

The Dynamic State of Transportation Finance

A white paper for participants of the

2005 James L. Oberstar Forum
*The Future of Transportation Finance:
'Gas Tax Plus' and Beyond*

**April 17-18, 2005
Minneapolis, Minnesota**

Sponsored by

**Center for Transportation Studies
University of Minnesota**

Prepared by

**Steve Lockwood, Principal Consultant
PB Consult, Parsons Brinckerhoff**

The Dynamic State of Transportation Finance

Transportation finance is under increasing scrutiny. In part, this reflects a growing concern over the adequacy of resources. This is evidenced in a series of current events, including reauthorization of the Federal-aid transportation program, impending congressionally mandated studies of the future of the Interstate Highway System and the Highway Trust Fund, and in on-going state, Federal and Transportation Research Board research. It is also reflected in actions by bellwether states, and by local project financing that capitalizes on new concepts and new technology.

Motor fuel taxes—“the gas tax”—Federal and state—have long been the centerpiece of highway finance and a significant component of transit funding. Gas taxes currently account for 55 percent of total highway finance and 25 percent of transit finance—with the remainder shared among a series of state and local taxes and fees. The stagnant levels of taxation in recent years, together with the impacts of erosion, inflation, diversion, evasion and alternative fuels contribute a natural focus on the sustainability of fuel taxes. This paper provides some context for consideration of these challenges and potential solutions.

I. WHO SPENDS HOW MUCH ON WHAT?

Questions

- What are financial resources needed for?
- Who is responsible for investment?
- How much is spent?
- How is it spent?
- What are the needs compared to currently available revenues?

As a point of departure regarding the future of transportation finance, it is important to understand current expenditure patterns. As percent of total GDP, transportation expenditures have been relatively stable at 10-11 percent during the last decade. In this \$1.3T sector, 90 percent of expenditures are private—purchase and operations of vehicles and commercial transportation expenditures. Only 10 percent is in the public sector—principally focused on “infrastructure—roadways and public transportation vehicles and operations. Highway capital spending by all levels of government as a percentage of GDP has remained steady at about 0.7 percent over the last two decades that has been about 6 percent of total state and local program expenditures. But this public component has a significant leveraging effect in the effectiveness of private investments and activities.

On a mileage basis, most of the transportation infrastructure is owned and operated by local government. However from a financing perspective, almost 65 percent of expenditures are by state government, reflecting the fact that while 75 percent of Nation’s 3.9 million roads are local (and the 9800 miles of rail transit), the state-owned interstate and principal arterials account for most of the vehicle miles of travel. For example, the 1.2 percent of highway miles represented by the state-owned Interstate System carries 25 percent of total travel. The Federal government controls only Federal lands/forest roads that account for only three percent of the road mileage and represent a nominal expenditure. On the transit side, most of the travel is local and within the jurisdiction of regional transit authorities established under state law—made up of local governments with various degrees of state participation—direct and indirect.

All levels of government generated \$138B in revenues for highways and \$37B for transit in 2003. This represents a 42 percent increase in nominal dollars over a six year period of the most recent surface transportation program, but only an estimated 24 percent increase when adjusted for inflation. The Federal-aid program accounts for a little more than 20 percent of the total highway revenues and about 25 percent of the transit program. Federal funding for both highways and transit is transferred to state government in the form of the Federal highway and transit programs within specific program categories, distributed by formula and accompanied by various Federal regulations and legal constraints and requiring matching with state funds at a minimum percent rate—typically 80 percent.

Exhibit 1 below shows the distribution of expenditure of the \$143B spent on highways in 2003 including carryover funds. (Note that expenditures and revenues can differ in any given year) State government predominates in road-related expenditures with almost 65 percent of total expenditure and 75 percent of capital. The remainder is by local government and a very small federal expenditure on federal lands. About 39 percent of total expenditure is for improved service (expansions and extensions) with the remainder in preservation, maintenance and day to day operations.

Figure 1: 2002 Highway Expenditures by Level of Government

Purpose	Federal	State	Local	Total
Capital, of which 52% (state) preservation		41	12	53
Maintenance and operations		11	15	26
Admin, law enforcement, research	1	12	8	21
Total—by source	2	64	34	100

Source: 2002 Conditions and Performance Report

About 31 percent of total transit expenditures were for capital investment, including the design and construction of new rail transit systems and the modernization of existing fixed assets such as tracks, rolling stock terminals and stations, maintenance and administrative facilities.

Issues

- What kinds of investments are needed for a desirable transportation system?
- Are we spending enough?
- On the “right” things?
- How would we know?

II. WHAT ARE THE TRADITIONAL SOURCES OF FUNDS?

Questions

- What are the conventional sources of revenue for transportation?
- Who pays, collects and how?
- What are the shares of these sources?

Sources of financial resources for transportation and key characteristics are depicted in Exhibit 2 and discussed below. Overall the Federal government—through the federal component of fuel taxes—funds 21 percent of highway expenditures, principally thru intergovernmental transfers to the states. The states fund almost 50 percent—largely through fuel and vehicle taxes. Local governments contribute the remaining 30 percent through a mix of revenues. User fees—combining fuel taxes, vehicle taxes and related fees and tolls—constitute about 60 percent of total revenues. The proportion of user fees (fuel taxes, vehicle fees and tolls) has been stable at about 50-60 percent of current revenues for over 50 years.

Figure 2: Transportation Revenue Sources and Characteristics

Type of Revenue	How collected	Example	Role	Issue
<i>Indirect User Fees</i>	<ul style="list-style-type: none"> • Paid by vehicle operator in some relationship to use 	<ul style="list-style-type: none"> • Fuel tax • Registration/license taxes, etc. 	<ul style="list-style-type: none"> • Major source of Federal and state funds 	<ul style="list-style-type: none"> • Tracks use generally • --although diverging with new technologies
<i>General funds</i>	<ul style="list-style-type: none"> • Property and income taxes allocated to transportation on ad hoc basis 	<ul style="list-style-type: none"> • Income • Property sales 	<ul style="list-style-type: none"> • Major source of local government funds 	<ul style="list-style-type: none"> • Unrelated to transportation activity • Competes with other social needs
<i>Direct user fees</i>	<ul style="list-style-type: none"> • Paid by user and time/place of use for amount used 	<ul style="list-style-type: none"> • Tolls • Transit fares 	<ul style="list-style-type: none"> • Conventional in some regions 	<ul style="list-style-type: none"> • Complex to collect
		<ul style="list-style-type: none"> • Congestion prices 	<ul style="list-style-type: none"> • Very limited application 	
<i>Dedicated taxes</i>	<ul style="list-style-type: none"> • Levied on property and dedicated to transportation 	<ul style="list-style-type: none"> • Local sales taxes • Sales tax on fuel, vehicles • Value capture (improvement, increment taxes) 	<ul style="list-style-type: none"> • Modest application/varies widely 	<ul style="list-style-type: none"> • Highly local and facility-specific

As a result of enhanced ISTEA and TEA-21 funding, Federal funding grew the fastest in percentage terms in the period, producing an increase in the Federal share. However, the states contribution grew the fastest in dollar terms, supplying half the increase in the period.

Fuel taxes and vehicle registration (indirect user fees)

As shown in Figure 3, about 54 percent of total highway revenues are from taxes and fees raised indirectly from users (almost 100 percent at the Federal level and 64 percent at the state level).. These taxes and fees—both at the Federal level and in most states—are dedicated by law to transportation (unlike most of Europe, where fuel taxes revenues are used for a range of general purposes beyond transportation and where transportation investments are

supported substantially out of general funds). This “trust” is said to be key to the long-term (50 year) political sustainability of the current funding arrangements—both Federal and state. In addition, the program is largely “pay as you go”, constraining expenditures to revenues as they become available from (predominately) tax sources. This explains why large projects often take many years. There is some debt financing being used (less than 10 percent of total expenditures—usually via toll-backed bonds but also sometimes backed by pledges of future Federal and state tax revenues.

The federal Highway Trust Fund, including the Mass Transit Account—is supported by the federal gas tax collected by the state level—and is allocated by formula and discretionary grants for purposes and with conditions established by Congress. It is the principal expression of national surface transportation policy. Increases in dedicated taxes are subject to state and Federal politics. The current Federal gas tax is 18.4c. At the Federal level, there has not been a fuel tax increase since the 4.3c in 1993.

The combined state and local fuel taxes average around 26 cents per gallon (21.6 cents is state gas tax alone). Over the last eight years only 14 states have increased their fuel taxes a total of 17 times by an average of four cents. Three additional states raised their taxes effectively through automatic indexing. The real value of user fees per vehicle has declined from six cents in the 1960s to about three cents in today’s dollars. The average driver pays about \$240 in fuel taxes or about two cents per mile (Federal and state taxes). In 2003 indirect user fees were the principal source of revenue in 22 states. However, ten states actually derive more revenue from registration and license fees than from state fuel taxes. Revenues from bonds account for almost 15 percent of state sources.

In most states, local government is prohibited from assess fuel or vehicle taxes or cap them at a low level. Their 30 percent of total revenues rely heavily on General Fund appropriations that make up about 40 percent of their revenues for highway transportation.

Figure 3: 2003 Revenues Used for Highways (by collecting agencies) in Millions and Percent

Source	Total Federal	State agencies	Local governments	Total
1. Motor-Fuel and Vehicle Taxes	\$27,737/20%	\$43,722/32%	\$2,171/2%	\$73,630/54%
2. Tolls	-	\$5,013/4%	\$1,217/1%	\$6,230/5%
3. Property Taxes and Assessments	-	-	6,902/5%	\$6,902/5%
4. General Fund Appropriations	\$1,686/1%	\$3,400/2%	\$16,344/12%	\$21,430/15%
5. Other Taxes and Fees	\$434/0%	\$3,382/2%	\$4,008/3%	\$7,824/6%
6. Investment Income and Other Receipts	\$18/0%	\$2,749/2%	\$5,176/3%	\$7,943/6%
7. Bond Issue Proceeds	-	\$9,526/7%	\$4,899/3%	\$14,425/10%
Grand Total Receipts	\$29,875/21%	\$67,792/49%	\$40,717/30%	\$138,384/100%

FHWA statistics HF-10

Other principal sources of revenue

- **Direct User Charges (DUC)**—Fees paid by users for amount of usage—related to amount of usage—and often to time, place and conditions of use are a convention in market economies. Tolls—a simple version of user charges—have played a modest and specialized role in US highway finance since the completion of the Interstate System. In general, direct user charges are much favored by economists as they can be varied in accordance with the relationship between supply and demand to allocate a scarce resource according to users’ willingness to pay. Payments for other networked utilities such as telecommunications, power and water share these features. Outside the US and a few other northwestern European countries, tolls are the consistent source of highway revenue for upper level roadways. Within the “Interstate era” (post 1956), tolls have contributed four to five percent of total highway revenues, a figure that has been relatively stable in recent decades. The

2005 Oberstar Forum

dollar increase has been from \$5B in 1999 to \$6.2B in 2003. Only six (large eastern) states with pre-Interstate legacy toll roads, bridges and tunnels, have as much as 10-15 percent of total revenues from tolls.

- **General Funds (Tax funds)**—General funds are supported by income taxes at the Federal and state level, and property taxes at the local level. General funds provide only 15-18 percent of total revenues for highways and transit, which compete with other government services for this resource. However, at the local level over two-thirds of road expenditures are appropriated from general funds. At both the state and local level transportation must compete with other general purpose government services for these revenues. By contrast with the US, in many countries fuel and related vehicle taxes are a major *source* of general revenue.
- **Special Assessment/Value Capture (tax assessments)**—Another important source at the local level for both highways and transit are various assessments levied on presumed beneficiaries of transportation investments through property taxes—in the forms of levies, tax increment assessments, and development fees. The proportion of total revenues raised from dedicated sales taxes at the local level has been a popular source of new finance in some of the larger urbanized states.

Transit Funding

Figure 4 illustrates the revenue breakdown for transit. Public transit funding comes from two major sources: *public funds* allocated by Federal, state, and local governments and *system-generated revenues* earned for the provision of transit services. Public subsidy generates about of two third of the needed resources. About 20 percent of the total—principally for capital—comes from the Federal level—mostly the highway trust fund. State and local general funds and other taxes account for about half of the total revenues with dedicated local sales taxes as the single largest source. These percentages may vary considerably by type of tax and among taxing jurisdictions.

System-generated revenues are comprised principally of passenger fares, although additional revenues are also earned by transit systems for the provision of other services such as advertising and concessions, and from joint development fees. Transit operators generally use system-generated revenue (fares and other sources) to fund operations. In 2003, \$25B in operating funds (90 percent spent in urban areas over one million population) were derived from an array of tax sources and \$12B in capital was generated in patterns similar to those in 2000 shown in Exhibit 4.

Figure 4: Percent of and Amounts of 2000 Revenues Used for Transit

Source	Total Federal	State Agencies	Local Government	System	Total	Percent
1. General Fund	\$999	\$2,192	\$2,322		\$5,513	17.9%
2. Fuel Tax	\$4,260	\$395	\$107		\$4,762	15.4%
3. Income Tax		\$152	\$47		\$198	0.6%
4. Sales Tax		\$576	\$4,209		\$4,786	15.5%
5. Property Tax		\$46	\$522		\$568	1.8%
6. Other Dedicated Taxes		\$640	\$392		\$1,033	3.3%
7. Other Public Funds		\$1,417	\$2,722		\$4,139	13.4%
8. Passenger Fares				\$7,811	\$7,811	25.3%
9. Other Revenue				\$2,021	\$2,021	6.6%
Total All Sources	\$5,259	\$5,418	10,321	\$9,832	\$30,831	100.0%

Source: National Transit Database.

Funding for capital investments (about 30 percent of total) by transit operators comes principally from public sources. In 2000, about one-third of total transit expenditures were for capital investment including rail and bus capital needs. Capital investment funds for transit are also generated through the issuance of bonds. Certificates of Participation (COPs) are tax-exempt bonds issued by state entities that are generally secured by revenues that are expected to be earned from the equipment that the COP funds are used to purchase. The USDOT has three financing programs to facilitate funding for transportation projects, including transit projects. These programs are the Transportation Infrastructure and Finance Innovation Act of 1998 (TIFIA), the State Infrastructure Bank (SIB) Pilot Program, and Grant Anticipation Revenue Vehicles (GARVEE bonds).

Issues

- What is the difference in the sources of revenue for state and local government?
- What is the proportion of total revenues that come from users directly or indirectly in highways and transit?
- What is the proportion coming from state and local taxes unrelated to transportation use?
- What is the proportion of highway revenues used to fund transit?

III. WHAT ARE THE KEY RECENT TRENDS?

Questions

- What have been the principal changes in sources of funds?
- What are the principal supplements to fuel taxes as their share has declined?
- How has the relative role of levels of government changed?

While there have been no sudden or dramatic changes in the aggregate mix and shares of transportation revenue sources, several key trends are apparent. Figure 5 indicates some comparisons over the last decade.

Figure 5: Comparison of Revenues (\$B) and Percents Used for Highways 2003/1992 (by Collecting Agencies)

	Total Federal	State Agencies	Local Governments	Total
1. Motor-Fuel and Vehicle Taxes	\$28/20% \$16/18%	\$44/32% \$32/36%	\$2/2% \$1/1%	\$74/54% \$49/55%
2. Tolls	-	5/4% 3/3%	\$1/1% \$1/1%	\$6/5% \$3/3%
3. Property Taxes and Assessments	-	-	\$7/5% \$5/6%	\$7/5% \$5/6%
4. General Fund Appropriations	\$2/1% 1/1%	\$3/2% \$2/2%	\$16/12% \$10/1%	\$21/15% \$12/14%
5. Other Taxes and Fees	<\$1/0% >\$1/12%	\$3/2% \$2/2%	\$4/3% <\$1/0%	\$8/6% \$3/3%
6. Investment Income and Other Receipts	<\$1/0% <\$1/0%	\$3/2% \$3/3%	5/3% \$3/3%	\$8/6% \$6/7%
7. Bond Issue Proceeds	-	\$9/7% \$6/7%	\$5/3% \$4/5%	\$14/10% \$10/11%
Grand Total Receipts	\$30/21% \$18/20%	\$68/49% \$47/53%	\$41/30% \$23/26%	\$138/100% \$88/100%

FHWA statistics HF-10—all rounded up to nearest B

Key Vectors in funding and revenues

Some key changes include:

- Macro stability—Within the more than 50 percent increase in total (nominal) highway funds, the overall shares by level of government have been quite stable. A comparison of the funding mix and shares over the last decade for highways (for which information is readily available) suggest vectors that may hold implications for the future (see section 4).
- Diversification in sources—The proportion of the total transportation funding represented by user fees (fuel taxes, tolls and fares) has remained about constant. But average state revenue increases have been slowing down as the average tax rate has not increased. Only one state has raised its fuel taxes faster than inflation. Since 1992, the proportion of total revenues represented by fuel taxes has dropped from 32 percent to 26 while the difference has been made up by tolls, bonds and other miscellaneous taxes. At the local level, the role of general funds has increased dramatically.

- **Local variation**—Aggregate national changes mask significant variation—with some states experiencing major increases in the role of local options sales taxes, toll roads and the use of bonds. By 2003, motor vehicle taxes and fees were a greater source of revenue than state gas taxes in 15 state and the largest single source of revenues in 9 states was bond proceeds.
- **Devolution**—There has been some increase in local share and decrease in state share of overall funding. At the local level, the share made up by local taxes has nearly gone from less that \$1B to about \$4B. There are several states where various local taxes and imposts other than property taxes make up 10-20 percent of total revenues.
- **Tolls and new capacity**—Toll revenues (state and local) account for about five percent of total revenues—a proportion that has been relatively constant over the last decade—and are collected from roads tunnels and bridges in 33 states although one-third of the total is collected in NY/NJ (a proportion that will be changing in the near future the array of new toll roads in other states). More striking is the unique roll of tolls in creating new capacity. Over the last ten years toll roads have constituted 40 percent of the new limited access road mileage (Interstate, other freeways and expressways).

Transit

Public funding for transit from all levels of government grew rapidly during the 1970s through drawing on Federal highway revenues, increased state and local appropriations and the passage of local options sales taxes for capital and operating support. Capital funding grew about 5 percent per year during the nineties. As indicated in Figure 6, the rate of growth in Federal support has declined as state and local resources were increasing utilized.

Figure 6: Annual Growth Rate 1966-2000

Year	Federal	State and Local	Total
1960-70	NA	8%	9%
1970-80	39%	12%	17%
1980-90	<1%	8%	5%
1990-2000	4%	5%	5%

Source 2002 Condition and Performance Report

Issues

- What are the implications of reduction in rate of growth in overall revenues?
- What are the implications of the decreased reliance on gas tax?
- How might devolution to greater role for local government affect transportation policy?
- What issues does this new mix of revenues raise regarding financial management?, budgeting, the role of the private sector?

IV. LOOKING FORWARD—DRIVING FACTORS AND POLICY ISSUES

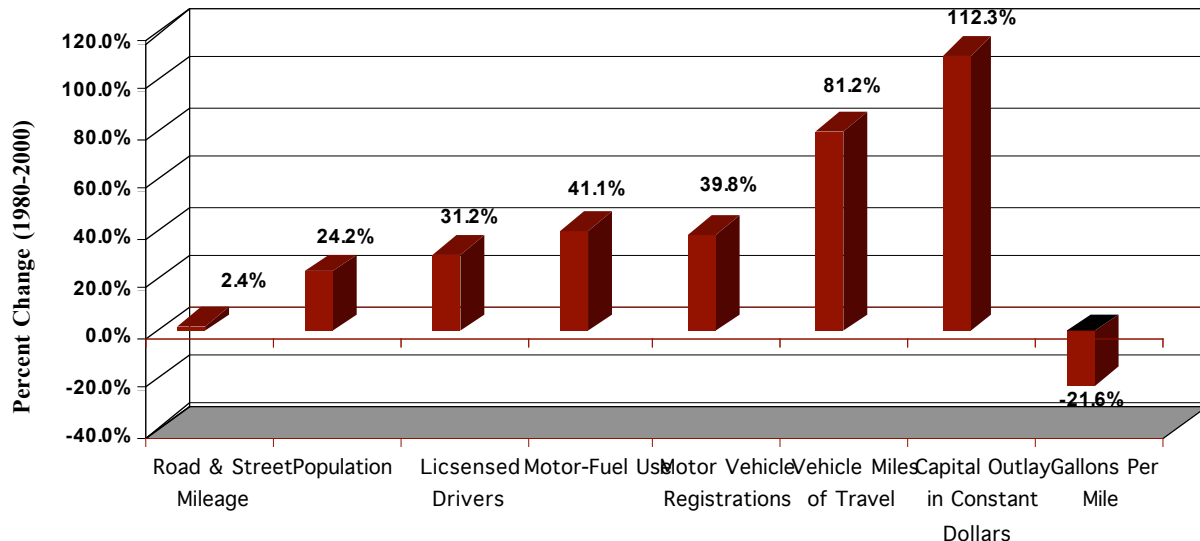
Questions

- What are current concerns about the level of funding for highways and transit?
- Is the highway trust fund in trouble?
- What the key driving forces behind an interest in alternative revenue sources?
- How is technology playing a role?

Stakeholders and Driving forces

There are a range of stakeholders with an interest in the future of highway finance—within the policy community at the Federal, state and local levels, among stakeholder groups (construction, environmental, land development) and among user groups—both individual and commercial. Therefore current concerns regarding potential future trends in transportation finance relates to a range of factors include the real value of revenues, who pays, institutional influence and a range of other socio-economic and political values. An overarching consideration driving concern over the aggregate adequacy of the current revenue streams is the Increase in the “drivers” of highway use (population, licenses, vehicles, use) as shown in Figure 7. These factors combine to create a need for increased revenues and reliable sources.

Figure 7: Key Indicators of Highway Demand



Source: Our Nations Highways (FHWA)

However, the industry estimate of “need” for highway investment far outstrips the available revenues. In 2003 against a current total highway capital investment of \$70B, U.S. DOT estimated that just to maintain current physical and operational—as is—would cost \$75B a year. To make all cost-effective improvements—including both condition and performance—would cost \$107 B. (a parallel effort by states concluded the levels were \$92B and \$125B). While transit capital investment reached approximately \$10 billion in 2003, the U.S. DOT forecast that \$20.6 B annually is required to fund the transit system improvements needed. Of course these estimates are not related to customers’ willingness to pay—nor are investments made in the most economically efficient projects since, as a tax-funded public agency monopoly in a political environment, investment program decisions must balance a combination of economic development, asset management, job stabilization program objectives.

There are, in addition, a set of factors that relate to funding and revenue sources. These include:

- Factors *external* to transportation policy
 - ✓ Construction cost inflation—The producer price index for highways is up 19 percent since TEA-21 (1996) averaging 2.5 percent per year, eroding the value of highway revenue in real terms. Historically, the increase in fuel taxes has lagged inflation somewhat.

2005 Oberstar Forum

- ✓ Erosion from fuel economy—Since the 1960s, fuel economy has doubled—thus reducing the revenue per mile. It has remained flat in last two decades at an overall average of 22-23 MPG. To a large degree, efficiency improvements have been offset by SUVs. The potential impact of fuel tax revenues from any major increase in fuel price, imposition of CAFÉ standards or global disturbance would probably be somewhat offset by reduced highway costs. A change of as much as a 20 percent increase in CAFÉ seems unlikely in the next 20 years, but a reduction of costs in hybrid electric vehicles could increase efficiency towards 50 mpg and as they penetrate the vehicle fleet, this increase becomes more likely, sooner.
- ✓ Alternative fuels—Alternative fuels (fuel cells) will be longer in coming and will be largely outside liquid fuel distribution (and difficult to tax). While the impacts are nominal at this time since the penetration into the vehicle fleet is still tiny, a significant long term impact (20-25 years) is possible. Given the advances in vehicle and propulsion technology, the inevitable shrinkage of petroleum resources and the range of related geo-political concerns, it is not unreasonable to presume that a viable non-petroleum “system” of vehicle, fuels and fueling infrastructure might emerge towards the middle of the century.
- Factors *internal* to transportation policy
 - ✓ Taxpayer resistance—Political resistance to raising taxes (taxpayer revolt) has been evident in the relatively few increases in state taxes. Of the 41 transportation funding measures on the ballot in 2002, only two include an increased state gasoline tax and local option sales taxes remain a popular means of raising funds—not only for transit, but increasingly for highways. Conversely, given the low cost of fuel in the US and the low rate of taxation, there would appear to be significant room for increases if appropriate public support could be generated by a consensus around confidence-generating policies and programs.
 - ✓ Diversion and Earmarking—Increasing programmatic demands are being made on the Federal highway trust fund including dedication of funds to transit without cost recovery, diversion to non-transportation purposes and application to non-priority needs. About 20 percent of Federal revenues are dedicated to non-highway uses. The trend to Congressional earmarking from 1,800 projects (4.4 percent in TEA-21) is now up to eight percent and 3,800 projects and 39 new categorical programs in the current House Bill (not including several thousands to come in the Senate Bill). Taken together, this may represent a reduction in the effectiveness of up to 10 percent of total user fee proportion of highway revenues (perhaps five percent overall).
 - ✓ Tax evasion—Conventionally estimated at \$1-3B or more, evasion has been subject to episodic Federal DOT/IRS/FBI and individual state compliance/enforcement campaigns.
 - ✓ Devolution—Devolution of responsibility for public services from state to local government as a matter of policy and in response to state fiscal problems is a continuing phenomenon. As discussed in Section II, above there has been a modest increase in the aggregate local share of total highway spending and a substantial increase in the local share of transit. This is accompanied by a shift from user fees to some non-transportation tax bases disconnected from use and users. This shift is especially pronounced in a few of the larger heavily urbanized states.
 - ✓ Privatization—Global trends in the providing infrastructure services are suggesting a substantially enlarged role for private enterprise in the development and operation of transportation facilities and services introducing private management and equity. This development is closely linked to the ability to charge users directly for premium services and generate project revenues. Significant public-private partnering will depend on direct user charges.
 - ✓ Resistance to direct user finance (tolls)—Federal and some state laws prohibit the application of tolls on the existing upper level Federal aid systems—the urban and intercity interstates—that constitute the major location where both capacity and traffic management are most needed. Some Interest groups believe that dealing directly with these costs—where they occur—can be submerged in a larger “global” funding program modification. Still others are concerned about toll programs and the risk that they might involve diversion of user revenues to non-highway purposes. As reflected in the increased recourse to toll roads for new capacity in a few of the fastest growing metropolitan areas like Texas, Florida, Georgia, etc. there is a clear increase in application of tolls that may, in the long run, lead to the deregulation at the federal level that would be required to fully exploit the potential of tolls

- ✓ Changes in governmental shares—Significant changes in the shares of revenues by level of government as a matter of policy is unlikely, since a major portion of both highway and transit funding comes from dedicated funding. On the highway side, however, the make-up of the local government component (now around 30 percent) will be under pressure to continue shifting from competitive sources (such as general funds) to other specific *temporarily* dedicated sources (such as sales taxes).

Likely impact of driving forces—short and long run

Contrary to some crisis perspectives, vehicle and fuel technology to not alone pose a great threat to transportation finance. An aggressive assumption regarding hybrids (50 percent penetration at 50 percent increase in fuel economy) over the next 15-20 years applied against the fuel tax component of highway revenues (55 percent) and transit revenues (15 percent) is only a 15 percent potential reduction in revenues. Indeed, the impact of conventional inflation is likely to present an equal challenge—even at its current two-to-three percent per year—as it operates on the capital component of expenditures. And the combined effect of congressional programmatic diversion and earmarking will further reduce the effective resources available to meet critical highway and transit needs as determined by owners. In the short run, therefore, the fuel tax component of transportation finance (55 percent) needs a fix—but one that can be met with a combination of modest reforms and/or increases in fuel tax regimes. Such reforms could be expected at the state level with an increase in public confidence in state programs. If comparable support is not developed at the federal level, the likely consequence might be erosion of the federal share in total funding and related devolution of federal influence.

In the long run, a different set of considerations comes into play. In a 20-25 year time frame, the relative sustainability of the fuel tax as the center piece of transportation revenues may become a serious issue, reducing the viability of fuels taxation. Therefore it is not too soon to consider the substitute options and the opportunities suggested by new communications and information technology.

Funding regimes do more than raise revenues.

Thus, the recent erosion of fuel tax component of transportation revenues might reasonably be “fixed” by modest modifications in the Federal and state fuel tax regimes described below in section V, in combination with some modest increase in the role of other sources. However, there are more compelling reasons for a considered program to supplement fuel taxes beyond concern for total funding shortfalls. These include a series of policy considerations

- Further devolution of the funding burden to local government and reduced federal, state and regional influence regarding regional and national
- Increased revenues sources are needed in certain regions where there is substantial general growth
- Congressional influence over the Federal aid program via the Federal HTF reduces the responsiveness and flexibility of the program to respond to specific state and local needs
- Continued evolution away from user financing further separating decision makers and users from funding sources

Different funding mechanisms have substantially different impacts on both investment behavior of owner-operators and use behavior of travelers and shippers. This is illustrated by two ends of the spectrum: local option sales taxes and general funds versus and tolls. Local options sales taxes levied to support highway and transit improvements separates the obligation to pay from use, disconnects costs from relationships to user benefits, commits initially to projects with limited flexibility to adjust, removes projects from regional trade-offs and are time-limited. Tolls, by contrast, link the project selection to anticipate customer willingness to pay, caps cost at the amount that can be financed, and can be used to manage congestion.

Key policy concerns: criteria for supplementing the fuel taxes with the “best” options

As indicated above, the rationale for new sources of transportation revenues is a mix of technical and policy issues—with both short and long-term dimensions. In the short term, the focus is on supplementing the existing mix of revenue sources and perhaps reducing the need to increase dependency on options that tend to undercut cooperative planning and efficient operations. In the long-term, however, replacement of fuel taxes must be given serious consideration. In both time frames, options to conventional fuel taxes can be systematically reviewed.

In considering means of supplementing the gas tax in the next two decades, the options include—at a minimum—the various revenue sources already being utilized (as proven, practical approaches for some contexts) as well as options based on new technology. However, from a policy point of view they have very different strengths and weaknesses. Figure 8 lists key criteria:

- Financial criteria (1-3) relate to their ability to have a significant impact—across a range of project types and settings and across many states
- Management criteria (4-6) relate to how the revenue relates to both to the way in which it structures and provides incentives for project or program development (incentive to C/E project selection and efficient project development)
- Policy criteria (7-9) relate to whether the financial mechanism used in conjunction with the revenue source is amenable for system management, is more or less equitable as between users and non-users and places increased initiative at the local level and the private sector.

Figure 8: Policy Criteria for New Sources of Transportation Revenue

Criteria	Federal Bonds	State/Local Sales Tax	Toll/Road Pricing	Distance (VMT taxes)	Value Capture
1. Meaningful financial contribution at the statewide program level	X	X	X	X	
2. Meaningful contribution in many states		X	X		X
3. Valuable for certain projects			X		X
4. Reliable (politically sustainable)					
5. Signals economic value of investment			X		X
6. Encourage efficient use and management			X		
7. Can be used for congestion and environmental policy			X	X	
8. User equity			X	X	
9. Encourages local and private involvement		X	X		X
10. Administratively efficient to collect	X	X	X		
11. Publicly acceptable		X			X

In the section that follows, funding options as supplements to—or replacements for—the conventional fuel tax will be considered.

Issues

- What are the short run priorities?
- What is the distinction between Federal level and state/local level concerns?
- What is the relationship between revenue raising mechanisms and other policy issues (such as coordinated planning, congestion management, role of private sector, equity)?
- What are the long run concerns?

V. LOOKING FORWARD—PROMISING FINANCIAL OPTIONS

Questions

- What are the options to meet short term funding shortfalls to supplement fuel tax revenues?
- What are the options to promote revenue raising mechanisms that support other policies?
- What are the options to replace fuel tax revenues in the long run?
- What are the options that capitalize on emerging technologies?
- What Policy issues are raised by alternative funding options?

Consideration of the future of transportation finance is a policy issue. That is, there are no formal changes regarding revenue sources and uses currently being proposed (legislatively) at the national level. There are Federal pilot programs that are designed to support experimentation and, at the state and local level, there have been several initiatives that represent new program approaches or research in consideration of possible changes.

Short term

Given the lead times involved in the infrastructure improvement cycle as well as the lead times involved in any significant national change in policy or technology, a short term perspective is limited to four generic strategies:

1. Improvement of the effectiveness of the current fuel tax regime—federal and state—through modest increases that might be achieved through a combination indexing and leveraging
2. Minimizing reliance on supplements to direct and indirect user funds that are totally unrelated to transportation and that undercut rational cooperative resource allocation—such as sales taxes
3. Supplementing fuel taxes with direct user fees that encourage improved accountability for improved facility management and operations
4. Undertaking advanced development activities for long term replacement of fuel-based charges and non-transportation-oriented non-user taxes

Improve the effectiveness of the current fuel tax regime—nationwide—through indexing and leveraging

These strategies are designed to improve the effectiveness of the existing federal aid system (and therefore of existing fuel taxes).

Leveraging. The federal aid program now provides significant administrative flexibility to make the flow of funds more efficient such including flexible match, advance construction. Other recent program adjustments permit borrowing against the anticipation of future conventional funds such as state infrastructure banks (SIBS) or grant anticipation vehicles (GARVEEs). These methods have also been used to combine and leverage other (non-conventional) revenue streams. In 2003, FHWA estimated that about \$29B in innovative finance projects have been leveraged against about \$9B of Federal investment from various sources—a rate of match well beyond conventional. In addition, there had been \$48million from flexible match; \$63million in equity contributions and \$6.3 B in revenue back bonds. Thus about twice as much non-Federal investment had been leveraged by these projects—compared to the norm—during the period.

Tax Credit Bonds—AASHTO has developed a strategy to augment the Federal highway program by selling up to \$60B of tax credit bonds against the bond holders' federal income tax liability. This scheme, capitalizes on Federal government accounting procedures to provide low cost capital up front with an interest spread that allows repayment with a portion of the proceeds, creating a sinking fund for principal. The costs of the program would be supported by an increase in Federal HTF revenues.

Indexing—Another short term fix is indexing the fuel tax rate to the consumer price index could insulate the tax yield from inflation (currently between two and three percent) to ensure constant purchasing power. Eleven states currently index their fuel taxes. Options that have been discussed include annual adjustments, use of a cap Indexing is currently used by three states.

Figure 9 indicates some of the key leverage techniques used to date.

Figure 9: Leveraging Strategies

Objective	Strategy	Method
Accelerate Projects	<ul style="list-style-type: none"> • Reduce inefficiencies in Federal-aid grants management 	<ul style="list-style-type: none"> • Advance Construction • Tapering • Toll Credits • Flexible Match
	<ul style="list-style-type: none"> • To leverage new and existing revenue streams 	<ul style="list-style-type: none"> • Grant Anticipation Revenue Vehicles (GARVEE) • State Infrastructure Banks (SIBs) • Transportation Infrastructure Finance and Innovation Act (TIFIA)
Increase Investment	<ul style="list-style-type: none"> • Reduce barriers to attracting private investment • Lower cost of borrowing • Develop debt options to use project revenues 	<ul style="list-style-type: none"> • Flexible Match • TIFIA • Section 129 Loans • SIBs

Minimizing reliance on revenue sources that undercut rational cooperative resource allocation

In the face of uneven investment needs in different parts of a state—and a general political reluctance to raise statewide taxes, several state legislatures have permitted or encouraged local governments to levy special purpose taxes for transportation.. This trend, begun in metropolitan areas building new rail transit systems in the 1980s, has now substantially expanded to other states and all modes. In the 1990s, 21 states passed laws authorizing various types of local option taxes. In 2004, 23 of 31 such ballot measures were approved for use of sales tax funds for transit and 19 of 24 were approved that included tax or bond measures for highways.

While such sources are still a relatively small proportion of total national transportation revenues, the percentage has been growing quickly, expanding from a very small base a decade ago by a factor of five—and is important in a few states. Popularity is said to stem from the direct voter influence over projects, the fact that the funds are spent locally, and the finite measures of the tax. The broad tax base also provides enormous leverage for a relatively low rate. (In one California county, a one percent general sales tax was estimated to be equal to a 16 cent gas tax!!)

Local tax measures—whether for highways or transit—are also associated with the establishment of new regional or county authorities (they share this feature with local toll authorities). Some observers see this as:

- a retreat from user fees and a shift towards detaching funding from use and users
- a gradual devolution of transportation finance burden back to local government
- a more parochial (as distinct from regional) perspective that may imply an absence of metropolitan planning, and with projects selected on “beauty pageant” basis
- a reduction in planning flexibility since tax election funds typically have to be spent on the ballot measure projects regardless of changes in circumstances or costs

Supplementing fuel taxes with direct user fees that encourage improved accountability of improved facility management and operations

The increase in the use of direct user charges (tolls and pricing) as a funding mechanism has the advantages of targeting improvements where there is an need expressed by user willingness-to-pay while, at the same time, generating revenues to support such improvements without wholesale program reform—at either the state or national level. In addition, toll project development introduces a financially disciplined project development process and new institutional options that can provide for more creative and efficient projects.

Toll Roads—Out of a total of approximately 185 miles of new access-controlled expressways developed per year over the last decade, 75 miles per year have resulted from new toll road development. Toll roads, therefore, are already responsible for approximately 40 percent of the total. Despite the increasingly important role, toll roads are not a “program” at the national level and there is no organized effort to consider or track their impacts. (There is not even an available comprehensive listing of all toll facilities constructed or under development, since many are developed by state, local and private entities outside the federal aid program.) It appears that, since ISTEA (1992) approximately 35 new toll roads (other than widening or extensions) have been developed or are currently committed—in addition to about a dozen toll bridges. Most of the newer schemes are supported by technological

advances such as GPS, short range communications, automatic vehicle identification tags, in-vehicle computing, tracking systems, automated billing and other technologies.

There is no metropolitan toll network in the US with the sole exception of Orlando that has over 160 miles of toll facilities developed by three separate entities (The NY/NJ metropolitan toll facilities are substantially bridges, tunnels and interurban). New toll roads appear to be a sunbelt phenomenon with Texas in the lead—committing to toll finance for all new capacity via a range of financial and institutional innovations. As toll roads grow more widespread and the applications more general the concept of the mixed-funding toll road is becoming more acceptable with financial packages combining toll revenue bonds, federal and state tax funds and local contributions. The advent of mixed funding substantially widens the potential applicability of toll roads although the Federal restrictions against the application of tolls on Federal aid highways is a major barrier to extensive use of tolls where they might be most needed to expand and reconstruct congested urban facilities. There is still considerable resistance to tolling from well organized independent trucking community and some construction interests.

Congestion pricing and managed lanes—Charges varying by time, location and congestion level for demand management purposes are still in their infancy in the US. There has been long-standing academic interest in pricing and several states are conducting 50 value pricing planning studies funded by FHWA Value Pricing Pilot program. Initial steps towards a greater application of pricing is evident in the conversion of (free) high occupancy vehicles lanes (HOV lanes) to high occupancy toll lanes (HOT lanes) that operate like variable-priced toll roads for single occupancy vehicles. HOV and HOT lanes are now being developed at the metropolitan network level in several urban areas. These approaches combine “tolling”—to cover costs—with “pricing” to manage congestion by varying the toll levels. To date, priced lanes—in conjunction with existing free roads—has been applied only to HOT lanes on I-15 San Diego, the Katy and 290 Freeways in Houston, and new SR91 lanes in Orange County, CA. Existing toll roads have had pricing added such as the San Joaquin and Foothill toll roads in Orange County CA, Lee County FL bridges and in the NY/NJ metro area. Cordon pricing is a more extreme application applied to all vehicles entering a central area. A major surge in interest and credibility was generated by the apparently successful London Congestion Pricing Scheme that adds to the small international inventory of such programs (Singapore, Norway, etc). Figure 10 suggests an array of approaches to incrementally introducing pricing into the free road environment.

Figure 10: Alternative Tactics as Components of National Direct User Charges Policy

Objective	Strategy	Tactic	Challenge	Technical issue	Private Sector Role Issues
Supplement conventional tax resource	<ul style="list-style-type: none"> Maximize toll revenues (TX model) 	<ul style="list-style-type: none"> Toll all new capacity (TX model) 	<ul style="list-style-type: none"> Market penetration at meaningful level (say, 25%, nationally) 	<ul style="list-style-type: none"> Widening existing free FA facilities may involve conversion of free lanes Many projects will be mixed funding 	<ul style="list-style-type: none"> Significant opportunities on high demand projects Mixed funding projects involve challenging procurement issues
Congestion management to improve service	<ul style="list-style-type: none"> Separate Premium service network (Poole, Orski) 	<ul style="list-style-type: none"> Incremental transition via HOV/HOT 	<ul style="list-style-type: none"> Preserving free parallel options while creating premium network 	<ul style="list-style-type: none"> Scale of network (require combining new and converted facilities) HOV reduces financial feasibility 	<ul style="list-style-type: none"> Limited opportunities given no revenue financing
Multimodal options to improve efficiency, equity	<ul style="list-style-type: none"> Increase efficiency via HOV, BRT, truck lane networks 	<ul style="list-style-type: none"> Lane additions and take-a-lane, some exclusive new facilities 	<ul style="list-style-type: none"> Subsidizing Costs (via HOT, fees) 	<ul style="list-style-type: none"> Net costs of free HOV (even O & M not covered by HOT) Utilization requires reinforcement with other measures 	<ul style="list-style-type: none"> Limited opportunities given no revenue financing
Rationalize Federal aid program	<ul style="list-style-type: none"> Confine FA support to existing free IS capacity (Pisarski) 	<ul style="list-style-type: none"> All non-IS become state responsibility Provide incentives for states to maximize toll financing 	<ul style="list-style-type: none"> Confines FA policy, funding to “SNS” Provides no relief to states 	<ul style="list-style-type: none"> Uneven impact on states re network characteristics 	<ul style="list-style-type: none"> Dependent on use of tolls

Development Opportunities for the Long Term

In the long term (20 years), the context for transportation funding may be changing, owing to vehicle and fuel technology developments that affect the viability of fuel taxes directly.

VMT Taxation Schemes—Several states—both jointly and separately—are investigating the potential of VMT (vehicle miles of travel) taxation. These schemes are based on a direct recording of travel (rather than fuel use) – thereby reflecting both actual cost occasioned and the jurisdiction in which the cost was occasioned. Key features of this system involve GPS-equipped vehicle with an on-board map-based computer that computes travel by jurisdiction and, using a fee schedule, the charges owed. This data is periodically uploaded, wirelessly, (at gas stations or other locations) to a “collection center” that bills the owner. Unlike tolls the system provides area-wide coverage, covering all facilities and all vehicular travel and the charges paid are irrespective of amount of fuel consumed. This system—like several others—also supports operation in a differential road-pricing mode by adding additional GIS information regarding the road network and a vehicle-to-roadside communications system to accommodate changing road conditions information.

Technology suggests that this may be the long-term direction for fully equitable true cost charging for road use with the flexibility to accommodate differential charges according to vehicle type and amount/type/location/timing/conditions of use. In particular, it provides an area-wide basis that represents a significant conceptual advance beyond tolling. However there are a series of complex issues that are not yet addressed. One key issue not yet addressed is the cost of administration—what would be the per vehicle cost for a new systems of collecting \$240/year compared to the low cost of administration of the in-place system. Since this approach operates by associating individual vehicles with specific facility use, there are nature concerns over protecting personal privacy. Other challenges include the need to add technology to accommodate pricing, the ability of the technology to discriminate among adjacent lanes that may offer different levels of service and concerns over privacy and security.

Vehicle Infrastructure Integration—When considering long-term future transportation finance, consideration must also be given to the larger technological context within which this development will take place (or may take place). The same set of technologies that support more direct means of charging users will also be part of other advances relating to vehicle/infrastructure/operator integration. For example, the current vehicle infrastructure Integration (VII) project (a consortium of FHWA, the vehicle manufacturers and AASHTO) represents a major initiative that may result in real time intercommunication of both individual vehicle and system status between vehicle owners, state and local transportation authorities, vehicle manufactures and other service providers a real time, national, network-wide basis.. While theses systems are being considered for safety, mobility management and commercial services, he supporting technology involves both geo-positioning and vehicle-to-roadside communication that could be easily adapted for direct payment by time, vehicle type, facility and road conditions. Segueing into direct user charges from an already deployed technology (rather than introducing a new system just for revenue collection) may be a more practical approach

Issues:

- Political resistance to change from user-stakeholders in the existing system
- National applicability of new revenue-raising systems among states and regions
- Cost of phasing in new systems and problems during long transition problems
- Political resistance to loss of legislative prerogative at state legislature and congressional levels
- Potential of new systems to capitalize on parallel technology developments
- Potential of new systems to capitalize on private enterprise, capital and management

Closure

The gas tax is not dead. (“Long live the gas tax”) It plays a critical role in US transportation finance, although the diversity and importance of other revenue sources—state and local—is much wider than often recognized. There are already a range of factors tending to undercut the historical central role of gas taxes at the federal and state level. Alternative fuels are only one of these factors—not consequential at this time—although likely to become a major concern in the next 20-plus years. In the immediate future, fixes to the gas tax need to be pursued.

In addition, options among the non-fuel tax dependent revenue sources should be considered for their roles as supplements to fuel and vehicle taxes. Among these options are those with apparent positive and negative features above and beyond their revenue potential. Some, such as local sales, taxes may undercut key program objectives of equity and coordination which others, such as tolls, may foster improved project selection and congestion management.

2005 Oberstar Forum

In the long run, a new framework for transportation finance is likely to be necessary. In part, this can evolve from the range of revenue sources already utilized; however the central role of fuel taxes and the important political and management dimensions of basing transportation finance on user fees, suggests a new system of direct user charges may be feasible and desirable. It is not too soon to begin to consider the technological, administrative and policy dimensions of such a system. Furthermore, the recent developments in toll road development and pricing provide a “laboratory” for gaining experience with direct user charges.

There is remarkable little systematic research regarding the current complex funding of surface transportation and the implications of the revenue sources and financing of the surface transportation system—at either the national or individual state levels. The impact of the funding mix on equity, system programming, project selection, system operational efficiency, relative influence of federal, state and local governments, role of the private sector, etc. have received only modest consideration. It is not too soon to undertake these needed investigations and generate a serious national dialogue about the future of transportation finance.