Defining the Legacy for Users: Understanding Strategies and Implications for Highway Funding

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1 Introduction

Research Objective

There is a large body of available research on transportation funding which focuses on transportation finance trends, issues and strategies[1]. Much of this analysis offers evidence and support for changes to current transportation revenue streams and/or collection tools. Under the worst case scenarios described by the research, maintaining current levels and methods of transportation finance will lead to major revenue deficiencies, with deficit figures at least in the tens of billions of dollars annually (Cambridge Systematics, 2005a&b). In the best case scenario, core highway finance revenue sources – those related to motor fuel taxes – will not be viable in the long-term due to increasing utilization of alternative fuels, improving fuel efficiency, inflationary impacts, and inappropriate diversion of transportation funds (TRB, 2006).

While it is important to understand transportation finance from the perspective of public sector entities responsible for maintaining transportation infrastructure, there is currently a dearth of research that examines transportation finance from the perspective of a key stakeholder – the transportation system end-user. From an equity standpoint, system end-users arguably are the most appropriate body for conducting rational benefit-cost assessments for transportation investment levels and priorities. In cases where research has included a consideration of system end-user interests, findings suggest that system end-users do not typically support alternative financing approaches. For example, one Citizens' Jury analysis conducted by the University of Minnesota in 1995 found that 71 percent of Twin Cities residents judged congestion pricing as an ineffective strategy for addressing current and impending problems of traffic congestion, or as a means for developing stable financing for surface transportation improvements (Jefferson Center, 1995). Finally, end-users often are not closely involved, vis a vis a public participation process, when quasi-government authorities make decisions to revise revenue collection systems.

Consequently, this report attempts to develop a national discussion on transportation finance with a system end-user perspective, including those users that conduct commercial activities on U.S. highways and roadways.

Defining Transportation

The U.S. surface transportation system is critical to the nation's economy[2]. The direct beneficiaries of this system can be defined as vehicle operators, while secondary and tertiary beneficiaries might include all U.S. citizens who consume goods and services, shippers and employers, and government services such as transit and paratransit, fire departments and police.

Roadways are, for the most part, public goods that provide free, public access. At the federal level, roadways are supported by the U.S. Department of Transportation under the following mission statement:

> *"Serve the United States by ensuring a fast, safe, efficient, accessible and convenient transportation system that meets our vital national interests and enhances the quality of life of the American people, today and into the future."*

In addition to its mission statement, the U.S. DOT identified several high-priority objectives in its existing Strategic Plan, including ensuring "global connectivity," improving "safety" and targeting "congestion reduction" initiatives. Typically, the public sector seeks to provide a public good when an essential product is not sufficiently produced by private sector markets or where the government is legislatively compelled to provide for the public's general welfare. Myriad examples of public sector motivation to support or enhance the social welfare of its citizens exist[3]. In the United States, examples of public goods include the military, primary and secondary education, public welfare programs, police and fire services and, as previously mentioned, the U.S. system of surface transportation. Since public goods and services benefit all U.S. citizens, in most cases funding is provided by a broadly targeted tax initiative combined with limited user fees. Consider the National Parks System, for which usage fees are levied, but which receives the majority of its funding through taxes collected from a broad base of taxpayers. Compared to other public goods, the funding mechanisms in place for the U.S. surface transportation system are an anomaly; unlike the vast majority of goods and services provided by the government, transportation infrastructure is financed through a unique system of user-sourced excise taxes.

2 Infrastructure Issues

There is little argument that highway congestion is a pressing concern for this country. It is predicted that, over time, physical bottlenecks will become more prevalent and create delays of longer duration; estimates are that national "vehicle miles traveled" (VMTs) for all road vehicle types will increase 72 percent by 2025. Paralleling this increase in overall traffic, the trucking industry will move an increasingly larger share of the nation's freight over these roadways; trucks' share of total tonnage will rise from 68.9 percent in 2005 to 69.5 percent by 2017 (American Trucking Associations, 2006b). Such increases in demand will require major improvements in infrastructure capacity, as well as requisite increases in revenue to fund the development of such infrastructure. Many strategies have been proposed for addressing new infrastructure demand, including innovative designs for multi-layer highways, elevated and tunneled highways, and advanced arterial intersections (Samuel & Poole, 2006). Solutions such as these, even if politically and environmentally acceptable, are not feasible in the current finance environment because of the unprecedented costs associated with such projects.

While most transportation planners and managers agree that infrastructure capacity increases are needed, the financial challenges associated with simply maintaining the current infrastructure system are considerable. The U.S. Chamber of Commerce Phase I Study found the following:

> *To "maintain" the current condition of the nation's pavements, bridges and transit infrastructure, expenditures by all levels of government of $222 billion is needed in 2005 and $295 billion (*annually) *by 2015* (Cambridge Systematics, 2005a).

The study finds that spending levels below this will not meet demand and system deterioration will be exacerbated. Furthermore, it concludes that there will be a $415 billion shortfall associated with maintaining the existing infrastructure over the years 2005-2015.

In summary, the major infrastructure management challenges can be described in the following manner:

- User demand for highways now commonly exceeds design capacity/supply.

- Solutions to insufficient capacity include building more infrastructure, although infrastructure improvements can be cost-prohibitive.
- Insufficient capacity may be partially remedied by decreasing user demand through market calibrations, which could result in equity concerns.
- Existing infrastructure requires ongoing maintenance which comes at a significant and increasing cost.

Table 1: 6-Year Estimated Needs for Highways and Transit

6-Year Estimated Needs for Highway and Transit Capital Investments[4]	U.S. Chamber of Commerce (2005 $)	FHWA (2005 $)	Congressional/ STS Requested[5]	SAFETEA-LU Authorized
Cost to Maintain	$750 billion	$639 billion	$500 billion	$286 billion
Cost to Improve	$1,044 billion	$1,036 billion		

3 Funding Issues

It is challenging to separate funding issues from infrastructure issues as adequate funding is central to transportation system maintenance and increased capacity.

However, to fully appreciate the funding challenges, it is important to understand the history and context of the past and current transportation funding environment. The transportation finance debate is in large part focused on the viability of the federal Highway Trust Fund, which is the principal federal funding mechanism of highway infrastructure improvement, maintenance and construction (GAO, May 2002).

The impetus for the creation of the Highway Trust Fund was the nearly toll-free Eisenhower Interstate System designed and built during the post-war 1950s and 60s[6]. To fund this large and unprecedented system of roadways, federal revenue collection was formalized as the Highway Trust Fund through the Highway Revenue Act of 1956[7]. Presently, federal Highway Trust Fund revenues are collected by the Department of Treasury and allocated by Congress under the 2005 *Safe, Accountable, Flexible, Efficient Transportation Equity Act* (SAFETEA-LU)[8].

Under a "user-pays" concept[9], the federal Highway Trust Fund currently receives revenue from excise taxes on gasoline and diesel fuels; sales of truck tires (over 40 lbs); truck tractor and trailer sales; and an annual Heavy Vehicle Use Tax (HVUT) which is primarily paid by the trucking industry[10].

The issue of paramount concern for the future of the federal Highway Trust Fund, as well as the myriad state transportation funding mechanisms that are modeled after the federal system, is the declining purchase power of the fund. Key problem areas that affect the future of the federal Highway Trust Fund include:

- Federal motor fuel taxes have not increased since 1993.
- Inflation has decreased the purchasing power of the static motor fuel tax.
- Increasing vehicle fuel efficiency reduces revenue (on a per-mile or per-vehicle basis).
- Highway user fees are diverted to non-highway programs.
- Tax exemptions reduce user-based revenues.
- Project "earmarking" can divert funding from critical projects.

4 Strategies & Implications: Problem Statement

The 2005 series of reports, *Future Highway and Public Transportation Finance* (Cambridge Systematics, 2005a & 2005b) document an untenable future for transportation finance in the U.S. Central to the reports' conclusion is that, absent changes, transportation revenue shortfalls that currently exist will continue to worsen through 2015. The projected state of funding will lead to an inability to maintain the existing infrastructure, as well as an inability to make appropriate investment in new infrastructure[11].

Likewise, a 2003 study, *Improving Efficiency and Equity in Transportation Finance,* indicates that legislatures at state and federal levels of government are looking beyond the current fuel tax-based user fee system by encouraging several types of state and local behaviors, including: 1) special local tax increases for transportation projects; 2) promotion of loan programs; and 3) the encouragement of competition among states in the pursuit of federal resources (Wachs, 2003).

Recognizing that the nation's transportation infrastructure must first be maintained and improved, and that the existing transportation finance models appear inadequate for meeting long-term infrastructure needs, it is critical to analyze and understand possible changes to transportation finance. Much of this process is speculative and theoretical in nature since there is little field data or empirical evidence available for many of the "alternative funding" strategies currently proposed by public and private stakeholders, particularly from an end-user impact perspective.

Key areas of focus and analysis must include:

- Cost-benefit comparisons between different funding schemata.
- Program design and business plan sustainability of alternative finance options.
- Efficiency metrics for finance options.
- Equity and administration issues associated with alternative finance options.

Highway Finance Strategy #1: State & Federal Fuel Tax Revenues

<u>Federal HTF</u>

The federal Highway Trust Fund (HTF), established through the Federal Highway Act of 1956, provides revenue to states for building and maintaining transportation infrastructure.

Approximately 90 percent of the federal Highway Trust Fund (hereafter referred to as the federal HTF) is derived from excise taxes on gasoline, diesel and other fuels (Marron, 2007). Thus, federal transportation funding is extremely dependant on the continued viability of the motor fuel excise tax, two key components of which are the rate of taxation and the level of fuel consumption (a function of both vehicle fuel efficiency and total vehicle miles traveled).

Unlike many other taxes levied on the sale of goods, the motor fuel tax is based on the quantity purchased and is not determined by calculating a percentage of the sale price. Therefore, a $1 gallon of gasoline and a $5 gallon of gasoline will both carry a tax of 18.4 cents per gallon.

Though federal tax rates on gasoline and diesel fuel have remained unchanged at 18.4 cents per gallon and 24.4 cents per gallon respectively since 1993, some growth in federal HTF receipts has occurred due to increases in consumption of taxable motor fuels. Figure 1 indicates that the amount of fuel taxed annually has increased 24.8 percent since the last federal motor fuel tax increase.

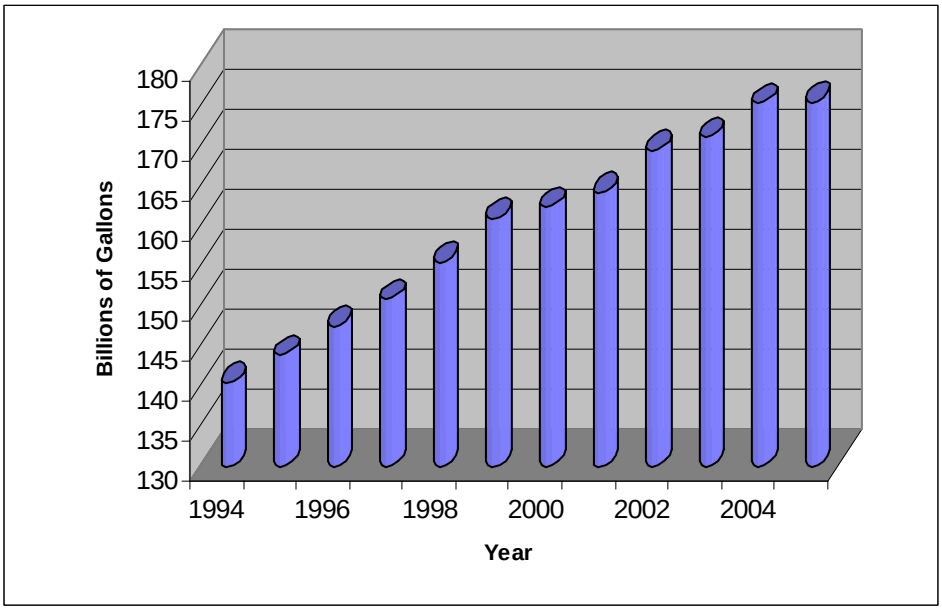

Figure 1: Annual Taxable Fuel Consumption
Source: FHWA, Office of Highway Policy Information, Federal Highway Statistics, Tables MF-2, 1994-2005. Available at: http://www.fhwa.dot.gov/policy/ohpi/qffuel.htm.

It should be noted that this growth in consumption logically presupposes increases in vehicle use and/or vehicle miles traveled; such increases in transportation system demand may lead to requirements for new road capacity as well as increases in road maintenance and reconstruction. Therefore, a baseline assumption is that increased consumption of taxable motor fuels represents increased use of roadways and highways, and an increased need for revenue to build and maintain infrastructure.

Figure 2 illustrates this relationship, showing that vehicle miles traveled (VMT), a key measure of infrastructure demand, has grown at the same rate as motor fuel consumption in recent years.

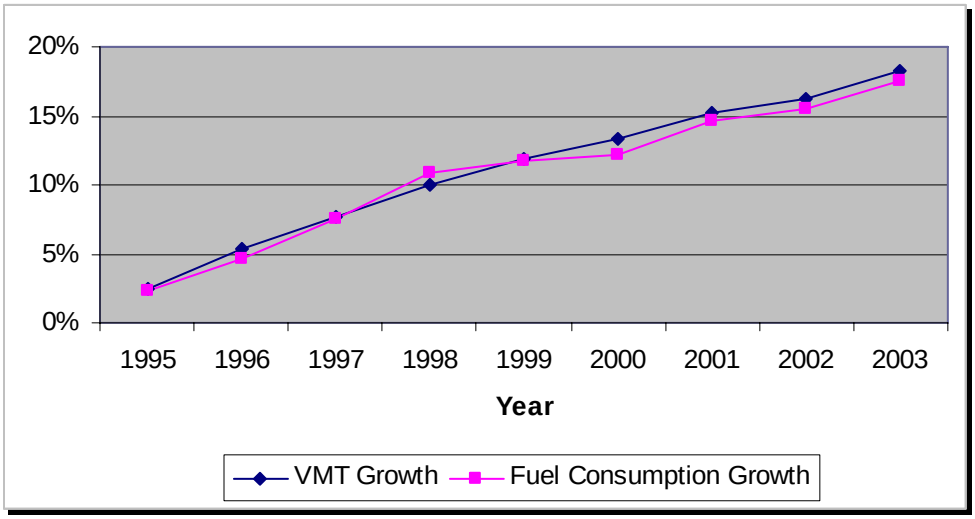

Figure 2: VMT and Fuel Consumption Growth
Source: FHWA, Office of Highway Policy Information, Federal Highway Statistics Tables MF-21 & VM-2, 1995-2004.
Available at: http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm.

State-Generated Revenues

States receive funds from multiple sources, including the federal HTF by way of the Federal-aid Highway Program, a federally assisted, state administered means for funding transportation improvements. In order to participate in the Federal-aid Highway Program, states are required to have a highway agency or Department of Transportation and must provide matching funds for most programs. While the level of matching funds varies by specific program, the match requirement is typically 80 percent federal and 20 percent state.

Therefore, the consequences arising from federal transportation revenue shortfalls are also realized at the state agency level. In 2004, states on average relied on federal funding for more than 25 percent of state highway receipts (FHWA, 2004c). Over the last decade many states have experienced sizeable budget shortfalls which either resulted in spending decreases or led to diversions from transportation accounts for non-transportation purposes.

For instance, New Jersey's state government predicted in early 2006 that the state's transportation trust fund would be bankrupt by the end of the year. Though the bankruptcy was averted through a legislative reauthorization, state government officials considered dramatic changes in transportation funding, including the privatization of toll highways. The consequences of state

transportation trust fund bankruptcy include the inability to meet federal match requirements. In the case of New Jersey, bankruptcy could have resulted in a loss of up to $1 billion in federal funding (Fischer, March 2006). Similar scenarios are playing out in other states[12], with contemplated funding options including: 1) increases in state fuel taxes; 2) transfer of state general fund revenues to transportation funds; 3) decreasing diversions of transportation funds; and 4) leasing or selling public roads to private firms as in the case of the Indiana Toll Road and the Chicago Skyway.

Most finance-related research concludes that the primary basis for HTF deficits is increasing system demand concurrent with stagnation in user revenues. First, federal and state user taxes on items such as motor fuels are quantity-based rather than price-based. Furthermore, these user fees have remained unchanged for over a decade while real costs have continuously increased. The result is that many local regions have resorted to special sales taxes and other non-user oriented methods to support the transportation system (Wachs, 2003). Likewise, the consequence of the revenue stagnation, particularly at the federal level, is that states will not be able to maintain or improve the current transportation system and will be severely under-funded over the next 25 years (2005-2030) if changes in the current system are not made (Cambridge Systematics, 2005a).

Highway construction and maintenance needs on state roadway systems continue to steadily increase as the number of users and the intensity of use escalates. Some states have responded in recent years by increasing state motor fuel tax rates to keep pace with inflation and system demands. Others have built in automatic inflationary adjustments or “rate indexing” that automatically adjusts the tax level without the need for legislative authorization, sometimes occurring annually or quarterly.

As the primary funding mechanism for state transportation funds, motor fuel taxes are critical. Since 1993, however, the average state motor fuel tax rate has changed only slightly, following a similar pattern of stagnation found with federal motor fuel taxes (as shown in Figure 3).

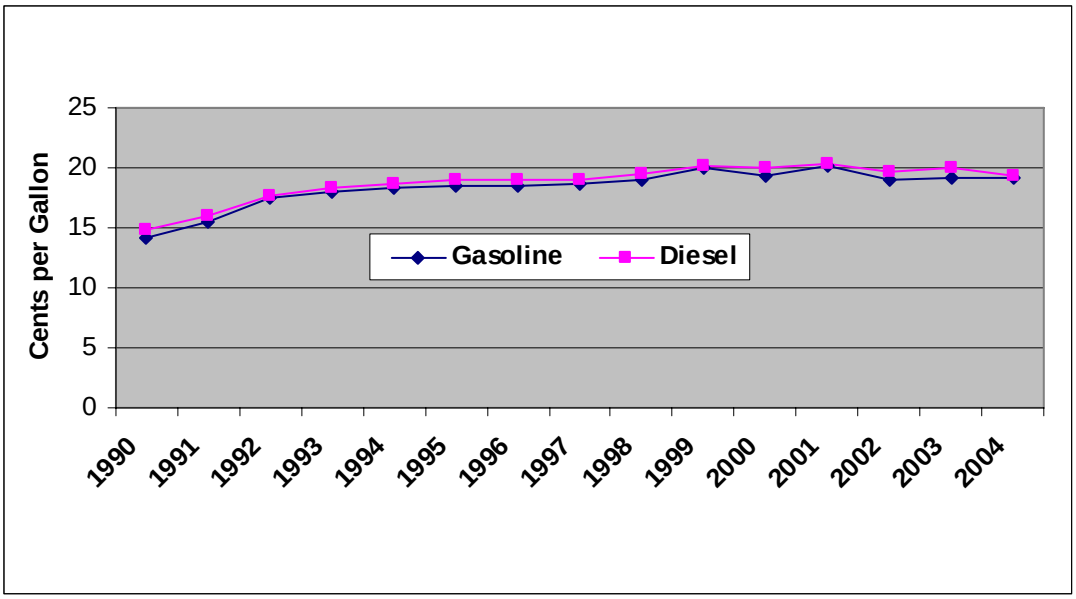

Figure 3: State Motor Fuel Tax Rates 1990 – 2004
Source: FHWA, Office of Highway Policy Information, Federal Highway Statistics Table MF-205, 2006. Available at: http://www.fhwa.dot.gov/policy/ohim/hs04/htm/mf205.htm.

As previously described, increased fuel consumption typically results in higher revenue to the state and federal highway trust funds. This, in turn, increases available funding to the states by way of federal HTF distributions. However, nominal increases are insufficient to fund necessary surface transportation system capacity and maintenance. The funding shortfall is further exacerbated by a number of impacts to the HTF revenue stream, including:

- Exemptions
- Diversions
- Tax Evasion
- Inflation
- Earmarks
- Federal & State Policy Conflicts
- Alternative Fuels and Increasing Fuel Efficiency

Resolving these issues is a critical first step in fully and transparently understanding the scale of the transportation funding predicament. Many of these issues readily undermine the argument that the transportation system is under-funded and/or that users are not paying their "fair share" of costs.

Fuel Tax Exemption Implications – Federal HTF

The Internal Revenue Service (IRS) exempts various entities from paying federal excise taxes on motor fuels for on-highway use (the largest revenue source for the HTF) including vehicles that fall into the following categories (IRS, 2006):

- Vehicles exclusively used by a state, political subdivision of a state (i.e. county or municipal governments), or the District of Columbia;
- School buses;
- Qualified intercity and local buses;
- Vehicles exclusively used by a nonprofit educational organization.

*Government Use Vehicles***:** Documented fuel consumption by state, local and municipal government fleets approaches 2 billion gallons of gasoline (diesel not included) each year. A conservative estimate of lost HTF revenue from this exemption, using only the 18.4 cents per gallon tax on gasoline, is **$363 million** annually (see Appendix A).

*School Buses***:** There are approximately 480,000 school buses in the United States with combined travel mileage of approximately 4.3 billion miles per year. The EPA estimates that more than 90 percent of school buses use diesel fuel. If a conservative average consumption rate of 7 miles per gallon (mpg) is used, school buses therefore consume approximately 615 million gallons of fuel each year, of which approximately 552 million gallons (90%) are diesel (EPA, 2006; School Transportation News, 2006).

If taxed at the federal rate of 24.4 cents per gallon, an additional $134.8 million would be deposited into the federal HTF on an annual basis. The remaining fuel consumed by school buses (approximately 61 million gallons of gasoline) if taxed at the federal rate of 18.4 cents per gallon, would result in additional HTF revenues of $11.3 million. These school bus estimates constitute a combined loss of revenue of **$146 million** annually to the HTF.

*Qualified Transit***:** According to the National Transit Database (NTD), mass transit systems in the 50 states and the District of Columbia consumed more than 500 million gallons of diesel in 2004 (NTD, 2004). When used for public transportation, the federal government either exempts or refunds the diesel excise tax (IRS, 2006). Assuming only half of the diesel consumed by the transit systems is exempt from the federal diesel tax, the exemption figure equates to a loss of more than **$61 million** per year.

Eliminating federal exemptions for transit, school buses and state and local government use would conservatively add more than **$570 million** to the federal HTF annually. The $570 million exemption was calculated by summing the federal exemptions for state, county and local gasoline use, transit diesel use and the diesel and gasoline use estimates by school buses. This estimate does

not include diesel used by state and local governments, fuel used by charitable organizations or gasoline used by public transit systems. If these exemptions were included the demonstrated diversion of funds from the HTF would increase considerably[13].

Fuel Tax Exemption Implications – State HTFs

Government Use Vehicles: In reference to *state fleets*, there are laws that exempt entities from paying state fuel taxes (see Appendix B). There are also states that exempt charitable organizations. These exemptions, while noble, produce a misrepresentation of user cost and subsidies. Presuming that alternative finance programs would not exempt these vehicles (per the IRS fuel tax exemption), the effect of applying a fuel tax to these groups becomes moot. Of the states that exempt or refund excise tax for state, county and local government use, approximately 740 million gallons of gasoline were consumed by these fleets at an annual loss of **$155 million** (see Appendix C).

School Buses: Applying the previous analysis and using the percentages listed above with a mean state diesel and gasoline tax of 20.47 cents and 20.30 respectively, approximately **$126 million** in excise tax revenue is lost to school bus tax exemptions, assuming all school buses are exempt from or entitled to a refund of the state fuel tax (FHWA 2003; FHWA 2006b).

Federal Fleets: In the 36 states that exempt federal fleets from paying the state gasoline tax, the federal government consumed approximately 210 million gallons of gasoline (FHWA, 2003; FHWA, 2006). To estimate the federal level of exemption from state fuel taxes in light of varying tax rates, a methodology was used whereby each state's per-gallon tax rate was multiplied by the "quantity of gallons consumed in each state by the federal government for highway use." The analysis indicates that state fuel tax exemptions for federal fleets conservatively total **$29 million** annually in lost revenue (see Appendix D). Not included in this figure is the 65 million gallons of diesel fuel consumed by federal vehicles annually[14] (FHWA, 2003; U.S. GSA, 2004).

U.S. Postal Service: As the operator of the largest fleet of government-owned vehicles, the United States Postal Service (USPS) is required to pay all federal

fuel taxes. However, 47 states and the District of Columbia exempt postal vehicles from state fuel taxes (CA, OR and WY are the exceptions). Since state-specific data was unavailable for fuel used by USPS-operated vehicles, national data on USPS fuel consumption was multiplied by average state diesel and gas tax rates to estimate the amount of funding revenue lost due to USPS fuel tax exemptions. USPS vehicles consumed 27.9 million gallons of diesel and 105.7 million gallons of gasoline in 2005, taxed at an average 2005 state rate of 20.47 cents and 20.30 cents respectively.

The result is an annual $5.7 million exemption associated with diesel and a $21.4 million exemption associated with gasoline, combining for an overall diversion of just over **$27 million per year**[15].

Documented losses due to federal and state fuel tax exemptions and refunds therefore total more than **$907 million** annually (see Table 2).

Table 2: Total Annual Federal and State Fuel Tax Exemptions

	Federal Exemptions	State Exemptions	Total
Government Use Vehicles	$363,000,000	$155,000,000	**$518,000,000**
School Bus Use	$146,000,000	$126,000,000	**$272,000,000**
Transit Use	$61,000,000	Unknown	**$61,000,000**
Federal Use	N/A	$29,000,000	**$29,000,000**
USPS	N/A	$27,000,000	**$27,000,000**
Charitable Organizations	Unknown	Unknown	**Unknown**
Total	$570,000,000	$337,000,000	**$907,000,000**

Additional research should determine the extent and amount of excise tax exemptions found in the following categories:

- Fuel consumed by charitable organizations;
- Diesel consumed by state, county and local governments; and
- Gasoline consumed by transit systems.

Once these figures are fully documented, the overall loss of motor fuel tax exemptions will conservatively range from **$1 billion to $1.5 billion annually, and may exceed $2 billion** per year when state fuel tax exemptions for transit are ascertained.

Diversion Implications

In 1983 Congress formed two units within the Highway Trust Fund, the Highway Account (HA) and the Mass Transit Account (MTA), the latter of which was to receive 11.1 percent of the HTF under the new legislation. The percent allocated to transit has grown since 1983. Figure 4 indicates the cumulative growth of total revenues received by the Mass Transit Account from federal HTF excise taxes

since 2004, which is nearly **$50 billion** over the time period from 1994 through 2005.

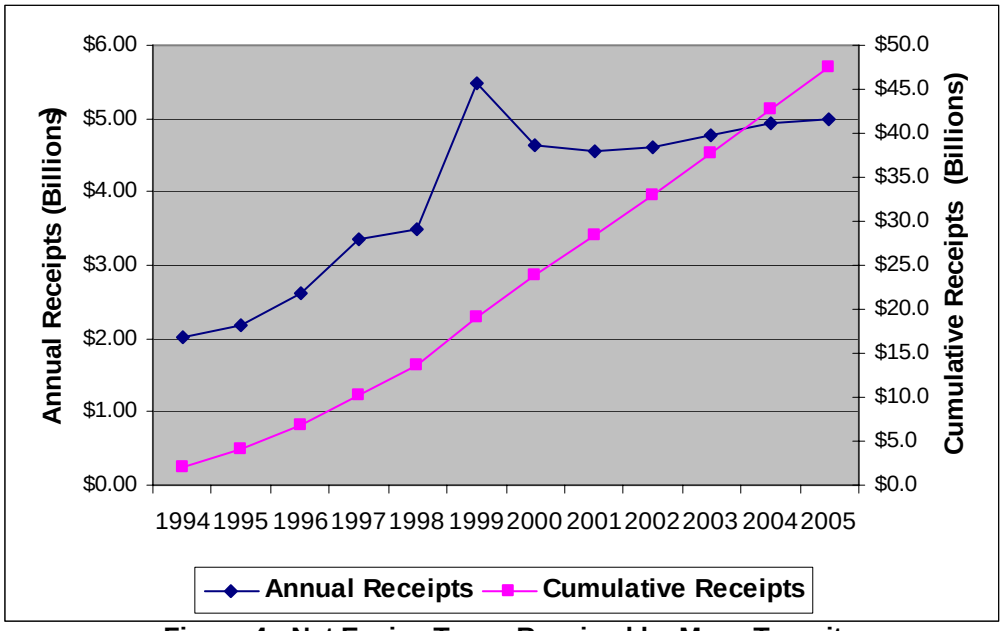

Figure 4 : Net Excise Taxes Received by Mass Transit
Sources: FHWA, Office of Highway Policy Information, Federal Highway Statistics Tables FE-10, 1994-2005. Available at: http://www.fhwa.dot.gov/policy/ohpi/qffinance.htm.

While some feel that the diversion of funds to the Mass Transit Account is inappropriate since federal HTF revenue levels, which are ostensibly inadequate, are generated by and for highway users, there are also strong benefit-oriented arguments for maintaining such expenditures. Public transit has some potential for reducing highway capacity demand, which supports the transportation system through congestion mitigation and decreased maintenance requirements[16].

However, there is a nearly complete void of analysis on the pavement impacts associated with transit vehicles, or on net HTF revenue losses – beyond existing operating subsidies – associated with transit fuel tax exemptions or rebates. Gross vehicle weights for loaded 40-foot buses exceed 40,000 pounds (Orion Bus Industries, 2007; AC Transit, 2006). Moreover, this issue is not unique to transit buses. In many states, trucks owned by public agencies or utilities (e.g., snow plows, garbage trucks and other municipal vehicles) are exempt from weight limits[17]. Plow trucks fully loaded with salt and sand weigh approximately 31 tons (Yates County Highway Department). The average excess weight of these trucks is estimated at three tons (Transportation Association of Canada, 1995). As a result, these trucks cause similar or greater damage to roads as equivalent private sector vehicles without any commensurate revenue contribution for the damage generated.

Like the Mass Transit Account, the U.S. Environmental Protection Agency (EPA) has also benefited from unique access to revenue collected by the Highway Trust Fund. A 1996 amendment to the Resources Conservation and Recovery Act allowed for the allocation of 0.1 cent per gallon of the motor fuel excise tax to be dedicated to enforcing anti-pollution laws and cleaning up sites related to leaking underground fuel storage tanks. The program, named the Leaking Underground Storage Tank (LUST) Trust Fund receives income from the federal motor fuel excise tax of approximately **$70 million** per year; revenue that would otherwise be directed into the federal HTF.

While there is some nexus between motor fuels and leaking tanks, it would be more cogent to fund this program in the same manner as EPA Superfund programs, since: 1) EPA has strong precedent for making responsible parties clean-up polluted sites (i.e. brown fields); and when not feasible, 2) EPA relies on Superfund revenues for clean-up, which has been sourced from general taxpayer funds since 1995.

There is a similar diversion paradigm at the state level, though non-LUST fund alternatives vary. Figure 5 shows that states report 78 percent of highway user revenues are dedicated to highway purposes, with 5 percent being directed to mass transportation and 4 percent for collection expenses. An additional 13 percent is classified by the FHWA as funding non-highway purposes and is diverted from surface transportation.

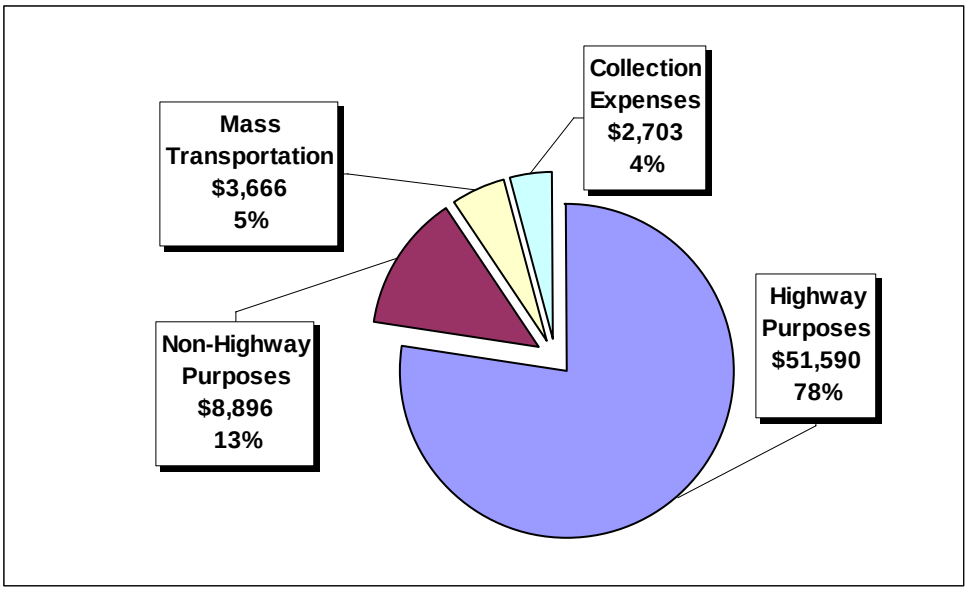

Figure 5: Disposition of State Highway User Revenues ($Millions) – 2004
Source: FHWA, Office of Highway Policy Information, Federal Highway Statistics Table HF-10, 2004. Available at: http://www.fhwa.dot.gov/policy/ohim/hs04/htm/hf10.htm.

The federal HTF maintains billions of dollars generating a significant amount of interest. This revenue, however, was directed to the general fund instead of to

transportation under the Transportation Efficiency Act for the 21st Century (TEA-21) reauthorization in 1998 (GAO, 1999). It is estimated that recapturing the interest on HTF balances could add an average of **$2.0 billion** to the HTF annually (Cambridge Systematics, 2005a).

Tax Evasion Implications

Motor fuel taxes represent the second most common form of tax evasion in the U.S., accounting for a loss of at least 6.5 percent of total fuel tax revenue (Council of State Governors/Council of Governors' Policy Advisors, 1996). While a conservative estimate of the scope of federal and state taxes lost due to fuel tax evasion may be as low as $1 billion annually, upper estimates suggest 25 percent of otherwise taxable fuel sold, nearly $9 billion, is illegally withheld from the HTF (FHWA, 2005d). Legislation during the mid-1990s moved tax collection to bulk distributors which scaled back the evasion problem, but the ongoing impact of evasion today is still viewed as considerable[18].

To address evasion, theoretical and empirical support exists for increasing criminal penalties. The Economics of Crime model states that an individual will be less likely to break the law if detection is likely and punishment is severe. Many studies recommend increasing criminal penalties based on this theory (Alm & McKee, 1998; Dubin, Graetz & Wilde, 1987; Allingham & Sandmo, 1972). While research shows that risk of incarceration is effective, substantial fines can also improve compliance (Miller, 2002). Others extend this theory specifically to fuel tax evasion (Sapp, 2004; Denison & Eger III, 2000).

In practice, increasing criminal penalties for tax evasion has broad support. During the mid-1990s, the federal government assigned a minimum $1,000 fine for using tax-exempt dyed fuel for taxable purposes. As a result, diesel fuel tax revenue increased over $1 billion, $700 million of which was attributed to improved compliance (FHWA, 1999). However, the relative relationship of a $1,000 penalty to the quantities and cost of fuel sold by tax evaders is likely inadequate. Both the FHWA and IRS found criminal prosecutions and jail sentences particularly effective in deterrence and overall compliance over the past decade (FHWA, 1996; IRS, 2007).

Inflation Implications

While the cost of gasoline and diesel has undergone dramatic fluctuations over the last five years, the overall price trend is clearly upward, in part reflecting the decrease in buying power. This same inflationary impact has considerably eroded the value of the static per-gallon tax. Federal excise taxes on motor fuels have not increased in nearly 15 years. The last increase in the federal motor fuel tax in 1993 coincided with a major political power shift in the U.S. Congress, and public debate has continued in recent years on the efficacy of raising the tax, with

some congressional leaders and the White House suggesting the tax should be eliminated altogether[19].

It is not surprising that the buying power of federal fuel tax revenue has decreased since 1993. Table 3 indicates 28.3 percent erosion in buying power per gallon sold when adjusted using the Consumer Price Index (CPI). In theory, to maintain revenue buying power by offsetting the effects of inflation since 1993, gasoline and diesel were under-taxed 7.27 cents and 9.64 cents per gallon respectively in 2006.

Table 3: Consumer Price Index Adjusted Fuel Tax Rates per Gallon

	1993 tax/gal	2006 tax/ gal	CPI adjusted tax/gal	Lost Revenue (¢)/gal	Decrease in Buying Power
Gasoline	18.4¢	18.4¢	25.67¢	7.27¢	-28.3%
Diesel	24.4¢	24.4¢	34.04¢	9.64¢	

While some economists and transportation planners have proposed indexing the fuel tax to tie it more closely to inflation, the concept is arguably regressive in that fuel costs would increase at the same time and inverse rate of the decreased buying power of money.

Earmark Implications

Many of the "investments" made through the SAFETEA-LU reauthorization of 2005 took the form of earmarks, representing more than 5,000 special state- and district-based projects – most authored by specific members of Congress[20]. The central tenet of earmarking is it allows members of Congress to return investment money to district constituents. While many programs that are funded through earmarked HTF money may be worthy programs that directly benefit the surface transportation system, there are a number that have little to do with transportation[21], as well as those that patently ignore a utilitarian approach to assisting a reasonable number of system users. A well documented example is the $320 million proposal to build a bridge in Alaska that would serve an extremely small number of users (Utt, 2005).

While it is neither likely nor desirable to eliminate all congressionally designated programming, in a period of transportation funding crisis, a principled position must be developed by Congress that curtails special interest projects. In general, earmarks must be minimized prior to Congress and transportation agencies raising the argument that "users are not paying their fair share." A more transparent approach to managing "earmarks" would be to: 1) clearly identify project authors and districts; and 2) develop and utilize an objective transportation system cost-benefit litmus test.

Allocation Formula Implications

Federal HTF revenues are directly distributed among states according to the amount a state contributes to the fund. If a federal HTF-taxed commodity is sold in a state, the tax money is "contributed" by that state to the federal HTF, which then distributes the pooled revenues through a separate formula funding process[22].

States that contribute more than they receive are referred to as donor states, many of which have more dense/urbanized populations than their counterparts, and thus purchase more fuel. In theory the higher VMT levels experienced by these states would ostensibly increase their infrastructure maintenance budget needs[23]. This is the primary rationale for maximizing the net return of revenue to the contributing state.

States that receive more than they contribute (referred to as "donee" states) are predominantly rural with sparse populations (Kirk, 2003). In 2002 the state that had the greatest donee differential between tax revenues contributed to the HTF and revenues returned by the HTF was Alaska, followed by Hawaii, Montana and the Dakotas. However, while these states may not generate considerable fuel tax revenue, they can often rationalize their role in macro-economic terms and/or corridor/network connectivity. Often times, major interstate corridors/connectors flow through donee states.

The donor-donee system may not be an efficient allocation of resources. It is successful in that it reallocates funds to individual states such as Alaska that may arguably possess strategic attributes beyond population densities or transportation system usage. However, the TEA-21 transportation bill provided the state with $6.96 for every $1.00 contribution. Whether or not the revenue contributions to donee states exceed a reasonable return-on-investment is hard to discern since few cost-benefit analyses are used to calculate federal HTF contributions to states. Nevertheless, donor states may suffer greater utilitarian consequences from "lop-sided" funding formulas. New Jersey, the most densely populated state, received only $0.91 for every $1.00 in HTF revenue contributions, even though its dense population and subsequent heavy use of roadways has degraded the state's transportation infrastructure. A related argument is that fuel purchases in any one state may not perfectly equate to system usage (e.g. VMTs).

SAFETEA-LU has attempted to improve equity by increasing the guaranteed return for states to 91.5 percent of the state's share of contributions. Such a

trend can be viewed as positive for the national transportation system, by making donor states greater beneficiaries of HTF funds.

State and Federal Policy Conflict Implications

In the current public finance environment, the U.S. Department of Transportation – as the recipient of federal HTF revenues – financially benefits from increases in gasoline and diesel consumption. At the same time, other federal agencies such as the Department of Energy encourage decreased use of fossil fuel energies such as gasoline and diesel. Other federal agencies such as the Environmental Protection Agency advocate solutions such as heavier idle reduction technologies that can incrementally reduce fuel efficiency. Although the U.S. DOT does not encourage increased use of fuels, its budget is currently predicated on fossil fuel consumption. Ultimately, the ideal solution is the creation of a national (multi-agency) energy plan that balances and prioritizes transportation management and finance with air quality enhancement and alternative fuel development.

There has been less than adequate public debate on how federal programs and agencies would be funded using an alternative finance mechanism or whether the U.S. DOT's role and budget would decrease as public sector roadway systems convert to private sector toll roads. It is simply not in the best interest of the U.S. DOT to align itself with national goals that would decrease energy consumption without identifying a new administrative funding approach. In the end, the consequence of these conflicting or absent missions across federal agencies is that states and other jurisdictions will step in to fix or address their unique component of the puzzle, resulting in a balkanization of programs and policies[24] such as:

- Promotion of different types and percentages of fuel additives;
- Promotion of different emissions requirements; and
- Promotion of different idling regulations.

With few exceptions, these policy conflicts in fuel consumption, revenue generation and air quality management exist at the state and MPO levels as well.

Alternative Fuel and Fuel Efficiency Implications

In March 2006 General Motors announced it will have hydrogen-powered vehicles in showrooms within 3 to 8 years (Spacemart, 2006). Hybrid vehicles that rely to some degree on electrification currently exist. While a large-scale deployment of such vehicles is still years away, the trend for a sustained rollout of vehicles that do not (primarily) rely on fossil fuel for energy raises important questions on the long-term viability of the motor fuel tax. Recent price spikes in motor fuel costs, along with ongoing environmental issues, have spurred

research and development in alternative fuels technology. These developments have led many to believe that in the longer term the Highway Trust Fund will need to be revised, overhauled or phased out.

With respect to fuel efficiency and the requisite impact on the HTF, a Transportation Research Board (TRB) reported entitled *The Fuel Tax* suggests that:

> *A 10 to 20 percent reduction in average gallons of fuel consumed per mile by the light-duty vehicle fleet is possible by 2025 if fuel economy improvement is driven by new government intervention such as … CAFÉ standards. In the absence of such pressures, fuel economy improvement is likely to be no more than a few percentage points* (Transportation Research Board, 2006).

Consideration of these predictions indicates that fuel price spikes alone may not motivate significant (market-driven) improvements in fuel economies and that public policy actions may be required to spur action in this sector. Whether or not such policy will evolve over the decade remains uncertain, but the expected increase in VMT by 2025 should far outweigh even a 20 percent reduction in fuel consumed per mile.

Highway Finance Strategy #2: State Debt Financing

A growing trend has emerged for utilizing loans as a mechanism to finance highway projects. One perspective is that the future repayment of these loan obligations may present a considerable challenge to states and localities.

All states currently use bonding as a source of revenue and, in recent years, many have increased reliance on borrowing (through bonding) to finance transportation improvements. The advantages of financing transportation infrastructure improvements through bonding are twofold:

- When borrowing costs are low, financing projects may be relatively cost-effective.
- Many large projects are on a scale that prohibits “pay-as-you-go” financing[25].

The Texas Transportation Institute (TTI) has argued for using a measure called the Highway Cost Index (HCI) as a metric for measuring the cost-effectiveness of bond-financed projects. The HCI attempts to measure the increase in highway construction costs, which TTI estimates at a 5 percent annual increase over the past five years. By applying the HCI rather than the more traditional CPI measure, TTI’s analysis favors bond financing of highway projects provided that bond interest rates are equal to or lower than HCI rates. Applying this model, reductions in construction costs would offset any future bond interest payments.

The requisite benefits from the completion of the highway project earlier rather than later (fuel savings, time savings, accident mitigation, etc.) then represent a net economic benefit of financing versus pay-as-you-go funding.

Prior to 1995, states were limited to using federal-aid highway funds to repay only the principal portion of these debts. The National Highway System Designation Act of 1995 expanded the ability of state governments to use federal-aid funds to cover interest, debt issuance, and commercial bond insurance coverage. States, political subdivisions of a state or public authorities are the only entities that can use federal-aid funds to cover future interest, debt issuance and commercial bond insurance costs in the bond finance process; the use of federal-aid in this manner is known as Grant Anticipated Revenue Vehicles (GARVEEs).

Finally, in an effort to provide states with more flexibility in the use of federal-aid highway program dollars, a number of new federal cash flow tools have been developed, including Advance Construction (AC) and Partial Conversion of Advance Construction (PCAC), Tapered Match, Flexible Match, and Toll Credits. These tools do not provide new revenue streams for states, but allow additional flexibility to manage existing federal-aid funds.

Debt Financing Implications

The criticism of bond financing derives from the potentially large interest costs over the long-term, with total costs of financing often reaching 140 percent of the actual project cost. Figure 6 shows a timeline of how states have increased reliance on bonding over the last 10 years, possibly in response to stagnant fuel excise taxes. The Brookings Institution reported that the amount of revenue generated through state borrowing increased 92.3 percent between 1995 and 1999, for a total increase of just less than $4 trillion (Wachs, 2003).

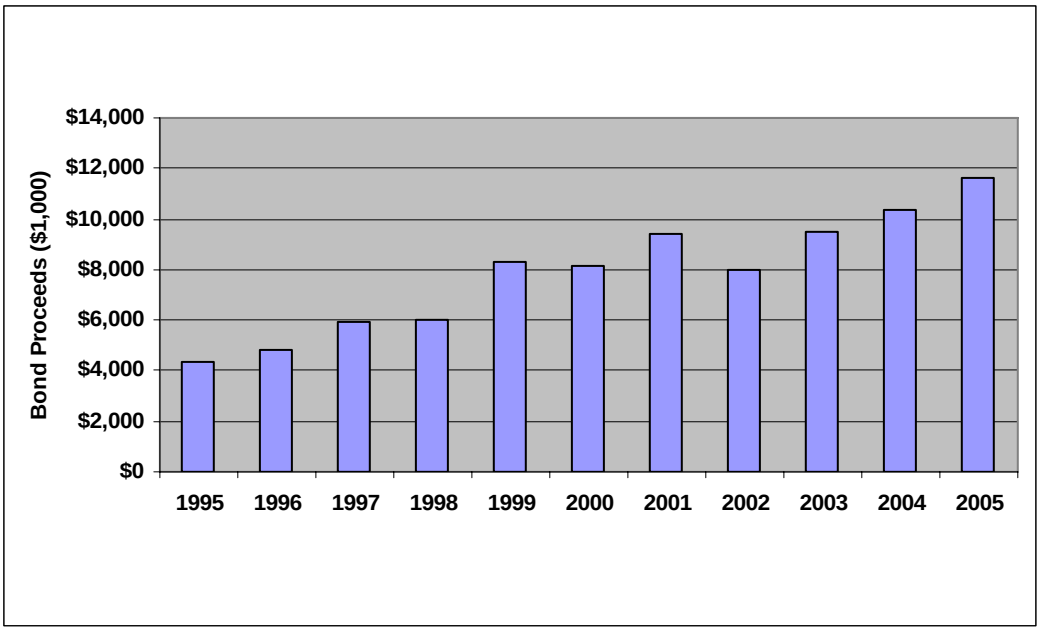

Figure 6: State Issued Bond Proceeds for Highways 1995 – 2005
Source: FHWA, Highway Statistics 2005, Table SF-21, SF-1
Available at: http://www.fhwa.dot.gov/policy/ohpi/hss/index.htm

Highway Finance Strategy #3: Credit Assistance to States

Rather than "granting" money to states, the federal government can loan states money through the Transportation Infrastructure Finance and Innovation Act (TIFIA) program. States and other organizations can use the funds to undertake transportation projects of national or regional significance, and the repayment revenues can be reinvested in other projects in the future[26].

State Infrastructure Banks (SIBs) were established as a pilot project in 1995 in the National Highway System Designation Act (NHS Act). Participating states can direct up to 10 percent of annual federal appropriations to the SIB and are required to match 25 percent of the federal funds[27].

TIFIA financing and SIBs are both considered revolving fund mechanisms. The money received must be repaid and is then reallocated to other transportation projects. TIFIA accomplishes this at a national level and SIBs allow states to establish similar methods at the state level.

Credit Assistance Implications

TIFIA financing and SIBs do not generate additional revenue but rather ensure that the granting source is regularly replenished. The result is that the burden of locating additional revenue sources is shifted to a more localized level. Funding

pools at the state or national level are preserved as the recipients are effectively taking out loans that will be repaid.

Highway Finance Strategy #4: Tolls

The concept of tolled transportation has been a contentious issue in the U.S. for many years[28]. After a period of decline in tolling popularity, a recent trend indicates a willingness within the federal government to allow states to further investigate and implement tolling as a revenue collection method.

In the past, with few exceptions, new tolling was not legislatively permitted on interstate highways. However, the potential for increased use of tolling on interstate highways has gained momentum with the addition of new tolling provisions in the last two reauthorizations. SAFETEA-LU includes allowances for interstate tolling pilot projects and designates some funding for value-added pricing pilot projects. These provisions reflect the underlying urgency to identify additional funding sources to bridge the gap in highway funding[29].

Many states have become more supportive of tolling concepts, citing the need to offset transportation budget shortfalls that have resulted from, among other things, insufficient revenues from the HTF. The U.S. DOT may also benefit from the tolling of interstate highways because it relieves the agency of sourcing additional funds at the national level. Toll critics, however, do not believe that tolling aligns with stated U.S. DOT goals of increased user access, mobility and system efficiency, nor is tolling as efficient a revenue collection method as excise taxes on fuels. Lastly, it can be rationally argued that tolling may balkanize the existing transportation system by creating myriad and disparate toll authorities and schemata.

This report discusses three different tolling approaches and, based on the unique characteristics to each, includes pros and cons that are typically associated with each strategy:

- **Traditional Toll:** Toll revenue collection system used on roadways, bridges and/or tunnels, and typically levied by public toll authority.
    - *Advantages:* Provides direct source of revenue.
    - *Disadvantages:* May discourage use of available capacity due to additional cost; inefficient revenue collection process.

- **Congestion Pricing Toll:** Tolling concept, also described as "variable pricing" or "value-pricing," used to influence levels of traffic demand by time and location. Levied by public toll authority.
    - *Advantages:* Discourages use of infrastructure to relieve congestion by removing those unwilling/unable to pay for that capacity at high demand times (typically by day-parts).
    - *Disadvantages:* May be regressive in that few commuters and commercial operators have individual control over commuting travel times. Furthermore, traffic may be diverted to secondary roads not designed for increased traffic loads.

- **Public Private Partnerships (P3) Involving Tolls:** New tolling concept that develops private sector-oriented management model (see following description).
    - *Advantages:* Private sector thought to be more efficient at resource management.
    - *Disadvantages:* Discourages use of available capacity and limits political accountability.

Traditional Tolling. Traditional tolling assesses static user fees on a single facility (road, bridge, tunnel). This method collects revenue under the same user-pays terms as does the motor fuels excise tax, though it does so for use of a specific facility.

A central criticism of highway tolling within the literature is the inefficient means by which payment is exchanged for use of a service. By requiring a monetary exchange (either physical or electronic) with each highway user (driver) at the point of access and/or departure, significant administrative costs can emerge. Such direct costs include: 1) the construction and maintenance of facilities and other infrastructure used to collect tolls (collection booths, widened roadways, additional roadway signage and lighting, administrative offices; electronic toll collection systems); 2) the staffing required to facilitate a tolling enterprise (toll collectors, administrative officials, maintenance personnel, enforcement personnel); and 3) the non-labor related costs of operations (electricity and other overhead inputs).

Additionally, a wide range of indirect transaction costs exist at toll plazas, including the following (Woo & Hoel, 1991; Peters & Kramer, 2003; Mulshine, 2002):

- Increased travel time due to congestion at toll plazas.
- Decreased fuel economy and increased wear and tear on vehicles due to frequent stopping.

- Increased pollution due to acceleration and deceleration and congestion-related slow-downs.
- Increased accidents at or near tolling areas.
- Revenue theft.

The sum of the *direct costs* of toll collection varies depending on several factors, such as the sophistication and cost-effectiveness of the business system, including the use of electronic toll collection.

Labor and technology inputs both add costs to the tolling process. Employees of many toll authorities, for instance, have been criticized for having relatively high salaries. In New Jersey eleven toll authority employees earned more than $100,000 in annual salary; 17 New Jersey toll booth "supervisors" and one toll collector had annual salaries and overtime that fell within the range of $70,000-$90,000 (Public Affairs Department, New Jersey Highway Authority, 2002). Massachusetts Turnpike Authority toll booth operators have an average annual compensation level of $66,000 (Samuel, 2006; Kriss, 2006).

Theft and fraud among toll authority employees and contractors is also a concern, as documented in recent media:

- Within the Massachusetts Turnpike Authority, a recent audit found that employee theft among toll booth operators likely costs the organization $300 million per year (Samuel, 2006; Kriss, 2006).
- In the State of Illinois, a single toll collector was found to have stolen over $180,000 in coins from a counting room over a five-month period (Samuel, 2005).
- In New York two E-Z Pass employees were convicted of selling rigged transmitters which redirected toll charges to large corporate E-Z Pass accounts (Samuel, 2005).

In comparison to staffed toll booth systems, electronic payment designs do have the potential to reduce certain labor costs, but require large initial expenditures in toll booth redesign and ongoing capital outlays to repair and replace collection equipment. This was the experience of the "E-Z Pass" system in New Jersey[30]. Though the system did increase efficiency – both in decreased labor costs and decreased delay for E-Z Pass users – by 2004 the initial construction costs (including $100 million in interest on bonds not paid off on schedule) and operating expenses (which came in 37 percent over budget) resulted in the New Jersey E-Z Pass system generating a **$469 million deficit**[31].

Additionally, a survey of FHWA's *State Administered Toll Road and Crossing Facilities* (FHWA, 2005b) reveals that many U.S. toll administrations are operating at a loss.

Table 4: Toll System Shortfalls – 2005

Toll System	Total Receipts 2005	Total Disbursements 2005	Shortfall
Central Texas Turnpike System	$75,787,000	$562,757,000	($486,970,000)
New Jersey Turnpike System	$1,589,252,000	$1,742,948,000	($153,696,000)
Florida Turnpike	$1,020,885,000	$1,130,355,000	($109,470,000)
Tampa-Hillsborough County (S. Crosstown) Expressway	$37,002,000	$136,999,000	($99,997,000)
East Boston Tunnels/ Massachusetts Turnpike System	$312,102,000	$377,588,000	($65,486,000)

Sources: FHWA, Federal Highway Statistics Table SF-3B, 2005.
Available at: http://www.fhwa.dot.gov/policy/ohim/hs05/htm/sf3b.htm.
FHWA, Federal Highway Statistics Table SF-4B, 2005.
Available at: http://www.fhwa.dot.gov/policy/ohim/hs05/htm/sf4b.htm.

Many of the indirect costs associated with tolling are difficult to quantify due to disagreement over the financial value of these costs and the difficulty of determining the true negative externalities associated with tolling[32]. Despite theoretical and practical difficulties in calculating indirect costs, extensive research has shown that tolling does precipitate significant pollution, fuel and compliance costs (the value of an individual's time)(Chin, et al, 2004). Using a conservative estimate of emissions releases and pricing, the yearly environmental cost of the Garden State Parkway (GSP) tolling system was estimated at just under $13 million. Pollution costs stand to increase within tolling systems that are less reliant on electronic tolling than the GSP, particularly in areas where emissions credits trade at higher prices (California), or in areas with a comprehensive CO_2 trading scheme (Europe) (Peters & Kramer, 2003).

Since passenger cars operate most efficiently at a relatively high constant speed, the frequent deceleration and acceleration required at toll booths sharply increases the total amount of fuel consumed. On the Garden State Parkway, it was estimated that the frequent stops and starts waste 333,877 gallons of gasoline each year. Using a gas price of $2.25, this calculates to just over $750,000 a year in directly attributable fuel costs. These estimates do not directly include fuel or environmental costs associated with idling while navigating toll congestion, which can be significant (Chin, et al, 2004; Peters & Kramer, 2003).

By calculating only the average time that it takes to complete the transaction at the tolling facility, about 5.4 seconds per transaction, the users of the Garden State Parkway collectively waste 654,484 hours per year. Using a $15 per hour average driver pay rate, this translates to $9.82 million in lost wages yearly. A more comprehensive study of national toll systems included the time it takes to slow down and average waiting times to determine more realistic delay times caused by toll facilities. The study estimates the total time at electronic toll

booths to be 8 seconds, and the total time at manual toll booths to be 36 seconds (including 20 seconds of waiting in line). Applying these delay times to the Garden State Parkway results in **$33.62 million in lost wages** every year (Chin, et al, 2004; Peters & Kramer, 2003).

Congestion Pricing Tolls. Some urban areas with high levels of congestion have developed High Occupancy Toll (HOT) projects, one of several "variable/value-pricing" products, which are free-flow lanes reserved for drivers that pay a variable fee based on changing congestion levels. Toll lane usage is often voluntary and drivers ostensibly only use the toll lanes if the value of their time is greater than the amount of the toll (and the driver can bear the cost)[33]. The variable cost to use HOT lanes, based on the time of day and the amount of traffic on the road, in theory creates supply-demand equilibrium.

The State of Delaware uses toll pricing to encourage commercial trucks to drive during less congested times – driving along I-95 between the hours of 10 p.m. and 6 a.m. reduces the toll from $8 to $2. This attempts to reduce congestion during daytime hours and to provide a less expensive alternative (Copeland, 2005). This price decrease, however, may not have any effect; a Georgia study showed that delivery time, and thus the time at which trucking operations occur are strongly driven by shipper/manufacturer requirements (Short, 2007). Consequently, the attempt to "price" trucks (that have no choice in delivery schedules) out of the commuter traffic mix becomes regressive and inflationary.

Similarly, states such as California and Georgia are considering the construction of Truck-Only Toll (TOT) lanes. TOT lanes would be constructed along existing interstates and reserved for use by toll-paying commercial vehicles. Such construction could be funded in part by non-government toll revenue, but it is likely that congestion-based tolling would not be sufficient to cover the cost of the infrastructure (Samuel, Poole & Holguin-Veras, 2002; SRTA, 2005).

P3-oriented Toll Systems. Highway tolling also has the potential to be a revenue source for the private sector. For example, in 2006 foreign-owned Cintra-Macquarie initiated a long-term lease with the State of Indiana to operate and maintain more than 150 miles of U.S. interstate highway. Through this 75-year lease agreement, a payment of $3.85 billion was made to Indiana for which Cintra-Macquarie will receive toll revenue, as well as have the ability to adjust toll rates.

A public-private partnership typically exists when the private sector is contractually tasked with ongoing operation and maintenance of public infrastructure[34]. The movement of financial risk from the public sector to the private sector, along with the one-time cash distributions, is seen as beneficial to states and their DOTs. Consequently, the U.S. DOT has released P3 "model

legislation" that provides guidance to jurisdictions on privatizing transportation corridors. The model legislation includes such language as:

> *"After selecting a solicited or unsolicited proposal for a public-private initiative, the Department shall enter into a public-private agreement for a transportation facility with the selected private entity or any configuration of private entities."*
>
> *"An affected jurisdiction may be a party to a public-private agreement entered into by the Department and a selected private entity or combination of private entities."*
>
> *"The public-private agreement shall provide for the planning, acquisition, financing, development, design, construction, reconstruction, replacement, improvement, maintenance, management, repair, leasing, or operation of a transportation facility.*
>
> *"The financing mechanism included in a public-private agreement may include the imposition and collection of user fees and the development or use of other revenue sources."*
>
> *"The Department shall take appropriate action to protect confidential or proprietary information that a private entity provides as part of an unsolicited proposal and that is exempt from disclosure under [INSERT CITATION TO STATE FREEDOM OF INFORMATION ACT OR OPEN RECORDS ACT]"* (Source: FHWA, PPP Legislation Working Draft. Available at: http://www.fhwa.dot.gov/ppp/legis_model.htm; accessed on May 8, 2007).

Tolling: Financial and Administrative Implications

Tax revenue "efficiency" can be defined as the percentage of gross revenue that is returned to the physical transportation system. In that regard, motor fuel taxes – in relation to other revenue collection mechanisms – represent an extremely efficient means of revenue collection, partly because they take advantage of large economies of scale and low marginal cost structures.

Since the "infrastructure" of existing excise tax collection mechanism is fully operational and scaleable, future tax increases will produce a relative decline in the cost to revenue ratio – making fuel excise taxes increasingly efficient as revenue increases.

Under the federal HTF model for revenue collection it is estimated that the cost for collection of federal motor fuel excise tax revenue is approximately 0.2 percent of the revenue collected (Peters & Kramer, 2003)[35].

Based upon available public financial data, tolling appears to be a far less efficient means of raising transportation revenue than motor fuel taxes. Unfortunately, the analysis must include a caveat: in examining financial statements for a variety of toll authorities, the ATRI research team found no apparent standard for public financial reporting of toll authority budgets. The result is that each respective toll authority appears to categorize and capture costs differently, particularly relative to collection costs.

Analysis of a sample of publicly available toll authority financial reports found that costs most closely associated with revenue collection ranged from 21.9 percent of revenue to 30.3 percent or more of revenue[36]. These are considered conservative estimates, and a more detailed analysis of available financials, however, will likely show higher revenue collection cost ratios.

Among three large toll authorities with publicly available financial reports (shown in Table 5), the conservative cost of collecting revenue through tolls – when compared to the cost of collecting revenue through the federal motor fuel excise tax – is exponentially higher.

The cost of collecting state fuel taxes is a greater proportion than the reported cost of collecting the federal excise tax on fuels, and ranges from approximately 1 to 2 percent[37]. When comparing a 2 percent revenue collection cost with the three selected Table 5 toll authority cost ratios, the latter are still more than 10 times as expensive.

Table 5: Cost to Revenue Ratio for Select Large Toll Authorities

Fiscal Year	Toll Authority	Toll & Related Revenue	Estimated Toll Operations Costs	Cost to Revenue Ratio
2004	New Jersey Turnpike Authority	$828,919,609	$251,389,101	30.3%
2005	New York State Thruway Authority	$511,200,000	$123,822,151	24.2%
2004	Ohio Turnpike Commission	$211,771,000	$46,449,000	21.9%

Political Implications

Public toll authorities and private tolling companies generate institutional issue concerns in several ways. First, tolling in general, and Public-Private Partnership (P3) tolling schemata in particular, may fragment the national transportation system since toll revenue collection and disbursement systems do not directly accommodate or support national transportation system funding or objectives. Organizations and businesses that toll are focused on a single segment of roadway within the national infrastructure, and often appear to be in competition with other portions of that same infrastructure.

Second, there is a lack of political accountability and public support for tolling and P3 tolling schemata as shown through several examples. In 1995 the eight-member Board of Directors of the Ohio Turnpike Commission increased the toll rate 82 percent over several years. As a result, price-sensitive heavy trucks diverted to alternative routes not designed to accommodate heavy vehicles (Ohio Turnpike Commission, 2004). Eventually, revenue impacts and safety concerns associated with truck traffic diversions to secondary roads compelled the Ohio Turnpike Commission to lower truck toll rates and increase truck speed limits to attract drivers back to the Turnpike (Land Line Magazine, 2006).

Lack of public accountability is another institutional concern. In Massachusetts, the Central Artery Tunnel (aka the "Big Dig") was managed by the Massachusetts Turnpike Authority (MTA). In 2006, a section of the ceiling of the Ted Williams tunnel collapsed, crushing a car and killing the passenger. Upon investigation of the incident, it was determined that several anchor bolts used to secure the piece of concrete had failed an inspection but had been used regardless. Massachusetts Governor Mitt Romney had been unsuccessfully pressuring former MTA chairman Amorello to resign for several years due to project management concerns. The governor, however, did not have the authority to remove Amorello from his position, and the former chairman did not resign until Romney took direct legal action, at which time Amorello was forcibly removed from his position (Boston Globe, 2006; Johnson, 2006).

Beyond the basic administrative inefficiencies demonstrated through tolling, revenue "waste" was also found to be an institutional concern. The Illinois State Toll Highway Authority headquarters building is anecdotally referred to as the "Taj Mahal." The Governor addressed this issue publicly, stating:

> "*The Tollway Building has been described as the Taj Mahal of Illinois. The Taj Mahal is known as one of the eight wonders of the world. The tollway building is a wonder of waste, excess and arrogance. Today I'm giving it a new label: For Sale. The sale of the Tollway building will generate $30 million*" (Blagojevich, 2003).

Examples such as these illustrate the serious consequences of handing control of major infrastructure projects over to those not directly accountable to the general public. The literature documents multiple instances where public interest and public participation processes have been neglected during the decision-making process of tolling enterprises.

The role of the private sector has traditionally been limited to designing, building and maintaining the highways on a contract basis with the appropriate government oversight. There is some conflict of interest when a government contracts with private sector entities to self-police quality assurance and

maintenance requirements, as is the case in the existing P3 toll leases, particularly when "non-compete" clauses minimize the threat or risk associated with government managing alternative (aka competitive) routes and corridors. Nevertheless, growing concerns over highway funding shortfalls and short-term opportunities to generate revenue has created an incentive for both the public and private sectors to consider an expanded role for the private sector.

Further investigations of P3 examples – such as the City of Chicago and State of Indiana leases, where the governments transferred almost all management and operational responsibilities of major toll roads to private entities, provides a more thorough understanding of user impacts. In late 2004 Chicago leased its Skyway to a private entity to operate for a period of 99 years. The agreement generated $1.83 billion for Chicago and was the first privatization of a tolled Interstate roadway to occur in the United States (Skyway Concession Company, LLC, 2005). In 2006, the State of Indiana followed suit by leasing the Indiana Toll Road for a period of 75 years for $3.85 billion. A foreign consortium assumed responsibility for managing and operating the toll road and quickly increased the tolls.

The public strongly opposed the lease of the Indiana Toll Road, and this appears to be reflected in the 2006 Indiana election, specifically with the defeat of Republican Congressman Chris Chocola, a supporter of privatization, who did not denounce the lease deal[38]. A similar instance of political fallout involves the now former Governor of Ohio, Ken Blackwell, who supported privatization of the Ohio Turnpike, but was also defeated in the 2006 mid-term elections. In those same elections, voters shifted control of the state House to the Democratic Party, which largely opposes the privatization of public highways (Dunn, 2006; Poole, 2006).

Safety Implications

The impact of tolling on safety has not been studied extensively. However, there is strong evidence that commercial vehicles often divert to secondary roads to avoid tolls when toll fees are viewed as excessive. Compared to interstates and toll roads, these parallel roads are almost always under-built for heavier trucks in larger numbers.

Between 1995 and 1999, the Ohio Turnpike Commission increased tolls on the Ohio Turnpike by 82 percent. As a result of this rate increase, commercial vehicle traffic diverted to alternate, non-tolled routes. Despite the toll rate hike, the revenues collected by the Ohio Turnpike Commission actually decreased[39]. Cities along the alternate truck routes began complaining as local residents wrestled with higher truck traffic. At the same time, state highway maintenance costs were increasing for these corridors[40]. In 2004, a crash involving a commercial truck and several SUVs resulted in the death of six people. This

crash occurred along one of the alternate routes and highlighted the need to move trucks back to the turnpike[41].

The Ohio State Highway Patrol confirmed that there was large truck diversion from the Ohio Turnpike, and proposed that diversion-generated safety concerns could be mitigated by a combination of uniform speed limits and toll fee reduction. In the State Patrol's analysis, a 17 percent increase in truck traffic on the toll road would be realized through a 27 percent toll reduction for Class 8 trucks and similar reductions for Class 7 and 9 trucks (Ohio State Highway Patrol, 2005). Likewise, toll diversion-related safety issues were recognized as a key future safety research need by the Transportation Research Board in 2005 (TRB, 2006b).

In October 2004, Ohio Governor Bob Taft announced plans to attract commercial traffic back to the Ohio Turnpike. The governor referenced safety hazards that resulted from heavy congestion along alternate routes as the primary reason. The strategies he suggested included temporarily lowering the commercial vehicle tolls along the turnpike, increasing the speed from 55 to 65 and increasing commercial vehicle size and speed enforcement along the alternate routes[42].

These strategies were enacted in January 2005. Truck toll rates were decreased by 25 percent and truck traffic along the turnpike increased as a result. Accounting for annual truck traffic growth, the overall net increase in truck traffic is estimated to be approximately 10 percent after the first quarter[43].

Effective January 1st, 2007, the Ohio Turnpike Commission announced that the toll rates were increasing from the "temporary" rates. The toll for cars increased 13.5 percent, while the toll for fully loaded commercial trucks (80,000 lbs.) increased nearly 8 percent (though it remains 21 percent lower than the1999 rate). For empty trucks, the toll increased more than 12 percent[44].

Implications for Rural America

While road tolling is finding some favor in metropolitan areas, it may be an unfeasible option in rural America. Tolls are designed for discrete segments of high-volume roadway funded directly by the users of a particular road. Most rural areas, while providing essential commodities and connectivity between corridors, lack the necessary population densities and financial base to support tolled facilities.

Many rural areas are undergoing significant population loss, according to a 2001 FHWA report. Moreover, after decades of youth emigration, mortality rates have surpassed birth rates in many counties. Combined with increasing unemployment and stagnating incomes, rural areas face considerable

transportation funding challenges (Johnson, 2006; Kirschner et al, 2006). The result is a tax and population base that is increasingly unable to support the cost of maintaining infrastructure that is vital to the nation as a whole.

Rural America comprises 83 percent of U.S. land, 21 percent of its population, 18 percent of jobs, 14 percent of earnings and 2,300 of 3,000 counties (FHWA, 2001). Out of a total 3.9 million miles of public highway, 3.1 million (81%) run through rural areas (Brown, 1996). This vast, decentralized region contains a multitude of challenges including long distances between population centers and high unit costs for service delivery, maintenance and operations (FHWA, 2001).

Meanwhile, trucking has become an increasingly common mode of goods transport. Deregulation of the freight rail industry resulted in consolidated carriers and reduced service to many rural areas (Brown, 1996). Large-scale agriculture and increased trade resulting from the North American Free Trade Agreement (NAFTA) increased truck traffic on many deficient rural roads. According to an estimate by the American Trucking Associations (ATA), trucks hauled 69 percent of domestic freight by tonnage in 2005, and more than 75 percent of U.S. communities are served exclusively by truck. Therefore, adequate highway infrastructure in rural areas is imperative for the efficient movement of freight (FHWA, 2001).

Roadway impacts in these rural areas require maintenance, but the relatively small population and tax base makes local financing challenging if not impossible. There is a backlog of maintenance and preservation needs, and a high percentage of county roads and bridges are deficient[45]. Outside of the federal-aid system, funding is often scarce for improvements on local roads and bridges since the limited tax base is vulnerable to cost overruns without support from stable state or federal funds (FHWA, 2001). Moreover, private infrastructure investment is risky in rural areas, making P3 options highly unlikely.

While it is not surprising that the 79 percent of the population that lives in urban areas may not be strong supporters of “ex-urban” infrastructure subsidies, they may not be considering that a majority of their raw and finished goods likely transect ex-urban and/or rural areas. The trucking industry was responsible for 84.3 cents on every dollar of all freight transported in the U.S in 2005 (ATA, 2006). With supply chains becoming more complex and more global, urban areas likely benefit more from a national seamless network than do rural area; even those located at points far removed from road capacity improvement projects benefit in today’s global economy.

The effect of this myopia is that net system benefits are often overlooked when developing site-specific plans (FHWA, 2001). The evolution of creative financing may not bode well for rural areas, since: a) based on VMTs, rural areas cannot augment local transportation funds with toll systems; b) P3s would be extremely risk-averse to the low or negative toll ROIs that would be realized in rural areas; and c) if mileage-based fees were enacted, state and federal contributions to rural transportation systems and corridors would essentially disappear (without additional, yet-unidentified funding sources).

Public Participation Process Implications

The U.S. surface transportation system is traditionally a publicly provided good; as such, citizens provide input through various public and political processes which, ultimately, guide investment and policy programs.

When highway management responsibilities are transferred, in whole or in part, from elected officials to autonomous transportation agencies (as is the case of many toll authorities and private sector entities), public approval and/or feedback mechanisms are disrupted or eliminated. The most critical concern when analyzing the adoption of toll mechanisms and public-private partnerships is accountability. Politicians are held accountable for the decisions made while in office; toll entities, however, may not face such accountability.

In states such as Texas, toll authorities are not required to seek public input on toll projects or changes in the toll fees (Citizens' Transportation Coalition, 2005). The authority may choose to seek public opinion to make the project as successful and profitable as possible, but this is strictly voluntary.

It is recommended that a moratorium be placed on new toll authorities and Public-Private Partnerships (P3) until evidence is presented guaranteeing that such arrangements do not disrupt or remove elements central to public participation and representation processes.

Highway Finance Strategy #5: Mileage-Based User Fees

There are additional alternative/creative finance strategies, including technology-based programs for tracking and costing vehicle mileage, with the potential to levy fees according to trip length, duration, time of day, and location[46].

A test of a high-tech approach to mileage-based user fees is currently underway in the State of Oregon[47]. The state of Minnesota is also considering such as system. But many questions arise in such scenarios, including:

- Would all drivers who want to use designated roads be required to have on-board GPS equipment;
- What are the actual costs associated with deploying and retrofitting such devices to all vehicles;
- How is mileage that accrues to private facilities documented and credited back;
- Will double-taxation occur (fuel tax paid along with mileage tax);
- How prevalent will fraud be;
- Will the systems be nationally standardized;
- What are the implications for the efficiency of revenue collection; and
- What are the implications for individual privacy?

As with most new concepts, many questions arise when contemplating how a new and innovative collection system would be instituted. Obviously transparent and reasonable answers should precede any large-scale deployment.[48].

Financial Implications

The cost of adding a GPS device to every vehicle in the nation is uncertain, but undoubtedly high. Likewise, there may be large costs associated with enforcement of GPS device use due to the likelihood that a market for device removal and/or device disruption would likely emerge.

Other Impacts

It is possible that multiple privacy issues might emerge through such a vehicle-tracking schemata, including government entities tracking vehicles, vendors selling tracking data and potential security breaches (e.g. hazmat transportation route information).

Equity issues may also emerge if such a system has different prices for travel in different areas. A conceptual scenario would allow “exclusive” communities to price specific socio-economic classes out of the market by placing relatively expensive per-mile charges within

neighborhood boundaries. Since toll authorities have few requirements for public participation and voter approval, toll increases are relatively free of political ramifications. Lastly, rural areas, as already indicated, would be hard-pressed to generate adequate fee revenues without some type of external support or subsidy.

5 Key Recommendations

An overall analysis of the transportation funding environment clearly shows that the current funding model is not adequate to meet increasing infrastructure needs. While it represents the most cost-efficient means for collecting revenue, the motor fuel excise tax is undermined by the implications previously discussed. Instead, a holistic program of strategies is needed to strengthen and preserve the federal Highway Trust Fund while minimizing or mitigating the various negative impacts previously described. Recommendations for doing so are detailed below.

Recommendation #1: Increase the Federal Motor Fuel Tax

Diesel fuel and gasoline are the critical fuel sources for the U.S. surface transportation system. All indications suggest that this will not change for years to come, based on the following:

- The current national commercial truck fleet, which exceeds 20 million vehicles, uses diesel and gasoline engines;
    - Short- to mid-term replacement of the fleet would be an enormous and expensive undertaking, assuming alternative fuel vehicles were even available.
- Traditional motor fuels are inexpensive and readily available.
    - Resources, reserves and the fuel distribution infrastructure are substantial, helping to keep costs low.
- Economically viable alternatives do not currently exist.
    - Most alternative fuel options presently require more energy to manufacture than is provided to the end-user.

The problems faced by the HTF are not attributable to increased use of alternative fuels or reduced fossil fuel consumption and the resulting tax revenue reductions. Rather, the core problem is that the federal excise tax on motor fuels has not increased since 1993, while transportation costs have often increased at rates higher than the CPI. Exacerbating the problem is inadequate national interest in increasing fuel taxes, in part due to the shock effect of large, short-run increases in the price of gasoline and diesel[49] (see Figure 7).

Figure 7: Average Cost of Gasoline
Source: Energy Information Administration, Table 10-All Grades Conventional.
Available at http://tonto.eia.doe.gov/oog/ftparea/wogirs/xls/pswrgvwall.xls.

In reaction to large increases in the cost of fuel, leaders in the oil industry propose that the primary cause of skyrocketing fuel costs is that supply cannot meet demand. An example of this is found in the testimony to Congress of former Exxon Mobil CEO Lee Raymond after Hurricanes Katrina and Rita[50]. Raymond stated that "markets work": if supply cannot meet a certain demand, then the price adjusts in a free market system[51]. The end result was that the average price of gasoline for U.S. consumers rose from a low of $1.78 in January 2005 to $3.07 in September of that same year – a $1.29 increase in just nine months time (Energy Information Administration, 2007). This constitutes a gasoline price increase of more than 72 percent. It should be noted that there was neither a 72 percent increase in prior demand, a 72 percent decrease in pre-hurricane supplies, nor the promulgated 72 percent decrease (nor any appreciable decrease) in demand after the price increase.

A follow up question to this might be: *Applying the free market logic promoted by oil companies, how would transportation system users be affected by a one-time increase in the excise tax on motor fuels if 20 cents were added to the cost of fuel?* In response, a recent study conducted by the University of California at Davis suggests that record high gasoline prices have not resulted in extreme changes to America's demand for fuel. The study examined two periods of rising prices: 1975 to 1980 and 2001 to 2006. In each period the researchers examined the elasticity of demand and found that demand was more sensitive to price changes in the late 1970s than it was during 2001 to 2006. During 2001 to

2006, demand for gasoline (measured by the volume sold) increased over the time period even as the price of gasoline increased. There were short periods when demand fell, but generally the demand for gasoline increased 1.5 to 2 percent each year (Baker, 2006). During this same period, average gas prices fluctuated between a low of $1.08 in December of 2001 and a high of $3.08 in September of 2005 (Energy Information Administration, 2007).

In the short-run, usually defined as less than one year, price increases in gasoline have little effect on consumer behavior due in part to consumer inability to adjust in the short-run. To reduce the impact of large price increases in the short-run, consumers may drive less or consolidate trips in order to decrease fuel consumption, though more dramatic consumption reductions would necessitate major lifestyle adjustments or infrastructure changes and would take longer amounts of time to achieve. In the face of persistent high fuel prices consumers may begin purchasing more fuel-efficient vehicles, seek employment closer to home, carpool and/or use public transportation. In the long-run the market can also adjust to increases in prices. Car manufacturers can produce more fuel-efficient vehicles and oil companies can increase fuel production at the refineries while increasing exploration for new resources.

While the research confirms that small tax changes will not motivate dramatic decreases in consumer demand for fuels, economic principles indicate that larger tax increases may be partially offset by lower producer pricing to ensure that demand does not unreasonably decrease. In the long-run consumer demand will decrease if a price increase is significant or excessive. Therefore the overall price of gasoline to consumers may rise by less than the incremental increase in the tax (Mankiw, 2006). The degree to which this would happen is unknown.

Therefore, an additional fuel tax burden may not ultimately be paid only by consumers. The share of the additional tax that will be paid by producers depends on short-run and long-run market forces, as well as the size of the tax increase.

A second question might follow: *Considering how suppliers and consumers might react to a hypothetical 20 cent per gallon tax increase for all motor fuels, what would such an increase mean to the Highway Trust Fund?*

Assuming that demand remains at the same level as it was in 2004, a conceptual 20 cent per-gallon tax increase on both gasoline and diesel fuel would create additional HTF revenues of **$35.1 billion** in one year[52]. These user funds would

be collected in an efficient and equitable manner at little to no additional cost since the existing fuel tax administration "infrastructure" would be utilized.

The research supports the contention that a federal motor fuel tax increase of 20 cents could provide a considerable revenue increase without great consequence in either public opinion or consumption demand. Therefore it is recommended that a national effort to increase the motor fuel tax be explored and instituted.

Recommendation #2: Eliminate Fuel Tax Exemptions

The basic rationale behind fuel tax exemptions is that government should not have to pay itself taxes. The HTF and state level transportation funds, however, were designed so that user impacts are appropriately calculated, managed and compensated through an equitable fuel excise tax system. Excise tax programs, by design, recognize user costs associated with service provision and/or user costs centers, and direct user revenue to critical government programs. Tax exemptions on motor fuels, therefore, allow other tax accounts (e.g. the general fund) to essentially take money from the HTF.

This is the basis for the HTF which is set up to collect money in a user-pays approach. However, tax-exempt vehicles use and impact highways and roadways in the same manner as tax-paying vehicles yet do not compensate the specific trust funds created to manage vehicle impacts. The additional **$907 million or more** in annual fees that are lost due to federal and state exemptions could be used to maintain and improve the roadways used by vehicles that are tax exempt.

It is recommended that the use of motor fuel tax exemptions be discontinued so as to appropriately allocate resources to the federal HTF and state transportation funds.

Recommendation #3: Decrease Diversions

Diversions, especially at the state level, should be scrutinized and minimized. Under the current user-pays system, transportation tax funds are meant to be collected from system users and distributed back to the system. Allocations to special projects or non-transportation-related efforts undermine the user-pays principle and weaken the argument that transportation is subsidized by non-users.

Recommendation #4: Safety impact audits should be required for new toll systems and privatization proposals on publicly owned roadways.

Safety is still a paramount concern for transportation users and a primary objective for transportation managers, but is patently missing from the research,

analyses and public discourse on different transportation funding strategies. Public and private entities should be required to analyze potential safety implications that may arise including increases in crash risk/exposure; traffic diversion impacts; and any decreases in safety program funding levels.

To effectively analyze safety impacts, government jurisdictions should expand the research and literature relating to development of new traffic diversion formulas, data sets and models.

Recommendation #5: Tolling is a relatively inefficient revenue-generating tool, and should be considered only as a last resort for system maintenance or expansion.

While toll systems may generate gross revenue, they are relatively inefficient mechanisms for addressing road maintenance or infrastructure capacity needs. Furthermore, as a congestion-reduction tool, toll systems have not been proven to be effective at a system level. The concept behind tolls as a congestion-reduction tool is relatively myopic: at certain toll levels, people will leave that road segment for a free or lower cost alternative. However, without broad changes in zoning, business models and recreational patterns, congestion-reduction initiatives will become inflationary and regressive for the vast majority of people and businesses that do not have control over travel routes or work hours.

Recommendation #6: Privatization is an untested social experiment in revenue generation. Consequently, the federal government should increase, not decrease, oversight of the concept.

The existing P3 “model legislation” has generally been deemed as lacking true guidance in areas of corridor connectivity, technology standards, system maintenance requirements, public participation processes and reasonable revenue generation expectations.

Based on existing models, there is no compelling reason to believe that managers of privatized road systems will maintain the corridors being leased or purchased for several reasons:

1. The Chicago Skyway lease does not require system performance measures;
2. The Indiana Toll Road lease provides minimal performance measures;
3. Both leases include broad, ill-defined “non-compete” clauses that tie the hands of government to improve nearby roads. With that in place, what would motivate a private entity, focused on ROIs and increasing shareholder equity, to expend resources to improve the system?

4. Nowhere are there federal requirements or expectations in privatization for increasing capacity or decreasing system congestion, a core objective of the U.S. DOT's Strategic Plan 2006 – 2011.

Recommendation #7: Focus on Taxation of New and Emerging Energy Sources

Over the next 50 years, it is a near certainty that surface transportation vehicles will run on some type of energy source, which presumably is measurable and therefore taxable. The fuels or energy should be viewed as a commodity that is purchased in some increment and use of the commodity will likely be relatively similar from vehicle to vehicle.

Future Energy Sources for Automobiles

Biofuels
Ethanol and biodiesel lead the field of agriculturally derived fuels designed to power traditional internal combustion engines and reduce reliance on petroleum-based fuels.

Electronic Vehicle Systems (EVS)
As battery technology rapidly improves, these fully electric vehicles are becoming a viable option.

Natural Gas
Already in use in many municipal bus fleets, natural gas provides a less-polluting and often cheaper alternative to traditional motor fuels.

Propane
Like natural gas, propane provides a less polluting and cost-competitive alternative to petro-fuels, with the added benefit of being almost entirely domestically sourced.

Hybrid Vehicle Technology
Already enjoying commercial success, hybrid vehicles marry a traditional internal combustion engine and rechargeable batteries to provide a dual source of automotive power. Second generation "plug-in" hybrids attempt to use battery power exclusively on short trips by expanding battery capacity and introducing charging via the electrical grid.

Advanced Combustion Engines (ACE)
ACE technologies attempt to dramatically improve the efficiency and pollution levels of traditional internal combustion engines through the introduction of advanced technologies and radical design implementations.

Hydrogen
Viewed by many experts as the future of automotive fuel, hydrogen-powered engines are completely pollution-free and hydrogen exists in potentially unlimited domestic supply.

Despite an ongoing national debate over the potential virtues of non-traditional motor fuels, this debate does not preclude the taxation of these alternative fuels

with funds directed to the current highway trust fund. It is therefore recommended that as alternative fuels are developed and deployed, methods of taxation be explored and eventually implemented so as to ensure the future viability of federal and state transportation funds.

6 Financing Transportation – A Total Package

In summary, the ATRI research confirms that there is a substantial, growing transportation funding gap that impacts local, state and national networks. Solutions must be developed that ensure both the short- and long-term viability of the nation's transportation system. Most analyses, including ATRI's, indicate that to maintain the existing transportation system, the next federal transportation bill must provide a minimum of $500 billion over a six-year funding cycle. In excess of that amount, some capacity improvements could also be realized.

However, competing transportation interests have paralyzed the discussion of how to increase, maximize and equitably distribute existing and future revenues. Funding debates have historically revolved around rural versus urban and highway versus transit needs. New issues have entered the fray, covering the semantics of taxes versus fees and the benefits/costs of privatization. The end result is that special interests – such as politicians, consultants, and investment firms – have entered the debate with proposals that primarily generate revenue or constituent favor. None of these entities, as a whole, represent system end-users. Furthermore, few new strategies increase net capacity or reduce system congestion.

Consequently, ATRI has scrutinized a range of funding approaches that claim to address the financial needs identified throughout the literature. The ATRI research team believes that, in applying a series of litmus tests or tenets, a rational, equitable package can be developed. These tenets include:

1) A holistic funding package must provide short- and long-term strategies for ensuring system viability;
2) Recognizing that the transportation finance model must be modified, the funding package should be equitable to all users, and disregard historical "sacred cows." Equitable should be operationally defined as a fair distribution of benefits *and* costs;
3) The package must recognize the diffused societal and economic benefits of transportation, hence its classification as a "public good;"
4) Both system users and government managers of transportation have different financial resources and limitations, so funding approaches must be socially responsible; approaches should recognize and address the synergies that derive from funding strategic connectors, rural networks and commuter transportation options.
5) Applying economic litmus tests to discern the effectiveness of the nation's transportation and distribution systems, the philosophy of developing and maintaining a national network of transportation corridors has been sound since the initiation of the Interstate system in 1956. This is the clear mission of the U.S. government; state and local governments do not

profess to hold the mandate or resources to ensure that a national system is seamless and provides both local and global connectivity;

6) Despite ominous prognostications relating congestion, gridlock and revenue shortfalls to declines in our nation's economic vitality, most relevant indicators – including economic growth and freight tonnage moved – have increased over time at rates that exceed both inflation and public expectations. The implication is that changes in our transportation funding model should be rational versus overly dramatic or momentous; return on investment benefits associated with funding strategies must be tangible and positive.

Accepting this, ATRI proffers the following financial package, which addresses many of the needs identified by various stakeholders (e.g. managers, builders, investment beneficiaries, policy-makers), but which puts primary emphasis on the needs and perspectives of system users. This, of course, includes the commercial carriers that rely heavily on the transportation system.

The following finance strategies ostensibly meet the requirements identified in the six ATRI tenets, as well as those promulgated in many other transportation funding analyses.

- **Increase fuel taxes to offset inflation and address unmet needs through the life of a six-year transportation bill.**

Based on a series of tax increase increments, ATRI proposes a fuel tax increase of 20 cents, resulting in an additional $225.4 billion in revenue over six years.

Table 6: Potential Revenue from Increases in Gasoline Tax

Year	Taxed Gallons Consumed (Billions)	Growth Multiplier	Additional Revenue from 5 Cent Increase (Billions)	Additional Revenue from 10 cent Increase (Billions)	Additional Revenue from 15 cent Increase (Billions)	Additional Revenue from 20 cent Increase (Billions)
2005	137.3	--	--	--	--	--
2006	140.2	2.13%	$7.00	$14.00	$21.00	$28.00
2007	143.2	2.13%	$7.20	$14.30	$21.50	$28.60
2008	146.3	2.13%	$7.30	$14.60	$21.90	$29.30
2009	148.6	1.60%	$7.43	$14.86	$22.30	$29.73
2010	151.0	1.60%	$7.55	$15.10	$22.65	$30.20
2011	153.4	1.60%	$7.67	$15.34	$23.02	$30.69
6-Year TOTAL			**$44.15**	**$88.21**	**$132.36**	**$176.52**

Table 7: Potential Revenue from Increases in Diesel Tax

Year	Taxed Gallons Consumed (Billions)	Growth Multiplier	Additional Revenue from 5 Cent Increase (Billions)	Additional Revenue from 10 cent Increase (Billions)	Additional Revenue from 15 cent Increase (Billions)	Additional Revenue from 20 cent Increase (Billions)
2005	38.0	--	--	--	--	--
2006	38.8	2.13%	$1.94	$3.88	$5.80	$7.76
2007	39.6	2.13%	$1.98	$3.96	$5.90	$7.93
2008	40.5	2.13%	$2.02	$4.05	$6.10	$8.10
2009	41.1	1.60%	$2.06	$4.11	$6.17	$8.23
2010	41.8	1.60%	$2.09	$4.18	$6.27	$8.36
2011	42.5	1.60%	$2.12	$4.25	$6.37	$8.50
6-Year TOTAL			**$12.21**	**$24.43**	**$36.61**	**$48.88**

- **Eliminate Fuel Tax Exemptions**

Based on the previously identified exemption targets, an extremely conservative estimate of revenue enhancements to the federal HTFs is $570 million annually.

While ATRI did not include state-level exemptions in its federal analysis, state HTFs would clearly experience meaningful increases in transportation funding with the elimination of fuel tax exemptions.

- **Eliminate Federal HTF Diversions**

Federal diversions are not large in scope but still represent financially and philosophically improper “leaks” from the weakened federal HTF. ATRI believes that similar changes in state HTFs would financially improve state-level resources. At the federal level, these changes would contribute $70 million annually to the HTF.

When the various recommendations are consolidated, the ATRI-proposed funding package conservatively raises an additional $60 billion to $229 billion for a total highway funding package of $346 billion to over $515 billion over a six-year funding cycle (see Table 8).

Table 8: 6-Year Highway Funding Proposals (millions)

Government Fleet Fuel Tax Exemptions	$2,178	$2,178	$2,178	$2,178
School Bus Fleet Fuel Tax Exemptions	$876	$876	$876	$876
Transit Fleet Fuel Tax Exemptions	$366	$366	$366	$366
LUST Funds	$420	$420	$420	$420
Subtotal	$3,840	$3,840	$3,840	$3,840
Additional Revenue From:	5 cent increase	10 cent increase	15 cent increase	20 cent increase
6-year Gas Tax	$44,155	$88,210	$132,364	$176,519
6-year Diesel Tax	$12,211	$24,433	$36,614	$48,876
Subtotal	$56,366	$112,643	$168,979	$225,395
Existing SAFETEA-LU Bill	$286,000	$286,000	$286,000	$286,000
TOTAL	**$346,206**	**$402,483**	**$458,819**	**$515,235**

Furthermore, it entrenches important policy, program and research guidance in the funding process to ensure longer-term viability, through more efficient revenue collection and spending. Without these changes, incremental increases in fuel taxes and/or limited use of tolling and congestion pricing initiatives will likely create unforeseen consequences for the larger transportation system.

Clearly the U.S. transportation system is essential to the country's economic vitality and quality of life. Transportation funding and policy direction must be made a national priority, whereby all jurisdictions are able to provide essential travel within, and across boundaries. Few argue that the impetus for such a goal lies with the federal government; all indications are that local and state jurisdictions are seeking national guidance and support.

A substantial increase in transportation revenue applied efficiently and in support of national objectives and policies will ensure that our nation's transportation system and economy remain strong.

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Appendix A

Federal Excise Tax Exemption Estimates for State, County and Local Governments

	Gallons of Gasoline Consumed by State, County and Local Governments	Federal Gasoline Tax Rate	Dollars Exempt
Alabama	35,555,000	0.184	$6,542,120
Alaska	7,085,000	0.184	$1,303,640
Arizona	32,399,000	0.184	$5,961,416
Arkansas	24,722,000	0.184	$4,548,848
California	196,394,000	0.184	$36,136,496
Colorado	32,992,000	0.184	$6,070,528
Connecticut	25,908,000	0.184	$4,767,072
Delaware	5,161,000	0.184	$949,624
Dist. of Col.	5,272,000	0.184	$970,048
Florida	102,334,000	0.184	$18,829,456
Georgia	55,194,000	0.184	$10,155,696
Hawaii	9,717,000	0.184	$1,787,928
Idaho	12,882,000	0.184	$2,370,288
Illinois	86,451,000	0.184	$15,906,984
Indiana	47,436,000	0.184	$8,728,224
Iowa	29,194,000	0.184	$5,371,696
Kansas	27,090,000	0.184	$4,984,560
Kentucky	34,032,000	0.184	$6,261,888
Louisiana	34,404,000	0.184	$6,330,336
Maine	9,613,000	0.184	$1,768,792
Maryland	26,884,000	0.184	$4,946,656
Massachusetts	34,237,000	0.184	$6,299,608
Michigan	63,929,000	0.184	$11,762,936
Minnesota	42,484,000	0.184	$7,817,056
Mississippi	20,234,000	0.184	$3,723,056
Missouri	45,304,000	0.184	$8,335,936
Montana	10,191,000	0.184	$1,875,144
Nebraska	17,775,000	0.184	$3,270,600
Nevada	12,701,000	0.184	$2,336,984
New Hampshire	9,141,000	0.184	$1,681,944
New Jersey	48,537,000	0.184	$8,930,808
New Mexico	16,391,000	0.184	$3,015,944
New York	99,339,000	0.184	$18,278,376
North Carolina	84,641,000	0.184	$15,573,944
North Dakota	8,198,000	0.184	$1,508,432
Ohio	79,259,000	0.184	$14,583,656
Oklahoma	31,608,000	0.184	$5,815,872
Oregon	25,315,000	0.184	$4,657,960
Pennsylvania	71,781,000	0.184	$13,207,704
Rhode Island	7,944,000	0.184	$1,461,696
South Carolina	27,125,000	0.184	$4,991,000

South Dakota	9,474,000	0.184	$1,743,216
Tennessee	43,295,000	0.184	$7,966,280
Texas	144,039,000	0.184	$26,503,176
Utah	19,270,000	0.184	$3,545,680
Vermont	5,537,000	0.184	$1,018,808
Virginia	49,610,000	0.184	$9,128,240
Washington	36,375,000	0.184	$6,693,000
West Virginia	16,072,000	0.184	$2,957,248
Wisconsin	43,293,000	0.184	$7,965,912
Wyoming	6,549,000	0.184	$1,205,016
Total	**1,970,367,000**	0.184	**$362,547,528**
Source: FHWA Statistics 2005, Table MF-21			

Appendix B

Exemption and Refund Provisions of State Gasoline Taxation

	Federal	State, County and Local
Alabama	Exempted	County Exempted
Alaska	Exempted	Exempted
Arizona	Taxed	Taxed
Arkansas	Taxed	Taxed
California	Taxed	Taxed
Colorado	Exempted	Exempted
Connecticut	Exempted / Refunded	Exempted / Refunded
Delaware	Exempted	Exempted
Dist. of Columbia	Exempted	Exempted
Florida	Exempted	Refunded (9.8)
Georgia	Exempted	Taxed
Hawaii	Exempted	Taxed
Idaho	Taxed	Taxed
Illinois	Exempted	Taxed
Indiana	Exempted	Taxed
Iowa	Exempted	Refunded
Kansas	Exempted	Taxed
Kentucky	Exempted	Taxed
Louisiana	Exempted	Taxed
Maine	Exempted	Exempted / Refunded[1]
Maryland	Taxed	Taxed
Massachusetts	Exempted	Taxed
Michigan	Exempted	Exempted
Minnesota	Exempted	Taxed
Mississippi	Taxed	Taxed
Missouri	Exempted or Refunded	Taxed
Montana	Taxed	Taxed
Nebraska	Exempted	Taxed
Nevada	Taxed	Taxed
New Hampshire	Exempted	Refunded
New Jersey	Exempted	Refunded
New Mexico	Exempted	Taxed
New York	Exempted	Exempted
North Carolina	Exempted	Exempted/Refunded[2]
North Dakota	Exempted	Taxed
Ohio	Exempted	Taxed
Oklahoma	Taxed	Local Exempted
Oregon	Taxed	Taxed
Pennsylvania	Exempted	Exempted
Rhode Island	Exempted	Taxed
South Carolina	Exempted	Taxed

South Dakota	Exempted	Taxed
Tennessee	Exempted	Exempted
Texas	Exempted	Taxed
Utah	Exempted	Exempted
Vermont	Taxed	Taxed
Virginia	Exempted	Exempted
Washington	Taxed	Taxed
West Virginia	Taxed	Taxed
Wisconsin	Exempted	Taxed
Wyoming	Taxed	Taxed
Source: FHWA Statistics 2001 Table MF-105		

The words "exemption" and "refund" are not used interchangeably. In this table, exemption is applied when the State purposely did not collect the tax; refund is applied when the State collected the tax and later returned it, in whole or in part. For those that are granted partial exemptions, the portions of those refunded or exempt is shown in parentheses.

[1]Use in local transit buses is subject to full refund. Local government vehicles exempt. State vehicles pay tax.

[2]State agency and county and city school use is exempt. County and city use, city transit use and use by the State Highway Department, volunteer or county fire departments and approved sheltered workshop organizations are subject to refund of 23.3 cents of the 24.3 cents tax; volunteer rescue squads, solid waste compactor vehicles, spreader trucks and bulk feed trucks with power take- off are eligible for refund of one-third of 23.3 cents of the 24.3 cents tax.

Appendix C

State Gasoline Tax Exemptions for State, County and Local Use

State	State, County and Local Use Gallons	State Gasoline Tax Rate	State, County and Local Use Exemptions
Alabama	-	0.180	$0
Alaska	7,085,000	0.080	$566,800
Arizona	-	0.180	$0
Arkansas	-	0.217	$0
California	-	0.180	$0
Colorado	32,992,000	0.220	$7,258,240
Connecticut	25,908,000	0.250	$6,477,000
Delaware	5,161,000	0.230	$1,187,030
Dist. of Col.	5,272,000	0.200	$1,054,400
Florida	102,334,000	0.145	$14,838,430
Georgia	-	0.075	$0
Hawaii	-	0.160	$0
Idaho	-	0.250	$0
Illinois	-	0.190	$0
Indiana	-	0.180	$0
Iowa	29,194,000	0.207	$6,043,158
Kansas	-	0.240	$0
Kentucky	-	0.185	$0
Louisiana	-	0.200	$0
Maine	9,613,000	0.260	$2,499,380
Maryland	-	0.235	$0
Massachusetts	-	0.210	$0
Michigan	63,929,000	0.190	$12,146,510
Minnesota	-	0.200	$0
Mississippi	-	0.184	$0
Missouri	-	0.170	$0
Montana	-	0.278	$0
Nebraska	-	0.253	$0
Nevada	-	0.248	$0
New Hampshire	9,141,000	0.195	$1,782,495
New Jersey	48,537,000	0.105	$5,096,385
New Mexico	-	0.189	$0
New York	99,339,000	0.233	$23,096,318
North Carolina	84,641,000	0.271	$22,937,711
North Dakota	-	0.230	$0
Ohio	-	0.280	$0
Oklahoma	31,608,000	0.170	$5,373,360
Oregon	-	0.240	$0
Pennsylvania	71,781,000	0.300	$21,534,300

Rhode Island	-	0.300	$0
South Carolina	-	0.160	$0
South Dakota	-	0.220	$0
Tennessee	43,295,000	0.214	$9,265,130
Texas	-	0.200	$0
Utah	19,270,000	0.245	$4,721,150
Vermont	-	0.200	$0
Virginia	49,610,000	0.175	$8,681,750
Washington	-	0.310	$0
West Virginia	-	0.270	$0
Wisconsin	-	0.299	$0
Wyoming	-	0.140	$0
Total	**738,710,000**	**-**	**$154,559,547**
Source: FHWA Statistics 2005, Table MF-121T and FHWA Statistics 2005, Table MF-21			

Appendix D

State Gasoline Tax Exemptions for Federal Use

	Federal Gallons Used	State Gasoline Tax Rate	Dollars Exempt
Alabama	3,328,000	0.180	$599,040
Alaska	1,986,000	0.080	$158,880
Arizona	-	0.180	$0
Arkansas	-	0.217	$0
California	-	0.180	$0
Colorado	4,716,000	0.220	$1,037,520
Connecticut	2,348,000	0.250	$587,000
Delaware	477,000	0.230	$109,710
Dist. of Col.	3,188,000	0.200	$637,600
Florida	9,053,000	0.145	$1,312,685
Georgia	4,502,000	0.075	$337,650
Hawaii	1,032,000	0.160	$165,120
Idaho	-	0.250	$0
Illinois	6,429,000	0.190	$1,221,510
Indiana	2,664,000	0.180	$479,520
Iowa	1,781,000	0.207	$368,667
Kansas	1,778,000	0.240	$426,720
Kentucky	2,849,000	0.185	$527,065
Louisiana	2,920,000	0.200	$584,000
Maine	748,000	0.260	$194,480
Maryland	-	0.235	$0
Massachusetts	4,365,000	0.210	$916,650
Michigan	5,154,000	0.190	$979,260
Minnesota	3,111,000	0.200	$622,200
Mississippi	-	0.184	$0
Missouri	3,571,000	0.170	$607,070
Montana	-	0.278	$0
Nebraska	1,720,000	0.253	$435,160
Nevada	-	0.248	$0
New Hampshire	762,000	0.195	$148,590
New Jersey	5,528,000	0.105	$580,440
New Mexico	3,906,000	0.189	$737,453
New York	12,091,000	0.233	$2,811,158
North Carolina	3,241,000	0.271	$878,311
North Dakota	1,184,000	0.230	$272,320
Ohio	5,445,000	0.280	$1,524,600
Oklahoma	-	0.170	$0
Oregon	-	0.240	$0
Pennsylvania	8,007,000	0.300	$2,402,100
Rhode Island	595,000	0.300	$178,500
South Carolina	2,892,000	0.160	$462,720
South Dakota	1,537,000	0.220	$338,140
Tennessee	5,785,000	0.214	$1,237,990
Texas	13,202,000	0.200	$2,640,400

Utah	2,383,000	0.245	$583,835
Vermont	-	0.200	$0
Virginia	5,269,000	0.175	$922,075
Washington	-	0.310	$0
West Virginia	-	0.270	$0
Wisconsin	2,589,000	0.299	$774,111
Wyoming	-	0.140	$0
Total	**142,136,000**		**$28,800,249**
Source: FHWA Statistics 2005, Table MF-121T and FHWA Statistics 2005, Table MF-21			

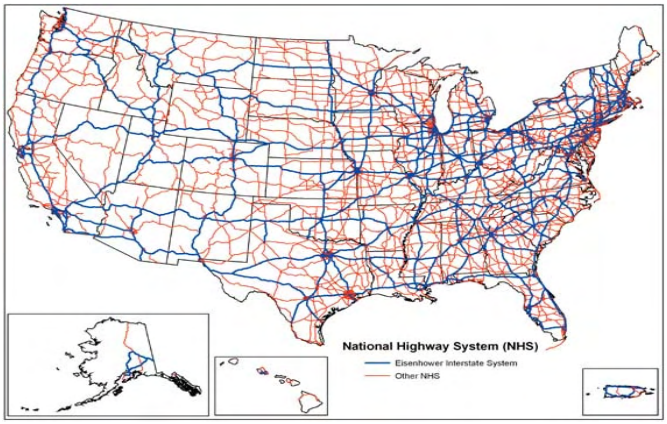
Endnotes

[1] Examples of this research include the following:

1. TRB Special Report 285. *The Fuel Tax, and Alternatives for Transportation Funding*. 2006.
2. Cambridge Systematics. "Future Highway and Public Transportation Finance: Phase I: Current Outlook and Short-Term Solutions." National Chamber Foundation, United States Chamber of Commerce, 2005a.
3. Cambridge Systematics. "Future Highway and Public Transportation Financing: Phase II. National Chamber Foundation, United States Chamber of Commerce, 2005b.
4. Goldman, Todd and Wachs, Martin. "A Quiet Revolution in Transportation Finance: The Rise of Local Option Transportation Taxes." Transportation Quarterly, Vol. 57, No. 1, pp. 19-32, Winter 2003.
5. Yarema, Geoffrey S. "Meeting the TEA-21 Reauthorization Challenge: Will System Performance Continue To Be 'Gone With The Wind'?" Third National Conference on Transportation Finance, Chicago, IL, October 27-30, 2002. Available at http://pubsindex.trb.org/document/view/default.asp?lbid=742447
6. Buechner, William. "Analysis and Comment on *1999 Status of the Nation's Highways, Bridges and Transit: Conditions and Performance*" American Road and Transportation Builders Association, 2000.
7. Wachs, Martin. "Improving Efficiency and Equity in Transportation Finance" Washington: Brooking Institution, 2003.
8. Hecker, JayEtta. "Highway Financing: Factors Affecting Highway Trust Fund Revenues." United States General Accounting Office Testimony before the Committee on Finance, US Senate, 2002.

[2] The U.S. surface transportation system is comprised of more than 3.9 million miles of roadway. This equates to nearly 20 percent of the world's surface transportation infrastructure and is a larger system than that of any single country or the European Union (CIA, 2006). Within this is the National Highway System (NHS) (also known as the National Defense Highway System), a series of interstate highways and other major arterials important to national defense and the national economy (see Figure A).

Figure A



Map Source: Federal Highway Administration Office of Planning, 2006.

It is estimated that 43 percent of overall Vehicle Miles Traveled (VMT) occur on the NHS, with about 7 percent of this travel being attributed to commercial motor vehicles such as large trucks. Though they produce a small minority of these VMTs, commercial vehicles – especially those 600,000 motor carriers that conduct interstate commerce – depend heavily on the efficiency and mobility associated with the national system. Of total VMTs produced by commercial motor vehicles, 40.3 percent occur on the Interstate System alone. Through the commercial use of the NHS, the U.S. economy is able to transport 9.1 billion tons of freight annually by truck, which represents 68.9 percent of total freight tonnage movement.

Sources:
1) U.S. Department of Transportation, Federal Highway Administration, Highway Statistics (Washington, DC: Annual Issues), Table VM-1, and www.fhwa.dot.gov/ohim/ohimstat.htm as of June 23, 2005;
2) FHWA 2004 Highway Statistics: http://www.fhwa.dot.gov/policy/ohim/hs04/htm/vm1.htm
3) American Trucking Associations. *American Trucking Trends 2005 – 2006*, 2006.

[3] When financing a public good such as the surface transportation system, public finance practitioners will likely set policy through a strategy that maximizes social welfare. Development of such a policy strategy may, for instance: 1) assess the fairness of revenue collection and allocations; and 2) assess the economic efficiency of policy alternatives (Greene, Jones, Delucchi, 1997). Those who practice finance of U.S. roadways and highways likely follow similar criteria.

[4]

Average Annual Capital Investment Needs for Highways and Transit	**U.S. Chamber of Commerce[a] (2005 $)**	**FHWA[b] (2005 $)**
Cost to Maintain	$125 billion	$106.5 billion [c]
Cost to Improve	$174 billion [d]	$172.8 billion [c]

[a] U.S. Chamber of Commerce, Future Highway and Public Transportation Finance, Phase I: Current Outlook and Short-term Solutions, 2005.
[b] Federal Highway Administration, Status of the Nation's Highways, Bridges, and Transit: 2006 Conditions and Performance, 2006. Available online at: http://www.fhwa.dot.gov/policy/2006cpr/es07t.htm
[c] These figures were determined by converting the 2004 estimate made by FHWA to 2005 dollars using the Highway and Street Construction Producer Price Index.
U.S. Department of Labor, Bureau of Labor Statistics. Available at http://www.bls.gov/ppi/home.htm.
[d] This amount was determined by increasing the 2000 estimate made by AASHTO by the 12.6 percent increase in highway construction costs as was done in the U.S. Chamber of Commerce study to determine the estimate of the cost of maintaining the current network in 2005 dollars.

[5] AASHTO, "Petri to Try 'A Few More Doors' in Gas Tax Push for Reauthorization," *Reauthorization Update*, 2003. Available at http://transportation1.org/aashtonew/?sid=55.

[6] Prior to the introduction of the Highway Trust Fund (HTF) in 1956 and the current system of "interregional superhighways," long distance travel in the United States was limited to travel over a series of local, interlinking two-lane highways. Several decades of research was conducted to develop a plan for highway infrastructure and funding. The culmination of this research was presented in a 1939 report to Congress named *Toll Roads and Free Roads*, which emphasized a policy direction entitled *Master Plan for Free Highway Development*. This report led the way for the development of a national interstate highway system that would be funded by all users of the surface transportation system instead of one that would be primarily funded by toll collections. (House Document NO 272, 132 PP, 60 FIG, 20 TAB, 3 APP, 1939).

The report, which was officially presented by F.D. Roosevelt found that:

> *Primary importance is attached to the designation and progressive improvement of a system of direct interregional highways designed to facilitate the long and expeditious movements that may be necessary in the national defense, and similarly wide-ranging travel of motorists in their own vehicles – a travel which, in addition to its immediate recreational benefits, is a powerful force for national unity.* (*Toll roads and Free Roads* (1939) Letter of Submittal, p. IX)

Thus it is highlighted by *Toll Roads and Free Roads* that the new interstate system is something that ties the nation together and benefits society rather than individuals.

Through close examination of all costs and benefits related to a proposed interstate system and the utilization of a series of toll roads, the 1939 report finds that:

> *…since a liberal estimate of revenue for the period 1945-1960 is less than 40 percent of a conservative estimate of debt service, maintenance and operating costs for the same period, a toll system on roads selected … is not feasible.*

The report concludes in *Part II: A Master Plan for Free Highway Development,* that three key reasons that toll roads on interstates are not a viable alternative are:

- Americans typically travel in short distances, and therefore would be more inclined to use existing free roads instead of tolled alternatives.
- Potential users of the highway system would not be willing or able to pay tolls, especially when free alternatives exist.
- Tolls collected by the small number of Americans willing to pay a toll would not be sufficient enough to support the highway system; likewise, because so few Americans would be willing to pay and be users of a new "tolled" system, there would be little or no benefit to the existing free roads in the form of congestion mitigation.

The impacts of the decision to build a "free" highway system were far-reaching, and may have contributed greatly to the future economic and social direction of the country.

[7] Though discussion of a national system of highways was ongoing before and after World War II, it was not until the 1950s that such a system was actually designed and built. The construction of the Eisenhower Interstate System was underway by 1956, and additional revenue to support it was sourced through the new Highway Trust Fund (HTF). The HTF became the core program to finance the growing highway infrastructure. As an evenly distributed taxation, mainly through the use of motor fuel, it was likewise considered equitable or "fair" (McDaniel, 2004).

[8] Past federal transportation spending authorizations include the following:

- Federal-aid Highway Act, 1916
- Federal-aid Highway Act & Highway Revenue Act of 1956 (inception of the HTF)
- Surface Transportation and Uniform Relocation Assistance Act / Federal-aid Highway Act: 1987
- ISTEA – 1991-1997: *Intermodal Surface Transportation Equity Act*
- TEA-21 – 1998-2005: *Transportation Equity Act for the 21st Century*

[9] The "user-pays" concept that is fundamental to the HTF has been in place since 1932 (after the initial Federal-aid Highway Act of 1916), when a 1 cent per gallon fuel tax was levied (McDaniel, 2004). It was not until the need for a national highway system was realized in the 1950s and the passing of subsequent legislative acts in 1956 (mainly the Highway Revenue Act), that the full array of federal taxes were introduced.

[10] The federally administered Highway Trust Fund (HTF) program collects tax revenues from motor fuels, heavy vehicle use, truck and trailer sales, and the sale of large tires. The gross revenues and relative share of each highway user tax/fee is presented below for 2004:

Federal Highway Trust Fund Highway Account Receipts Attributable to Highway Users ($Millions)								
2004								
Motor Fuel				Other User Fees				
	Gasoline/ Gasohol	Special Fuels (Diesel)	Subtotal	Federal Use Tax	Trucks & Trailers	Tires	Subtotal	Total
Dollars	$19,262	$7,286	$26,548	$945	$1,847	$446	$3,238	$29,786
% Total	64.60%	24.50%	89.10%	3.20%	6.20%	1.50%	10.90%	100.00%
Source: FHWA Office of Highway Policy Information; Table FE-9								

The next table indicates the total tax rates and the distribution of these taxes, and indicates that not all of the revenue collected from the highway related taxes is deposited into the Highway Account portion of the HTF.

Federal Highway User Fees September 2004 Source: FHWA Office of Highway Policy Information; Table FE-21B						
Fuel Taxes						
User Fee		**Distribution of Tax**				
		Total Tax Rate	**Highway Account**	**Mass Transit Account**	**Leaking Underground Storage Tank Trust Fund**	**General Fund**
Gasoline		18.4	15.44	2.86	0.1	0
Diesel/Kerosene		24.4	21.44	2.86	0.1	0
Special Fuels		18.3	12	2	0	4.3
Liquified Petroleum Gas		13.6	11.47	2.13	0	0
Liquified Natural Gas		11.9	10.04	1.86	0	0
Other Special Fuels		18.4	15.44	2.86	0.1	0
Neat Alcohol (M85)		9.25	7.72	1.43	0.1	0
Gasohol	10% Blend	13.2	10.24	2.86	0.1	0
	7.7% Blend	14.396	11.436	2.86	0.1	0
	5.7% Blend	15.436	12.476	2.86	0.1	0
Other Taxes – All Revenues to Highway Account						
Tires	0-40 lbs	No tax				
	40-70 lbs	15 cents per lb. in excess of 40 lbs.				
	70-90 lbs	$4.50 per tire plus 30 cents per lb. in excess of 70 lbs.				
	Over 90 lbs	$10.50 per tire plus 50 cents per lb. in excess of 90 lbs.				
Truck and Trailer Sales		12% of retailer's sales price for tractors and trucks over 33,000 gross vehicle weight (GVW) and trailers over 26,000 GVW.				
Heavy Vehicle Use		Annual Tax :				
	55,000-75,000 GVW	$100 plus $22 for each 1,000 lbs. (or fraction thereof) over 55,000 lbs.				
	Over 75,000 lbs.	$550				

[11] This report, sponsored by the U.S. Chamber of Commerce, makes several long-term recommendations, most suggesting the need for investigation, development and implementation of new or "innovative" finance options. The analysis specifically states that if the current revenue is sustained, in the short-run, a deficit of $42 billion for system maintenance will accrue, while a total deficit of $91 billion annually is created when necessary improvements to the transportation system are added. The report offers a prediction of a $1.0 trillion shortfall over ten years.

[12] Several other states have similar issues:

In late 2004 Vermont officials estimated that the shortfall in the budget needed to properly maintain roads was about $70 million annually (Ziconni, 2004).

In California, the state's electorate approved a proposition in 2002 that "permanently dedicated revenues from the sales tax on gasoline to transportation infrastructure needs." This proposition also included a provision that allowed the governor, with concurrence from two-thirds of the legislature, to suspend the gasoline sales tax dedication. Between 2002 when the proposition was passed and 2004, transportation infrastructure had not received any of the dedication from the sales tax; the amount of this revenue is estimated to be $1.1 billion per year. In 1999 officials estimated that by the year 2009, California would have an unfunded transportation need of $117 billion; at the end of 2004, this estimate was increased to $160 billion if nothing was changed (California Transportation Commission, 2004).

[13] It is noted that state governments do not report the amount of diesel used for public purposes to the Federal Highway Administration and fuel usage by charitable organizations, and other NGO data could not be obtained.

[14] An exemption rate for this fuel is not available since a state-by-state breakdown is not available and therefore the loss in tax revenue could not accurately be estimated.

[15]

USPS Fuel Consumption And Fuel Tax Diversion	
Diesel Consumed (gallons)	Gasoline Consumed (gallons)
27,929,918	105,727,886
20.47 cent avg. state tax rate	20.30 avg. state tax rate
$5,717,254	$21,462,761
Total Fuel Tax Diversion	**$27,180,015**

[16] Whether or not that truly is the case, this position faces similar policy conflicts to those seen at the federal agency level using the following logic: through the use of MTA funds mass transit intends to reduce use of highways and motor fuels, which reduces funds available to the MTA. Likewise, if it is the case that motor fuels are "phased out," and replaced by alternative fuels or alternative forms of transportation, mass transit itself will require a new revenue source.

[17] California, Maine, Pennsylvania and Wyoming, among others.

[18] Recent history of evasion of federal motor fuels tax: In 1994, the FHWA estimated that the actual cost of state and federal fuel tax evasion was around $3 billion per year (FHWA, *Motor Fuel Tax Evasion Summary*, http://www.fhwa.dot.gov/policy/summ.htm). It was during this year that FHWA began to dye fuel to differentiate between that which was sold tax-exempt and that which was taxable. The Omnibus Budget Reconciliation Act of 1993 strengthened anti-evasion efforts by moving the point of taxation further up the distribution chain to the removal of bulk storage from the supply racks; only fuel that would be used for tax-exempt purposes could be removed from bulk storage without the federal excise tax being paid first (FHWA, Revenue Enhancement through Increased Motor Fuel Tax Enforcement, 1996. Available at: http://www.fhwa.dot.gov/policy/taxpaper.htm). Compliance with fuel tax regulations can then be determined by auditing the color of the fuel during roadside inspections.

The fuel dyeing initiative was a collaboration of the Joint Committee made up of transportation and IRS representatives at both the state and federal levels. SAFETEA-LU currently includes a provision of $2 million annually and the IRS contributes additional funds to be spent on fuel tax evasion projects, and although no money is allocated at the state level, states can use up to 0.25 percent of their STP funding for tax evasion projects (FHWA, Fact Sheets on Highway Provisions. http://www.fhwa.dot.gov/safetealu/factsheets/taxevasion.htm). Every dollar spent on enforcing compliance has resulted in net benefits due to losses that have been recovered (FHWA, Revenue Enhancement through Increased Motor Fuel Tax Enforcement, 1996. Available at: http://www.fhwa.dot.gov/policy/taxpaper.htm).

[19] There have been several efforts in recent years to eliminate the federal motor fuel tax, with the strongest efforts occurring in 2001 under a Republican-led Congress and Executive Branch. As early as mid-2000, congressional leaders were weighing their options by suggesting a temporary repeal of the tax (Mullins, et al, 2000; CongressDaily, 2000), an effort that was in response to a relatively short-term spikes in fuel costs. Such efforts were preceded by unsuccessful attempts at repeal in 1996 (Taylor, 2000).

[20] As listed at: http://www.taxpayer.net/Transportation/safetealu/earmarks.pdf

[21] Examples of this include non-highway related programs which have diverted several million dollars to recreational bike trails, as well as horse trails. Another example is a $2.75 million allocation to renovate the National Packard Museum.

[22] When the Highway Trust Fund was originally established by the Federal-aid Highway Act of 1956, the National Highway System was in its initial stages of construction. At this time, the redistribution of monies from well populated or larger states to smaller and less densely populated states was necessary to build an interconnecting network of quality roads. As the initial construction of the National Highway System neared completion, concern shifted from creating and maintaining the national network to the equity of the redistribution process (Kirk, 2003).

To address the equity concerns among states, lawmakers included a guaranteed return of 85 percent of the estimated national fuel tax paid by each state in the Surface Transportation

Assistance Act of 1982. The Intermodal Surface Transportation Equity Act of 1991 (ISTEA) increased the guaranteed return to 90 percent and enacted a number of other changes intended to help close the gap between returns for donor and donee states. Although the politicians from the donee states were relatively satisfied with the provisions under ISTEA, the discontent voiced from the donor states resulted in further revisions when the Transportation Equity Act for the 21st Century (TEA-21) was passed. TEA-21 raised the guaranteed return rate to 90.5 percent and also added a guaranteed minimum amount of $1 million in federal funding to each state and the District of Columbia (Kirk, 2003). The Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) further increased the guaranteed return for states; by the 2008-2009 fiscal year, the guaranteed return will reach 92.0 percent (Fischer, 2005).

[23] For example, states that received lowest return on their contribution paid in 2002 were New Jersey -- which has the largest percentage of land considered urban, and the rapidly growing states of Florida, Georgia and Texas.

[24] The policies of many sectors of government are at conflict when considering the current model used to finance transportation. There are several federal agencies, for instance, with different missions that include decreasing the consumption of motor fuels used by the public. Objectives may include diversification of national energy sources to reduce reliance on foreign sources or reductions in energy use to mitigate pollution.

Government entities that are allocated resources from the federal HTF benefit from increased use of motor fuels, especially under the current system where tax rate increases are non-existent. However, there are HTF funded programs within the U.S. DOT designed to promote congestion reduction, air quality improvements, VMT diversions to more “efficient” modes, etc. – all of which have noble aims in their own right, but nevertheless reduce HTF funding levels.

While these objectives are not central to the DOT’s critical mission, decreasing the consumption of traditional motor fuels *is* a critical goal of the Environmental Protection Agency (EPA) and many Department of Energy (DOE) programs. The DOE, for instance, has as one of its major strategic goals to “protect our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally sound energy.” Likewise, the EPA’s SmartWay Transport Partnership highlights techniques and funding opportunities to reduce truck idling which will lead to decreased consumption of diesel fuel. The Departments of Commerce, Homeland Security and Agriculture also have missions that, if accomplished, would decrease consumption of gasoline and diesel fuel, even though each gallon of taxable motor fuel saved is lost revenue for the transportation system.

[25] In these circumstances, it is often necessary to borrow for the cost of the entire project up front, allowing the project to be constructed in a shorter time frame, and also allowing the state to pay the principal back over time as the traditional user-based revenues (motor fuel tax revenue, vehicle fees, or tolls) are collected.

[26] TIFIA assistance is either in the form of direct loans, loan guarantees, or standby lines of credit. TIFIA funds are intended to be used for large surface transportation projects that cost more than $100 million (or half of a state’s annual federal-aid highway apportionments) or more than $30 million for Intelligent Transportation System (ITS) projects. In addition, projects funded by TIFIA

are intended to be supported at least in part by user fees or other non-federal sources. The contribution of TIFIA funds for a project is limited to one-third of the total project cost.

[27] There are a number of steps a state must go through to establish an SIB. First, the state needs to sign a cooperative agreement between the FHWA/FTA Administrator and any other entity involved with the SIB to establish how the funds will be managed. Second, the state has to establish an advance capitalization (ACAP) amount that allows the state "to designate a certain level of potential SIB funding for each fiscal year." Third, eligible funds are transferred into the SIB. The state submits a written request to transfer up to 10 percent of its eligible federal-aid highway apportionment into the SIB. Fourth, the state obligates the funds to be used for transportation projects. Finally, the state requests disbursement of federal funds into the SIB. The state must deposit its 25 percent match the day of or before the federal funds are deposited.

[28] The first privately owned turnpike in the United States was opened in 1792 between Philadelphia and Lancaster, Pennsylvania. Despite a vigorous public debate centered on the fairness of paying for access to travel facilities, and the potential for monopolistic exploitation of turnpikes through exorbitant tolls, throughout the nineteenth century thousands of new, tolled turnpikes were built between the rapidly growing eastern industrial centers as well as in the newly settled regions of the west. By 1920, private turnpikes had been almost entirely eliminated by the consistent public protest and "shunpiking" tactics employed by an anti-turnpike movement aligned with the Progressive Party, which emphasized collectivist political ideologies and expanding the scope of public services provided by government to include road construction and upkeep (Munroe, et al, 2006; Klein & Majewski, 2004).

Between the late 1930s and early 1950s, with the automotive revolution in full swing, the first government-owned toll highways opened in Connecticut, Pennsylvania, Indiana, Massachusetts, Ohio, New Jersey, and New York. Including the three major Illinois toll routes opened in 1958, these state-run systems represent nearly the entirety of tolled intrastate highways. The New York State Thruway would become the design model for the U.S. Interstate Highway System and eventually all of these state-run limited-access highways were incorporated into the Interstate network to varying degrees. Since the development of these systems, the majority of new tolled roadways have been short spans connecting intra-urban areas within large cities. The combination of intense and worsening highway congestion in many U.S. cities and large shortfalls in highway budgets has encouraged many states to examine using traditional tolling schemata and innovative road pricing solutions to both reduce congestion on existing roadways and generate additional funding for roadway improvement projects (McNichol, 2003; Arnott, 2005).

[29] The federal government (through SAFETEA-LU) is also encouraging state governments to consider tolling operations by increasing flexibility on the use of tolling, not only to manage congestion, but also to finance infrastructure improvements. The following list identifies and briefly describes these federal programs designed to establish new tolling operations on a pilot or demonstration basis:

- **Interstate System Construction Toll Pilot Program**
  Under this provision, a state or group of states can seek permission to toll bridges, tunnels, and interstate highways in order to finance interstate highway improvements. This program, however, can only be applied to three total projects.

- **Interstate System Reconstruction and Rehabilitation Toll Pilot Program**
  This program is a reconstruction/rehabilitation effort that will allow a total of three projects to collect tolls for such purposes. The program is intended to aid interstate highways that could not otherwise be maintain or improved without the imposition of tolls. This program is carried over by SAFETEA-LU from the TEA-21 reauthorization.

- **Value Pricing Pilot Program**
  This program is aimed at increasing the use of road pricing for the purposes of managing congestion, increasing air quality, decreasing energy use and benefiting overall transportation system efficiency. This program is limited to a total of 15 variable pricing pilot programs.

- **Express Lanes Demonstration Program**
  This program intends to allow tolling of highways in order to mitigate congestion, reduce emissions (specifically in non-attainment regions) and/or to finance additional infrastructure for congestion mitigation purposes. The program allows for up to 15 demonstration projects.

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[30] With the new E-Z pass infrastructure in place, an E-Z Pass-enabled toll booth was able to accommodate about 1,200 vehicles per transaction point per hour, compared to 400 with a worker taking cash and 800 with an automated change/token booth. Initial construction costs for E-Z Pass collection infrastructure totaled approximately $500 million, scheduled to be paid off entirely by the fines collected from toll violators. There have been far fewer toll violations than originally anticipated, and only half of the anticipated revenue from fines has been charged to date. When this unexpectedly low rate of toll violation is combined with the poor fine collection rate and the administrative costs associated with responding to tens of thousands of complaints about false-positive violations from toll system users, it resulted in the toll authority actually spending $33 million to collect just under $16 million in fines since the E-Z pass system was implemented in 1999. Of the 400,000 violation notices issued monthly between March and June of 2002, sixty-eight percent were found to be false-positives – most the result of weak batteries in the transponders that had been issued to motorists using the system (Malinconico, 2002). The batteries are designed to last on average seven years, and the state had no system to warn users when they were approaching this threshold, or any means by which users could test their transponders. The cost of replacing transponders (which cost between $23 and $28 a piece) is expected to total nearly $60 million yearly.

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[31] With the addition of a violation collection system, which brought in $17 million less than it cost, and the impending replacement of over $60 million worth of transponders, the E-Z Pass tolling project that was originally designed to provide a $34 million profit to the New Jersey tolling authority had instead created $500 million in debt, with no clear direction for injecting new funds into the system outside of raising tolls. New Jersey's immediate solution to the problem included the construction of a new "high speed" E-Z Pass system, at a cost of $100 million, not including $50 million to demolish the old E-Z Pass booths, which have been in operation for less than a decade. The total labor cost savings attributable to the E-Z pass usage, for reference, is approximately $7 million per year.

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[32] Stopping to pay a toll increases the total driving time on a stretch of roadway, more so during rush hour than at other times. However, fewer total vehicles use the toll route than would if the route was free to use, since many people refuse to pay tolls and switch to alternate routes, thereby reducing overall congestion. It is unclear how the congestion costs should be computed in this case – particularly whether congestion and associated increases in travel times, accidents,

and wear and tear on vehicles for free secondary routes should be included in the sum congestion costs of the toll route, or whether the balance of congestion-related costs should be computed across the toll route and the free routes.

[33] One California study examined the users of HOT lanes on SR-91 in the Los Angeles/Riverside area. It found that, in fact, 18 percent of users had tolls paid for by third-parties. Additionally, users regularly overestimated the time-savings provided by the use of the HOT lanes by five minutes to a half-hour. The study also found that while HOT usage was most dependent on current congestion conditions and traveler needs, there was also a strong correlation between certain demographic traits and HOT lane usage. Those with higher incomes, females, individuals with higher educational attainment and middle-aged individuals were all more likely to use HOT lanes (Sullivan, 2003).

[34] There are many examples of transportation infrastructure projects that involve various types of public-private partnerships in the U.S. Virginia, Texas, and Florida use asset management contracts to finance the long-term operation and maintenance of highway infrastructure. The private partner receives a fee from the public sector for managing and financing various aspects of highway maintenance needs. California SR-91, SR-125, and the Central Texas Turnpike Project among others were all financed using variations of the build-operate-transfer (BOT) model. The private sector is responsible for the design, construction and operation of the roads. The role of the private sector in financing the projects varies. Private partners that are involved in the financing aspect of BOT projects can collect revenues from the public sector, by charging user fees, or a combination of the two (FHWA, 2004b).

A Comprehensive Development Agreement (CDA) is a type of public-private partnership that allows a consortium of investors to work on multiple phases of the project simultaneously instead of sequentially. Traditionally, highway infrastructure funding projects are divided into multiple phases that are usually completed by different parties including funding, design, and construction. CDAs allow a single consortium to complete all of these elements.

The best example of a CDA in the U.S. is the Trans-Texas Corridor (TTC). Under the terms of the TTC CDA, the consortium will invest $6 billion into the design, construction, and initial operation (up to 50 years) of a 316-mile, four lane toll road. In addition, the consortium will pay the state of Texas $1.2 billion for the long-term construction and operation rights for the initial section of the TTC.

The reason a CDA is advantageous for large-scale projects is two-fold. First, it utilizes private investments allowing government funding to be spent elsewhere. Second, it allows the project to be completed more quickly because various phases can be completed simultaneously.

CDAs are not without opposition, however. In response to the TTC CDA, an advocacy group called CorridorWatch has emerged to protest the development project. Although the group is opposed to many aspects of the TTC, one concern relates to the actual CDA creating government subsidy-like support for the private toll operator. This might occur when non-compete clauses in P3 contracts limit the government's ability to maintain the surrounding networks and essentially force traffic onto the private facility, negating the need for private sector investment and maintenance. Ultimately neither party can, nor desires to, reinvest revenue in the transportation system.

A less conventional approach is for the public sector to finance and construct a highway infrastructure project and then turn control of that project over to the private sector to operate. Chicago recently did this when it leased its Skyway, a 7.8 mile toll facility, to a private company for $1.83 billion for 99 years. After the success of the Chicago Skyway lease, Indiana began considering the privatization of its 157-mile toll road. The Indiana Toll Road is a major trucking route linking the Midwest and the east coast; 60 percent of its tolls currently come from trucks (Samuel, 2005).

[35] Peters and Kramer state: *"The IRS, in response to a question from the US Senate (US Senate 1997), reported that the cost of collecting federal fuel taxes was $51 million in 1996 or .2% of revenue collected (IRS 1996)."*

Sources cited by Peters and Kramer:

1) US Senate. Committee on Environment and Public Works. "ISTEA, Role of Federal, State, and Local Governments in Surface Transportation: Hearing Before the Subcommittee on Transportation and Infrastructure." (HRG: 104-745). Government Printing Office, Washington, DC, 1997.

2) Internal Revenue Service. "Report to the Assistant Commissioner from the Excise Tax Task Force – Doc#9065." Washington, DC: IRS, December 1996.

[36] **New Jersey Turnpike Authority**

The New Jersey Turnpike Authority reported approximately $828.9 million in total revenue for the fiscal year ending December 31, 2004. This revenue included the following:

- Toll Revenue, $715.5 million;
- Income from Investments, $5.5 million;
- Concessions revenue, $30.8 million;
- Miscellaneous revenue, $41.2 million;
- Arts Center, $3.32 million;
- ETC Project Fees, $32.3 million.

During the same period, the costs of toll revenue collection totaled:

Executive Office	$3,297,041.00
Electronic Toll Collection Department	$2,917,510.00
Finance and Budgets	$6,284,543.00
Operations	$5,661,108.00
Toll Collection	$78,365,385.00
Internal Audit	$1,083,058.00
Employee Benefits	$64,638,984.00
Electronic Toll Collection	$89,141,472.00
Total	**$251,389,101.00**

Not included in these cost of revenue collection figures are the following:

- Law, $1.5 million;
- Human Resources, $3.1 million;
- Technology and administrative services, $14.2 million,

- Purchasing, $0.68 million;
- Patron Services, $0.89 million;
- State Police, $45.4 million;
- Maintenance, $80.7 million;
- Engineering, $3.2 million;
- Strategic Planning, $0.27 million;
- Non-Departmental, $18.6 million;
- Snow, $6.5 Million;

Source: New Jersey Turnpike Authority 2004 Annual Report, p. 19.
http://www.state.nj.us/turnpike/2004-NJTA-Annual-Report.pdf

New York State Thruway Authority

For the fiscal year ending December 31, 2005, toll revenue for the New York State Thruway Authority was $511,200,000 (pg. 27). The following conservatively estimates the cost of collecting revenue during that same time period:

Maintenance	
Toll Equipment	$ 4,968,218
Operating	
Toll Collection	$ 78,314,954
Administrative and General	$ 28,708,443
Finance and Accounts	$ 11,830,536
Total:	**$123,822,151**

Costs not included in our total are categorized under Maintenance:
- Highway, $34.1 million;
- Highway and Equipment, $26.3 million;
- Snow and Ice Control, $14.9 million;
- Headquarters and Division Staff, $15.9 million;
- Buildings, $14.6 million; Bridges and Structures, $17.5 million

Operations:
- Policing, $45.2 million;
- Traffic Administration, $12.6 million

Source: 2005 Annual Report. New York State Thruway Authority/Canal Corporation, Page 17.
http://www.nysthruway.gov/about/ar2005.pdf

Ohio Turnpike Commission

For the fiscal year ending December 31, 2004, the Ohio Turnpike Commission reported approximately $211.7 million in total operating revenue:
- Tolls, $189.7 million;
- Special Toll Permits, $2.75 million;
- Concessions, $13.7 million;
- Other, $1.1 million

Non-operating revenues:
- State Fuel Tax Allocation, $2.69 million;
- Investment Earnings, $1.6 million

During this same period, the Commission also reported $46.4 million in costs likely related to the collection of toll revenues:

Services and Toll Operations	**$46,449,000**

Not included in this calculation were Operating Expenses:
- Administration and Insurance, $7.9 million;
- Maintenance of Roadway and Structures, $30.9 million;
- Traffic Control, Safety, Patrol & Communications, $12.9 Million;
- Major Repairs and Replacements ($0.27) million;
- Depreciation Expense, $50.4 million

Non-Operating Expenses:
- Interest Expense, ($37.8) million;
- Loss on Disposals, ($1.6) million

Source: Ohio Turnpike Commission, Comprehensive Annual Financial Report for the Year Ended December 31, 2004, p. 30.
http://www.ohioturnpike.org/pdf/2004_report_full.pdf

[37] FHWA reports that the administrative cost for most states is approximately 1% of the state gasoline tax and many pay approximately 2% in compliance fees to distributors/producers. As an example, in 2002 the Texas Highway Administration collected $2.832 billion in motor fuel taxes and paid $57 million (2%) to the distributors of motor fuel to collect this tax (Peters and Kramer, 2003).

[38] "Democratic opponent Joe Donnelly has hit Chocola for not speaking out against Republican Gov. Mitch Daniels' plan for leasing out the Indiana Toll Road to a foreign investor … [the leasing decision has] proven unpopular with voters, said Jim Wensits, writer for the South Bend Tribune, and 'some of that resentment is going to come up' at the polling booths" (Vlahos, Nov. 2006).

[39] Reddig, M., "Proposed toll increase could drive truckers off Pennsylvania's Turnpike," Land Line Magazine, January 16, 2004.
http://www.landlinemag.com/Special_Reports/2004/Jan04/PA_Turnpike.htm

[40] "Kicking Asphalt on Ohio's Turnpike," The Buckeye Institute for Public Policy Solutions, August 18, 2004. http://www.buckeyeinstitute.org/print.php?id=79

[41] Associated Press, "Ohio Turnpike Tolls Rising for Cars, Lowering for Trucks," WTOL-TV Toledo, December 19, 2006.
http://www.wtol.com/Global/story.asp?S=5830127&nav=menu34_10

[42] Taft, B., "Taft plan to improve safety and mobility in northern Ohio," News Release, October 11, 2004. http://www.dot.state.oh.us/news/2004/10-11-04Gov.htm

[43] Samuel, P., "25% lower toll rates on Ohio Turnpike attracts 10% more trucks," Toll Roads News, June 2, 2005. http://tollroadsnews.info/artman/publish/article_939.shtml

[44] Ohio Turnpike Commission. Commission Approves Permanent Commercial Roll Rate Reduction. Available at http://www.ohioturnpike.org/pdf/toll_adjustment.pdf. Accessed 2006.

[45] Forty percent of county roads are inadequate for travel. Nearly half of the bridges longer than 20 feet are structurally deficient.

[46] It has been proposed by at least one series of reports (Cambridge Systematics, 2005a&b) that mileage-based revenue collection be conducted by state and local governments. Fees would vary based on the aforementioned criteria and could be collected through a system of either "low-tech" odometer-based tools or through a "high-tech" system that involves the use of global positioning system (GPS) devices combined with global information system tools.

[47] This test is in response to increasing fuel efficiency and the potential for alternative fuel use.

[48] It should be noted that for a GPS-based system to function, vehicles would have to be equipped with on-board computers to monitor and communicate mileage information, which will present significant transition challenges (Forkenbrock, 2004).

Aside from the initial purchase and installation costs that would be necessary to transfer to this system of collecting fees, driver privacy is a leading concern (Porter, 2005). Protections such as encrypting sensitive information and limiting the amount of information that can be stored or transmitted may minimize the level of intrusion, but drivers would still have to give up some amount of privacy, however small, if this system is adopted. The trade-off is, assuming no tax evasion within the system, the potential for a complex system that distributes fees collected to the locations that are impacted by the actual vehicle use.

[49] Elected officials believe that the public will bear the sole burden of a tax increase on motor fuels, and often refuse to raise the motor fuel taxes on fears of public backlash (Farrel, 2005; Mufson, 2006; Murphy, 2004).

[50] Lee Raymond Stated: "Finally, my third point. Markets work – if we let them. … credit goes to our free market system. The hurricanes showed that markets work, even under the most extraordinary conditions.

Even before the hurricanes made landfall, shippers rerouted tankers, refiners recalibrated output, traders reallocated resources, investors moved capital, and consumers began to change their consumptions patterns.

Prices for products did increase, of course, but there was no panic and no widespread shortage. Retailers responded to the short-term supply disruption, consumption decreased, and imports increased to make up for the shortfall.

The remarkable recovery would not have been possible had the millions of Americans impacted by the storm – energy produces, refiners, suppliers, retailers and consumers, not had a free hand to respond. Markets enabled them to do so." (Raymond, 2005)

[51] In theory, if the free market was manipulated by a government price cap, the market would have failed to deliver adequate supply and there would have been shortages.

[52] In 2004 the net total motor-fuel volume taxed is estimated by FHWA to be 175,876,463,000 gallons. When this is multiplied by an additional 20 cents, the product is $35,175,292,600. Source: http://www.fhwa.dot.gov/policy/ohim/hs04/htm/mf2.htm as seen on 2/25/07.

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