closed	193
Number posted	1,880
Number structurally deficient	2,138
Percent structurally deficient	33.9%

Source: PennDOT Bureau of Design

An enhanced program is needed to reduce the number of locally deficient bridges, to address the deficiencies on local bridges under 20 feet, and to do needed preservation on local bridges. In addition, local governments need assistance to improve local highway conditions, and to improve traffic signals.

Additional Annual Funding Needs: An additional annual need of \$250 million for highway and bridge improvements is estimated. An additional \$182 million program under the congestion category is needed to modernize and improve the operation of traffic signals as detailed under the Congestion Management portion of this chapter.

3.2.7 Summary

Table 8 lists the additional annual funding needs for each of the areas considered. Figures are provided for FY 2010-11, FY 2019-20 and FY 2029-30 which gives an indication of the impact of inflation. An additional \$2.57 billion in current dollars

is required to meet all needs on state highways and bridges. That unmet needs number grows to \$6.54 billion in 20 years.

For local roads and bridges, along with traffic signals, the current unmet need is \$432 million, growing to \$1.09 billion by FY 2029-30.

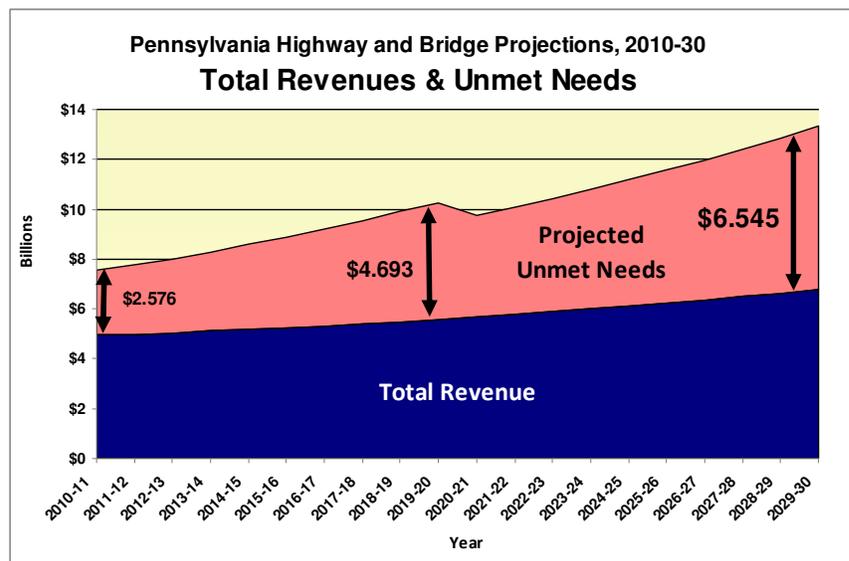
Table 8: Summary of Existing Annual Unmet Highway and Bridge Needs

Highway Element	Description	Additional Annual Funding Needs (Millions)		
		FY 2010-11	FY 2019-20	FY 2029-30
PennDOT Highways & Bridges				
Pavements	<ul style="list-style-type: none"> Addressing the quality of pavements by getting them back on a proper cycle of preservation along with addressing the backlog of reconstruction needs for the 40,000-mile state system. 	\$1,761	\$2,731	\$4,450
Bridges	<ul style="list-style-type: none"> Addressing the backlog of structurally deficient bridges on the state system. 	\$370	\$1,290	\$920
Congestion Management	<ul style="list-style-type: none"> Includes better operation of the system through Intelligent Transportation Systems (ITS)/operations of the higher level system (primarily the expressways) 	\$70	\$91	\$227
Safety	<ul style="list-style-type: none"> Efforts include improvements which are expected to reduce fatalities on the roadways. 	\$75	\$116	\$190
Capacity	<ul style="list-style-type: none"> Addresses the need for new capacity on the Core Highway System. 	\$300	\$465	\$758
TOTAL		\$2,576 million	\$4,693 million	\$6,545 million
Local Highways & Bridges				
Highways & Bridges	<ul style="list-style-type: none"> Addresses local road and bridge needs. This is an estimate. Needs for local bridges are known but no estimate is available for highways. 	\$250	\$388	\$632
Traffic Signals	<ul style="list-style-type: none"> Funding for a traffic signal modernization and retiming program to be collaborative between PennDOT and local governments. 	\$182	\$282	\$460
TOTAL		\$432 million	\$670 million	\$1,092 million



Figure 45 graphically shows the impact of inflation on unmet highway and bridge needs displayed against revenues that are expected to experience conservative growth. Total revenue as shown represents a combination of funding from the MLF and federal funding over a 20-year period. The analysis again indicates that there is a current gap of approximately \$2.57 billion, which is expected to grow to \$4.69 billion within 10 years and to \$6.54 billion by the year 2030. This points to the need for transportation revenue sources that grow with inflation.

**Figure 45: Pennsylvania Highway and Bridge Projections:
Total Revenues & Unmet Needs**



Source: Gannett Fleming, Inc.

3.3 Public Transportation Funding Needs

3.3.1 Approach

Based on PennDOT guidance for estimating transit funding needs for purposes of this study, the approach used by the team was to:

- Review the work products of the Transportation Funding and Reform Commission (TFRC).
- Review events/shifts that have occurred since the TFRC report was published in November 2006.
- Establish base numbers for FY 2009-10 to use as a foundation for forecasting.
- Develop forecasting assumptions.
- Extend the forecasts of needs, resources, and shortfalls to FY 2029-30.

3.3.2 Summary of Events Subsequent to the Publication of the TFRC Report

In the three years since the TFRC issued its report, there have been a number of significant events that need to be considered as part of updating the TFRC findings, including:

- The enactment of Act 44, which restructured state transit funding programs and increased state transit funding starting in FY 2007-08.
- The recent federal decision on the I-80 tolling initiative, which will dramatically reduce actual Act 44 transit funding starting in 2010-11.
- The availability of \$347 million in federal ARRA (i.e., “stimulus funding”) for capital projects.
- The economic recession that has affected multiple economic factors that impact public transportation finance, including employment and commutation patterns, wages, and expense and revenue trends.

Enactment of Act 44 and the availability of federal stimulus funding are both known quantities and therefore their impacts are relatively easy to measure. By contrast, the long-term effects of the current recession are much more difficult to predict.

3.3.3 Transit Operating Needs Assumptions and Forecasts

The former Class 1-4 transit systems (SEPTA, PAAC, other Urbanized Area Systems, and Rural and Small Urban Providers) comprise the majority of transit needs and are also the programs where the largest projected funding shortfalls were forecast by TFRC. As a starting point, the study team completed a 10-year (1997-98 versus 2007-08) financial analysis of the former Class 1-4 Systems to determine historical trends in operating expenses, revenues, and deficits. The results were compared with the TFRC’s forecasting assumptions to determine whether any adjustments were warranted for this study.

For **expense forecasting**, the TFRC reviewed the historical rates of expense growth for the transit systems serving the cities of Philadelphia, Pittsburgh, Lehigh Valley, Williamsport, Erie, and Indiana, along with Union/Snyder counties. The TFRC review included both fixed-route and demand-responsive services.

Table 9 summarizes the expense increase data included in the TFRC’s November 2006 report.



**Table 9: Historical Expense Growth Rates
as reported by the TFRC (in percent)**

Transit System	Overall Expense Growth	High Growth Expense Categories					
		Health Care	Fuel	Pension	Workers Comp	Labor	Purchased Service
SEPTA Philadelphia (2000-2005)	3.8	9.5 (1996-2005)	9.6 (1996-2005)			4.3	
PAAC Pittsburgh (1996-2005)	3.7	9.8 - active 15.0 - retirees		175		5.0	
LANTA Lehigh Valley (1997-2005)	9.1	18.6	13.2	8.7	29.4		
EMTA Erie (1999-2005)	8.0	15.1	24.7	9.9	22.5		
River Valley Williamsport (1996-2005)	5.1	12.9	7.3				
ICTA Indiana (1996-2005)	12.9	11.5		9.3	11.0	7.9	69.5

Note: TFRC explained the 175 percent increase in PAAC pension costs as being caused by (a) very low pension costs in the early years, and (b) low earnings on fund reserves.
Source: TFRC

The TFRC extrapolated the above data to represent all of the former Class 1-4 transit systems and arrived at an annual expense escalation factor of 5.6 percent, which was applied by the TFRC as part of developing its estimate of transit operating needs.

As part of this study, the actual 10-year rate of average annual expense growth (*for fixed-route services only*) from 1997 through 2007 was calculated for the total of all former Class 1-4 systems. Through that analysis the average annual rate of expense growth for fixed-route services was determined to be 4.73 percent. The fact that this rate is less than the rate determined by the TFRC is logical since the TFRC analysis included both fixed-route and demand-responsive services, and the expenses associated with demand responsive-service were increasing dramatically during the period reviewed. Although an expense growth rate of less than 5.6 percent was evaluated based on recent economic trends and the recent experience of zero or no growth in the consumer price index (CPI), the study advisory group and PennDOT agreed that 5.6 percent was still an appropriate cost escalation assumption. This determination was based on the fact that many of the drivers of transit cost increases (existing labor contracts, legacy pension costs that will

prevail for many years, continued high rates of growth in most of the high-growth expense categories listed in Table 9 above) have not followed the CPI trend.

For transit **revenue forecasting**, TFRC applied an annual growth factor of 1.5 percent for combined government operating assistance and operating revenue. The actual 10-year trend for system revenue, calculated as part of this study, was 3.87 percent. Based on this range of growth rates and an assumption that system revenue should increase to partially offset increasing expenses/deficits, a 3 percent average annual growth rate is assumed for revenue forecasting.

Government funding forecasts were developed in consultation with PennDOT and were based on historical trends, no I-80 tolling and PennDOT guidance. The full set of assumptions used to project transit operating income are shown in Table 10.

Table 10: Assumptions for Operating Revenue and Funding Growth

Funding Source	Through FY 2010-11	FY 2011-12 and Beyond
Operating Revenue	3%	3%
State Funding Sources:		
Turnpike	flat (no I-80 tolling)	flat (no I-80 tolling)
Lottery (FTP)	flat	2.5%
Sales Tax	flat	2.5%
PTAF	flat	flat
Federal Funding Sources	2.5%	2.5%
Local Funding	2.5%	2.5%

Source: PennDOT Guidance to consultants

Since the funding originally envisioned from the Act 44 provisions based on tolling of I-80 was uncertain, the forecasting conservatively assumed that those funds would not be available. If I-80 tolling would have been enacted, the transit funding realized from the Turnpike source would have increased by 2.5 percent annually rather than being held flat. The other sources in Table 10 would not be affected.

TFRC’s “Improved Mobility Scenario” was used as the base level of expenses and funding need against which the above forecasting assumptions were applied. This scenario would include the actual base operating expenses, an incremental \$8 million annually for operating costs associated with select capital enhancements and minor expansion (this is only 50 percent of the \$16 million identified by the TFRC, on the assumption that some of those improvements and the corresponding operating expenses and funding have already been implemented with Act 44 funding), and an additional \$5 million annually for operating costs



associated with significant asset improvements and major system expansion projects.

Base operating expense, revenue, and funding for former Class 1-4 systems that formed the base for forecasting are shown in Table 11.

Table 11: Base Operating Expense, Revenue, and Funding

Improved Mobility Scenario	FY 2009-10 (millions)
Total Operating Expense	\$1,587
Total Operating Revenue	\$596
Total Available Funding	\$991
Shortfall	\$0

Source: PennDOT records

The 50 percent increase in state operating assistance which most public transportation authorities enjoyed in FY 2007-08, followed by an additional 20 percent increase in FY 2008-09 resolved the majority of operational budgetary problems. However, the specifics of each transit system's operating crisis prior to Act 44 were unique to that transit system. In addition, each transit system reacted differently to the availability of increased funding--based on existing conditions, policies and local demands/expectations.

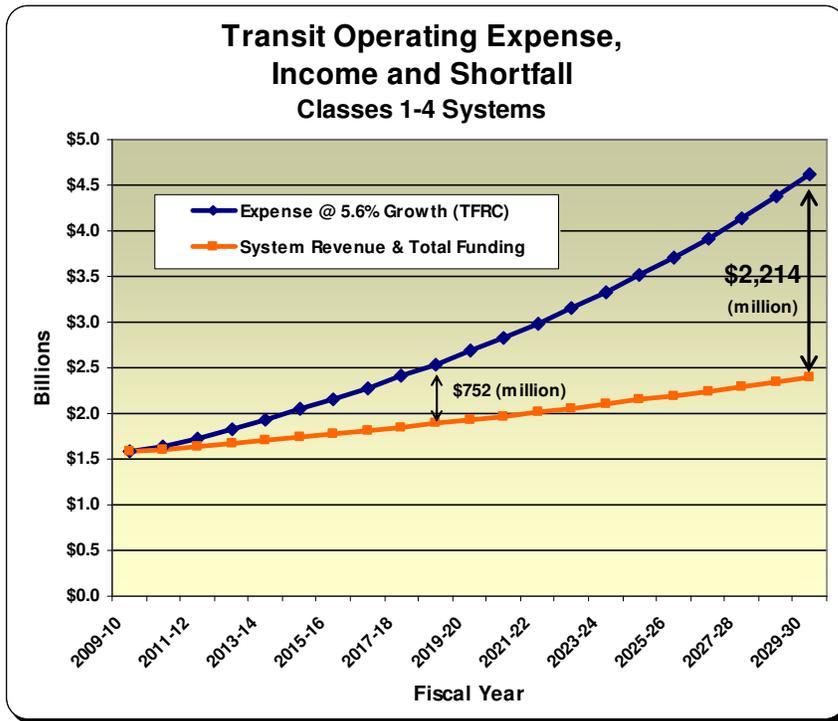
In early 2010, three situations define public transportation operations in Pennsylvania:

1. Many systems either held the line on service expansion or implemented additional service cautiously. They created operating revenues which are available to preserve service during periods of flat state operating assistance. There was no increase in state operating assistance between FY 2008-09 and FY 2009-10; an increase in FY 2010-11 will depend on economic recovery and the performance of sales tax. For the short term, these systems will not be forced to consider major service cuts or fare increases.
2. Some systems immediately introduced major service expansions, using all available funding each fiscal year. These systems are now dependent on annual state operating assistance increases to offset increasing labor, health care and fuel costs. Without increases in state funding, they may not be able to balance their operating budgets and may be forced to make service and fare changes within the next two to three years.

3. The Port Authority of Allegheny County (PAAC) is in a unique position. The TFRC identified significant and growing legacy costs which created a higher cost base for PAAC than other public transportation systems in Pennsylvania. Although PAAC has taken steps to mitigate legacy costs associated with newer employees, the existing legacy costs remain high and growing. PAAC will struggle to balance its operating budget. Recent analyses by PAAC suggest that a 15 percent service reduction may be necessary in the 2010-11 timeframe to balance the operating budget.

The longer term results of applying the forecasting assumptions explained above to the base needs and funding levels in Table 11 are illustrated in Figure 46.

Figure 46: Transit Operating Expense, Income, and Shortfall



Source: Consultant projections based on PennDOT guidance

Application of the previously-described assumptions results in a combined state and local funding shortfall forecast of over \$2,214 million the year 2029-30. This shortfall would generally be shared by the ratio 75 percent state/25 percent local, which is consistent with the TFRC analysis and the matching provisions of Act 44. This equates to a 2029-30 state share of \$1,661 million and a local share of \$0.553 million.



3.3.4 Transit Capital Needs Assumptions and Forecasts

Capital assistance is intended to keep current transit assets such as buses, rolling stock and rail infrastructure in a state of good repair. Consistent with the approach used to analyze operating needs, the TFRC’s **“Improved Mobility Scenario”** was assumed for capital funding analyses. In establishing the costs associated with the Improved Mobility Scenario, the TFRC adjusted the needs estimates provided by transit systems to reflect

- TFRC’s assessment of “true needs,”
- organizational capacity to implement and effectively manage capital improvement projects, and
- savings opportunities (\$5 million in the base year).

The base capital needs identified by the TFRC for the Improved Mobility Scenario are as shown in Table 12 along with capital funding available based on PennDOT and Federal Transit Administration (FTA) records. The total capital funding available and the resulting unmet capital needs amounts take into account the additional funding from Act 44. The unmet capital needs amount, even after passage of Act 44, is consistent with the fact that the Act 44 revenue enhancement fell short of the TFRC’s recommended level of funding.

Table 12: Base Capital Funding Needs and Shortfall (millions)

Improved Mobility Scenario	FY 2007-08	FY 2008-09	FY 2009-10
Capital Needs Less Opportunities	\$728.9	\$760.3	\$791.8
Post-Act 44 Capital Funds Available (includes federal, state, and local)	\$498.7	\$552.7	\$610.3
Post-Act 44 Unmet Capital Needs	\$230.2	\$207.7	\$181.5

Note: Data is for former Class 1-4 transit providers only. Does not include ARRA funding.
Sources: Needs based on TFRC Analyses. Historical Capital Funds Available based on PennDOT and FTA records.

A capital cost escalator of 3 percent was used for forecasting purposes, which is identical to the assumption used by TFRC. Beginning in FY 2010-11, reduced Act 44 revenues based on no I-80 tolling are assumed. Growth assumptions for the various capital funding sources are shown in Table 13.

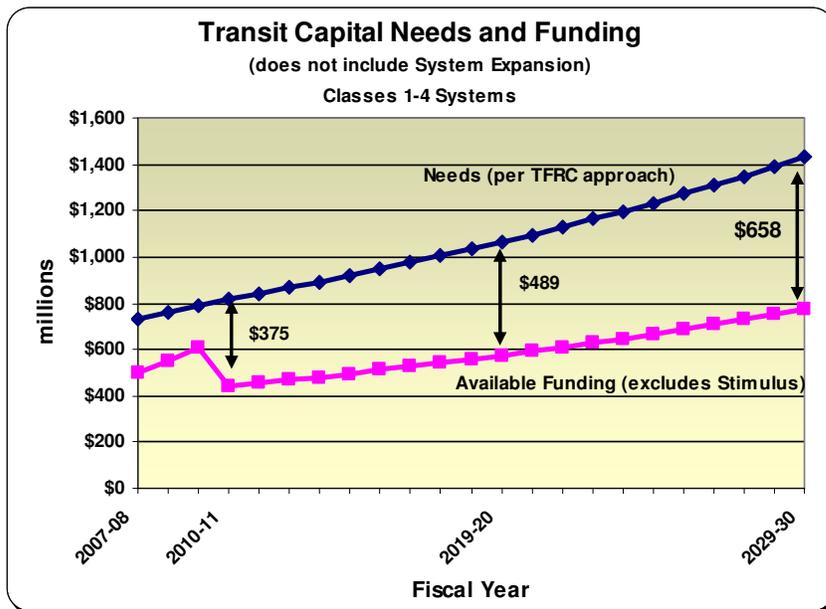
Table 13: Capital Funding Forecasting Assumptions – w/out I-80 Tolling

Source	Forecasting Assumptions for FY 2010-11 and Beyond
State Bond	Flat \$125 million annually
Turnpike (Asset Improvement)	No funds available
Turnpike (New Initiatives)	No funds available
Dedicated Sales and Use Tax(SUT)	Flat in FY 2010-11 and 2.5% annual growth thereafter
Federal Capital (All Except Flex)	3.0% annual growth
Federal Flex	Flat \$25 million annually
Local Capital	Constant percent of total federal and state funds, excluding stimulus

Source: PennDOT Guidance to consultants

The forecasts of transit capital funding needs, grant income, and shortfalls based on the above base funding and forecasting assumptions are illustrated in Figure 47. While the shortfalls are not as dramatic as for operating assistance, they are still substantial and will constrain transit providers’ ability to maintain assets in a state of good repair and implement strategic capital improvements to address the demand associated with growing areas.

Figure 47: Base Transit Capital Needs and Funding (millions)



Source: Needs projections from TFRC

Without approval to toll I-80, existing asset maintenance capital funding derived from Turnpike sources is eliminated entirely in FY2010-11, resulting in a dramatic



increase in the capital funding shortfall to \$375 million. Table 14, which lists all of the new state transit capital funding made available since the TFRC completed its analysis, further illustrating the impact of the reduced Act 44 funding. The New Initiatives category (also referred to as System Expansion in the next section) in Act 44 has not been funded and will remain unfunded, with no I-80 tolling.

Table 14: Incremental State Transit Capital Funding – Post TFRC

	Fiscal Year						
	2007-08	2008-09	2009-10*	2010-11	2011-12	2012-13	2013-14
Asset Improvement (Turnpike)	50.0	100.0	150.0	-	-	-	-
Formula Capital (SUT)	66.4	58.0	58.0	58.0	59.5	60.9	62.5
New Initiatives (Turnpike)	-	-	-	-	-	-	-
Totals	116.4	158.0	208.0	58.0	59.5	60.9	62.5

One-time infusion of federal ARRA funds that occurred in FY 2009-10 is not included in this table.

Table assumes no I-80 tolling; stimulus funds not included.

Source: Historical data from PennDOT records

3.3.5 Shared Ride Program and Programs of Statewide Significance

The above analysis only includes the needs and projected funding associated with fixed-route transit services provided by the former Class 1-4 transit systems. Other programs supported with federal, state, and local funding include:

- **Shared Ride Program for Senior Citizens** (Lottery funded)
- **Community Transportation Capital**
- **Persons with Disabilities Program** (all counties except Allegheny and Philadelphia)
- **Keystone Corridor Intercity Rail** (Amtrak service between Harrisburg and Philadelphia)
- **Intercity Bus Assistance Program** (state-subsidized, privately-operated intercity bus service in 16 corridors)
- **Welfare to Work Program (W2W)**
- **State Match for federal Job Access and Reverse Commute Program (JARC) and New Freedom Grants**
- **Demonstration, Research, Technical Assistance**

Although the TFRC projected FY 2007-08 unmet needs totaling \$28 million for the Programs of Statewide Significance, the additional funding provided through Act 44 resulted in full funding of these programs.

3.3.6 System Expansion Projects

Transit “System Expansion” is a category of projects reviewed by TFRC and includes capital projects which expand service into new areas, often through construction of fixed guideway infrastructure (Act 44 used the terminology “New Initiatives” to refer to these projects). The TFRC, at the time of its review, acknowledged a number of such projects being discussed in response to various local and regional needs, including:

- commuter rail service in the Harrisburg area
- restoration of rail service between Reading-Philadelphia
- Philadelphia Navy Yard
- “Route 100” in Southeastern Pennsylvania
- Harrisburg-Altoona-Pittsburgh rail service expansion
- Scranton-NYC rail service
- Lehigh Valley-NYC rail service
- extension of PAAC’s light rail service to Oakland and to the Pittsburgh International Airport

Going back to the middle of the 20th century, public transportation providers have struggled to retain core operating services with inadequate resources for capital investment. This has resulted not only in deferral of both state-of-good repair capital projects, but also strategic investment in capital projects intended to help shape more sustainable land development patterns, respond to growth areas, capitalize on economic development opportunities, and proactively capitalize on emerging federal programs and funding. The inability to move forward with prudent system expansion projects:

- Relegates transit to a mode of last resort for choice travelers
- Contributes to growing congestion on Pennsylvania roads and at airports
- Restricts mobility for persons that cannot drive, do not have access to an automobile, or otherwise must rely on public transportation
- Provides few attractive alternatives for intercity and inter-regional travel
- Places Pennsylvania at a competitive disadvantage when competing for federal funding on programs such as the high speed initiative.



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System expansion projects would address regional mobility needs that typically go beyond the chartered service areas of individual local transit providers. While many of these services are intercity/regional in nature and thus fall under the Commonwealth's purview, Keystone East (Harrisburg-Philadelphia) is the only corridor similar to the above projects that has received Commonwealth investment. There are a variety of explanations as to why these projects have not been advanced beyond the study phase including:

- These types of projects were “orphaned” in the past state transit funding structure – i.e., not the focus of or within the financial capacity of local transit providers, and also beyond the financial resources available to the Commonwealth.
- Even though Act 44 created a New Initiatives funding category designed to provide up to \$50 million annually to begin to address such projects, actual Act 44 capital funding levels have not been sufficient to provide any funding for this category.
- The competitive nature of the federal New Starts Program, which generally awards funding to projects that offer state and local funding above federally legislated minimums.
- Lack of advocacy groups with a regional or statewide focus that is on a par with the Pennsylvania Public Transportation Association (PPTA) whose primary focus is local transit providers and services.
- High up-front capital costs and no certain source of funding for operating deficits.

While not commenting on the merits of the above individual projects, the TFRC did assume that some new system expansion projects would secure federal New Starts funding commitments and would warrant State investment. In addition, PennDOT's successful applications for federal high-speed rail funding for both further enhancements for Harrisburg-Philadelphia (Keystone East) and significant upgrades for Harrisburg-Pittsburgh (Keystone West) will provide a sizable portion of the needed financial capacity to make rail service in those corridors very competitive with other modes. Keystone East is already an increasingly preferred modal choice for many residents of central and eastern Pennsylvania that frequently travel to Philadelphia and other destinations along Amtrak's Northeast Corridor.

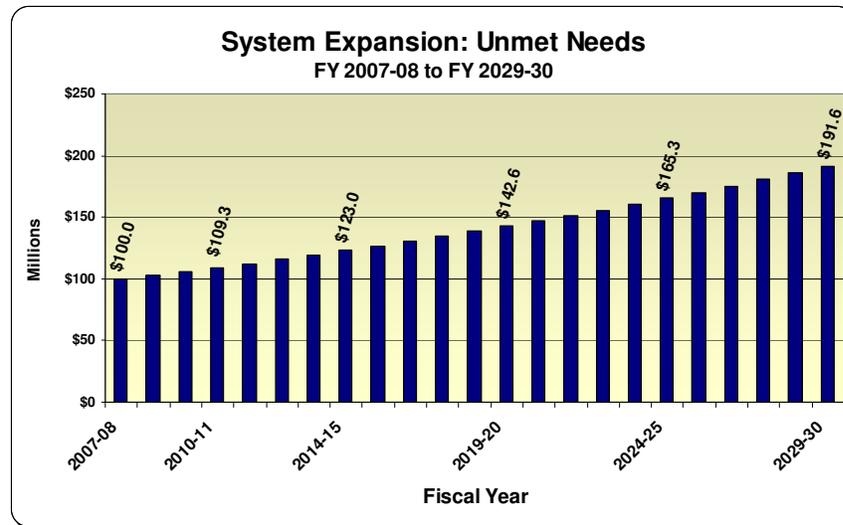
While TFRC's focus regarding system expansion was on fixed guideway systems, express bus service between urbanized areas is currently receiving increasing attention as a less costly, nearer-term alternative. Several transit providers have implemented expanded service to address increasing demand between the service

areas of local transit systems. Examples include Greensburg-Pittsburgh, Beaver County-Pittsburgh, Lebanon-Harrisburg and York-Harrisburg. Rabbit Transit instituted express commuter bus service to/from Harrisburg, and COLT is progressing toward implementation of two different express bus options between Lebanon and Harrisburg. The recently completed Harrisburg-Hershey-Lebanon premium transit feasibility study concluded that premium express bus service would be the most feasible short-term approach to meeting the rapidly growing needs throughout that corridor (COLT's planned express service would not address the needs of the Hershey area). And finally, Commuter Services of Central PA is advancing a nine-county study to investigate the demand and the feasibility of implementing transit service between the major cities. Although these new and planned services are an encouraging sign, new services of this type generally rely on CMAQ funding which can only be used for operating subsidies for several years. Therefore a reliable source of operating funding will be needed if these services are to survive and thrive into the future.

Based on an assumption of \$200 million in total project costs and a 50 percent combined state and local share of such costs, the TFRC estimated the unmet need at \$100 million in FY 2007-08. As noted above, although there is language in Act 44 that permits up to \$50 million of the annual Asset Improvement Program derived from the Act to be used for expansion projects, Act 44 funding allocated to date has not been sufficient to permit use of any of the Asset Improvement funding for such projects. Furthermore, without I-80 tolling, no funds will be available for the Asset Improvement Program (and therefore for System Expansion) beginning in FY 2010-11. Since the need identified by the TFRC has not been met through Act 44 or any other new funding source, this study accepted the TFRC estimated unmet need of \$100 million per year for System Expansion. Assuming that the cost of such projects will escalate at 3 percent per year and that this will be a recurring need throughout the forecast period, the resulting shortfall will grow from the \$100 million base in FY 2007-08 to \$192 million in FY 2029-30. This is illustrated in Figure 48.



Figure 48: System Expansion Projects – Unmet Needs



Source: FY 2007-08 base year data from TFRC Report

Using the 75 percent state/25 percent local state/local cost sharing model advocated by the TFRC, the state share of the 2029-30 funding shortfall would be \$143.7 million and the local share \$47.9 million.

3.3.7 Transit Needs Analysis Summary

Although it was known at the time Act 44 of 2007 was enacted that total incremental transit funding was substantially less than the need identified by the TFRC, the situation will soon be exacerbated by the inability (to date) to implement tolling on I-80. The immediate impacts have been partially offset by the \$347 million in federal stimulus funding, although the capital projects being advanced with stimulus funding may not be the same projects that would have been advanced if Turnpike funding had occurred as planned. Failure to implement the tolling measure will affect both the transit operating and capital programs:

- Operating Program Impacts – Without I-80 tolling, operating assistance from the Turnpike for former Class 1-4 providers will be frozen at \$250 million annually rather than increasing 2.5 percent per year as envisioned by Act 44. With transit expenses projected to continue to increase, the gap between needs and available resources will be evident for some systems in 2010-11, and will continue to widen, eventually to \$2.2 billion (using the TFRC expense escalator of 5.6 percent) by FY 2029-30.

- Capital Program Impacts – The capital funding gap for former Class 1-4 systems is projected to grow from \$375 million in FY 2010-11 to \$657 million in FY 2029-30.

Although the largest shortfalls initially occur in the capital program, operating funding shortfalls escalate more rapidly and quickly become the dominant funding challenge for public transit providers relatively early in the forecast period.

The New Initiatives Program (referred to as Service Expansion by the TFRC) created by Act 44 has not received any funding allocations to date, and will not receive any funding in the future unless the following conditions are met:

- I-80 tolling is implemented sometime in the future.
- Funds allocated to the Asset Improvement Program are sufficient to permit the allocation of up to \$50 million per year for system expansion projects.

Even if the full \$50 million allowed under Act 44 were to be made available, the need for System Expansion funding identified by the TFRC would only be partially met.

In the absence of I-80 tolling, the unmet capital funding need for the System Expansion Program is estimated at \$109 million for FY 2010-11 and will grow to \$192 million in FY 2029-30.

Unmet transit funding needs for Operating Assistance and Capital Programs (which include System Expansion projects) projected through FY 2029-30 are summarized in Table 15.

Table 15: Projected Unmet Transit Funding Needs (millions)

Program	FY 2010-11	FY 2019-20	FY 2029-30
Operating Assistance	\$ - - *	\$752	\$2,214
Capital Assistance/ System Expansion	\$484	\$631	\$849
Totals	\$484*	\$1,383	\$3,063

* The level of operating shortfall for FY 2010-11 is uncertain at this time



4. Inventory of Funding Mechanisms

Pennsylvania's extensive transportation needs require consideration of a variety of broad-based funding approaches, some of which could be applied in the near term and others over the longer term. A long list of potential funding mechanisms and tools was generated as a result of the research, interviews conducted with industry subject matter experts, and input from the Task Force. Through several brainstorming sessions with the Task Force, this list was refined, and a series of criteria was developed for use in evaluating the merits of each funding mechanism. A description follows for each criterion.

- **Funding Stream Considerations** – This takes into consideration the potential revenue that a funding mechanism could generate and whether this revenue would be sufficient to meet future needs. Other possible evaluations were the sustainability and flexibility of the funding approach. In relation to revenue sources, “sustainability” refers to whether the funding fluctuates or is generally stable over time.
- **Administration and Implementation** – The ease of administration and the implementation cost were taken into account. For instance, if an existing vehicle or mechanism to collect the revenue is already in place, it would theoretically be relatively simple and cost-effective to implement that funding mechanism. There may also be political or technological barriers that may cause some difficulty in administering and implementing new funding mechanisms. The ease with which a funding approach may be enforced is an important criterion.
- **Equity and Fairness** – The question of who the funding mechanisms benefit and who faces the majority of the burden of the cost is taken into consideration. This includes the application of the “user/beneficiary pays” principle¹¹ and consideration of equity across income groups and geography.
- **Economic Efficiency and Impact** – This relates to the ability of the mechanism to promote efficient use of the system and minimize any adverse impacts.

After a thorough evaluation against these criteria, the funding mechanisms were grouped into three areas:

- Those most viable and likely to advance.

¹¹ National Surface Transportation Infrastructure Enhancing Commission, “Paving Our Way, A New Framework for Transportation Finance.” (February 2009)

- Those that may be viable, but have inherent challenges to be addressed.
- Those least likely to advance.

Through the evaluation, it became apparent that not every identified mechanism was a true revenue generator that would be appropriate as a statewide revenue source. The funding mechanisms were further organized into the categories of Revenue Generators, Tools, and Local Options. Consideration was also given as to whether they could be implemented in the near term or would require legislative or other actions that would delay implementation.

The remainder of this section describes the mechanisms and tools that were evaluated. More detail is provided on those most likely to advance, including the key characteristics of each.

4.1 Funding Instruments and Experiences

Table 16 lists potential revenue generators and highlights their yield potential (revenue against size of rate increase), sustainability, and long-term viability for implementation. The list is sorted based on eligibility by project type (highway/bridge and transit, or highway/bridge only).

Table 16: Summary of Funding Mechanisms

Revenue Generator	Yield	Sustainability	Administration & Implementation	Other Considerations
Title	Potential	“Long-Term Viability”	Existing Mechanism	Pros/Cons
ELIGIBILITY: HIGHWAY / BRIDGE & TRANSIT				
State Sales Tax on Fuel	HIGH – Based on current rates and consumption, a rate of 6% would yield \$1 billion.	Mixed – Will vary with the price of fuel which has a degree of volatility; will also be impacted with greater fleet efficiencies	HIGH - Sales tax collection is in place.	Consists of an additional charge, based on the monetary amount of fuel sold; volatile with the price of fuel.
Tolling	HIGH – Currently 9% of state hwy revenues	HIGH – Stable and predictable	MIXED – Only the PTC currently has toll authority; cost of adding toll facilities	Could require federal approval; diverts some traffic to lower-order roads; could generate significant revenue in high traffic areas.
State Sales Tax on Vehicles	MODERATE – Could be diversion to MLF or increase	MODERATE – Will vary with economic trends	HIGH – Existing / in place	Low correlation between sales and system use; diversion would require replacement to General Fund.
Real Estate Transfer Tax	MODERATE	LOW – Will vary with economic trends	HIGH – Existing / in place	Could have negative economic impact on home sales.



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Revenue Generator	Yield	Sustainability	Administration & Implementation	Other Considerations
Title	Potential	“Long-Term Viability”	Existing Mechanism	Pros/Cons
Vehicle Lease Tax	LOW – \$63 million/yr.	LOW – Increases generate small revenue increases	HIGH – Existing / in place	Low yield.
Vehicle Rental Tax	LOW – Generates only \$28.8 million	LOW – Increases generate small revenue increases	HIGH – Existing / in place	Low yield.
Tire Tax	VERY LOW – Generates only \$6 million annually	LOW – Increases generate small revenue increases	HIGH – Existing / in place	Low yield.
Marcellus Shale Extraction Fee	UNKNOWN	HIGH – Drilling has potential for large economic impacts	MODERATE – New fee; may or may not be used to subsidize transportation improvements	Could address local transportation impacts of drilling. Could include a local option to address local road impacts.
ELIGIBILITY: HIGHWAY / BRIDGE				
Increase/Index the Motor Fuel Tax	HIGH – 1-cent tax = \$62 million	MODERATE – Will decline with ongoing fleet efficiencies	HIGH – Existing / in place	Indexing provides timely response to increasing costs and inflation. Revenues will decline from fuel efficiency and use of alternative fuel vehicles.
Oil Company Franchise Tax (OCFT)	HIGH – Raising the ceiling to \$1.63 = \$420 million	MODERATE – Will decline with ongoing fleet efficiencies; adjustment to ceiling could allow for growth	HIGH – Existing / in place	Could be indexed; diesel surtax provides greater equity. Revenues will decline from fuel efficiency and use of alternative fuel vehicles.
Vehicle Registration Fee – Increase	MODERATE – \$1 = \$8.0 million	MODERATE – Registrations grow 2% annually	HIGH – Existing / in place	Pennsylvania’s rates are among the nation’s lowest. Fees have traditionally been kept low to make auto ownership affordable for all
Vehicle Registration Fee – Expansion	VARIABLE – Depending on factors used	HIGH – If tied to vehicle value	MODERATE – Would require changes in process	No tie to usage. Fees have traditionally been kept low to make auto ownership affordable for all.
Remove PSP from Motor License Fund	HIGH – \$576 million annually	HIGH – PSP portion of MLF growing at 7.8% annually	MODERATE – Shifts burden to the General Fund	A growing drain on the MLF for highway-related enforcement.
VMT Fee	HIGH – Flexible yield rate	HIGH – Growth directly related to travel	LOW – Requires new collection mechanisms	Privacy concerns will need to be addressed; a more equitable fee for all users; predictable revenue source; costs to implement could be significant

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Revenue Generator	Yield	Sustainability	Administration & Implementation	Other Considerations
Title	Potential	“Long-Term Viability”	Existing Mechanism	Pros/Cons
Driver’s License Fee	LOW – Generates only \$50-60 million	LOW – Increases generate small revenue increases	HIGH – Existing / in place	Regressive, yet can help close funding gap; low administrative cost
Vehicle Title	LOW – \$82 million annually	LOW – Increases generate small revenue increases	HIGH – Existing / in place	No tie to system usage

The following are potential revenue mechanisms that were evaluated as most viable and likely to advance. These include traditional items that are already in place as well as new mechanisms.



4.1.1 Increase/Index the Motor Fuel Tax

Introduction - Though not always a politically popular option, raising the motor fuel tax could be part of a near-term solution to the funding gap. Besides simply raising the tax, there also is an option to enact legislation that would index the Motor Fuel Tax to inflation. As indicated earlier, the state’s fuel tax is administered in two parts—the flat tax and the Oil Company Franchise Tax (OCFT).

Key aspects of this option are included below:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none"> • A small tax increase can generate a fair amount of additional revenue in the short term. • Revenues will fall as more fuel-efficient vehicles and greater use of alternative fuels become more prominent. • Indexing the fuel tax to inflation will keep pace with the increasing cost of constructing facilities. 	<p>Administration and Implementation</p> <ul style="list-style-type: none"> • Collection mechanisms are already in place because the tax already exists. • Legislators may not favor their perceived lack of control over a tax that automatically varies with inflation.¹² • With indexing implemented, the gas tax could be adjusted to fluctuations in inflation without legislative approval.¹³
<p>Equity and Fairness</p> <ul style="list-style-type: none"> • The General Assembly has traditionally opted for higher fuel taxes and lower registration fees, so every resident could have access to a vehicle. • In theory fuel taxes levy the greatest burden on the heaviest users of the transportation system, but the relationship is becoming less direct. • Fuel taxes are not fully equitable among vehicle classes.¹⁴ 	<p>Economic Efficiency and Impact</p> <ul style="list-style-type: none"> • Increasing the motor fuel tax may encourage users to conserve fuel by driving less, having a positive effect on the environment and on congestion.¹⁵ • The motor fuel tax has some inefficiencies because a per-gallon charge does not directly reflect the relative wear and tear a particular vehicle causes to a roadway.¹⁶

¹² Reed, James B. and Matt Sundeen, “Surface Transportation Funding: Options for States.” National Conference of State Legislatures (May 2006)

¹³ Reed, James B. and Matt Sundeen, “Surface Transportation Funding: Options for States.” National Conference of State Legislatures (May 2006)

¹⁴ National Surface Transportation Policy and Revenue Study Commission, “Transportation for Tomorrow.” (December 2007)

¹⁵ National Surface Transportation Infrastructure Enhancing Commission, “Paving Our Way, A New Framework for Transportation Finance.” (February 2009)

¹⁶ National Surface Transportation Policy and Revenue Study Commission, “Transportation for Tomorrow.” (December 2007)

4.1.2 Oil Company Franchise Tax – Millage Increase or Change Floor/Ceiling

Introduction - Pennsylvania’s current Oil Company Franchise Tax assesses a millage rate against the wholesale price of liquid fuels (gasoline) and fuels use (diesel). The current rate is 153.5 mills for all fuels plus a diesel surtax of 55 mills (for a fuels use total of 208.5 mills). The effective rates are 19.2 cents for gasoline and 26.1 cents for diesel. There is a 90-cent floor and a \$1.25 ceiling. When the OCFT was first implemented in 1981, the intent was to have a tax that grows with the growing price of fuel. Since 2006, rates have been at the ceiling. Raising the millage rate or adjusting the ceiling are viable near-term options.

Key aspects of this option include:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none"> • A slight millage rate increase could generate a significant amount of revenue. • Raising the tax ceiling and floor would provide an opportunity to bring in additional revenue. • Revenue is not sustainable and will decrease as the use of more fuel-efficient vehicles and alternative fuels increase. • Increase could provide added funding for local governments. 	<p>Administration and Implementation</p> <ul style="list-style-type: none"> • Collection mechanisms are already in place because tax already exists. • Tax is collected from distributors, not individuals, so it may be easier to enforce.
<p>Equity and Fairness</p> <ul style="list-style-type: none"> • Pennsylvania General Assembly has traditionally opted for higher fuel taxes and lower registration fees, so every resident could have access to a vehicle. • The motor fuel tax is somewhat regressive, placing a relatively higher burden on lower income populations; however, fuel taxes that directly support transportation are perceived to be more equitable. • The diesel surtax provides a greater equity between automobiles and trucks with regard to their relative wear and tear on the transportation network. 	<p>Economic Efficiency and Impact</p> <ul style="list-style-type: none"> • Increased motor fuel taxes may encourage users to conserve by driving less, which has positive effects with respect to environmental and congestion mitigation goals.



4.1.3 State Vehicle Registration Fee Options

Introduction - As stated previously, Pennsylvania has an annual flat passenger vehicle registration fee of \$36 dollars. In FY 2007-08, the state collected approximately \$694 million in registration fees for all classes of vehicles. There are several ways that additional revenue could be generated through registration fees. The \$36 flat fee could be increased or expanded to include other variable fees. Additionally, making registration fees applicable for two years could ease administrative and compliance burdens and would have a one-time impact on revenues.

4.1.3.1 Increase/Index the State Vehicle Registration Fee

Pennsylvania has a lower rate for vehicle registration when compared to other states, making an increase a feasible option for further consideration. There is also the possibility of indexing the registration fee to inflation.

Key aspects of this option include:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none"> Increasing the registration fee could generate a moderate amount of additional revenue in the near term. Registration fees have been well-established as a flexible, dedicated transportation funding source at the state level. Registration fees have generally had steady growth. 	<p>Administration and Implementation</p> <ul style="list-style-type: none"> Collection mechanisms are already in place because fee already exists. Funds are restricted to highway and bridge projects by state constitution.¹⁷ Registration fees can only be adjusted by the legislature.
<p>Equity and Fairness</p> <ul style="list-style-type: none"> Pennsylvania’s General Assembly has traditionally kept registration fees low so all residents can have mobility options. Fees place transportation funding responsibility on vehicle owners who could directly benefit from transportation improvements. Out of state trucks pay their share through International Registration Plan Flat fees do not reflect system usage. 	<p>Economic Efficiency and Impact</p> <ul style="list-style-type: none"> Raising registration fees does not provide an incentive to use the transportation system more efficiently.

¹⁷ Reed, James B. and Matt Sundeen, “Surface Transportation Funding: Options for States.” National Conference of State Legislatures (May 2006)

4.1.3.2 Expand the State Vehicle Registration Fee

Introduction - The structure of registration fees could change from a flat per vehicle fee to a schedule of rates based on factors such as vehicle type, weight, age, horsepower, or value. Additional fees could be added to the registration fees, including a vehicle property tax which would be based on a vehicle’s fair property value. These types of fees are typically assessed as a percentage of the vehicle’s estimated worth and could be limited to personal vehicles.

Key aspects of this option include:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none"> • Higher registration fees would generate significant revenue in the near term. • Registration fees are well-established as a flexible, dedicated transportation funding source at the state level.¹⁸ • Fees could have strong sustainability if tied to vehicle value.¹⁹ 	<p>Administration and Implementation</p> <ul style="list-style-type: none"> • A collection and administration process is already in place, but major upgrades would be needed depending on type of enhancement. • Depending on the type of vehicle “factor” used in determining new fees, there could be significant data collection issues. If the data isn’t currently being collected, then a method would have to be designed (if possible) and funded to collect this data retroactively for almost 8 million passenger vehicles currently in the data base. Also, for new vehicles on the data base, the source applications for a title would have to contain the data for the vehicle “factor”.
<p>Equity and Fairness</p> <ul style="list-style-type: none"> • Registration fees do not take into account actual use of the transportation system (VMT for instance) so they are less equitable in terms of system usage. • For trucks, higher registration fees are potentially viewed negatively since they are in addition to the existing federal Heavy Vehicle Use Tax. 	<p>Economic Efficiency and Impact</p> <ul style="list-style-type: none"> • Registration fees are relatively inexpensive to administer in relation to potential yield. • Registration fees allow for collections from vehicles using alternative fuels without establishing new mechanisms for collection.²⁰

¹⁸ National Surface Transportation Infrastructure Enhancing Commission, “Paving Our Way, A New Framework for Transportation Finance.” (February 2009)

¹⁹ National Surface Transportation Infrastructure Enhancing Commission, “Paving Our Way, A New Framework for Transportation Finance.” (February 2009)

²⁰ National Surface Transportation Policy and Revenue Study Commission, “Transportation for Tomorrow.” (December 2007)



4.1.4 Tolling

Introduction - There are several options for tolling. Tolls may be imposed on existing highways or only on new highway capacity. Tolling can be combined with congestion pricing. Toll revenues can be designated for improvements to the highway on which the tolls are collected, or to fund general transportation projects. Tolls may escalate based on distance traveled and vehicle type, as with the Pennsylvania Turnpike fare structure. The conversion of High Occupancy Vehicle (HOV) Lanes to High Occupancy Toll (HOT) Lanes, often coupled with electronic tolling, has been tried in several different states to provide more efficient highway travel. The only HOV lanes in Pennsylvania are located in the Pittsburgh area.

Currently, the only authority to toll in the Commonwealth rests with the Pennsylvania Turnpike Commission, along with certain bi-state authorities operating bridges over the Delaware River. The cost per mile on the Pennsylvania Turnpike is somewhat higher when compared to the nearby Ohio Turnpike or New York State Thruway.²¹ As part of Act 44, Pennsylvania has attempted to toll I-80, yet the Commonwealth's application to do so has been denied by FHWA.

Key aspects of this option include:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none"> Tolling can generate substantial revenues, but only in areas where traffic volumes make it cost-effective to implement.²² 	<p>Administration and Implementation</p> <ul style="list-style-type: none"> Legislation is necessary to enable new types of tolls or pricing initiatives.
<p>Equity and Fairness</p> <ul style="list-style-type: none"> Depending on where toll money is invested, can be seen as geographically inequitable. 	<p>Economic Efficiency and Impact</p> <ul style="list-style-type: none"> Targeted tolling may be one option for Pennsylvania to toll existing roadways with the money going directly to improvements on that highway, i.e., tolling Interstate facilities where they must be reconstructed (e.g., I-95 through Philadelphia).

²¹ Pennsylvania Turnpike Cost per Mile = \$0.082 (Approximately 347.6 miles)
From Interchange 2 Gateway

Ohio Connection to 359, Ohio Turnpike Cost per mile = \$0.063 (Approximately 236.4 miles)
From Interchange Westgate (2) to Eastgate (239) = \$10.25 (EZpass) or \$15.00 (Non-EZpass)
New York State I-87 (Thruway) Cost per mile = \$0.042

²² National Surface Transportation Infrastructure Enhancing Commission, "Paving Our Way, A New Framework for Transportation Finance." (February 2009)

4.1.5 Phase out of State Police Funding from Motor License Fund (MLF)

Introduction - This option has been discussed in the past, and would generate additional revenue for use on the transportation system. This option would entail eliminating the \$500 million-per-year payment from the Motor License Fund to the state police. The Motor License Fund receives its money from the state gasoline tax, motor vehicle license and registration fees, and other fees.

Key aspects of this option include:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none"> Retaining the state police payment would translate to a significant transportation revenue source. 	<p>Administration and Implementation</p> <ul style="list-style-type: none"> MLF monies diverted from the state police would have to be replaced by the General Fund Budget.
<p>Equity and Fairness</p> <ul style="list-style-type: none"> The use of highway revenues to fund highway-related enforcement activities is common practice, so transferring the funding may be viewed negatively in terms of highway safety. 	



4.1.6 Natural Gas Extraction Fee (Marcellus Shale)

Introduction - Fees may be applied to the exploration, drilling, and operations associated with gas extraction. Pennsylvania is among the nation's largest natural gas-producing states, but it does not impose any tax on methane extracted from underground. The Pennsylvania Department of Environmental Protection (DEP) has proposed final rules to substantially increase permit fees for Marcellus Shale gas wells. The implementation of fees for the Marcellus Shale development has been discussed during the budget process, but no fees have been enacted.

Key aspects of this option include:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none"> Given the value of recoverable natural gas in the Marcellus Shale (some estimates are \$500 billion), drilling has the potential for significantly large economic impacts.²³ 	<p>Administration and Implementation</p> <ul style="list-style-type: none"> Revenues have been proposed to the General Fund with no dedication to transportation.
<p>Equity and Fairness</p> <ul style="list-style-type: none"> There is no direct link to transportation usage. A portion of fees could be directed to local governments, or a local option provided, to address impact of drilling operations on local roads. 	

²³ Penn State Cooperative Extension College of Agricultural Science Natural Gas Impacts: Economic Issues. <<http://naturalgas.extension.psu.edu/Economic.htm>.>

4.1.7 Vehicle Miles Traveled (VMT) Fees (Mileage-Based)

Introduction - A long-term view of transportation funding in Pennsylvania could include the implementation of VMT fees. VMT fees charge drivers based on how many miles they drive rather than by how much fuel their vehicles consume. Congestion pricing can also be employed, charging vehicles when they enter a congested area or when they travel during rush hours.

Though the technology exists to track the number of miles driven, there are several issues and concerns that need to be addressed before VMT fees become a viable funding option. Privacy is one of the main concerns as well as the administration and implementation cost of collecting the fees. Currently, there are no VMT-based fees levied in the United States, though several pilot programs have been undertaken. National policy and direction may help to solve some of the perceived technical and institutional challenges with VMT fees.

Key aspects of this option include:

Funding Stream Considerations	Administration and Implementation
<ul style="list-style-type: none">• VMT fees are a long-term option that could help offset diminishing fuel tax revenues as improvements to fuel efficiency continue.• Revenues can be collected from vehicles regardless of the type of fuel they use (including hybrids and electric vehicles).• VMT fees could be set to yield any level of desired revenues.	<ul style="list-style-type: none">• VMT fees introduce administrative concerns with potential fraud/evasion at the point of collection. Whereas fuel taxes are collected from a known number of fuel distributors, VMT fees would be collected from millions of highway users.• VMT fees would be more costly to collect and administer than fuel taxes, with uncertain long-term costs.• Experts predict that implementation could take a decade or more, allowing time to address the process and issues.• VMT fees or congestion-pricing fees require the political will to implement a new approach.• Privacy is a major issue, although there are demonstrated ways to address this concern.



Equity and Fairness

- VMT fees are more directly related to vehicle use than are fuel taxes or registration fees.
- During peak periods, fees may be higher for those who cannot change their destination or time of travel (e.g., freight shippers or shift workers).

Economic Efficiency and Impact

- Congestion pricing in conjunction with VMT fees could be used to help make the transportation system run more efficiently by encouraging people to drive at off-peak times or take alternative modes of transportation.
- VMT fees could be readily converted to a congestion-pricing charge or a weight-distance fee that would better reflect the impact of road wear and tear.
- VMT fees do not conflict with the need to reduce energy costs, reduce the balance of payments, or reduce fossil fuel consumption.²⁴
- VMT fees, especially if applied as congestion-pricing fees or weight-distance taxes, can send strong pricing signals to users.²⁵
- VMT fees may reduce the incentive to drive fuel-efficient vehicles unless incorporated as part of the fee.

4.1.8 Sample Revenue Yields

Table 17 shows sample revenue yields for the current major funding sources discussed above.

Table 17: Pennsylvania Funding Sources – Potential Yields

Funding Source	Modification	Yield
Vehicle Registration Fees	For each \$1 fee (passenger vehicles—commercial vehicles would vary based on percentage increase)	\$8.0 million annually
Liquid Fuels Tax	For each 1-cent/gallon	\$62 million annually
Oil Company Franchise Tax	Raise the ceiling of the tax to \$1.63 from \$1.25	\$420 million annually

Source: PennDOT Bureau of Fiscal Management

²⁴ National Surface Transportation Policy and Revenue Study Commission, "Transportation for Tomorrow." (December 2007)

²⁵ National Surface Transportation Policy and Revenue Study Commission, "Transportation for Tomorrow." (December 2007)

4.2 Tools

Through research of funding mechanisms a number of items were identified that were not truly revenue generating, but were rather tools that could be applied in conjunction with certain revenue options such as tolling. Several tools are viable and would provide an opportunity to explore new funding options, but would likely not generate new revenue in and of themselves. These tools are reviewed in Table 18 and discussed in more detail in the following subsections.

Table 18: Summary of Funding Tools

Mechanism	Other Considerations	
Title	Pros	Cons
Public-Private Partnerships (PPP)	Provides access to new sources of capital; transfers risk to the private sector; can address many forms and modes.	Potential transfer of control to private entities; not a direct revenue generator.
Regional Transportation Districts (RTDs)	Tax dollars are spent in the area where they are raised.	Local projects may clash with overall state or regional priorities for transportation plans.
Transit Revitalization Investment Districts (TRIDs)	Supports investment on underutilized areas with transit access; can stimulate PPP.	Potentially high administrative costs.
Transit Oriented Development (TOD)	Can be effective in some areas where transit is being added.	Funding stream may fluctuate with market conditions.
Borrowing and Bonding	Helps advance projects that would otherwise take years to develop, if at all.	Requires a long-term dedicated revenue source to avoid depleting resources for ongoing maintenance and other existing programs.



4.2.1 Public-Private Partnerships (PPP)

Introduction - As defined by FHWA, public-private partnerships (PPP) are contractual agreements between a government entity and a private party to provide a product or service to the public.²⁶ There are many different types of arrangements possible for various transportation modes. PPPs, or “P3s,” can significantly help with financing of a project as well as accelerating project delivery.

Key aspects of this option include:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none"> • PPPs are not necessarily a revenue generator but can provide measures for cost savings. • PPPs can provide access to new capital (private sector money) as well as other types of resources (management, technical). • PPPs used to operate toll facilities are most effective on busy highways in heavily populated areas. 	<p>Administration and Implementation</p> <ul style="list-style-type: none"> • Current law in Pennsylvania does not allow an existing facility to be leased to a concessionaire (PPP). • For Pennsylvania to benefit from PPPs, the need exists to waive or limit the provisions of the Separation Act, which requires four-part bidding for capital projects. • The state’s ability to maintain levels of service or adjust user charges is diminished when control of a roadway is transferred to the private sector. • PPPs transfer some portion of risk to the private sector.
<p>Equity and Fairness</p> <ul style="list-style-type: none"> • PPPs encourage competition through competitive procurements. 	<p>Economic Efficiency and Impact</p> <ul style="list-style-type: none"> • PPPs may provide an opportunity for projects to be completed for less money and more quickly than without the partnership. • Under PPPs, efficiency improvements may extend to the operations and maintenance phase.

²⁶ NGA Center for Best Practices, “Innovative State Transportation Funding and Financing – Policy Options for States.” (2008)

4.2.2 Regional Transportation Districts (RTDs)

Introduction - These districts are often given the authority by the state to levy fees and taxes to fund their mobility needs. In some cases they may also have the ability to incur debt. The taxes and fees are often subject to voter approval and certain limits or caps may apply.²⁷

Key aspects of this option include:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none"> • Fees and taxes levied by RTDs typically cannot exceed limits set by the state. 	<p>Administration and Implementation</p> <ul style="list-style-type: none"> • The boundaries of an RTD can be that of a Metropolitan Planning Organization (MPO), simplifying administration. • RTDs may have more local control over projects. • Certain RTDs may lack the ability to raise tax rates due to a struggling local economy. • Local transportation projects may clash with overall state transportation priorities.
<p>Equity and Fairness</p> <ul style="list-style-type: none"> • RTD revenue must be spent in the area where it is raised. 	

²⁷ Reed, James B. and Matt Sundeen, "Surface Transportation Funding: Options for States." National Conference of State Legislatures (May 2006)



4.2.3 Transit Revitalization Investment Districts (TRIDs)

Introduction - The Commonwealth of Pennsylvania enacted Act 238 of 2004 which allowed local and county governments, transit authorities, and other transportation providers to use a TRID to facilitate and implement Transit Oriented Developments (TODs). The program is administered by the Pennsylvania Department of Community and Economic Development (DCED). DCED works with PennDOT to help fund development within one-eighth-mile to one-half-mile of a railroad, transit, light rail, busway, or similar transit stop or station. TRID boundaries coincide with a value capture area that enables the local jurisdictions and transit agency to share the tax revenues generated by real estate investment.

Key aspects of this option include:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none"> • TRIDS are not a direct transit capital investment revenue source. 	<p>Administration and Implementation</p> <ul style="list-style-type: none"> • A TRID must be designated and approved by the State. • TRIDS can involve high administrative costs. • Pennsylvania has limited experience with TRIDS. • TRIDS represent a new, potentially uneasy role for transit agencies, which would be placed in partnerships with developers and local municipalities. • TRIDS support investment in underutilized areas with transit access.
	<p>Economic Efficiency and Impact</p> <ul style="list-style-type: none"> • TRID locations, within close proximity to transit stations, are intended to support ridership and encourage denser and more walkable communities. • TRID development can create transit villages by stimulating public/private partnerships, establishing value capture areas, and encouraging private sector investment.

4.2.4 Value Capture and Transit Oriented Development (TOD)

Introduction - Some municipalities or transit agencies have generated funds from taxes related to the increases in property values that can result from transportation improvements. For example, a developer may choose to build apartments near a new transit station, which increases the tax base, providing a dedicated funding source for transit investment and improvements. In addition, property owners (typically developers or other commercial entities) near the improvements will sometimes help finance the project,²⁸ providing a one-time increase to revenue.

Key aspects of this option include:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none">• Value capture is not a direct transit capital investment revenue source.• The property tax funding stream may have annual fluctuations due to market conditions.	
	<p>Economic Efficiency and Impact</p> <ul style="list-style-type: none">• The private sector is usually opposed to the public sector capturing the added value due to new transportation improvements.• Value capture along with transit oriented development could be effective in areas where transit is being expanded.

²⁸ NGA Center for Best Practices, "Innovative State Transportation Funding and Financing – Policy Options for States." (2008)



4.2.5 Borrowing and Bonding

The TAC explored a number of potential borrowing and bonding options, as described in the following subsection. These include traditional bonds, GARVEE bonds, expansion of the State Infrastructure Bank (SIB), and private markets/equity.

4.2.5.1 Traditional Bonds

Pennsylvania has the capability of issuing traditional bonds with legislative approval. PennDOT has issued debt sparingly in relation to advancing projects. In Pennsylvania, the Accelerated Bridge Program is aimed at reducing the number of structurally deficient bridges in the state and is partially funded by bonds. The combination of bond revenue with ongoing federal and state resources has allowed PennDOT to start repairs on more than 500 bridges in 2009 through the accelerated bridge program. This concept could be expanded to other types of projects, particularly those with a long life span such as capital projects. What must further be considered is a dedicated funding stream for repayment.

Key aspects of this option include:

Funding Stream Considerations

- If financing tools are used to leverage capital in the form of debt or equity, they rely on existing or new revenue sources to pay the indebtedness.

Administration and Implementation

- Borrowing will require approval by the legislature.
- Since the late 1970s, Pennsylvania has only used debt financing for specific circumstances and General Obligation bonds for transit.
- Bond issues are dependent on bonding capacity and the willingness of the sponsoring agency.
- Debt mechanisms must be balanced against long-term revenue sources. Many states cap the amount of debt that can be issued.
- Innovative finance is usually well accepted for capital improvements since it spreads the cost of projects over time.

Equity and Fairness

- Incurring longer-term debt helps advance programs and projects that would otherwise take years to develop, if at all. Innovative finance spreads the cost to future users, who will also benefit from the investment.

Economic Efficiency and Impact

- Requires a long-term dedicated revenue source to avoid depleting resources for ongoing maintenance and other existing programs.

4.2.5.2 GARVEE Bonds

Introduction - Grant Anticipation Revenue Vehicles (GARVEE) bonds allow states to pay principal and interest on bonds with expected future-year federal-aid appropriations.²⁹

Key aspects of this option include:

Funding Stream Considerations

- GARVEE bonds provide more capacity by being pledged against future federal revenues, but thus limit access to future federal aid.

Administration and Implementation

- GARVEE bonds would require Pennsylvania to enact enabling legislation.
- Voter approval is often part of the legislation requirement to issue bonds.

²⁹ NGA Center for Best Practices, "Innovative State Transportation Funding and Financing – Policy Options for States." (2008)



4.2.5.3 Expansion of the State Infrastructure Bank

Introduction - State infrastructure banks (SIBs) are revolving funds, administered by states, that support surface transportation projects. SIBs offer low interest loans, loan guarantees, and other credit enhancements to public and private sponsors of federal-aid highway projects. The Pennsylvania State Infrastructure Bank (PIB) was established in 1998 and allows PennDOT to administer, through the bank, low interest loans for eligible transportation improvement projects. The repayments on the loan go to a revolving account allowing for new project loans to be administered. There are four separate accounts to cover highway/bridge, transit, aviation, and rail freight projects. The 2008 Annual PIB Report lists approximately \$55 million dollars in active loans. Several PIB loans have involved PPPs, which has expanded opportunities for innovative financing. Other innovative measures are the establishment of Tax Increment Finance districts, transportation impact fees, special tax assessments, and developer agreements.³⁰

Key aspects of this option include:

<p>Funding Stream Considerations</p> <ul style="list-style-type: none"> • The Pennsylvania SIB has a limited capacity and a very large number of loans. • SIB loans have a ten-year term with low fixed rates. • Infrastructure banks can provide large and stable sources of funds for a limited period of time. • Construction projects receive highest priority for funding. 	<p>Administration and Implementation</p> <ul style="list-style-type: none"> • The current Pennsylvania SIB program is very successful and projects are supported by local elected officials. • No new action is required for Pennsylvania to make use of this funding mechanism. • Expanded use of the SIB will require Pennsylvania to put more resources into the SIB.
	<p>Economic Efficiency and Impact</p> <ul style="list-style-type: none"> • The relative economic efficiency of an SIB loan would depend on the source of revenues from which borrowed funds were repaid. This tool is more efficient if funds are repaid from sources beyond those typically used for statewide transportation programs.

³⁰ <<http://www.dot.state.pa.us/pennidot/bureaus/pib.nsf/fund?readform>>
<<http://www.dot.state.pa.us/pennidot/bureaus/pib.nsf/report?readform>>

4.2.5.4 Private Markets/Equity

Introduction - Private equity in transportation financing plans creates a new source of available funds for states. Repayment to private investors usually takes the form of a percentage of tolls collected, or a concession for the private investor to operate the facility.

Key aspects of this option include:

Funding Stream Considerations	Administration and Implementation
<ul style="list-style-type: none"> Access to private equity can increase amount of capital that can be raised.³¹ 	<ul style="list-style-type: none"> Pennsylvania may need to enact enabling legislation to take advantage of private markets.

4.3 Local Options

The TFRC report recommended that broader authority and responsibility be given to local government in supporting regional transit systems. Act 44 did not address this issue and did not provide additional tools for raising revenue at the local level. As this study identified various funding mechanisms, many mechanisms were deemed to be more appropriate for use as a local option tax. Table 19 lists those potential revenue options.

Table 19: Summary of Local Options

Revenue Generator		Other Considerations	
Title	Pros	Cons	
Earned Income Tax	High yield; less regressive.	Not directly related to transportation.	
Fuel Sales Tax	High yield.	Would require new mechanisms to track sales because fuel tax is collected before distribution to local areas.	
Impact Fees	Works well in areas with strong development pressure.	Current law makes funding state projects difficult.	
Local Sales Tax	Potential high yield (both residents and visitors contribute); existing collection process.	Regressive (places a greater relative burden on lower-income populations); already exists in Philadelphia and Allegheny counties.	
Access Fee	Predictable and stable; places responsibility on property owners near highway/transit.	Could be assessed with property taxes, although new revenue collection mechanisms may be necessary; could negatively impact development.	

³¹ National Surface Transportation Infrastructure Enhancing Commission, "Paving Our Way, A New Framework for Transportation Finance." (February 2009)



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Revenue Generator	Other Considerations	
Title	Pros	Cons
Drink Tax	Can provide dedicated source of revenue.	Not related to transportation; drink tax levied in Pittsburgh area has been unpopular.
Parking Tax	Can generate substantial revenue.	Viewed as behavior modification rather than revenue generator; requires new revenue collection mechanisms.
Occupancy Fees	Can generate new transportation income.	Requires new revenue collection mechanisms.
Sewer Use Fee	Can generate moderate revenue; predictable and reliable.	Not related to transportation; may discourage investment and development.
Storm water Fee	Moderate yield.	Connection between impervious surface cover and transportation is weak.
Tax Abatement	Can stimulate development or redevelopment.	Not directly related to transportation; mixed results.
Toll Surcharge	Could generate high revenues.	Requires new revenue collection mechanisms.
Hotel Room Tax	Moderate revenues; collection mechanism already in place.	Applies only to travelers; current fees not necessarily dedicated to transportation.
Safety Violation	Targets drivers who are the greatest safety threat.	Low yield.

5. Conclusions and Recommendations

5.1 Conclusions

Pennsylvania's transportation system is critical to our economic well-being and the quality of life of each and every resident and visitor. In addressing current needs, PennDOT and Pennsylvania's transit agencies have made considerable progress in reducing costs and implementing efficiencies.

However, this progress is not enough. Pennsylvania's ability to meet transportation system needs presents great challenges both in the near term and the longer term. This study examined the fiscal status of the State's transportation program and has identified the following conclusions.

Transportation infrastructure investment is critical to the Commonwealth's economy.

Transportation is a critical component of the State's economy. We have reaped the benefits of previous generations that developed and built our vast transportation system.

- Investment in this system reduces fuel consumption, travel time, and distribution costs, making Pennsylvania businesses more competitive.
- The American Association of State Highway and Transportation Officials (AASHTO) has estimated that freight movements, as measured in tons, will grow between 75 and 80 percent by 2035. This will create increasing challenges in terms of stress on the system.
- Increased funding from the federal American Recovery and Reinvestment Act (ARRA) and state Act 44 has been critical to putting Pennsylvanians back to work as well as retaining construction jobs. However, these gains could be reversed without new funding initiatives.
- Public transit is essential to moving people and ensuring the ongoing vitality of the economy. Transit services play a significant role in efforts to mitigate traffic congestion, conserve fuel, enhance transportation system efficiency, and address air quality issues.



There are tremendous unmet needs on our transportation system.

In today's dollars, we need to invest an additional \$3.5 billion annually from federal, state and local sources. And this investment must grow with inflation if we are going to upgrade our existing system to a state of good repair and create a more advanced transportation system to sustain and ensure strong economic growth.

Recommended Funding (Millions)

	2010 Need	2020 Need	2030 Need
Highway & Bridge	\$2,576	\$4,693	\$6,545
Public Transportation	\$484	\$1,383	\$3,063
Local Government	\$432	\$670	\$1,092
Total	\$3,492	\$6,746	\$10,700

Providing this funding will mean:

- Rebuilding 500 bridges per year for the next 10 years, then 300 bridges a year for the following 10 years; reducing the structurally deficient bridge percentage to 5 percent.
- Improving pavements on a 50-year cycle with appropriate interim treatments, saving motorists wear and tear on their vehicles.
- Modernizing and timing traffic signals along corridors which will move traffic more efficiently.
- Providing adequate and predictable transit operating assistance and keeping buses and rail lines in a state of good repair, controlling the increases in fares for those dependent on transit service.
- Implementing new bus routes and commuter rail service, opening up new markets for transit.
- Managing congestion, thereby reducing emissions and improving air quality.
- Eliminating bottlenecks so freight can move more efficiently, controlling the cost of the goods that we buy.
- Avoiding hundreds of highway fatalities each year, saving millions of dollars and great personal loss.
- Improving local roads and bridges, as well as reducing costs for local businesses.

The current funding structure for transportation is not adequate to meet the long-term transportation funding needs.

Current and future trends indicate serious issues not only with current transportation resources, but also with the viability of mechanisms for revenue collection in the future:

- The current funding structure that relies primarily on gasoline taxes is not sustainable in the long term and is likely to erode more quickly than previously thought. Heightened concerns regarding global climate change and dependence on foreign energy sources are creating momentum toward greater fuel efficiency, alternative fuels, and new vehicle technology. These factors are expected to significantly improve the overall fleet efficiency, thus lowering revenue from gasoline taxes.
- Revenues into the Motor License Fund were down \$193 million below estimates in FY 2008-09. With the current economic conditions, recovery is expected to be slow.
- Federal funding, while being an important portion of Pennsylvania's revenue stream, cannot be counted on to fill the gap. The Federal Highway Trust Fund is currently insolvent, and timing of federal surface transportation reauthorization is unknown.
- ARRA funding has provided an important short-term boost in transportation revenue, but this will not solve the immediate or longer-term problems of funding system needs.
- Act 44 provided \$900 million annually in new revenue for both highways and transit. However, the lack of approval to toll I-80 by July 2010 will reduce these revenues in half, leaving a significant funding gap.
- Act 44 was expected to provide more predictable revenue streams for public transit, but the economic recession has impacted the sales and use tax.

5.2 Recommendations

Near Term Need: Generate new revenue to stabilize Pennsylvania's transportation system

The most immediate problem for Pennsylvania is the reduction of Act 44 revenue based on the recent federal decision to not approve the application to toll I-80. There will be an immediate decrease of \$472 million in current funding for highways and transit, based on expected revenues from Act 44.



Even if I-80 tolling had been approved, Pennsylvania's gap between transportation improvement needs and revenue is substantial. This report identifies more than \$3 billion annually in highway and transit needs that currently cannot be addressed. This gap between needs and revenues will continue to grow as inflation erodes the buying power of transportation dollars, and improvements in fuel efficiency reduce the revenues being received.

Short-term fixes will no longer provide a solution to this funding problem. Pennsylvania must develop a phased, long-term funding strategy. Having such a long-term view will positively affect general business investment by avoiding the boom and bust funding cycles of the past.

TAC recognizes that the current recession makes this a difficult time to increase transportation revenue. However, Pennsylvania's economy depends on the transportation system, and investments in transportation do create jobs. FHWA and FTA have both estimated that at least 30,000 jobs are directly and indirectly created for every \$1 billion in highway or public transportation expenditures.

The TAC has identified existing and new mechanisms which could be enacted to raise revenues. These are listed in Section 5.3 and fully detailed in Chapter 4.

Longer-term need: Establish a new transportation funding framework to ensure sustainable mobility

Pennsylvania's current structure for transportation funding is neither adequate in revenue yield, nor structurally sustainable over the long term. Needs and inflation continue to outpace revenue as infrastructure ages. Changes in technology will mean more fuel-efficient vehicles. A reduction in the order of 20 percent in gallons of fuel consumed per vehicle mile by the light duty fleet is possible by 2025 if proposed fuel economy standards are implemented. Ultimately we may see a large percentage of the vehicle fleet using alternative fuels and electric-powered engines.

A new framework is needed to allow PennDOT, transit providers and the private sector transportation industry to establish a world class transportation system that allows Pennsylvania to compete in a global economy. A funding structure that is predictable and sustainable would allow for long-term improvements and investments in technology, equipment and people to efficiently improve the system for the long term.

The TAC has stopped short of recommending a specific revenue scenario. This report demonstrates the significant level of investment required simply to have a reasonable program that stabilizes our transportation system. The ultimate revenue scenario will be determined by Pennsylvania leadership in the Legislature

and the Administration collaborating with the transportation industry and a wide range of other stakeholders who recognize that if our transportation system crumbles, our economy crumbles – as does our quality of life.

Short of a specific recommended scenario, the following describes at least five major elements that reflect the future will require change, vision, and bold leadership. It also reflects a positive view that long-term solutions exist but will need to be phased over many years. The time to start is now.

5.2.1 Vehicle-Miles Traveled (VMT) Fee...A More Direct User Pay System

Technology advances will increasingly make possible revenue systems that are truly based on usage of the transportation system. There is considerable interest across the country in more direct forms of “user pay” charges—in the form of a charge for each mile driven—referred to as a VMT Fee. VMT fees have been successfully demonstrated in Oregon and other states on a small scale. Particular questions must be answered regarding user privacy and the cost of implementing a VMT Fee. Ultimately such fees may be established through federal policy, but Pennsylvania must be advocating and planning for such solutions in the short term and collaborating on a myriad of implementation issues through AASHTO, TRB, and the Pennsylvania Congressional delegation.

VMT fees can be designed to be flexible and also allow for peak hour pricing, dedicated lanes, etc. in highly congested areas as appropriate. The public today is far more accepting of Web-based transactions than it was only a decade ago. As an example of the embrace of technology which will make a direct user pay system feasible, many Pennsylvanians are loyal users of EZ-Pass.

5.2.2 Tolling Options for Existing and New Highways

Tolling remains a viable option which can take various forms. Highway tolls can be applied to new construction and existing highways. Tolls can be implemented through High Occupancy Toll (HOT) lanes or through congestion-pricing schemes, charging by time of day or by area. However, the recent experience with the approval process to toll I-80 indicates that more flexibility is needed. A change in federal law is needed to remove the barriers to tolling, and provide viable options for states to raise revenue.

Major highways generally, and the Interstate system specifically, will not be sustainable without a nearly uniform use of tolling. Here too, technology will



make such systems more efficient. The public is accepting of tolling – with some exceptions – if the pricing translates into a quality product and enhanced mobility. Adaptations to tolling schemes can minimize the impact of tolls on local trips. The TAC can also foresee a time when the federal government shifts to a tolling approach to the Interstate System as national policy. Pennsylvania must help to lead the direction-setting to ensure that federal policy changes work in ways that are beneficial to the Commonwealth.

5.2.3 Greater Use of Public-Private Partnerships

Public-Private Partnerships are contractual agreements between a public agency and the private sector to collaborate on a transportation project. Some of the more visible PPPs involve the leasing of a toll road to private companies to raise transportation revenue. There are also many other opportunities for collaboration with the private sector for all modes, including arrangements to more efficiently deliver transportation improvements. Pennsylvania currently needs enabling legislation to be able to explore these options.

Public-Private Partnerships are not revenue sources, but they can create cost savings and bring private investment into transportation. PennDOT and others now have sufficient experience with Design-Build and other alternative contracting approaches to expand the use of public-private partnerships.

5.2.4 Strategic Borrowing

Debt financing for transportation became an issue for Pennsylvania during the 1970s. Since 1979, PennDOT, to its credit, has been averse to debt financing. That caution is generally still in order. However, debt financing can be properly used when it can be linked with a dedicated revenue source to finance the debt and to protect other revenue sources from being consumed. Further, there should be an exploration of some reasonable debt financing for transportation investment in line with specific project investments with a high level benefit-cost. Infrastructure is a long-term asset, which borrowing can assist in delivering sooner. As such, debt financing is not entirely inappropriate if carefully and responsibly managed and capped.

5.2.5 Local Option Taxes

Local government has considerable responsibility for transportation, being responsible for more than 77,000 miles of highways and 6,400 local bridges. Local contribution to public transit is also an important piece of the funding picture. The TFRC proposed that there be more local dedicated taxes to support transit.

Local government can play a larger role in overall mobility within each region and locale within the state. However, greater local capacity is needed. Local governments have few options other than property taxes to raise local revenues. Local jurisdictions require more options to produce revenue to address local highway, bridge and transit needs. They should be given authority to add a local option to existing taxes or be able to enact new local taxes to support all transportation modes.

5.3 Funding Mechanisms and Approaches

Pennsylvania’s extensive transportation needs require consideration of a variety of broad-based funding approaches, some of which could be applied in the near term and others over the longer term. A long list of potential funding mechanisms and tools was generated as a result of research, interviews conducted with industry subject matter experts, and input from the TAC.

Table 20 summarizes a list of potential revenue generators for Pennsylvania transportation, including their yield potential, and other considerations. The table also identifies if the potential revenue source can be used to fund highway/bridge projects, transit projects, or both.

Table 20: Potential Revenue Sources

	Revenue Generator	Yield Potential	Considerations	
			Pros	Cons
Eligibility: Highway/Bridge & Transit	State Sales Tax on Fuel	HIGH—Based on current rates and consumption, a rate of 6 percent would yield \$1 billion	Sales tax collection in place.	An additional charge based on the monetary amount of fuel sold; volatile with price of fuel.
	Tolling	HIGH: Currently 9 percent of state highway revenues	Could generate significant revenues in high traffic areas.	Could divert traffic to lower-order roads.
	State Sales Tax on Vehicles	MODERATE: Could be diversion to MLF or increase	Collection in place.	Low correlation between sales and system use; could be burden on the General Fund if diverted.
	Real Estate Transfer Tax	MODERATE	Existing fee.	Could have negative impact on home sales; not predictable.
	Vehicle Lease Tax	LOW: Current yield = \$63 million/yr.	Existing fee.	Low yield.



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	Revenue Generator	Yield Potential	Considerations	
			Pros	Cons
Eligibility: Highway/Bridge	Vehicle Rental Tax	LOW: Current yield = \$28.8 million/yr.	Existing fee.	No tie to system usage; low yield.
	Tire Tax	VERY LOW: Current yield = \$6 million/yr.	Existing fee.	Low yield.
	Marcellus Shale Extraction Fee	UNKNOWN	Could address the local transportation impacts of drilling.	Could include a local option to address local road impacts.
	Increase/Index the Motor Fuel Tax	HIGH: 1-cent tax = \$62 million/yr.	Indexing provides timely response to increasing costs and inflation.	Revenues will decline from fuel efficiency and alternative fueled vehicles.
	Oil Company Franchise Tax (OCFT)	HIGH: Raising the ceiling to \$1.63 from \$1.25 = \$420 million/yr.	Could be indexed; diesel surtax provides greater equity.	Revenues will decline from fuel efficiency and alternative fueled vehicles.
	Vehicle Registration Fee Increase	MODERATE: \$1 = \$8 million/yr.	Pennsylvania's rates are among the nation's lowest.	No tie to usage. Fees have traditionally been kept low to make auto ownership affordable for all.
	Vehicle Registration Fee Expansion	VARIABLE: Depends on factors used		
	Remove PA State Police funding from Motor License Fund	HIGH: \$576 million/yr.	A growing drain on the MLF for highway-related enforcement.	Shifts burden to General Fund.
	Vehicle-Miles Traveled (VMT) Fee	HIGH: Flexible yield rate	A more equitable fee for all users; predictable revenue source.	Privacy concerns will need to be addressed; costs to implement could be significant.
	Driver's License Fee	LOW: Current yield = \$50-\$60 million/yr.	Existing fee; low administrative cost.	Regressive, yet can help close funding gap.
Vehicle Title Fee Increase	LOW: Current yield = \$82 million/yr.	Existing fee.	No tie to system usage; low yield.	

6. Appendix A - Glossary

AADT – Annual Average Daily Traffic

AASHTO – American Association of State Highway and Transportation Officials

Act 44 of 2007– State legislation that provided additional revenue for highways, bridges and transit.

ARRA – American Recovery and Reinvestment Act: Also known as the “stimulus plan,” the \$787 billion economic package was enacted by the U.S. Congress in February 2009. In addition to federal tax cuts, the Act included increases in spending for core investments, such as roadway and bridge projects, and other transportation infrastructure.

CAFÉ – Corporate Average Fuel Economy: regulations first enacted by the U.S. Congress in 1975 intended to improve the average fuel economy of cars and light trucks (trucks, vans and sport utility vehicles) sold in the U.S. in the wake of the 1973 Arab oil embargo.

DMS – Dynamic Message Sign: They provide important traveler information. The signs can be placed over travel lanes or placed alongside the roadway.

FHWA – Federal Highway Administration

FTA – Federal Transit Administration

HAR – Highway Advisory Radio: These are low-power AM radio stations that broadcast information for motorists, such as traffic congestion and special event information.

HTF – Highway Trust Fund: A fund established in 1956 to ensure the dependable financing and maintenance of the Interstate Highway System and other roadways. It has since been expanded to include public transportation. The HTF is capitalized through taxes on highway motor fuel and truck-related taxes on truck tires, sales of trucks and trailers, and heavy vehicle use.

IRI – International Roughness Index: An index that quantifies the irregularities or qualities of pavement surfaces.

ITS – Intelligent Transportation Systems: Devices that improve the flow of traffic. A few examples include closed circuit television cameras (CCTV), highway advisory radio, and interconnected signals.

MLF – Motor License Fund: A special state government account which is capitalized through various taxes on gasoline and other fuels, car and truck registration fees, and fines and other fees.

MPO – Metropolitan Planning Organization: The federal government has designated MPOs to assist state departments of transportation in carrying out



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various planning functions. These include long-range transportation planning, including the development of regional long-range transportation plans and transportation improvement programs. There are 15 such MPOs, or “planning partners,” in Pennsylvania.

NHS – National Highway System: In 1995 Congress designated this network of interstates and other roadways as important to the nation’s economy, defense, and mobility.

PPP or P3 – Public-private partnerships

PTC – Pennsylvania Turnpike Commission

PTTF – Public Transportation Trust Fund: A special public transportation fund created by Act 44 of 2007.

RPO – Rural Planning Organization: Similar to MPOs, RPOs are the rural examples of their urban counterparts. RPOs operate under agreement with PennDOT to approve the development and implementation of highways, transit, and other transportation facilities and services. There are eight such RPOs in Pennsylvania.

SAFETEA-LU – Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users: The federal six-year transportation funding bill that covered fiscal years 2004-2009.

SD Bridges – Structurally deficient bridges are those structures that are unable to carry vehicle loads or tolerate the speeds that would normally be expected for that particular bridge in its designated network. They do not meet current criteria for live load capacity and traffic capacity.

STIP – State Transportation Improvement Program

TEA-21 – Transportation Equity Act for the Twenty-First Century: A predecessor to the federal surface transportation legislation of SAFETEA-LU that authorized Federal surface transportation programs for highways, highway safety, and transit for the 6-year period 1998-2003.

TMC – Traffic Management Center

TRFC – Transportation Funding and Reform Commission

VMT – Vehicle Miles of Travel: A summary of total miles traveled and a possible mechanism by which to replace the fuel tax.

7. Appendix B –Relevant Recommendations from Previous TAC Studies

Recommendations from two recent TAC studies are included as an appendix to this report, given their relevance to transportation funding issues.

7.1 Pennsylvania Traffic Signal Systems: A Review of Policies & Practices

7.1.1 Develop an Asset Management System

Before traffic signal systems can be enhanced, there must be a better understanding of existing assets—especially current operating performance. Pennsylvania’s locally owned 13,600 signals are estimated to be valued at more than \$1 billion (\$75,000 each).The development of an asset management system would provide a tool to systematically evaluate signal system conditions and needs and would be consistent with a holistic approach to signal systems. An asset management tool would allow better planning, deployment, operations and maintenance of signal systems.

7.1.2 Pursue Tiered Operations and Maintenance on Critical Corridors

Operations on critical corridors are a primary concern. Many of the signal systems along a specific corridor are operated individually by a local authority without the broader consideration of the entire corridor. A holistic approach would pursue tiered operations and maintenance along critical corridors across jurisdictional boundaries. Tiered operations and maintenance may include municipal maintenance and PennDOT and/or municipal operational responsibility.

This is consistent with the Department’s Mobility Strategic Focus Area Executive Goal to “effectively and efficiently operate the transportation system.” It is also consistent with the TEA-21 mandated ITS Regional Architectures which have been or are under development with in Pennsylvania. The Regional ITS Architecture is a framework for ensuring institutional knowledge, participation and coordination in planning for the implementation of ITS projects. It provides an organized framework for planning ITS integration through transportation planning and planning organizations business processes. Signal systems are a fundamental element in that framework.



The criteria for which corridors should be considered for tiered, inter-jurisdictional operations and maintenance include several considerations. An asset management system would be a helpful in identifying critical corridors and systems. Ultimately, stakeholders must collectively agree that a regional and tiered approach is the best strategy for each specific corridor.

7.1.3 Pursue Tiered Operations and Maintenance for most Signals

Although a tiered, inter-jurisdictional effort along critical corridors may be the best approach in the short-term, a long-term solution may include a tiered operations and maintenance for all signal systems throughout Pennsylvania. This holistic approach to signal systems would improve inter-jurisdictional coordination through regional and statewide signal committees. A regional approach would promote more effective management practices for even isolated traffic signals.

Statewide Tiered Operations – Stakeholder’s Role

	Level	Responsibility
Tiered Operations and Maintenance	State Signal Committee	➤ Statewide oversight and priority setting
	Regional Signal Committee	➤ Regional oversight and prioritization ➤ Identification of funding opportunities for signal enhancements
	District	➤ Oversee signal system operations ➤ Implement operational revisions
	Critical Corridors Consortium	➤ Coordinate operations and maintenance along critical corridors
	Local Municipalities	➤ Perform basic signal modifications ➤ Perform/ coordinate basic maintenance activities ➤ Jointly oversee signal system operations and maintenance in some cases (larger municipalities with the majority of a regions traffic signals)

7.1.4 Promote a "Holistic" Approach to Signal Systems Management

The solutions discussed in sections 7.1 through 7.3 lay the foundation for a holistic approach to signal systems management (see Exhibit 7.8). The development of an asset management system and a tiered approach to operations and maintenance establishes the framework for PennDOT and planning organizations to develop a Regional Traffic Signal Improvement Program (RTSIP). Furthermore, this solution is consistent with PennDOT’s emerging Mobility Plan and Transportation Systems Operations Plan

(TSOP). The TSOP defines: Why, What, and How with regard to managing capacity. “Traffic Signal Operations” is one of four critical elements of the TSOP. As the TSOP continues to be developed, it will be presented to District personnel and to planning partners. This will be a significant opportunity to promote signal systems management at a holistic level.

7.1.5 Expand Traffic Signal Enhancement Initiative (TSEI) and Congested Corridor Improvement Program (CCIP)

Both the Traffic Signal Enhancement Initiative and the Congested Corridor Improvement Program are valuable tools in congestion reduction (see program descriptions below). These holistic approaches evaluate systems across jurisdictional boundaries and involve stakeholders at various levels.

Traffic Signal Enhancement Initiative

Traffic Signal Enhancement Initiative	
Background	<ul style="list-style-type: none"> ➤ The Traffic Signal Enhancement (TSEI) Initiative called for PennDOT to “partner with municipalities to identify traffic signals that need to be retimed, upgraded, or better integrated into an overall congestion management strategy.”
Goal/ Outcome	<ul style="list-style-type: none"> ➤ The goal of the TSEI is to reduce travel times and delay on specified signalized corridors. The TSEI seeks to optimize traffic flow through signalized intersections. ➤ All projects under the TSEI must have traffic flow as their primary focus, but safety enhancements may be included as an additional benefit. Moreover, PennDOT focuses on corridor-based projects but will consider improvements to grid systems or isolated intersections if sufficiently justified.
Status	<ul style="list-style-type: none"> ➤ Implementation of the TSEI began with a \$1 million set aside in PennDOT’s 2001-2002 and 2002-2003 Highway Administration Business Plans. ➤ For fiscal years 2003-2004 and 2004-2005, \$1.2 million has been allocated to the TSEI. Projects for the TSEI are submitted by the Traffic Signal Section in each District Traffic Unit. Each District may submit a maximum of two municipally-supported projects for consideration each year.

Congested Corridor Improvement Program

Congested Corridor Improvement Programs	
Background	<ul style="list-style-type: none"> ➤ PennDOT initiated the Congested Corridor Improvement Program (CCIP) to identify congested corridors in the Commonwealth and, in conjunction with its partners, define and implement needed improvements. ➤ Transportation corridors and associated improvements are identified in partnership with MPO’s/RPO’s including utilization of existing congestion management systems (plans).
Goal/ Outcome	<ul style="list-style-type: none"> ➤ The proposed improvements are directed at activities such as roadway geometry, signal operations, access management, multimodal initiatives, intelligent transportation systems (ITS), traffic regulation techniques, transportation demand management (TDM) measures, and planning and zoning practices that are appropriate for a particular transportation corridor.



Congested Corridor Improvement Programs	
Status	<ul style="list-style-type: none"> ➤ CCIP studies have been compiled for 17 corridors and eight corridors are underway. ➤ For fiscal year 2003-2004 and for future years, \$1.2 million was allocated.

7.1.6 Review and Update the Traffic Signal Permit Process

The review and update of the existing traffic signal permit process falls under institutional responsibility/ accountability, but also offers opportunities to more efficiently operate and manage signal systems.

The review and update should be divided into two phases: Technical and Legal. By addressing each phase individually, there is a better likelihood that one phase will not adversely affect the progress of another phase.

7.1.7 Establish Operational Audits Program

Critical signal systems are not evaluated frequently enough due to the lack of data collection and the cost of analysis. Ideally, critical systems should be extensively evaluated every three to five years. An efficient and cost-effective procedure should be considered that periodically assesses critical systems in order to improve operations.

Several districts perform informal operational assessments of critical corridors on a periodic basis or when issues arise; however, no formal process or protocol exists for performing these assessments. Often these assessments are performed “when time permits” but not as part of an organized or systematic spot-audit process. Although minor improvements can be identified and made within this current process, other stakeholders are not made aware of these improvements and of the larger issues identified which may necessitate dedicated funding.

Guidelines and protocols for performing operational audits should be established so key stakeholders are involved/ aware of the process and as such can promote needed improvements. Specific considerations to be evaluated when conducting these audits are detailed in the following table.

Operational Audit – Assessment Considerations

Assessment Area	Considerations
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Assessment Area	Considerations
Operations	<ul style="list-style-type: none"> ➤ Are intersection phases appropriate for observed conditions? ➤ Are intersection timings appropriate for observed conditions? ➤ Is the intersection on the appropriate “recall” mode? ➤ Is there suitable progression between intersections?
Maintenance	<ul style="list-style-type: none"> ➤ Are detectors functioning properly? ➤ Are individual signals interconnected and communicating properly? ➤ Are there any other maintenance issues?
Other	<ul style="list-style-type: none"> ➤ Could lane reassignment or minor geometric enhancements improve operations? ➤ Could basic, low-cost access management practices (such as shared driveways) improve operations? ➤ Are emergency services needs addressed? ➤ Are pedestrians accommodated?

7.1.8 Complete Updates and Revisions to PennDOT Traffic Signal Publications

PennDOT publications and guidelines provide a vital tool for both PennDOT and local authorities in designing, constructing, maintaining, and operating signal systems. Signal systems involve a variety of disciplines and evolving technologies. Signal training and education can be divided into four core areas:

Operations - Operations include the assessment of traffic flow needs to consider the number and arrangement of lanes, phasing, and timing. Operations (such as phasing and timing) establish the basic parameters for signal design, but are also critical in reassessing existing operations.

Design - Design considers the physical layout of the signal installation. Such items as location and types of structures are considered as well as pedestrian accommodations and signal head placement. Design is contingent upon operational requirements.

System - Involves other disciplines to integrate communications and technologies in order to make the signal function properly and communicate with other signals and systems.

Maintenance - Includes preventive and response maintenance activities to keep signal systems operating efficiently.

PennDOT is currently updating several traffic signal publications. These publications should continue to be updated. Where deficiencies in PennDOT publications exist, national publications should be identified or additional materials should be developed.



7.1.9 Allocate a Portion of Any New Funding Increase to Signals

Chapter 90 of Title 75 (The Vehicle Code) of the Pennsylvania Consolidated Statutes enables the collection and distribution of the liquid fuels tax, a permanent state tax of 12 cents per gallon. One-half cent per gallon of that tax is paid into a liquid fuels tax fund specifically appropriated for transportation improvements, one of which is traffic signals, including acquisition, maintenance, repair, and operations.

7.1.10 Provide Incentives for Operational Enhancements

Presently, there are no direct incentives for operational enhancements; therefore, municipal practices focus almost entirely on maintenance activities in order to be compliant with the traffic signal permit and to avoid liability issues. Operational enhancements have indirect benefits of reducing congestion, but no direct benefits to municipalities. Often operational enhancements are identified only when there are significant complaints by the public and/ or elected officials or as part of area development.

If additional funding is secured, financial incentives should be given to municipalities for implementing operational enhancements. Financial incentives should be used to encourage municipalities to invest in proactive monitoring, operating, and managing of their traffic signal systems. Often, these enhancements can be implemented at relatively low-cost.

Typical operational enhancements may include:

- Lane reassignment or minor geometric enhancement
- Repairing detectors
- Assessing and adjusting modes of operation
- Adjusting timing and offset to improve intersection operations and corridor progression
- Development of new timing plans and timing plans to address special needs such as homeland security, incident management and special events
- Installing compatible technologies such as the same type of controller
- Upgrading communication systems
- Implementation of energy saving devices such as Light Emitting Diodes (LEDs)
- Addressing emergency service needs.

The incentive should cover a percentage of the evaluation, design and implementation of the enhancement provided these benefits could be documented. The exact percentage of incentive should be further evaluated to determine an appropriate level that encourages municipal participation, but does not result in unlimited requests.

7.1.11 Encourage Regional Maintenance Contracts with Operational Incentives

Shared maintenance across jurisdictional boundaries provides an opportunity to decrease contract costs through improved economies of scale and to improve operations through better coordination and communication, as well as through operational incentives to maintenance contractors. It also reduces the amount of training needed for each municipality. PA has a large challenge achieving local government efficiency with so many units of municipal government. There is a great interest in cooperation and collaboration, recognizing that may be more feasible/practical than mergers.

Shared maintenance contracts provide an opportunity to share resources, thus reducing costs. Shared maintenance practices are most beneficial in rural areas, where limited ownership of signal systems may result in higher per signal maintenance costs. As part of the update (Section 7.8) to PennDOT Publication 191, Guidelines for the Maintenance of Traffic Signal Systems, the existing standard shared maintenance and regional maintenance contracts should be revised and updated to be used by municipalities and regional consortiums. Critical components of shared maintenance contracts include:

- Defining roles and responsibilities
- Defining reporting and financial protocols
- Defining response maintenance activities and response times
- Defining preventive maintenance requirements and timeframes
- Defining operational requirements
- Identifying incentives.

The operational incentive program discussed in Section 7.10 should be extended to maintenance contractors. Often, maintenance contractors are aware of operational deficiencies, but have no mechanisms to make enhancements. Funding increases discussed in the previous section would be used for the incentive part of this recommendation.



7.1.12 Provide Incentives for Inter-jurisdictional Coordination

Inter-jurisdictional coordination is often an objective in long-range transportation plans. This type of coordination can help promote a regional, as well as a holistic system approach to managing and maintaining traffic signal systems. As part of this recommendation, funding preferences would be given to projects that are requested using collaborative funds by collaborative efforts. The approach would encourage MPOs/RPOs, counties, and other jurisdictions to work closely together and to think beyond their political boundaries. This initiative is consistent with the ideas presented in Section 7.2, but provides financial incentives to implement inter-jurisdictional coordination. Part of the inter-jurisdictional coordination should include integration with regional traffic management centers (TMCs) to address regional traffic and operations.

Many municipalities do not have the expertise, staff or funding to operate and maintain their traffic signal systems to their full potential. However, if traffic signal partnerships were formed, the burden would be shared by many. As a part of the traffic signal partnerships, funding incentives could be offered for doing so.

This recommendation is one that should be carried out in balance so that it does leverage transportation resources, but at the same time does not result in an oppressive degree of “strings attached.” Transportation resources are substantial and should result, where practicable, in other beneficial activity by the recipient that contributes to the overall operation and maintenance of traffic signal systems as well as the transportation system as a whole.

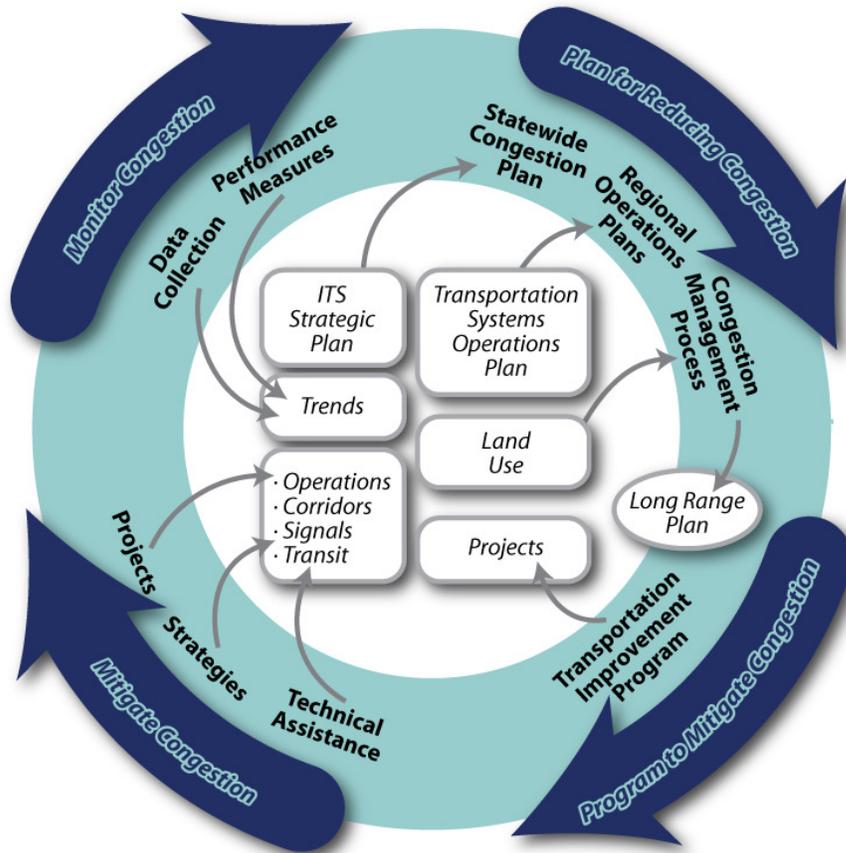
Incentive programs will need to meet the needs of both the Department as well as the recipient. An example program may be as such:

- One time allocation of funds provided for upgrade of a signal system to municipalities who work together.
- Once upgraded, these municipalities must continue to maintain the systems to a certain standard. The Department will regularly monitor the system to ensure that the conditions are being met. In return for proper maintenance of the signal systems, the municipalities will receive a cost incentive fixed sum that can be used for transportation improvements.

7.2 Congestion Mitigation & Smart Transportation

The Task Force believes that to better address congestion in Pennsylvania a continuous process of monitoring, planning, programming appropriate projects, and implementing mitigation strategies is required, as graphically displayed below:

Figure 49: The Congestion Mitigation Process



Communication and cooperation are keys to successfully mitigating congestion. PennDOT, planning partners, municipalities, and others need to be engaged in order to properly identify congestion concerns and to identify mitigation techniques, whether they be capacity enhancements, operational initiatives, or demand management strategies. PennDOT must be better engaged in planning, and planning partners should focus on operational issues.

Addressing congestion mitigation within a Smart Transportation context will require a three-pronged approach:

- **Planning and Programming:** Establish comprehensive statewide, regional, and local planning processes to address



congestion in a way that is strongly linked with the project programming process.

- **Congestion Mitigation:** Establish congestion mitigation approaches that minimize cost and maximize benefits.
- **Monitoring:** Establish monitoring so that PennDOT can allocate resources effectively and document improvement benefits.

Specific recommendations under each category are provided below.

7.2.1 “Planning & Programming to Mitigate Congestion” Recommendations

Establish comprehensive statewide, regional, and local planning processes to address congestion in a way that is strongly linked with the project programming process. This would include:

- Establish strengthened congestion management planning within PennDOT:
 - Increase PennDOT participation from the Central Office and District Offices in development of regional CMPs.
 - Integrate regional CMPs into a statewide CMP. Promote statewide and regional coordination of congestion management programs and processes.
- Develop “rightsized” CMPs in all planning partner areas, not only the largest urban areas. These CMPs should include the appropriate operational focus through the incorporation of the Regional Operations Plans.
- Integrate CMP results with MPO/RPO long-range plans.
- Develop a stronger planning focus at the District level to better coordinate with municipalities on land use and transportation.
- Encourage land use controls at the county level so that land use and transportation decisions are more effectively managed.
- Encourage use of official maps to reserve needed right-of-way for future improvements.
- Continue Transportation Systems Operational Planning at the statewide level and regional level.
- Provide statewide direction on congested corridors and traffic signal enhancement. PennDOT should move toward an expanded role in signal operations, providing technical assistance and technology transfer to municipalities across the

state. This will be particularly important because, in light of resource limitations, system operations solutions will receive a greater emphasis than building new facilities or expanding existing facilities.

- Involve transit agencies to a greater degree in planning and design when addressing congested corridors.
- Implement training and capacity building in these areas for PennDOT and MPO/RPO staff.
- Implement an “operations and demand management” review (similar to safety review) to the PennDOT Project Development process to ensure that strategies that better manage capacity and reduce demand are considered along with strategic capacity enhancements/additions.
- Continue to encourage development of local access management ordinances.

7.2.2 “Congestion Mitigation” Recommendations

Establish congestion mitigation approaches that minimize cost and maximize benefits:

- Establish a low-cost bottleneck program that focuses on affordable improvements such as low-cost capacity improvements, restriping to change lane configurations, use of shoulder lanes, ramp extensions, and improved merge and acceleration areas. The Federal Highway Administration (FHWA) has materials that could be used as a basis for the program’s development.
- Expand transportation operations to include appropriate ITS components for incident management and traveler information.
- Implement ramp management analysis and mitigation into planning and project development.
- Implement a quick clearance policy.
- Promote corridor improvements such as improved intersection geometry facilitating turning movements and improved signal coordination for key arterial corridors based on planning partner CMPs. When intersection configuration is involved, give strong consideration to the use of a modern roundabout design. Reinstitute the Congested Corridor Improvement



Program and the Traffic Signal Enhancement Initiative with minor modifications.

- Implement traffic signal recommendations identified in the TAC Study, *Traffic Signal Systems: A Review of Policy and Practices*. Many of the recommendations have not been carried forward or have been suspended.
- Emphasize demand management strategies to encourage greater use of public transportation and other alternative modes. Promote directed use strategies where there is a robust transportation network to support demands.
- Introduce traffic calming measures to encourage “as-designed” system utilization.
- PennDOT should engage and educate stakeholders regarding revised highway occupancy permit (HOP) and traffic impact study (TIS) requirements.
- Create a model TIS ordinance for municipal use.
- Reevaluate obstacles to implementing traffic impact fee ordinances.

7.2.3 “Monitoring” Recommendations

Establish monitoring so that resources can be allocated effectively and improvement benefits can be documented.

- Identify preferred congestion performance measures (in addition to level of service) that address both recurring and non-recurring congestion. These measures should be:
 - Easily measurable and understandable.
 - Addressing existing and future recurring and non-recurring congestion.
 - System-wide versus localized.
 - Easily monitored through a “dashboard.”
- Highlight operational successes.