Report of the National Surface Transportation Infrastructure Financing Commission

PAYING OUR WAY

A New Framework for Transportation Finance

NATIONAL SURFACE TRANSPORTATION INFRASTRUCTURE FINANCING COMMISSION

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February 26, 2009

The Honorable Joseph R. Biden, Jr.
President of the United States Senate
Washington, DC 20510

The Honorable Nancy Pelosi
Speaker of the United States House of Representatives
Washington, DC 20515

Dear Mr. President and Madam Speaker:

We are pleased to transmit to you the final report of the National Surface Transportation Infrastructure Financing Commission entitled "Paying Our Way: A New Framework for Transportation Finance." Over the last two years the Commission has worked to respond to Congress's charge in Section 11142 of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act—A Legacy for Users to assess future federal highway and transit investment needs, evaluate the future of the federal Highway Trust Fund, and explore alternative funding and financing mechanisms for surface transportation.

In developing this report, the Commission benefited from extensive input from a wide array of experts from organizations in the private and public sectors. This investigative effort was aided by the release of our interim report in February, 2008, "The Path Forward: Funding and Financing Our Surface Transportation System," which identified guiding principles and a systematic approach that have underpinned our evaluation of alternatives and the resulting policy recommendations included in this report.

The recommendations we offer focus on transforming the way we, as a nation, pay for critically needed surface transportation investments and, in so doing, respond to the urgent need for fundamental reform. The Commission recognizes that while such change will neither be easy nor occur overnight, the transportation system and the nation cannot afford to wait. Expansion of short term, conventional funding measures will be required in the interim.

This report is signed on behalf of all fifteen Commissioners and represents a carefully deliberated consensus of opinion about the various strategies that we believe, together, can help solve our surface transportation investment crisis and provide a useful road map for transitioning to a new financial policy framework.

We appreciate having the opportunity to serve on the Commission and we trust the findings and recommendations contained in this report will aid your efforts to address the current challenge and put the transportation system back on track toward a safe, effective, efficient, fair and sustainable future.

As required by statute, this report along with an identical letter is being transmitted to the Secretary of Transportation, the Secretary of the Treasury, the Committee on Ways and Means of the House of Representatives, the Committee on Finance of the Senate, the Committee on Transportation and Infrastructure of the House of Representatives, the Committee on Environment and Public Works of the Senate, and the Committee on Banking, Housing, and Urban Affairs of the Senate.

Sincerely yours,

Robert D. Atkinson
Chair

Martin Schultz
Vice Chair

Paying Our Way

A New Framework for Transportation Finance

Final Report of the National Surface Transportation Infrastructure Financing Commission

February 2009

This report is a product of the National Surface Transportation Infrastructure Financing Commission (and not of the U.S. Department of Transportation).

Additional information on the Commission is available at: http://financecommission.dot.gov

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- American Road and Transportation Builders Association
- American Society of Civil Engineers
- American Trucking Associations
- Associated General Contractors of America
- Bipartisan Policy Center – National Transportation Policy Project
- Coalition for America's Gateways and Trade Corridors
- Environmental Defense Fund
- ITS America
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LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AMT	Alternative Minimum Tax
APTA	American Public Transportation Association
C&P	*Conditions and Performance* report (DOT)
CAFE	Corporate Average Fuel Efficiency
CBO	Congressional Budget Office
CPI-U	Consumer Price Index for all Urban Consumers
DOT	Department of Transportation
EIA	U.S. Energy Information Agency
ETC	electronic toll collection
FAH	federal-aid highway (program or system)
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FY	fiscal year
GARVEE	Grant Anticipation Revenue Vehicle
GAN	Grant Anticipation Note
GDP	gross domestic product
GPS	Global Positioning System
GVW	gross vehicle weight
HOT	high occupancy/toll
HOV	high occupancy vehicle
HTF	Highway Trust Fund
HVUT	Heavy Vehicle Use Tax
ISRRPP	Interstate System Reconstruction and Rehabilitation Pilot Program
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITS	Intelligent Transportation System
LDV	light-duty vehicle
MFT	motor fuel tax
MPG	miles per gallon
NCHRP	National Cooperative Highway Research Program
NHS	National Highway System
OBU	on-board unit
PAB	private activity bond
PFC	passenger facility charge
PMT	passenger miles traveled
R&D	research and development
RD&D	research, development, and demonstration
ROW	right of way
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SIB	State Infrastructure Bank
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century
TIFIA	Transportation Infrastructure Finance and Innovation Act of 1998
TRB	Transportation Research Board
VAT	value-added tax
VMT	vehicle miles traveled

STEERING OUR NATION'S TRANSPORTATION SYSTEM BACK INTO THE BLACK

Summary Findings and Recommendations

The nation faces a crisis. Our surface transportation system has deteriorated to such a degree that our safety, economic competitiveness, and quality of life are at risk.

As a nation, we have reaped the benefits of previous generations' foresight and investment, generations that developed and built a transportation system that became the envy of the world. Over the last few decades we have grown complacent, expecting to be served by high-quality infrastructure, even as we devoted less and less money in real terms to the maintenance and expansion of that infrastructure. Not only have we failed to make the needed and substantial investment; we have failed to pursue the kind of innovation necessary to ensure that our infrastructure meets the demands of future generations.

This is not to say the nation is asleep at the wheel. The United States Congress has recognized the dangers of inattention and delay and has asked for assistance to re-envision the way the federal government funds and finances our national surface transportation infrastructure. Congress established the National Surface Transportation Infrastructure Financing Commission to provide recommendations for policy and action. This report offers the results of the Commission's investigative efforts and deliberations. It provides a new framework for consideration by policy makers with responsibility for financial stewardship of the nation's surface transportation network—and for all Americans traveling that network through cities and rural areas from coast to coast.

The Commission sought out the best ideas, the latest data, and the strongest research. Commissioners vigorously debated the options and developed recommendations for improved methods to fund and finance our national surface transportation infrastructure. While no first draft of a major reform is perfect, the Commission respectfully *and unanimously* offers its report as a road map for the transition to a new funding and finance framework, in the hope that this will inspire and inform further efforts toward a national surface transportation system that is more efficient, more effective, and more sustainable. The Commission's recommendation to shift from our current funding approaches, based largely on indirect user fees in the form of federal motor fuel taxes, toward a new system built around more direct user charges in the form of fees for miles driven will require hard work, thoughtful attention to myriad policy issues and implementation details, and the cooperation and support of the American people.

- **Real highway spending per mile traveled has fallen by nearly 50 percent since the federal Highway Trust Fund was established in the late 1950s. Total combined highway and transit spending as a share of gross domestic product (GDP) has fallen by about 25 percent in the same period to 1.5 percent of GDP today.**
- **Because it is not adjusted for inflation, the federal gas tax has experienced a cumulative loss in purchasing power of 33 percent since 1993—the last time the federal gas tax was increased.**

ROOTS OF THE PROBLEM AND WIDENING INVESTMENT GAP—BACKGROUND

The roots of our current crisis lie in our failure as a nation to fully understand and, more important, act on the costs of deferred investment in our surface transportation infrastructure, especially in the face of an aging infrastructure, a growing population, and an expanding economy. From 1980 to 2006, the total number of miles traveled by automobiles increased 97 percent and the miles

traveled by trucks 106 percent. Over the same period, the total number of highway lane miles grew a scant 4.4 percent—meaning that over twice the traffic was traveling on essentially the same roadway capacity. And that says nothing about the mounting neglect of the system: over half of the miles that Americans travel on the federal-aid highway system are on roads that are in less than good condition, more than one-quarter of the nation's bridges are structurally deficient or functionally obsolete,[1] and roughly one-quarter of the nation's bus and rail assets are in marginal or poor condition.[2]

Traffic congestion in many of the nation's metropolitan areas is endemic, with the cost of congestion—including lost time, wasted fuel, and vehicle wear and tear—topping $78 billion per year for the nation's 437 urban areas.[3] Transit ridership has recently surged, leaving some systems operating near or beyond their physical capacity. Many rural areas currently do not have any transit services and in areas that do have service the quality and coverage are inconsistent.

The federal government does not bear sole responsibility for the current crisis. All levels of government are failing to keep pace with the demand for transportation investment. Increasingly, policy makers at all levels must use existing revenues simply to attempt to keep pace with the preservation and maintenance of an aging system, leaving few or no resources for vitally needed new capacity and improvements to the system.

EXHIBIT ES–1: AVERAGE ANNUAL CAPITAL NEEDS AND GAP ESTIMATES, ALL LEVELS OF GOVERNMENT, 2008–35 (in 2008 dollars)

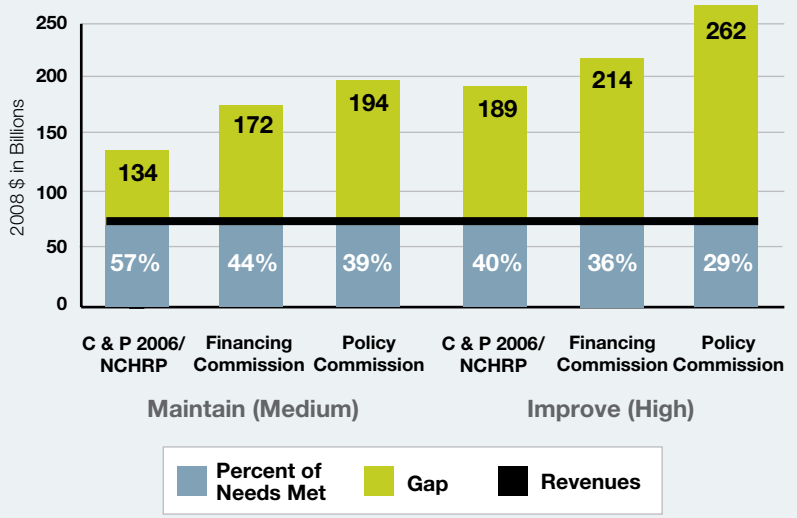
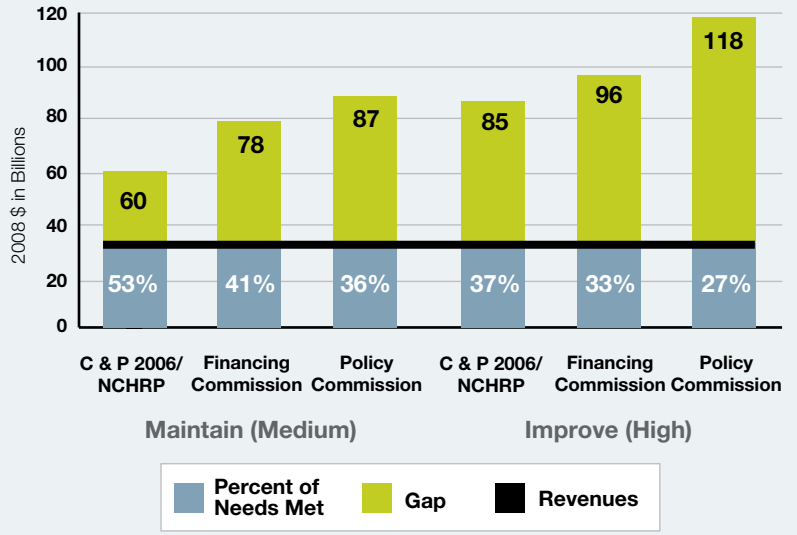


EXHIBIT ES–2: AVERAGE ANNUAL CAPITAL NEEDS AND GAP ESTIMATES, FEDERAL GOVERNMENT, 2008–35 (in 2008 dollars)



An ever-expanding backlog of investment needs is the price of our failure to maintain funding levels—and the cost of these investments grows as we delay. Without changes to current policy, it is estimated that revenues raised by all levels of government for capital investment will total only about one-third of the roughly $200 billion necessary each year to maintain and improve the nation's highways and transit systems. (See Exhibit ES–1.) At the federal level, the investment gap is of a similar magnitude, with long-term annual average Highway Trust Fund (HTF) revenues estimated to be only $32 billion compared with required investments of nearly $100 billion per year. (See Exhibit ES–2.)[4]

Meanwhile, the federal Highway Trust Fund faces a near-term insolvency crisis, exacerbated by recent reductions in federal motor fuel tax revenues and truck–related user fee receipts.

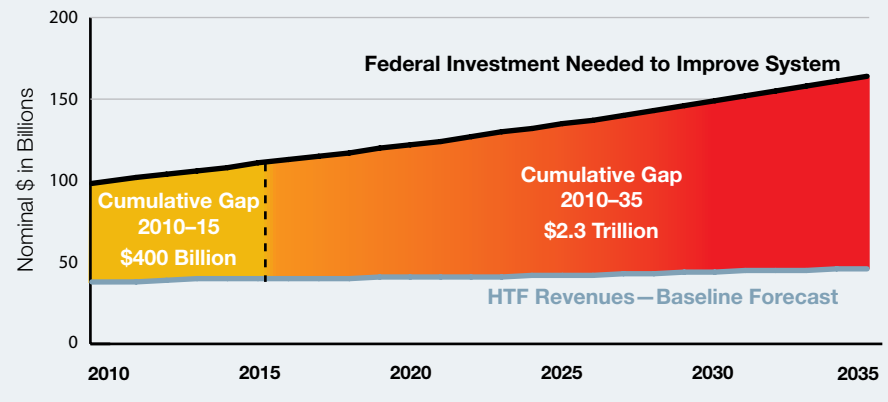
- **Urban travelers are delayed in rush hour traffic nearly one week (40 hours) per year, and in total Americans spend 4 billion hours per year stuck in traffic.**
- **As of 2006, over half of the total vehicle miles traveled on the overall federal-aid highway system occurred on roads that were in less than good condition, many of which are in rural areas that connect these regions to each other and to urban centers.**
- **Due in large part to ridership growth, many existing transit systems are operating near or in excess of their physical capacity and above a level that provides acceptable passenger comfort and safety.**

Sources: TTI 2007 Urban Mobility, FHWA 2006 C&P, TCRP 2008 State and National Public Transportation Needs.

This problem will only worsen until Congress addresses the fundamental fact that current HTF revenues are inadequate to support current federal program spending levels. Comparing estimates of surface transportation investment needs with baseline revenue projections developed by the Commission shows a federal highway and transit funding gap that totals nearly $400 billion in 2010-15 and grows dramatically to about $2.3 trillion through 2035. (See Exhibit ES–3.)

The problem, however, is not simply insufficient investment. Our system is underpriced. Basic economic theory tells us that when something valuable—in this case roadway space—is provided for less than its true cost, demand increases and shortages result. Shortages in our road system are manifested as congestion. All too often the prices paid by transportation system users are markedly less than the costs of providing the transportation services they use (including pavement repair)—much less the total social costs (including traffic congestion and pollution). This underpayment contributes to less efficient use of the system, increased pavement damage, capacity shortages, and congestion.

EXHIBIT ES–3: A LARGE AND WIDENING GAP BETWEEN FEDERAL REVENUES AND INVESTMENT NEEDS, 2010-35 (in nominal dollars)



If the federal government fails to act now, and to act dramatically, we will only compound these problems for future administrations and Congresses and for the next generation of Americans. We will face increasingly deteriorating roadways, bridges, and transit systems. We will suffer from more accidents and fatalities on our transportation system. We will endure ever greater spans of our lives stuck in traffic, wasting our time and robbing our businesses of vital economic activity and productivity. We will waste non-renewable petroleum and harm our environment unnecessarily. And, finally but importantly, every day of delay is a day when inflation, neglect, and inefficient use waste scarce taxpayer and system-user dollars.

SEARCHING FOR SOLUTIONS—THE FINANCING COMMISSION'S CHARGE AND DELIBERATIVE PROCESS

In response to these challenges, Congress established the National Surface Transportation Infrastructure Financing Commission to embark on an investigative and analytical effort to assess the funding crisis and make recommendations to address the growing transportation infrastructure

investment deficit. Specifically, Section 11142(a) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users established the Commission and charged it with analyzing future highway and transit needs and the finances of the Highway Trust Fund, making recommendations on alternative approaches to funding and financing surface transportation infrastructure, and reporting back to Congress within two years (by April 2009). While the Commission recognizes the important intersection between highways and transit and other forms of transportation, including freight rail, intercity passenger rail, inland waterways, and aviation, the focus of its work was highways and transit.

The Commission consists of 15 individuals from diverse backgrounds—economics, finance, government, industry, law, and public policy—united by a passion to help develop a more viable model to fund and finance our national surface transportation system. Its final report has drawn heavily on available literature, ongoing debates and forums, and, most important, input offered directly by a wide range of experts and user group representatives—for which the Commissioners are extremely grateful.

In charting its course, the Commission was mindful of the important work of the National Surface Transportation Policy and Revenue Study Commission (referred to here as the Policy Commission). Given the Policy Commission's thorough treatment of how investments should be prioritized and delivered, the Financing Commission focused its efforts primarily on the question of how revenues should be raised, including whether there are other mechanisms or funds that could augment the current means for funding and financing highway and transit infrastructure. As it relates to this core question, the Commission also considered how much revenue is actually needed and a few key issues related to how it should be invested.

To guide its work, the Financing Commission established a set of goals for the national surface transportation system—that it be *safe, effective, efficient, fair, and sustainable*. And to achieve these fundamental goals, the Commission developed a set of overarching principles to guide consideration of funding and finance approaches.

Readers should recognize that there are inherent and unavoidable trade-offs among these principles, which require some subjective balancing among them. The Commission strived to achieve such a balance in its final recommendations. ***Chapter 1 lays out these principles in greater detail and provides additional background on the nature of the Commission's charge.***

The Commission relied heavily on previous efforts by the U.S. Department of Transportation, the Policy Commission, and others to define the extent of the needs and forecast revenues for the future. The Commission did, however, develop from these resource materials its own refinements to account for currently available information as well as its hypotheses for the future. ***Chapter 2 establishes the investment needs and revenue forecasts developed by the Commission and used as the baseline for its deliberations.***

Working directly from the guiding principles and the baseline estimates, the Commission next developed systematic evaluation criteria to apply to the widest range of alternative funding approaches for the federal program, and indirectly for state and local programs, feasible for a study of this scale. ***Chapter 3 presents the 14 evaluation criteria that the Commission developed and the results of a preliminary screening of a comprehensive range of alternative funding mechanisms.***

GUIDING PRINCIPLES TO SHAPE A NEW FUNDING AND FINANCE FRAMEWORK

- The funding and finance framework must **support the overall goal of enhancing mobility** of all users of the transportation system. The range of mobility needs throughout the nation requires an intermodal transportation network that ensures easy access, allows personal and business travel as well as goods movement without significant delays, and permits seamless transfers and choices among complementary transportation systems and services.
- The funding and finance framework must **generate sufficient resources to meet national investment needs on a sustainable basis**, with the aim of closing a significant funding gap. The framework must enable the federal government to raise sufficient funds and also support the ability of other levels of government to raise sufficient funds and make appropriate investments.
- The funding and finance framework should **cause users and direct beneficiaries to bear the full cost of using the transportation system to the greatest extent possible** (including for impacts such as congestion, air pollution, pavement damage, and other direct and indirect impacts) in order to promote more efficient use of the system. This will not be possible in all instances, and when it is not, any cross-subsidization must be intentional, fully transparent, and designed to meet network goals, equity goals, or other compelling purposes.
- The funding and finance framework should **encourage efficient investment** in the transportation system—recognizing the inherent differences between and within individual states—such that investments go toward projects with the greatest benefits relative to costs.
- The funding and finance framework should **incorporate equity considerations**—for example, with respect to generational equity, equity across income groups, and geographic equity.
- The funding and finance framework should **support the broad public policy objectives of energy independence and environmental protection**. Revenue-raising mechanisms that impose the full cost of system use (including externalities such as carbon emissions) can support reduced petroleum consumption and improved environmental outcomes.

After examining the full range of potential funding approaches, the Commission conducted an additional level of review for a subset of the most promising options or those that otherwise required more in-depth analysis. *Chapters 4, 5, and 6 provide the results of these in-depth analyses for motor fuel tax mechanisms, freight-related funding options, and facility-level tolling and broad-based pricing mechanisms.*

In recognition of the supporting role that financing mechanisms can play in leveraging resources—as distinct from the underlying revenue-raising mechanisms that generate net new resources—the Commission considered alternative financing approaches, including private-sector financial participation, that can help meet the investment challenge. *Chapter 7 summarizes the results of this assessment, recognizing that these financing approaches are enhancements to rather than substitutes for much needed funding increases.*

Finally, and critically, the Commission arrived at specific policy recommendations to help narrow the federal funding gap and transform the overall funding and finance framework for the nation's investment in surface transportation infrastructure. *Specific recommendations are offered in detail in Chapter 8 and in summary form here.*

THE FINANCING COMMISSION'S RESPONSE—FINDINGS AND RECOMMENDATIONS

Through its wide-ranging investigative and deliberative process, the Commission makes the following critical findings:

- **There is no easy "silver bullet" solution to the problem of insufficient funding.** As an important corollary, not all approaches work equally well throughout a geographically and economically diverse country. The Commission assembled a broad and balanced menu of options for Congress to consider, with an assessment of the pros and cons of each approach.

- **The current federal surface transportation funding structure that relies primarily on taxes imposed on petroleum-derived vehicle fuels is not sustainable in the long term and is likely to erode more quickly than previously thought.** This is due in large measure to heightened concerns regarding global climate change and dependence on foreign energy sources, which are creating a drive for greater fuel efficiency, alternative fuels, and new vehicle technology.

- **The current indirect user fee system based on taxes paid for fuel consumed provides users with only weak price signals to use the transportation system in the most efficient ways.** This results from three primary factors: system users are typically unaware of how much they pay in fuel taxes (as distinct from the price of gasoline), such that daily swings in price mask the tax component and blunt its effect on demand; fuel taxes and other direct and indirect user fees currently account for less than 60 percent of total system revenue (federal, state, and local), so that users do not bear anywhere near the full costs of their travel; and fuel taxes have no direct link to specific parts of the system being used or to times of the day and thus cannot be used to affect these kinds of traveler choices.

- **A federal funding system based on more direct forms of "user pay" charges, in the form of a charge for each mile driven (commonly referred to as a vehicle miles traveled or VMT fee system), has emerged as the consensus choice for the future.** The Commission cast a wide net, reviewed many funding alternatives, and concluded that indeed the most viable approach to efficiently fund federal investment in surface transportation in the medium to long run will be a user charge system based more directly on miles driven (and potentially on factors such as time of day, type of road, and vehicle weight and fuel economy) rather than indirectly on fuel consumed. At the same time, this choice for the federal system provides a foundation for state and local governments that choose to use it to develop their own mileage-based systems that piggyback on the federal system in order to raise their share of needed revenues in ways that spur more efficient use of the system. The Commission believes that such a system can and should be designed in ways that protect users' privacy and civil liberties, that incorporate any necessary cross-subsidies (for instance, to benefit the national network or to meet social equity objectives), that do not interfere with interstate commerce, and that support goals for carbon reduction. Moreover, greater use of pricing mechanisms, including both targeted tolling and broad-based VMT pricing systems, may spur more efficient use of our highway network and, by shifting demand to less congested periods of the day or to other modes, may in turn enable more efficient investment, thus reducing the additional capacity that needs to be built.

INFRASTRUCTURE STIMULUS WILL NOT SOLVE THE PROBLEM

An economic stimulus spending package that includes investments in surface transportation, while helpful, will not solve the immediate or the longer-term problems of funding system needs. The current investment shortfall is just too great.

The Highway Trust Fund will continue to need significant augmentation beyond whatever an immediate short-term stimulus plan can provide. For instance, a stimulus package that includes nearly $40 billion for highway and transit infrastructure, while important in addressing the short-term economic crisis, will pay for only about three months of the identified annual national funding gap to maintain and improve the system—a gap that repeats itself and compounds year after year.

EXHIBIT ES–4: REVENUE OPTION EVALUATION SUMMARY*

Strong	Moderate	Weak	Not Applicable/ Seriously Flawed**
Federal Options			
• Vehicle miles traveled fee • Automobile tire tax • Motor fuel tax • Carbon tax/cap and trade • Customs duties • Truck/trailer sales tax • Vehicle registration fee • Heavy Vehicle Use Tax • Container fee • Tariff on imported oil • Sales tax on motor fuels • Truck tire tax	• Freight waybill tax • Vehicle sales tax • Harbor maintenance tax • General fund transfer	• Freight ton-mile tax • Driver's license surcharge • Bicycle tire tax • Dedicated income tax • Auto-related sales tax • Freight ton-based tax • General sales tax	• Vehicle inspection and traffic citation surcharge • Vehicle personal property tax • Windfall profits tax • Petroleum franchise tax • Minerals severance tax • Federal tax on local transit fares • Federal tax on local parking fees
State and Local Options Benefiting from Federal Action			
• Facility level tolling and pricing	• Proceeds of asset sales, leases, and concessions	• Cordon area pricing • Passenger facility charges	• Development and impact fees • Tourism-related taxes • Tobacco, alcohol, and gambling taxes

**For revenue options that are dependent upon utilization of a targeted investment fund as a basic premise for feasibility, such a fund is assumed for evaluation purposes (e.g., for all freight-related funding mechanisms and more specifically those more narrowly targeted to intermodal port and harbor-related investment).*

*** State and local options in this category may have applicability but there is no relevant federal action or role.*

- **As a nation, we cannot afford to wait for a new revenue system to be put in place to start addressing the fundamental investment challenge. And, in the short term, effective and feasible options are limited.** Given the significant current funding shortfall, the Commission concluded that the best near-term options for federal investment are increases to current federal fuel taxes and other existing HTF revenue sources. After reviewing a wide array of options and suggesting several viable candidate approaches (see Exhibit ES–4), the Commission concluded that increasing and indexing existing mechanisms satisfies the key evaluation criteria most effectively—primarily in raising significant sums with relatively low implementation costs or other hurdles. That is not to say that other options are not possible should Congress choose to pursue other avenues as well, but increases in existing HTF revenues present the best option in the near term, the Commission believes.

- **Federal actions can help expand the options available to states and localities to fund their shares of investment.** While many state and local funding options are not reliant on the federal government for implementation, several key federal actions could help facilitate and encourage the greater application of some—specifically, user-backed funding approaches such as tolling and pricing—to help meet a portion of state and local government investment needs, including their required matching of federal support.

- **Finally and importantly, financing approaches—as distinct from revenue-raising mechanisms—are not a substitute for solving the underlying problem of insufficient funding.** Properly structured financing techniques and government financial programs, including those focused on facilitating partnerships with the private sector, can play an important supplementary role. Their success, however, will depend on their ability to leverage new revenue streams to repay upfront capital investments. Even with this, financing approaches will have limited positive impact if not coupled with substantial net new resources.

The Commission realizes that the transition from the current funding and finance model to a new model cannot be made overnight and that the immediate needs are simply too critical to wait until such a system is put in place. The Commission therefore makes the following recommendations for a multi-pronged approach to meet both short-term and longer-term challenges. More detailed recommendations are provided in Chapter 8.

Ensuring the Security and Sustainability of the Highway Trust Fund

The Commission recognizes the fundamental value of the Highway Trust Fund—not only today but also as the appropriate foundation for any new user-based revenue system for surface transportation investment in the future—and offers the following overarching recommendation.

- **Preserve the Highway Trust Fund mechanism and take any necessary actions to help ensure its security and sustainability in the near and longer term.** This should include ensuring the integrity of the trust fund structure premised on the link between direct and indirect user fees and transportation spending upon which the HTF is based. It also should include continued efforts to reduce and minimize tax evasion and methods to align spending and receipts, with interest earned on any balances accruing to the HTF.

Positioning Federal Funding for the Longer Term

In order to transition to the longer-term solution of funding based on mileage charges, the Commission makes the following recommendations:

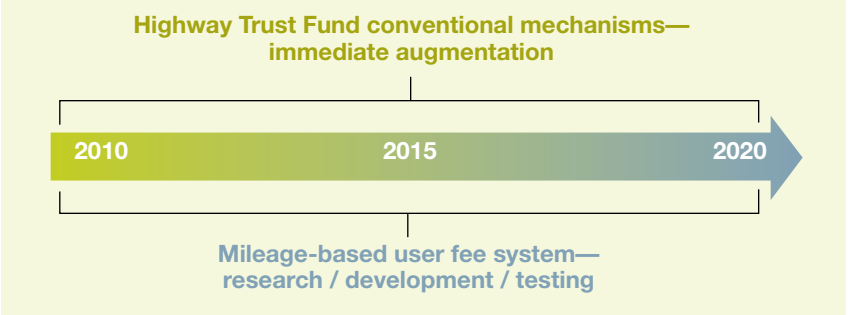
- **Commence the transition to a new, more direct user charge system as soon as possible and commit to deploying a comprehensive system by 2020.** Because of the complexity inherent in transitioning to a new revenue system and the urgency of the need, the Commission recommends that Congress embark immediately on an aggressive research, development, and demonstration (RD&D) program. This would identify and address critical policy questions such as privacy, administrative methods and costs, and the interplay with climate change and other national policy goals, in order to inform Congress as it moves forward. This will require investment in research and technology, including a variety of demonstration programs of mileage-based user fee systems. A research agenda of the nature envisioned would be best overseen by a body within the U.S. Department of Transportation that combines technology, policy, tax administration, and systems expertise. It also could benefit greatly from an expert independent advisory committee to help review and advise on funding of RD&D programs, further explore policy issues, and make specific recommendations to Congress.

- **Ensure that, once implemented, mileage-based fees and any other charges are set to meet the designated federal share of national surface transportation investment needs, and index these rates to inflation.** Simply shifting from one revenue system to another will not solve the under-investment problem if rates are not set at sufficient levels and maintained over time to meet the needs. While a mileage-based direct user fee system is sustainable in the long term, it will suffer at least some of the same consequences as the motor fuel tax system if rates are not set and maintained at adequate levels. For illustrative purposes, the Commission estimates that to meet the base case "Need to Maintain and Improve" annual investment level, the federal VMT fee assessed on all miles driven, regardless of the system where they occur, would be roughly 2.3¢ per mile for cars (equivalent to a 48.4¢ gas tax). To equal the amount raised by the Commission's short-term HTF augmentation recommendations, the fee level for cars would be about 1.4¢ per mile; to match current HTF revenues, about 0.9¢ per mile. These rates would be somewhat higher if assessed only on miles traveled on the federal-aid highway system as opposed to all highway miles. However much revenue Congress decides to raise at the federal level, the Commission believes it is critical to move forward with a VMT fee system.

- **As the new mileage-based fee system is put in place, reduce and ultimately eliminate current fuel and other vehicle-related charges as the primary mechanism for funding the surface transportation system, recognizing that the fuel tax may play a role in meeting other important national policy objectives.** Once a national VMT fee system is in place, and assuming that rates are set at a sufficient level, the need for the motor fuel–based revenue sources for the HTF will be eliminated. To the extent, however, that surface transportation fuels are subject to a charge in the future to account for their carbon emissions (e.g., a carbon tax or priced through carbon trading), an appropriate portion of those proceeds should be credited to the HTF and dedicated to funding carbon-reducing transportation strategies.

- **Establish VMT technology standards and require original equipment vehicle manufacturers to install standardized technology by a date certain that will accommodate the desired 2020 comprehensive implementation.** Any technology deployed should be designed to accommodate the full range of potential charge systems in anticipation of the potential for state, local, and private toll roads to piggyback on the national system. These state, local, or private systems should be required to be interoperable with the national VMT standard. Ideally such systems also should incorporate in-vehicle or after-market Global Positioning System (GPS) devices.

MILEAGE-BASED USER FEE SYSTEM: 2020 IMPLEMENTATION



- **Initiate an extensive public outreach effort to create a broad understanding of the current funding problem, the proposed solution, the intended method of implementation, and the anticipated impact on individual system users.** This kind of public outreach effort is imperative to a successful transition, for once individuals understand better both the current predicament and the opportunity

to achieve positive change, they are more likely to embrace it. With the current indirect system (cents per gallon at the pump, hidden to most consumers in the price of gasoline), most people do not know what they are paying now relative to what is being provided and, more important, what is required to achieve an effective surface transportation system. The direct user charge system being proposed has the potential to make the connections much more evident and thus improve the willingness of individual system users to pay their fair share of the cost. But it will require education and outreach to reach that point.

Addressing the More Immediate Federal Funding Crisis

The stakes are too high and the hole we have dug for ourselves too big to wait for a new revenue system to be put in place. The Commission therefore offers the following recommendations for the federal surface transportation funding system in the short to medium term (i.e., starting with the upcoming reauthorization of federal surface transportation programs if not before).

- **Enact a modest 10¢ increase in the federal gasoline tax, a 15¢ increase in the federal diesel tax, and commensurate increases in all special fuels taxes, and index these rates to inflation.** These adjustments should be enacted in conjunction with the upcoming reauthorization of the federal surface transportation programs if not sooner. The Commission recognizes that the increases recommended here are not easy to achieve, especially in the context of the current economic recession, and that larger increases would be even more difficult to enact. The Commission, however, views the need for this increase as urgent and critical to begin to stem the degradation of the Highway Trust Fund and make positive strides forward.

The proposed 10¢ gas tax increase to maintain the current federal surface transportation program level equals:

- **½¢ per mile**
- **$5 a month per vehicle**
- **$9 a month per household***

**Based on 1.89 vehicles per household and 11,818 miles driven per vehicle (2006 Highway Statistics), and 20.4 average MPG (EIA 2008 estimates).*

These adjustments approximate the amounts required to recapture the purchasing power lost to inflation since 1993, the last time the federal HTF taxes were raised. They translate into approximately $20 billion per year in additional revenue for the Highway Trust Fund. While this is necessary to fund the current level of federal commitments and helps alleviate a portion of the funding gap, it does not eliminate it—closing approximately 43 percent of the "cost to maintain" federal funding gap and 31 percent of the "cost to improve" gap for the combined highway and transit system based on the Commission's estimates. Addressing the remaining annual funding gap will require either more substantial increases or other revenue streams, or both.

The impact on individual households of the recommended gas tax increase is that on average they would pay approximately $9 per month more in federal gas taxes (individual households now pay on average $17 per month). By comparison, the average household pays about $300 per month to operate and maintain its cars (and about $800 per month to own and operate them).[5]

- **Double the Heavy Vehicle Use Tax (HVUT) to account for the fact that it has not been increased since 1983 and to recapture lost purchasing power, and index the HVUT and the excise tax on truck tires to inflation going forward. Meanwhile, maintain the current sales tax on tractors and trailers, which as a sales price-based tax is inherently adjusted (at least relative to the price of these items).** The Commission considered a number of alternative freight-related revenue sources but determined that, while several of them may be viable options, the best way to increase funds from freight sources in the short run is by adjusting the fees that the entire trucking industry currently pays into the Highway Trust Fund. In addition, the Commission recommends that Congress authorize a study to assess whether a shift toward freight users paying a greater share of total surface transportation infrastructure based on the costs they impose on the system is warranted.

Historically, states and localities have contributed over 55 percent of transit and highway capital investment and shouldered primary responsibility for the extensive costs of operating and maintaining the system.

Facilitating Non-Federal Investment in the Short and Medium Term

Beyond the immediate steps necessary to address the federal funding crisis and position the nation for a new direct user charge system, the Commission believes important steps are imperative to expand the ability of states and localities to use other options to fund non-federal surface transportation infrastructure investment. Historically, states and localities have contributed over 55 percent of transit and highway capital investment, and they have shouldered primary responsibility for the extensive costs of operating and maintaining the system. The Commission believes that carefully targeted federal incentives can help spur new approaches at the state and local level, including tolling and pricing, thereby fostering greater overall investment that will in turn allow federal dollars to go farther. Although other funding mechanisms undoubtedly are important at the state and local level, federal policy does not generally play a significant role.

- **Expand the ability of states and localities to impose tolls on the Interstate System by allowing tolling of net new capacity.** This recommendation builds on the currently enacted Interstate System Construction Toll Pilot Program and would remove the limit on the number of facilities that can take advantage of the program. In considering this and subsequent recommendations, and to ensure full adherence to the commerce clause of the Constitution, any potential adverse impacts on interstate commerce and local travel should be thoroughly analyzed and appropriately mitigated as a requirement for implementation.

- **Allow tolling of existing Interstate capacity in large metropolitan areas (of 1 million or more in population) for congestion relief.** This recommendation builds on the Express Lanes Demonstration Program, expands its potential applications, and removes some of the pilot requirements.

- **Continue the Interstate Highway Reconstruction and Rehabilitation Pilot Program and expand it from three slots to five.** This pilot program allows tolling of existing Interstate capacity for reconstruction and rehabilitation. If tolling the existing Interstate System is determined to be the appropriate solution by a particular state, this pilot program enables the state to use this option to help meet its funding gap. States that participate in the pilot program must ensure that there are appropriate protections for system users and interstate commerce.

- **Support standardization of tolling and information systems by completing necessary rulemaking regarding electronic tolling and interoperability.** A key role of the federal government is to spearhead the coordination that is required to ensure frictionless transitions throughout the system and to provide users with the information they need to make smart choices.

- **Reauthorize the federal credit program for surface transportation (originally authorized by the Transportation Infrastructure Financing and Innovation Act of 1998 and now commonly referred to as TIFIA) with a larger volume of credit capacity, broadened scope, and greater flexibility. In conjunction with core credit assistance, authorize incentive grants to support and encourage the development and financing of user-backed projects. The Commission recommends a total of $1 billion per year in budget authority for the following purposes:**

  Credit Assistance ($300 million in annual budget authority)—to fund core credit assistance. The Commission also recommends several programmatic refinements, including having greater flexibility to make credit commitments.

  Pre-construction Feasibility Assessment Grants ($100 million in annual budget authority)—designed to address a key obstacle that states and localities face in advancing user fee-backed projects. The program would provide funding (in the form of grants or "conditional loans" to be repaid when possible) for a portion of the costs that a state or local sponsor must incur to undertake early planning, feasibility studies, environmental clearance, and other development-stage activities. The Commission believes that such a program could create substantial leverage of limited federal assistance.

  Capital Cost Gap Funding Grants ($600 million in annual budget authority)—to provide incentive grants to states to complement TIFIA credit assistance. Recognizing that there are many projects for which partial (but not 100 percent) funding through user-backed revenue streams is possible, this program would provide grant funding to help close a portion of the estimated gap between the amount of capital for construction that can be derived from future user fees and the amount necessary to complete and maintain the facility for its useful life. Such a program could help spur states and localities to seek to build more projects that rely at least in part on user-backed revenues, allowing federal funds to go farther since they would be supplemented by additional user-based revenues.

- **Invest $500 million per year ($3 billion over a six-year authorization period) to re-capitalize State Infrastructure Banks (SIBs) and continue to allow states to use their federal program funds for this purpose as well.** While the TIFIA program focuses on large projects of national and regional significance, there are similar opportunities for smaller projects that the SIB model is well positioned to serve. Providing this level of new capitalization funding could help support a wide range of smaller projects that have the potential to leverage user-backed payments and other new revenue streams but that lack access to capital markets on a cost-effective basis.

- **Take actions to facilitate and encourage private-sector financial participation where this can play a valuable role in providing cost-effective and accelerated project delivery, and support user fee–based funding approaches to meet the country's capacity needs and, in particular, its urban congestion challenges. At the same time, ensure that appropriate governmental controls are in place to protect the public interest in all respects.** Private capital can help deliver more projects and thus play a role in helping to address the investment gap. It should only be pursued, however, with appropriate protections for the public interest. These should include, above all else, ensuring appropriate maintenance of and access to privately operated facilities and requiring that any proceeds generated for state or local project sponsors be used for additional surface transportation investment within the state or relevant jurisdiction. Federal policy in this area should recognize the respective purviews of federal and state governments and should preserve and support the ability of state and local officials to impose appropriate restrictions on these arrangements. The federal government should support the development of best practice information to inform state and local efforts, including working with appropriate stakeholder and industry groups to develop guidelines for transparency and accountability for public-private partnerships.

- **Expand the highway/intermodal Private Activity Bond (PAB) program from its current $15 billion national volume cap to $30 billion and limit the use of the program to projects that create net new capacity.** Once the turmoil in the financial markets subsides, it is anticipated that the existing capacity of the PAB program will be consumed quickly. More states and local sponsors will be looking to take advantage of this mechanism to lower financing costs for projects with private-sector financial participation by making private provision of infrastructure eligible for the same exemption from federal taxation that state and local governments have for publicly provided infrastructure.

- **Consider authorizing the issuance of tax credit bonds to support capital investments with public benefits.**[6] The Commission encourages Congress to consider the use of tax credit bond financing as an appropriate tool for surface transportation projects where the public benefits cannot be fully monetized by direct users or other beneficiaries and where traditional HTF revenue-based programs are inadequate. Examples of investments with broad national benefits that could potentially be strong candidates for this type of federal subsidy include intercity passenger rail and goods movement projects. Use of such tax incentives, however, should be carefully targeted to capital investments with clear public benefits.

Commentary on Potential Federal Financing Institution

If Congress chooses to create a national infrastructure financing entity, the institution should be structured in a manner that addresses actual funding and credit market gaps and that targets assistance to projects that are essential to the national network but that lack access to sufficient resources through existing programs or other sources. Congress also should ensure that any such entity is properly integrated with or a logical extension of current programs, most notably federal credit programs such as TIFIA.

Any proposal to create a national infrastructure financing entity, as has been discussed in recent months in the form of a National Infrastructure Bank or National Infrastructure Reinvestment Corporation, must be considered in relation to its ability to provide necessary

financing unavailable through current government programs or the private markets and to be more effective than current programs in delivering the financial subsidies. It should be noted that the Commission's finance-related recommendations can be achieved within existing agencies and programs (e.g., the TIFIA credit assistance program) and do not require the creation of a new national-level entity. Either way, the Commission urges that important steps be taken (through fundamental reform of existing programs and/or proper structuring of a new entity) to support infrastructure investment that provides the highest societal returns while leveraging limited tax dollars with private-sector investment and new sources of revenue—particularly from direct user fees.

Any existing or new federal financing for targeted investments should be structured to offer one or more of the following benefits: access to capital that is difficult to obtain in private markets, lower-cost financing and more flexible terms than available from other sources, credit enhancement to help projects gain access to private markets, or financial assistance for projects of importance to the national transportation system that cannot be fully funded with identified revenues. The Commission cautions that the potential role of a new infrastructure financing entity should be examined in the context of long-term funding needs and not only as an immediate response to the current disruption in the credit markets.

Finally, the Commission emphasizes that the focus on new or enlarged funding programs and financing techniques should not be seen as a substitute for generating revenue by raising taxes, expanding tolling capabilities, or developing other sources. The institutional mechanisms being proposed, whatever their merit, will not in and of themselves directly address the core problem of insufficient revenue to support needed investment.

THE PATH FORWARD—CONCLUSIONS AND NEXT STEPS

The Commission has evaluated a wide range of options that could begin to close what has become an unacceptable and unsustainable investment deficit in our nation's surface transportation infrastructure. The Commission assessed each option's ability to raise significantly more resources at the federal level and to support the ability of state and local governments to do the same. In offering Congress the results of this analytical and deliberative process, the Commission recognizes that there are no easy solutions. Looking to the future, the Commission endorses the growing consensus that transitioning to a funding approach based more directly on use of the transportation system is the right foundation.

In the twentieth century, surface transportation was largely about steel and concrete: extending and expanding the physical network of roads, bridges, and rail systems and the cars, buses, and trucks that operated on it. The goal was to raise the money needed, from whatever sources, to build a robust enough system to meet the nation's mobility needs.

Looking to the future, the Commission endorses the growing consensus that transitioning to a funding approach based more directly on use of the transportation system, including mileage-based user fees, is the right foundation.

In the twenty-first century, steel and concrete will of course continue to be the foundation of our surface transportation infrastructure, and raising the resources needed to support that system will still be important. New capabilities of the system, however, will need to be not just big but also "smart." We are now able to use technological advances to significantly improve how

people pay for their use of the transportation system. Importantly, doing so will enable the delivery of a host of other benefits, including real-time information to vehicle drivers to help reduce congestion, improve safety, and reduce emissions, to transit operators to improve the convenience and reliability of public transit, and to system managers to better monitor and manage the system and improve the allocation of transportation infrastructure resources.

The Commission's core recommendations focus on the first attribute of this new intelligent system: improving how the system is funded, specifically in ways that are more sustainable and more efficient. The Commission's other recommendations also play vital roles in ensuring overall funding security and staving off further system degradation through immediate action that will afford the nation the time to realign the funding framework.

Transitioning from a fuel tax–based system to one based more directly on use of the highway system measured by miles driven undoubtedly will require a great deal of planning and public education. But that is no reason to delay initiating the transition. As one Commissioner warns, "If we don't start, we won't ever get there." And, as this process commences, policy makers will need to ensure that all stakeholders are consulted and involved in the decision making for all aspects of the transition.

In closing, if we fail to address the immediate funding crisis and longer-term investment challenge facing our surface transportation system, we will suffer grim consequences in the future: unimaginable levels of congestion, reduced safety, costlier goods and services, an eroded quality of life, and diminished economic competitiveness as a nation. Our alternative future—with increased federal revenue, new funding approaches, and new technology as a foundation—is an integrated national transportation system that is less congested and safer and that promotes increased productivity, stronger national competitiveness, and improved environmental outcomes. That future is waiting for us to embrace it.

Endnotes

1. Federal Highway Administration (FHWA), *2006 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance* (Washington, DC: U.S. Department of Transportation, 2007) (2004 data).

2. Federal Transit Administration, *Transit State of Good Repair* (Washington,DC: October 2008).

3. Texas Transportation Institute, *The 2007 Urban Mobility Report* (College Station, TX: September 2007).

4. Needs estimates are National Cooperative Highway Research Program revised estimates based on FHWA, op. cit. note 1; on 2007 estimates in National Surface Transportation Policy and Revenue Study Commission, *Transportation for Tomorrow* (Washington, DC: 2007); and on Financing Commission estimates developed from data provided by FHWA. Revenue estimates developed by Financing Commission.

5. Based on information from AAA's 2008 edition of *Your Driving Costs* (Heathrow, FL: AAA, 2008) for average sedans and on data from FHWA, *Highway Statistics 2006* (Washington, DC: U.S. Department of Transportation, 2008).

6. Tax credit bonds are a form of debt financing that significantly subsidizes the borrowing cost of the project sponsor (debt issuer) by having the federal government pick up part or all of the interest expense through the provision of tax credits to the investors.

E62
E25
E80
84
%
Back-on-Track
Culver City
Windsor Hills
View Park
Ladera Heights
Marina Del Rey
Inglewood
Lennox
Westmont
Hawthorne
Gardena
El Segundo
Lawndale
Manhattan Beach
Hermosa Beach
Redondo Beach
Torrance
Palos Verdes Estates
Lomita
Rolling Hills Estates
Rolling Hills
Harbor City
Wilmington
Carson
Compton
Willowbrook
Lynwood
South Gate
Florence
Huntington Pk.
Walnut Park
Maywood
Bell
Cudahy
Monterey Park
Alhambra
Los Angeles
Dockweiler State Beach
L.A. Int'l Airport
Flat Rock Pt.
Palos Verdes Pt.
Malaga Cove
Palos Verdes
Pacific Coast Hy
Del Amo Fashion Center
Zamperini Field
Civic Center
The Galleria at South Bay
Southbay Pavilion at Carson
Raleigh Studios
Los Angeles A F B
Alondra Park
Hawthorne Mun. Airpt
Jack Northrop Field
Lincoln Pk.
USC Health Sciences
S. Coast Botanical Gardens
Rolling Hills C.C.
U.S. NAVAL RES.
Long Aquarium
Seaside
Sepulveda Blvd
Pacific Coast Hy
Palos Verdes Dr. N.
Redondo Beach
Hawthorne Blvd
Crenshaw Blvd
Western Av.
Avalon Blvd
Wilmington
Anaheim St.
Carson St.
Del Amo
Lastlake Av.
Alcalde St.
Thomas St.
Lincoln Av.
Rosecrans Av.
Manchester Av.
Imperial Hy.
Vernon Av.
Florence Av.
Slauson Av.
Gaffey St.
Pacific Coast Hy
Harbor Fwy
San Diego Fwy
Gardena Fwy
Terminal Island Fwy
Long Beach Fwy
Alameda St.
Santa Fe Av.
Wilmington Blvd
Avalon Blvd
Normandie Av.
Vermont Av.
Hoover St.
Figueroa St.
Broadway
Main St.
Lucas Av.
Mariposa Av.
Sepulveda Blvd
Aviation Blvd
Inglewood Av.
Prairie Av.
Hawthorne Blvd
Crenshaw Blvd
Western Av.
Vermont Av.
Figueroa St.
Gaffey St.
Harbor Fwy
Pacific Coast Hy
Redondo Beach

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SETTING COURSE

Commission's Charge and Guiding Principles

The nation's surface transportation system is in physical and financial crisis.

All levels of government in the United States are failing to keep pace with the demand for transportation investment and increasingly must use existing revenues simply to attempt to keep pace with the preservation and maintenance of an aging system. This leaves few or no resources for vitally needed new capacity and other improvements to the system. As a result, congestion and system reliability have steadily worsened (see Box 1–1). Calls for increased investment, new institutional approaches to funding and to building and maintaining the system, and technological innovation are mounting.

If the federal government fails to act now, and act dramatically, the problems will only compound. We will end up with increasingly deteriorating roadways, bridges, and transit systems. We will suffer more accidents and fatalities on our transportation system. We will endure countless more hours stuck in traffic, which will take a growing toll not only on business productivity and our economic vitality as a nation but also on our basic quality of life. And, finally, we will waste precious taxpayer and system user dollars if costs continue to mount faster than inflation and continue to rise due to system neglect.

In response to these challenges, Congress established the National Surface Transportation Infrastructure Financing Commission (referred to here as the Financing Commission or the Commission) to analyze the funding crisis and make recommendations to address the growing transportation infrastructure investment deficit. In this report, the Commission presents Congress with a variety of options, highlights the advantages and disadvantages of each option, and makes recommendations about the most viable approaches to address the urgent needs of the U.S. transportation system.

This chapter outlines the Commission's mandate, identifies key issues beyond the mandate that influence the recommendations, and outlines the principles on which the Commission believes any new finance framework—consisting of both funding and financing strategies—should be based. The chapter concludes with an overview of the remainder of the report.

I. THE COMMISSION'S CHARGE

Congress created the National Surface Transportation Infrastructure Financing Commission to address the future of the federal Highway Trust Fund (HTF), alternative funding and finance mechanisms for surface transportation more broadly, and the fundamental question of how transportation revenue should be raised.

The Financing Commission draws its authority from Section 11142 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which authorizes federal surface transportation programs for highways, highway safety, and public transportation through federal fiscal year 2009. SAFETEA-LU directed the Commission to embark on an investigative and analytical effort, which included several specific issues related to the Highway Trust Fund and a broader survey of the nation's options for surface transportation funding and financing mechanisms, and to report back to Congress no later than April 2009. (The Commission began its work in April 2007 and released an interim report in February 2008.)

Congress authorized the Commission to examine these specific HTF issues:

- Current revenues in the federal HTF
- Projections of how HTF revenues might change
- Alternatives for funding the HTF
- Highway and transit needs for HTF funds
- Potential fuel tax exemptions for states waiving HTF funds
- Other matters closely related to these tasks

More broadly, the Financing Commission is to provide recommendations addressing:

- Funding levels sufficient to maintain and improve the nation's highway and transit systems
- Funding levels sufficient to ensure that federal investment in highways and transit systems does not decline in real terms
- Other mechanisms or funds that could augment the current means for funding and financing highway and transit infrastructure

Consistent with its statutory charge, the Commission has focused its efforts on highway and transit investment needs and funding options. It is clear, however, that improving the transportation system also requires giving more attention to other modes necessary for moving goods and people—including ports, inland waterways, freight and intercity passenger rail, aviation, and various intermodal linkages. The Commission has not attempted to quantify the potential investments in these other modes and related connections that might be advisable or necessary, but it acknowledges that such additional investments are critically needed and makes appropriate references to them in this report, especially as they relate to freight movement.

The Commission is mindful of the important work completed by the National Surface Transportation Policy and Revenue Study Commission (the Policy Commission) in January 2008 and its perspective on many of the funding issues the Financing Commission is authorized to explore. In light of the Financing Commission's broad mandate and the work already completed by the Policy Commission, the Financing Commission formulated three interrelated questions that are critical to addressing the surface transportation funding crisis:

1. How much revenue is needed to maintain and improve the nation's highway and transit systems?

2. How should this revenue be raised, including consideration of whether other mechanisms or funds could augment the current means for funding and financing highway and transit infrastructure?

3. How should this revenue be invested?

While the Policy Commission responded to the first of these questions, the Financing Commission does offer its own assessment of funding needs. The third question is relevant to the Commission's mandate because the amount of revenue required will depend on the scope of the federal surface transportation system and how efficiently the revenue is invested. This question of how best to

Section 11142(a) of SAFETEA-LU established the National Surface Transportation Infrastructure Financing Commission and charged it with analyzing future highway and transit needs and the finances of the Highway Trust Fund and making recommendations regarding alternative approaches to funding and financing transportation infrastructure. These recommendations must address, but are not limited to, the following topics:

(a) the levels of revenue that the federal Highway Trust Fund will require to maintain and improve the condition and performance of the nation's highway and transit systems and to ensure that federal levels of investment in highways and transit do not decline in real terms (§ 11142(b)(2)(A)-(B)); and

(b) the extent, if any, to which the Highway Trust Fund should be augmented by other mechanisms or funds as a federal means of financing highway and transit infrastructure investments (§ 11142(b)(2)(C)).

BOX 1–1. GROWING CRISIS IN SYSTEM PERFORMANCE

While accomplishments have been achieved in recent years, performance in several critical areas is declining, and without increased funding and a corresponding change in investment policies, these areas will deteriorate further.

Highway Performance

Highways serve as the backbone of our transportation system and are widely recognized as one of the nation's greatest assets. They provide citizens with a high degree of personal mobility and are integral to the movement of freight and the productivity of U.S. industry. Despite improvements in some areas, the performance of our highway system is generally in decline:

- From 1980 to 2006, automobile vehicle miles traveled (VMT) increased 97 percent and truck VMT increased 106 percent, while over the same period the total number of highway lane miles grew only 4.4 percent.[a]
- From 1982 to 2005, hours of delay per traveler increased 171 percent and total hours of delay increased 425 percent; over this same period, the total cost of congestion increased 383 percent and in the nation's 437 urban areas that cost is now estimated at over $78 billion per year.[b]
- As of 2006, over half of total VMT on the overall federal-aid highway system occurred on roads that were in less than good condition, many of which are in rural areas that connect these regions to each other and to urban centers. Over one-quarter of the nation's bridges are structurally deficient or functionally obsolete.[a]

Transit Performance

An efficient, safe, and environmentally sound network of public transportation facilities is essential both to moving people and to ensuring the ongoing vitality of the U.S. economy. Public transportation also plays a significant role in our efforts to mitigate traffic congestion, conserve fuel, enhance transportation system efficiency (including of highways), and address air quality issues. The nation's transit systems, however, face many challenges:

- Total ridership grew by 32 percent from 1995 to 2007 (2.4 percent annually) and recently surged in response to the increase in motor fuel prices that occurred in early and mid-2008.[c]
- Roughly one-quarter of the nation's bus and rail assets are in marginal or poor condition (near or past their useful life or have one or more defective or deteriorated components).[d]
- Between 1996 and 2006, more than 460 miles of fixed-guideway public transportation were added across 26 cities (exclusive of commuter rail service using private rail facilities). As a result of ridership growth, however, some existing rail systems are operating near or in excess of their physical capacity and above a level that provides acceptable passenger comfort and safety.[c]
- Many rural areas currently do not have any transit services, and in areas that do have service the quality and coverage are inconsistent.[c]

Freight Movements

Efficient and reliable freight movement is and will continue to be the lifeblood of the U.S. economy. Without a balanced and integrated network of freight infrastructure to support trucking, freight rail transportation, port activity, and intermodal transfers, we will not maintain our global economic competitiveness. Demand for freight movement is expected to increase rapidly in the future; our transportation system, however, is ill equipped to handle it:

- From 1994 to 2006, ton-miles of freight moved by truck and rail grew by 31 percent and 52 percent, respectively, while the ton-miles moved by water shrank 31 percent.[e]
- The top 25 truck bottlenecks in the United States (primarily at interstate interchanges) account for approximately 320 million total vehicle hours of delay and 37 million truck hours of delay each year.[f]

Safety

Continually improving the safety of our transportation system has been a high priority for transportation agencies at all levels of government. In the past, highway and transit safety performance has improved steadily and significantly over time. But achieving further improvements, most importantly reductions in fatality rates, will require additional effort and investment:

- From 1980 to 1994, the fatality rate (measured as deaths per million VMT) fell by almost 50 percent and the total number of highway fatalities declined by 20 percent. Improvements have been more modest in recent years; from 1994 to 2006, the highway

allocate resources, however, involves numerous issues as diverse as the relative role of various modes, the management of state transportation departments, and the nature of environmental regulation, to name a few. Because of its far-reaching nature and because the Policy Commission covered some of these aspects in detail, the Financing Commission determined that the third question was beyond its primary scope. The second question fits squarely within the Financing Commission's mandate and was not fully investigated by the Policy Commission. The Financing Commission therefore chose to make the question of how transportation revenue should be raised the principal focus of its inquiry and of this report. The other two questions are touched on as they relate directly to and are, in certain instances, inseparable from the principal focus of how the revenue should be raised.

(BOX 1-1, continued)

fatality rate declined by only 18.5 percent and the total number of fatalities actually rose by 4.7 percent. Since 2006, however, progress has been made. In 2007, the overall number of traffic fatalities on the nation's highways was the lowest since 2004, and improvement continued into 2008.[g]

- From 1995 to 2006, annual transit-related fatalities dropped from 0.77 to 0.49 per 100 million passenger miles traveled, a reduction of 36 percent.[h] Looking forward, however, the National Transportation Safety Board has expressed concerns that the rail transit industry is not investing enough to protect its workers, passengers, and capital assets.[d]

Environmental Impact

The environmental impact of the surface transportation system is an increasingly important performance consideration. Future surface transportation investments not only must provide increased capacity and better efficiency but also must seek to minimize impacts on the physical environment as well as harmful emissions:

- In 2007, the transportation sector was responsible for about 30 percent of U.S. carbon dioxide emissions.[i]
- While highway emissions of several regulated air pollutants have fallen significantly over the last several decades, greenhouse gas emissions (principally carbon dioxide) continue to climb—and are up 28 percent since 1990, due to increased travel demand associated largely with population growth and the stagnation of fuel efficiency across the U.S. vehicle fleet.[j]

Notes

a. Federal Highway Administration, *2006 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance* (Washington, DC: U.S. Department of Transportation, 2007).

b. Texas Transportation Institute, *The 2007 Urban Mobility Report* (College Station, TX: September 2007).

c. Transit Cooperative Research Program, *State and National Public Transportation Needs Analysis* (Washington, DC: Transportation Research Board, September 2008).

d. Federal Transit Administration, *Transit State of Good Repair* (Washington, DC: October 2008).

e. Bureau of Transportation Statistics, *National Transportation Statistics*, Table 1-46b: U.S. Ton-Miles of Freight, BTS Special Tabulation (millions), updated October 2008.

f. Cambridge Systematics, Inc., *Estimated Cost of Freight Involved in Highway Bottlenecks*, prepared for Federal Highway Administration (Cambridge, MA: 2008).

g. National Highway Traffic Safety Administration, *Traffic Safety Facts* (Washington, DC: U.S. Department of Transportation, 2006 and 2008).

h. Federal Transit Administration, *National Transit Database – Transit Safety and Security Statistics and Analysis Reporting*.

i. Energy Information Administration, *Emissions of Greenhouse Gases* (Washington, DC: U.S. Department of Energy, December 2008).

j. Environmental Protection Agency, *Inventory of Greenhouse Gas Emissions and Sinks: 1990-2006*, Table 2-15 (Washington, DC: April 2008).

II. THE CONTEXT FOR FUNDING REFORM

The Financing Commission's recommendations are set against a backdrop of policy considerations and assumptions that are explicitly outlined in this section. Each of these is addressed, as appropriate, in this report and in the Commission's final recommendations.

While the primary purpose of the Commission's deliberations has been to make specific recommendations about the advantages and disadvantages of various funding and financing approaches for surface transportation investment, the Commission recognizes the importance of underlying policy considerations that shape the federal role in transportation and that also must influence the ultimate finance framework to be selected. Accordingly, the following discussion

The annual levels of federal highway and transit spending required to meet the "need to maintain" level under the Financing Commission's Base Case Scenario are $59 billion and $19 billion, respectively, for a total of $78 billion. Estimated average annual revenues under current law generate approximately $32 billion, resulting in an annual revenue gap of $46 billion (in 2008 dollars).

The annual level of federal highway and transit spending required to meet the "need to improve" level under the Base Case Scenario climbs to $74 billion and $22 billion, respectively, for a total of $96 billion. This translates into an annual revenue gap of $64 billion (in 2008 dollars).

sets out the Commission's understanding of the broader context for the nation's surface transportation system, which a funding and financing system must be consistent with.

Considering the Federal Role in Transportation Investment

The federal government has wide-ranging goals for the surface transportation system and plays a critical leadership role in ensuring that these goals are adequately met.

The Commission recognizes the federal government has a critically important role in the national transportation system, promoting several goals, including safety, economic opportunity and access to transportation for all regions of the country, better air quality and environmental stewardship, effective freight movement, increased economic efficiency, fairness for both direct and indirect beneficiaries of the national transportation system, and development and widespread adoption of innovative approaches to providing cost-effective transportation solutions, including new technology. These considerations guided the Commission's deliberations.

Placing the Federal Role in Context

Federal policies can be considered only within the context of national needs and related state and local policies, recognizing that federal government actions have an impact on the ability to deploy certain approaches by other levels of government.

While the federal Highway Trust Fund helps pay for the nation's transportation infrastructure, it is the responsibility of state and local government to develop, construct, operate, and maintain that system (other than a very small number of roads on federal land). Every trip—whether carrying people or freight—uses a network of state, local, and sometimes private infrastructure from origin to destination. Thus the federal government should take into account state and local government assessments of transportation needs and should ensure that federal policies support and promote surface transportation investments across the nation at levels adequate to maintain system quality on all aspects of the national transportation system, not just those that are federally funded. Toward that end, federal funding and financing policies need to be coordinated with related state and local policies and must be cognizant of the impacts that one jurisdiction's actions—particularly those of the federal government—have on others' ability and willingness to deploy certain approaches. As federal action has the potential to either promote or impede funding and financing options at the state and local level, this interplay must be adequately considered in federal-level decision making regarding transportation funding and finance.

Placing Investment Needs in Context

The debate over transportation investment needs is not whether there is a gap in funding but rather how big that gap is.

This report addresses the widest possible set of surface transportation investment needs, including the investment required to improve the system for urban and rural system users and to meet the needs of freight movement. It also considers the investment required simply to maintain current performance and, more important, to improve it. Although the investment required to improve the condition and performance of our surface transportation system is significantly greater than that needed to maintain it, both sets of investment needs are simply daunting in comparison with current investment levels.

The Problem Is Broader than Urban Congestion

All state and local governments, including rural and urban localities, face substantial funding burdens to accommodate national interests. The Commission's recommendations therefore aim to address the full range of needs.

Federal portions of the system in urban areas are relatively small in terms of lane miles, but they have an outsized impact on the system as a whole because congestion and bottlenecks in large metropolitan areas can cause delays that ripple through the entire system and have significant impacts on both the economy and quality of life. Although urban congestion requires considerable attention, the ultimate solutions also must address both rural needs and freight-related investment demands. Rural highway miles represent 69 percent of federal-aid highway miles and 33 percent of vehicle miles traveled (or total miles traveled by all vehicles).[1] In addition to serving rural population centers, the preservation, maintenance, and improvement of rural surface transportation infrastructure helps people and goods travel efficiently between large metropolitan areas and across the country. Providing and maintaining transportation infrastructure—both for through traffic from large metropolitan areas and, in particular, for improved safety on rural roads—can place a significant burden on rural state and local governments.

Freight, which is moved through both rural and urban areas and through intermodal connections, requires a fully functional and integrated transportation network. The cost of facilitating that movement frequently falls to a single local jurisdiction and exceeds local funding capacity. Although local or regional governments may bear the responsibility for maintaining or improving specific portions of the system under the current funding system, they cannot and should not bear the entire cost, which ultimately benefits the nationwide movement of freight so critical to our national economy.

Revenue Mechanisms Can Improve System Performance and Reduce Investment Demand by Improving Efficient Use

Needs are not set in stone. Some revenue mechanisms, including those that charge more for traveling in peak periods or on heavily congested facilities, not only generate revenue but also positively influence how users decide when and where to use the system. By applying certain revenue mechanisms and optimizing use of existing infrastructure, we can—in some cases—reduce the need for additional infrastructure.

Demand for transportation services should not be separated from the way in which the services are funded. The more direct the charges are for use of specific infrastructure, the more efficient the use of that infrastructure can be, which may in turn reduce the need for expensive capital improvements. For example, charging higher prices to travel on highly congested roads can shift travel to less congested times of day or to other modes, such as transit. Some revenue mechanisms promote better utilization of existing capacity than other mechanisms and may

simultaneously generate revenue, reduce the need for additional improvements, and have other societal benefits, such as reduced pollution.

Technological Innovation Will Be a Key Ingredient to Success

Technology can promote multiple objectives and facilitate new revenue and finance mechanisms.

New technologies, such as electronic transponders, video recognition tolling, and satellite-based payment systems, are creating new options for funding the transportation system that simply have not been available before. Although none of these options is in wide use yet across the country, these technological advances offer the promise of providing policy makers with new opportunities to not only raise needed funding but also improve energy efficiency, mitigate congestion, protect the environment, and improve safety. Consideration of alternative funding approaches therefore must take into account the role that technological innovation can and should play in the future.

III. PRINCIPLES FOR SURFACE TRANSPORTATION FUNDING AND FINANCE RECOMMENDATIONS

The Financing Commission's recommendations are based on a set of principles that together can help to achieve a national surface transportation system that is *safe, effective, efficient, fair, and sustainable.*

As a first order of business, the Commission agreed on broad goals for the surface transportation system: it must be safe, effective, efficient, fair, and sustainable. To achieve these fundamental goals, the Commission developed six overarching principles to guide its consideration of funding and finance approaches. Although these guiding principles are generally applicable to all levels of government, the Commission focused primarily on applying them to the federal level. After an extensive review of relevant literature and discussion with stakeholder groups, the Commission selected a reasonable and logical group of revenue raising and finance mechanisms for detailed analysis and applied the principles and related evaluation criteria to this set of options.

Although the Commission's core objective was to arrive at a package of funding approaches that together incorporate these principles in a meaningful way, clearly not every recommended mechanism will fully adhere to all the principles. There can be different priorities, or weighting, across the principles, reflecting legitimate differences of opinion as to the relative importance of each. And there are inherent and unavoidable conflicts among some of the principles, so that achieving some principles through certain mechanisms impinges on the ability to fully achieve other principles. The guiding principles should be applied to the surface transportation system as a whole and, to the extent possible, to individual system components, balancing across the various individual funding principles and policy objectives.

The following guiding principles are not listed in priority order but rather should be considered collectively.

- The funding and finance framework must *support the overall goal of enhancing mobility* of all users of the transportation system.

- The funding and finance framework must *generate sufficient funding to meet national investment needs on a sustainable basis*, with the aim of closing the significant funding gap. The framework must enable the federal government to raise sufficient funding and also support the ability of other levels of government to raise sufficient funds and make appropriate investments.

- The funding and finance framework should *cause users and direct beneficiaries to bear the full cost of using the transportation system to the greatest extent possible* (including for impacts such as congestion, air pollution, pavement damage, and other direct and indirect impacts) in order to promote more efficient use of the system. This will not be possible in all instances, and when it is not, any cross-subsidization must be intentional, fully transparent, and designed to meet network goals, equity goals, or other compelling purposes.

- The funding and finance framework should *encourage efficient investment in the transportation system*—recognizing the inherent differences between and within individual states—such that investments go toward projects with the greatest benefits relative to costs.

- The funding and finance framework should *incorporate equity considerations*—for example, generational equity, equity across income groups, and geographic equity.

- The funding and finance framework should *support the broad public policy objectives of energy independence and environmental protection.*

Each principle is described in greater detail in this section.

Support Overall Goal of Enhancing Mobility

The core objective of any new funding and finance framework must be supporting enhanced mobility throughout the national surface transportation system and for all system users in a way that also supports economic efficiency. The range of mobility needs throughout the national system requires an intermodal transportation network that ensures easy access, allows personal and business travel as well as goods movement without significant delays, and permits seamless transfers and choices among complementary transportation systems and services. Optimized mobility also enables people to choose their preferred travel method based on their individual needs and lifestyles.

Recognizing that from our current starting point it is simply an unrealistic aspiration to achieve wholly unrestricted mobility, it is of paramount importance to the functioning of the U.S. economy and to the quality of life throughout the country to aggressively and immediately improve the mobility provided to citizens and businesses by addressing congestion bottlenecks and providing travel choices throughout the system. The choice of funding approaches can help achieve this objective—through, among other methods, approaches that charge more for travel in peak periods or on particularly congested parts of the system. The ultimate funding and finance package therefore should be developed to help narrow the "mobility gap" that exists today but it should do so in a way that balances the benefits of increased investment in mobility with the costs of the investments.

Generate Sufficient Funding on a Sustainable Basis

The nation's significant underinvestment in surface transportation infrastructure has brought us to a crisis. Developing a revenue-raising approach that can generate significantly more funding for our surface transportation system is therefore a high priority. Legitimate debates about how to measure the transportation "investment gap," how responsible the different levels of government should be in addressing that gap, and how to determine which investments to make with any given level of resources should not derail efforts to raise more revenue. Doing so, at least in the short and medium term, will most likely require a combination of a number of revenue sources to build a viable funding strategy. Moreover, it must be recognized that there is not likely to be one politically feasible "silver bullet" solution to meet the full range of national needs. Options to address urban challenges, such as those that incorporate congestion pricing approaches, for instance, will not be appropriate for vast areas of the country.

- **Since 1988, constant spending (in 2008 dollars) on highways grew 38 percent, but actually declined by 7 percent when considered in relation to vehicle miles traveled. Similarly, constant transit spending grew by 47 percent since 1988, but this increase was only 14 percent in relation to passenger miles traveled.**
- **Total combined highway and transit spending as a share of gross domestic product (GDP) has fallen about 25 percent since the beginning of the federal Highway Trust Fund.**
- **By not adjusting the tax rate for inflation, gas tax receipts have experienced a cumulative loss in purchasing power of 33 percent since 1993 (the last time the gas tax was increased).**

Of equal importance to the quantity of revenue that can be generated is the sustainability of those revenues for meeting current and future demands. It is not enough to offer a funding framework that can meet identified needs in the short term. Ideally, the package also must be able to meet these needs on an ongoing and sustainable basis.

Sustainability can be measured by the extent to which funding mechanisms can be adjusted by system operators or policy makers to meet needs over time, including adjusting for inflation. Sustainability also must incorporate the relative scalability, stability, and predictability of a set of approaches.

Our current federal funding approach is weakened by two factors. First, by not being indexed to inflation, the Highway Trust Fund's purchasing power relative to needs erodes over time. Without periodic correction by Congress, the gap between needs and revenues grows. Second, increasing fleet fuel economy and changing vehicle technology will erode the long-term sustainability of fuel-tax-based revenue mechanisms, as vehicles use less (and different) fuel over the same distance traveled and thus pay lower taxes for the same travel benefit.

Make Users and Direct Beneficiaries Primarily Responsible for Costs to Encourage Efficient System Use

Those who directly use and benefit from the transportation system should, as a general rule and when feasible, bear the primary responsibility for the full cost of system use, including those costs placed on others and the environment—what economists refer to as "externalities." Internalizing the full costs of transportation will require more accurately identifying, quantifying, and charging the full range of costs, including the direct costs of transportation improvements and operations, such as pavement damage, and the indirect costs, such as those due to associated congestion, accidents, and pollution.

Subsidizing use by not making users and direct beneficiaries primarily responsible for these costs can result in "overconsumption" of the system and inefficient use. A better alignment of costs with use should produce greater system efficiency in terms of both system use and investment, as those decisions would be guided more directly by the willingness of users and direct beneficiaries to pay.

Direct system users include motorists who drive on the road network, transit riders who use public transportation systems, and transport and logistics companies that move goods over the highway, port, and rail networks. Examples of those who benefit less directly from the transportation system include businesses that receive goods that move on that system as well as individual citizens who purchase such goods or rely on certain components of the system for their safety and security. Some of these beneficiaries pay for the system when costs are passed on through charges (that is, for goods and services) imposed by direct system users.

In some cases, such as in rural areas, where it is more difficult for subcomponents of the system to be fully self-funding from users and direct beneficiaries, some cross-subsidies will be necessary and appropriate to meet other policy objectives. In these cases, cross-subsidization should be intentional, fully transparent, and designed to meet network, social equity, or other specified goals. Today, individual publicly owned toll roads and bridges are both recipients from and sources of cross-subsidies of the broader network. Similarly, non-tolled roadway systems generally are not held to the standard of funding self-sufficiency at the level of the individual roadway or system and are often financially supported by non-user fee revenues, such as sales and property taxes. The goal in these and other similar cases, however, should be to move toward a closer alignment of costs and prices.

Although transit systems historically also have not been funded on a fully self-sustaining basis, farebox revenues generate 35 percent of the operating costs on average across all transit modes and a portion of the capital investment requirements for transit systems.[2] It also is important to take into account additional benefits from transit systems, including congestion and pollution reduction. For example, there is evidence that public transportation benefits users of other parts of the transportation system by reducing congestion and improving travel reliability. Moreover, one of transit's ongoing key roles is to provide critical transportation services and mobility for some individuals who could not otherwise afford them (if, for example, they had to use private automobiles). Such systemic impacts must be fully considered in evaluating the appropriateness of apparent cross-subsidization.

Encourage Efficient Investment

The overall funding and finance framework should encourage efficiency not only in system use but also in system investment. In other words, it is not enough to ensure that users are paying their full costs; resultant revenues also should be invested efficiently in projects that represent cost-effective uses of what will continue to be limited resources, while also recognizing that some cross-subsidization in the system is required.

Once more efficient use of the system is established, more efficient investment may follow. Achieving the objective of efficient investment, however, also requires strong analytical tools and decision-making discipline in order to fully translate optimized system use into the most efficient set of investment decisions.

Incorporate Equity Impacts

The choices and combinations of approaches selected for the funding and finance framework should reflect equity considerations—specifically generational equity, equity across income groups, and geographic equity. Generational equity refers to the allocation of the cost burden across time or generations. Although it is appropriate to use capital financing to make capital investments, particularly for long-lived, larger capacity enhancements to the system (such as

new bridge spans, new highways and major reconstruction, and transit system extensions), policy makers should avoid overcommitting future revenues and shifting the financial burden to future generations, which in turn limits future investment opportunities. Decisions about how financing mechanisms are deployed have a direct bearing on generational equity and must consider the distribution of financial burden between current and future payers relative to the distribution of benefits.

Income group equity refers to the relative burden placed on individuals across the economic spectrum. Generally, the lowest-income groups currently pay a larger portion of their incomes for transportation than higher-income groups.[3] The funding system should avoid a more regressive allocation of costs and work toward a more progressive allocation.

Geographic equity refers to the extent to which users and beneficiaries bear the cost burden for the portions of the system they use or benefit from, based on their geographic proximity to those portions. For example, people in some parts of the country have to commute long distances for jobs and normal daily activities, requiring more lane miles per capita than areas where jobs and populations are closer together. At the same time, areas with relatively small population bases may bear the burden of supporting highway infrastructure that is valuable to users (especially freight carriers) throughout the country that pass through such areas. The funding and finance framework should attempt to distribute the costs of the system equitably in light of these geographic considerations. There will be instances where some amount of geographic cross-subsidies may be required to achieve certain national network benefits (for example, to support key system improvements in places that are geographically disadvantaged in terms of population density or difficult terrain, requiring expensive infrastructure). When there is such geographic cross-subsidization, it should be transparent and designed to meet network goals.

There will be instances where some amount of geographic cross-subsidies may be required to achieve certain national network benefits.

Support Energy Independence and Environmental Protection Goals

Future transportation funding policy must be more consistent with the public policy objectives of reducing petroleum consumption and protecting the environment than the current funding policy is, which relies on taxes on fossil fuels as its funding mainstay. Reliance on fossil fuel consumption to generate most of the federal surface transportation revenues—while at the same time not charging the full costs of such consumption—is at odds with these increasingly important objectives. Revenue-raising mechanisms that charge the full cost of system use (including externalities such as carbon emissions), that incorporate demand management techniques, and that promote transit and high-occupancy vehicle use can support reduced petroleum consumption and improved environmental outcomes.

IV. GUIDE TO THIS REPORT

The Commission's charge and the application of the guiding principles introduced here are examined in detail as follows:

- Chapter 2 addresses the investment needs and places those needs in the context of currently available and projected resources.
- Chapter 3 builds on the overarching funding principles introduced in Chapter 1 to provide specific evaluation criteria and a preliminary screening of a comprehensive range of alternative funding mechanisms.
- Chapter 4 provides an in-depth review of existing and potential fuel tax mechanisms and offers a more detailed evaluation of this central funding approach.
- Chapter 5 provides an in-depth review of potential freight-related funding mechanisms and their possible applicability to funding specific categories of investment.
- Chapter 6 offers a comprehensive discussion of facility-level tolling and broad-based pricing mechanisms, including the potential of a mileage-based user fee system to serve as an alternative or addition to the current national fuel tax system.
- Chapter 7 addresses the finance mechanisms that can be used to leverage available revenue streams, recognizing that these approaches are enhancements to rather than substitutes for much needed increased funding. This chapter also addresses the current and potential role of private-sector financial investment and considers the appropriate role of federal programs and policies to facilitate such investment.
- Chapter 8 offers the Commission's specific policy recommendations to narrow the funding gap and transform the funding and finance framework for the nation's investment in surface transportation infrastructure.
- The Annex provides a synopsis of the Commission's responses to Congress's specific questions and a roadmap to related key elements of this report.

Endnotes

1. Federal Highway Administration, *Highway Statistics 2006* (Washington, DC: U.S. Department of Transportation, 2008), Tables VM-3 and HM-15.

2. Federal Highway Administration, *2006 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance* (Washington, DC: U.S. Department of Transportation, 2007), Chapter 6.

3. According to the Brookings Institution, "the working poor spend 6.1 percent of their income on commuting compared to 3.8 percent for other workers" and the "working poor that commute using their own car spend the most; 8.4 percent." Robert Puentes, *A Bridge to Somewhere: Rethinking American Transportation for the 21st Century*, Blueprint Policy Series (Washington, DC: Brookings Institution, 2008), p. 34.

2

THE ROUTE WE ARE ON

The Widening Investment Gap

Congress established the Highway Trust Fund (HTF) in 1956 so that federal taxes on motor fuels and vehicles would be used to help build and maintain a surface transportation system that ultimately would become one of the most developed national networks in the world.

Although the portfolio of federal taxes and associated rates worked well to accomplish the mission of constructing the Interstate System, resulting revenues over the last few decades have fallen woefully behind the system's burgeoning investment needs. Inflation has significantly eroded the buying power of motor fuel taxes, which have not been increased since 1993, and fuel efficiency improvements mean people pay less in fuel taxes per mile of roadway travel.

A growing economy and an increasing population, together with constraints on rail capacity, have significantly increased both the amount of freight carried on the highway system and the number of people using the system. In addition, advances in technology have not been effectively employed to better manage the existing system capacity. As a result, our national surface transportation system is no longer performing well in certain key respects and is suffering from spending levels for maintenance and capacity improvement that are insufficient to meet the demands of travelers, accommodate the movement of goods, improve access in rural areas, or even provide the desired level of safety. Individually and collectively, we face serious consequences if we continue on the present path of failing to enhance or even maintain an aging system: too many lives lost from unsafe conditions, an eroded quality of life for system users, and diminished economic performance as a nation.

I. OVERVIEW OF SURFACE TRANSPORTATION SPENDING

While national surface transportation expenditures have increased over time (in nominal terms), they have not kept pace with the demands of a growing nation. The federal contribution as a percentage of total spending has remained fairly constant in recent years, funded primarily by indirect user fees—particularly motor fuel tax revenues.

Total Highway and Transit Spending

The deterioration of system performance appears at first glance to have occurred despite significant increases in total national spending on transportation infrastructure. Examining spending levels in the context of inflation, increasing vehicle and passenger travel, and economic growth, however, paints a very different picture.

Over the last 18 years, total annual highway spending by all levels of government for capital improvements, operations, and maintenance increased 38 percent, from $125 billion in 1988 to $172 billion in 2006, in 2008 dollar terms.[1] (See Exhibit 2–1.)[2]

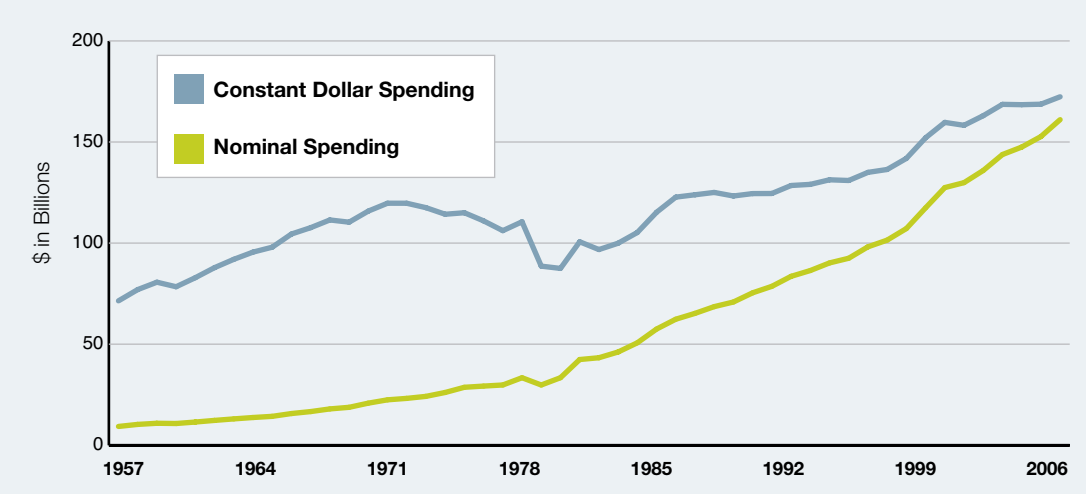
This measure of inflation-adjusted spending, however, does not account for the increasing demands placed on an aging transportation system by a growing economy and population. Between 1988 and 2006, total vehicle miles traveled (VMT) increased by over 48 percent (from 2.03 trillion to 3.01 trillion). Therefore real highway spending in constant dollars divided by VMT has actually declined by 7 percent since 1988 and has fallen by nearly 50 percent since the beginning of the federal HTF in the late 1950s.[3] (See Exhibit 2–2.)

Between 1988 and 2006, total transit spending by all levels of government increased 48 percent, from $33 billion to nearly $49 billion in 2008 dollars.[4] (See Exhibit 2–3.)

The demands on transit infrastructure as measured by passenger miles traveled (PMT), however, increased by nearly 30 percent between 1988 and 2006 (from 40.6 billion PMT to 52.2 billion PMT). Transit spending, in constant dollars divided by PMT, therefore increased by only 14 percent since 1988.[5] (See Exhibit 2–4.)

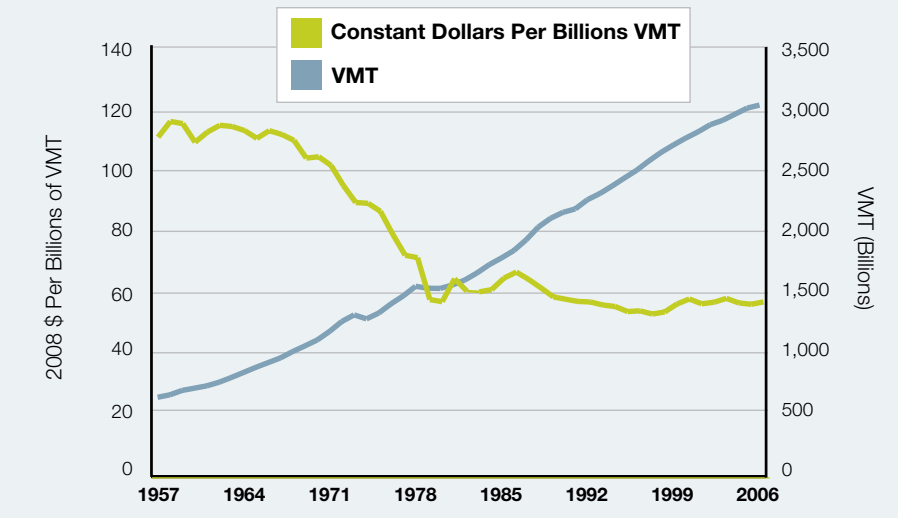
Another common way to measure real spending is to express it as a percent of gross domestic product (GDP). This method produces very similar results. Total combined highway and transit spending as a share of GDP has fallen about 25 percent since the beginning of the federal HTF. According to data from the Congressional Budget Office (CBO), this expenditure averaged 1.9 percent of GDP from 1956 to 1970 but only 1.4 percent of GDP from 1990 to 2004.[6] (See Exhibit 2–5.)

EXHIBIT 2-1: HIGHWAY SPENDING IN NOMINAL AND CONSTANT DOLLARS, 1957-2006



Source: Spending data are from FHWA Highway Statistics Table HF-10. Unless stated otherwise, inflation adjustments are made using the CPI-U (as reported by the Bureau of Labor Statistics) and constant dollar amounts are expressed in 2008 dollars.

EXHIBIT 2–2: VMT-ADJUSTED HIGHWAY SPENDING, 1957-2006

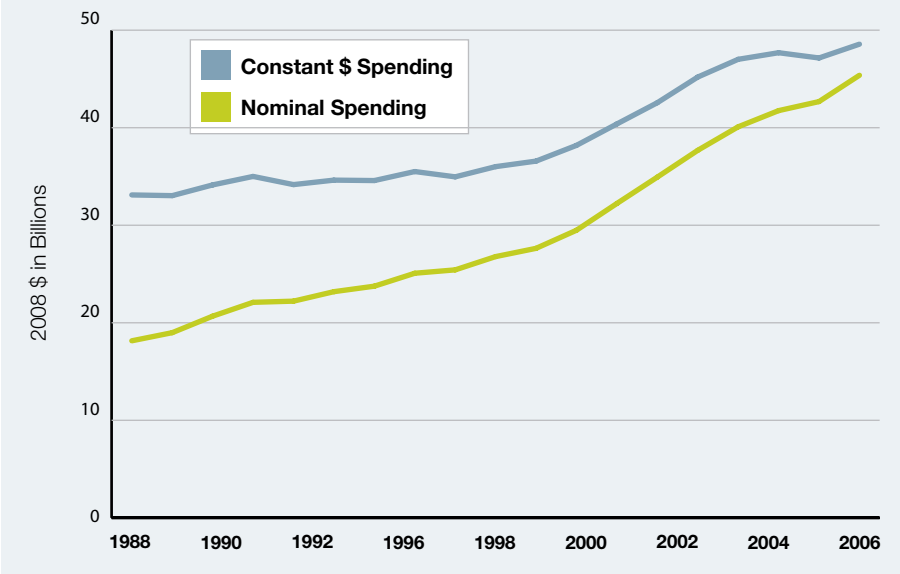


Source: VMT data are from FHWA Highway Statistics.

Federal Share of Total Surface Transportation Spending

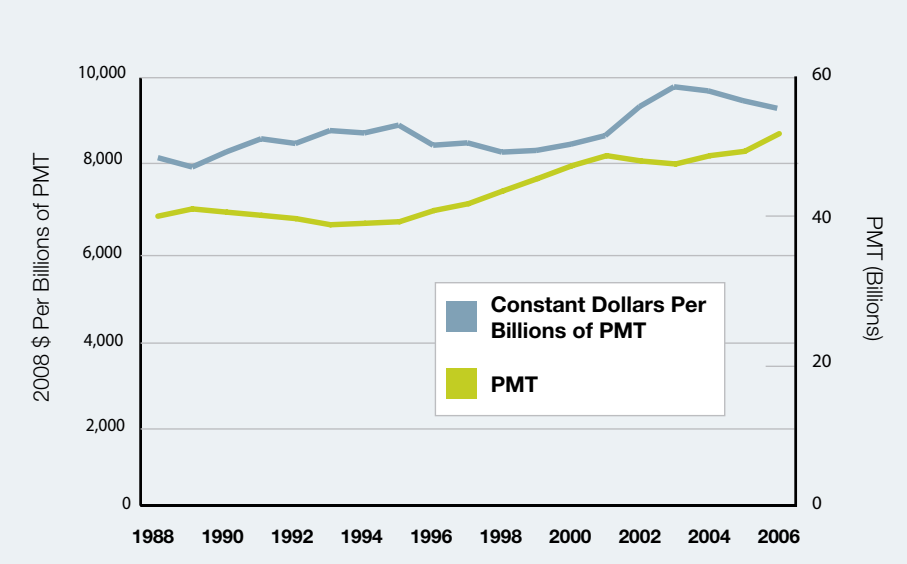
Historically, the federal government has played an important role in funding overall highway and transit spending. The federal share of total highway spending (capital investment and operations and maintenance costs) has ranged from 17 percent in the late 1950s to more than 30 percent at times during the 1960s, and it is currently near the long-term average of about 25 percent. Regular federal funding for transit began in 1962; since 1988 the federal share of total transit spending has averaged about 18 percent.[7]

EXHIBIT 2–3: TRANSIT SPENDING IN NOMINAL AND CONSTANT DOLLARS, 1988-2006



Source: Spending data are from American Public Transportation Association, 2008 Public Transportation Fact Book, Part 2: Historical Tables 34-36, June 2008.

EXHIBIT 2–4: PMT-ADJUSTED TRANSIT SPENDING, 1988-2006



Source PMT data are from the APTA 2008 Public Transportation Factbook.

Federal Share of Surface Transportation Capital Investment

Another way to look at the federal share of transportation spending is in terms of capital spending only (i.e., excluding spending on maintenance and operations), since nearly all federal funding is for investment in capital projects. The federal share of total highway capital investment has ranged from 16 percent (in the first year of the HTF) to just over 50 percent in the mid-1980s. As illustrated in Exhibit 2–6, the federal contribution to highway capital spending was 44 percent in 2006, close to the long-term average of about 45 percent. Of the 56 percent non-federal share in 2006, about 34 percent represents state-level investment and about 24 percent represents capital spending by local governments.[8]

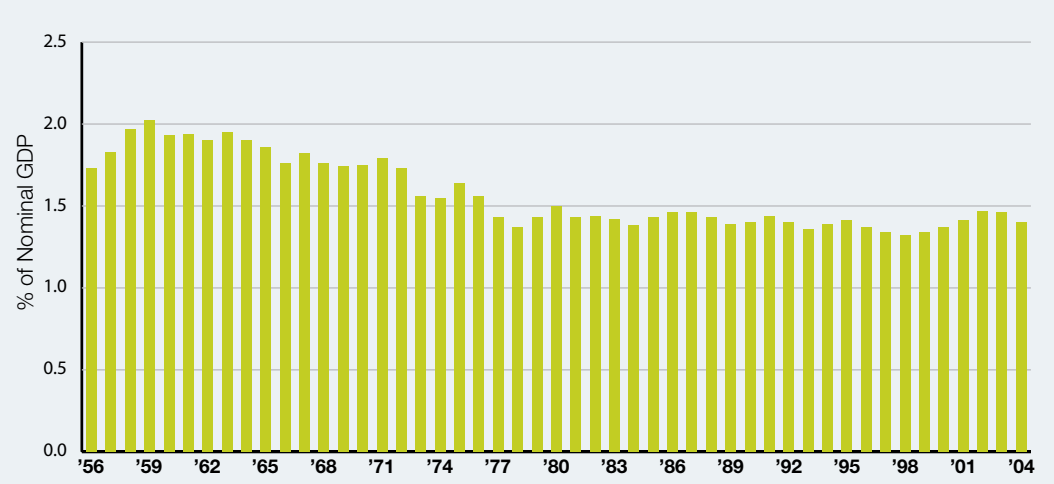
The federal share of transit capital investment grew rapidly from 1962 through the early 1980s, when federal funding accounted for much of the capital investment in mass transit. Federal funding for transit capital has declined since then, averaging close to half of total capital investment since the late 1980s, and was about 44 percent of the total in 2006.[9]

Contribution of User Fees to Surface Transportation Investment

The sources of funding for surface transportation and the degree to which revenue mechanisms are tied to system use vary by both level of government and mode.

- **Highways:** In 2006, some 58 percent of total highway funding came from user fees, which included both tolls and indirect user charges in the form of motor fuel taxes and vehicle-related fees. Historically, direct and indirect user fees have provided the majority of total revenues raised for highway funding. Their share, however, has declined over time, peaking in 1965 at 73.5 percent and subsequently settling

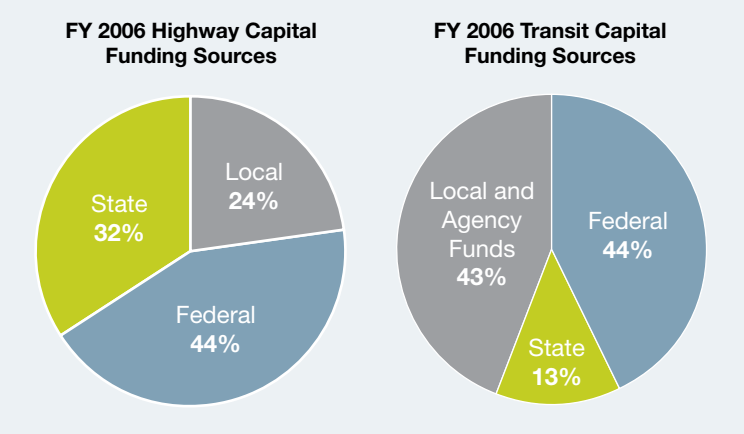
EXHIBIT 2–5: COMBINED HIGHWAY AND TRANSIT SPENDING AS A PERCENT OF GDP, 1955-2004



Spending data from CBO Report on Issues and Options in Infrastructure Investment, May 2008. Data on GDP are as reported by the Bureau of Economic Analysis.

at around 60 percent (with approximately 5 percent funded from tolls and 55 percent from fuel and vehicle-related charges).[10] At the federal level, virtually all highway funding comes from fuel and vehicle-related user charges (the share of federal funding from non-user charges is typically 2–3 percent, mostly from small General Fund programs and interagency transfers). Highway user charges also provide the majority of state funding for highway investment, but they have declined gradually over time from a high of 88 percent in 1965 to 69 percent in 2006.[11] At the local level, highway user charges have not been a significant source of revenues (less than 10 percent of the total).[12] Instead, funding primarily comes from General Fund allocations, property taxes, sales taxes, and various other taxes and fees. Overall the trend is away from having users pay the full cost of system use. Indeed, as states and localities have sought to raise more funds they have increasingly looked to sources other than user charges. According to the Government Accountability Office, in the last decade at the state and local level motor fuel taxes went up 2.4 percent, specialized non-user taxes went up 7.5 percent, and property taxes devoted to transportation increased 4.4 percent.[13]

EXHIBIT 2–6: SHARE OF CAPITAL FUNDING, BY LEVEL OF GOVERNMENT



- **Transit:** In 2006, some 29 percent of total transit funding came from user fees in the form of passenger fares and other local system-generated revenues. The remainder of transit funding came from federal motor fuel taxes and General Fund allocations (about 18 percent of total funding), state General Fund and tax revenues (20 percent of the total), and local General Fund and tax revenues (33 percent).[14] These shares have been relatively consistent over the last two decades.

BOX 2-1: WHY IS THE HIGHWAY TRUST FUND IMPORTANT?

Prior to 1956, federal motor fuel and vehicle taxes were directed to the General Fund of the U.S. Treasury. Federal financial assistance to support highway programs was provided from the General Fund, but with no defined relationship between the funding provided and highway-related taxes collected. Since then, the establishment and ongoing maintenance of the HTF has offered the nation and transportation agencies some important benefits:

- The HTF helps ensure federal highway user taxes are used for transportation purposes through the application of "budgetary firewalls" that prevent the diversion of revenues to non-transportation activities.
- The HTF enables the use of multi-year "contract authority," which provides states with advance knowledge of future federal highway funding commitments and allows them to conduct meaningful long-range planning and to contract for multi-year projects based on a reasonable degree of year-to-year consistency in federal funding levels.
- The historical predictability and reliability of annual HTF spending has made federal surface transportation funding a viable means for supporting state-level and transit agency debt obligations used to finance long-lived assets.

As the federal motor fuel and vehicle taxes become less sustainable, the benefits of the HTF are diluted. If the HTF is to continue to provide state and local governments with meaningful support for capital planning and programming, its current funding sources must be significantly augmented.

II. FEDERAL SURFACE TRANSPORTATION FUNDING AND THE HIGHWAY TRUST FUND

The current system for federal funding of surface transportation is centered on the Highway Trust Fund—the mechanism by which the federal government provides resources to states and transit agencies for highway and transit investments. Since its creation in 1956, the HTF generally has provided stable, reliable, and substantial highway and transit funding. (See Box 2-1.) In recent years, however, the stability and adequacy of the HTF has diminished. Projections of future federal investment needs and HTF revenues suggest that the situation will continue to deteriorate if nothing is done to boost revenes.

Highway Trust Fund Overview

The vast majority of federal surface transportation funding—nearly 90 percent in 2007—is provided through the HTF. The remainder is appropriated from the General Fund of the U.S. Treasury, primarily for transit capital and preventive maintenance spending.[15] The HTF initially was authorized by the Highway Revenue Act of 1956 to account for the collection of certain federal highway user taxes on motor fuels and vehicles and to ensure a dependable source of funding for financing the National System of Interstate and Defense Highways and other major highways. In 1983, in conjunction with a major federal motor fuel tax increase, Congress determined that proceeds from 1¢ per gallon on gasoline and diesel should be dedicated to fund transit and established a Mass Transit Account within the HTF. The Mass Transit Account allocation was subsequently increased three times and is currently 2.86¢ per gallon.[16] Since 1956, periodic legislation has extended and occasionally increased the taxes that fund the HTF. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) signed into law in August 2005 extended the HTF and its associated taxes through Fiscal Year (FY) 2011.

Highway Trust Fund Mechanics

The HTF is essentially an accounting mechanism within the U.S. Treasury and is outside the General Fund. The Internal Revenue Service collects receipts from HTF revenue sources and deposits them in the General Fund of the Treasury. Each month, the Treasury Department estimates the amount of highway user taxes that will be collected and credits the appropriate amounts to the HTF. Adjusting transactions are made periodically to bring the deposits, originally based on estimates, into line with actual tax collections. The cash balance of the HTF then rises and falls depending on the level of monthly credits and the amount of disbursements to "liquidate" the obligations of federal agencies such as the Federal Highway Administration and the Federal Transit Administration to reimburse states and transit agencies for the federal share of eligible program and project costs.

Tax revenues credited to the HTF do not automatically determine annual spending on federal highway and transit programs. Instead, authorization acts such as SAFETEA-LU provide budget authority for federal programs. Thus Congress controls annual spending from the HTF by limiting the amount of budget authority that can be obligated in a particular year. It is important to note that annual obligation levels do not precisely equate to the amount of HTF cash outlays that will occur in a given year. Federal reimbursements for highway and transit obligations typically span several years, depending on the nature of the activities or projects being funded. Thus a given year's outlays represent payments for both new obligations as well as those from previous years.

Current Highway Trust Fund Revenues

Net HTF receipts grew from $15.3 billion in 1988 to $39.4 billion in 2007, increasing more than 2.5 times in 19 years. The increase, however, was only 47 percent in 2008 dollar terms. When adjusted for VMT, HTF receipts actually fell by 1 percent during that time (compared with total highway spending by all levels of government, which fell 7 percent). Examined as a percentage of GDP, receipts dropped by 5 percent since 1988.[17]

As shown in Exhibit 2–7, the bulk of HTF revenue is raised through federal excise taxes on highway motor fuels (gasoline, diesel, and special fuels), with the remaining revenue coming from taxes on truck tires, sales of trucks and tractor trailers, and a Heavy Vehicle Use Tax (HVUT). (A small amount also is raised through fines on motor carriers.)

Motor fuel taxes yield far greater revenue than the other HTF funding mechanisms: about 89 percent of the HTF net receipts. Currently, each 1¢ per gallon of gasoline tax yields approximately $1.4 billion annually and each 1¢ per gallon of diesel fuel tax yields approximately $400 million. Other revenues (not based on motor fuel consumption) account for only about 11 percent of the HTF net receipts. Although official data on 2008 receipts were not available when this report was finalized, preliminary figures indicate that HTF net revenues in 2008 were about $3 billion lower than in 2007.[18] Compared with 2007 actual revenues, 2008 preliminary revenues from motor fuel taxes were relatively constant, as were HVUT revenues. Revenues from the retail tax on trucks and the tire tax, however, apparently declined by about 62 percent and 16 percent, respectively.[19]

EXHIBIT 2-7: HTF REVENUES AND YIELDS BY SOURCE

(excludes 0.1¢ per gallon that goes to the Leaking Underground Storage Tank Trust Fund)

Source	Current Rate	2007 Revenues ($ Millions)	2008 Preliminary Revenues ($ Millions)	Average 2007-08 Yield ($ Millions)
Gasoline & Other Fuels	18.3¢/gal	$25,419	$25,326	1¢/gal = $1,386
Diesel	24.3¢/gal	$10,132	$10,532	1¢/gal = $425
Retail Tax on Trucks	12.0% on retail sales	$3,809	$1,446	1% = $219
Highway-Type Tires	9.45¢/100 lbs capacity	$461	$387	1¢/100 lbs = $45
Heavy Vehicle Use Tax	$100 + $22/1,000 lbs	$1,032	$1,038	$10+$2.2/1,000 lbs = $103
Gross HTF Receipts		$40,853	$38,729	
Refunds & Transfers		($1,489)	($2,360)	
Net HTF Revenues		$39,364	$36,369	

Sources: 2008 data from US Treasury, FY2008 Highway Consolidated Report. 2007 data from March 2008 Treasury Report. Rates from FHWA table FE-21B.

As shown in Exhibit 2–8, the share of HTF receipts from the diesel fuel tax has increased significantly over time—especially since 1984, when the diesel tax rate was increased from 9¢ to 15¢ per gallon while the rate for gasoline remained at 9¢ per gallon. This 6¢ difference in the two tax rates remains in effect today.[20]

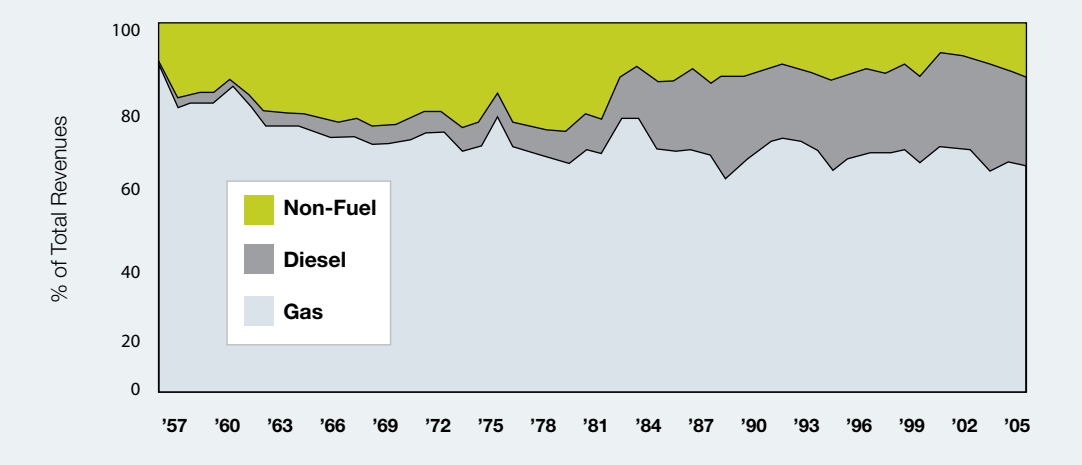
Motor Fuel Taxes

In 2007, combined federal motor fuel tax receipts contributed roughly $35.6 billion to the HTF. These taxes are charged at a flat rate per gallon that Congress sets. The current tax rates on motor fuels are 18.4¢ per gallon for gasoline/gasohol and 24.4¢ per gallon for diesel fuel. (The current federal tax for other "special" motor fuels such as liquefied natural gas varies by fuel type, but averages about the same as the gasoline tax.) One cent per gallon in motor fuel taxes (including on gasoline, diesel fuels, and special fuels) yields about $1.8 billion per year.[21] Federal motor fuel tax revenues are allocated as follows:

- Proceeds attributable to 2.86¢ of the tax (equivalent to about $5 billion annually in 2007 and 2008) are credited to the Mass Transit Account of the HTF.
- Proceeds attributable to 0.10¢ of the tax are credited to the Leaking Underground Storage Tank Trust Fund (not part of the HTF).
- About 4.2 percent of gross motor fuel tax receipts is transferred to the Sport Fish Restoration and Boating Trust Fund or refunded to state and local governments, agricultural users, and other specified exemption categories.
- The remaining proceeds are credited to the Highway Account of the HTF (15.44¢/gallon for gasoline and gasohol and 21.44¢/gallon for diesel fuel).

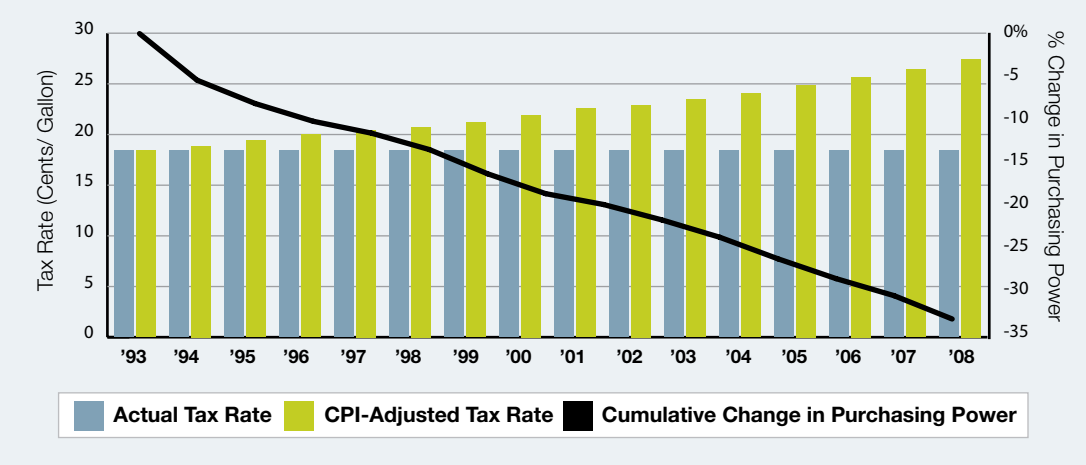
Growth in motor fuel tax receipts is driven by two factors: tax rates and fuel consumption. Federal motor fuel tax rates were last raised in 1993, when Congress added an across-the-board 4.3¢ increase. The proceeds from this increase, however, initially were directed to the General Fund and were not credited to the HTF until October 1997 (start of federal FY 1998). Because the tax rate has remained constant since 1993, inflation has significantly eroded the value of the tax receipts.

EXHIBIT 2-8: HTF RECEIPTS OVER TIME BY GENERAL CATEGORY, 1957-2006



Source: FHWA Highway Statistics, Tables HF-10 and HF-210

EXHIBIT 2-9: FEDERAL GASOLINE TAX RATE AND LOSS IN PURCHASING POWER



Source: FHWA 2006 Highway Statistics, Table FE-21B, indexed using CPI-U as reported by the Bureau of Labor Statistics.

In order to help maintain the purchasing power of the fuel tax receipts, the tax rates would need to be indexed to a measure of inflation. Exhibit 2–9 illustrates that if the federal gas tax rate of 18.4¢ per gallon had been indexed using the Consumer Price Index for all Urban Consumers (CPI-U) beginning in 1993, the tax rate in 2008 would be 27.5¢ per gallon. By not adjusting the tax rate for general inflation, gas tax receipts have experienced a cumulative loss in purchasing power of about 33 percent over the last 15 years.

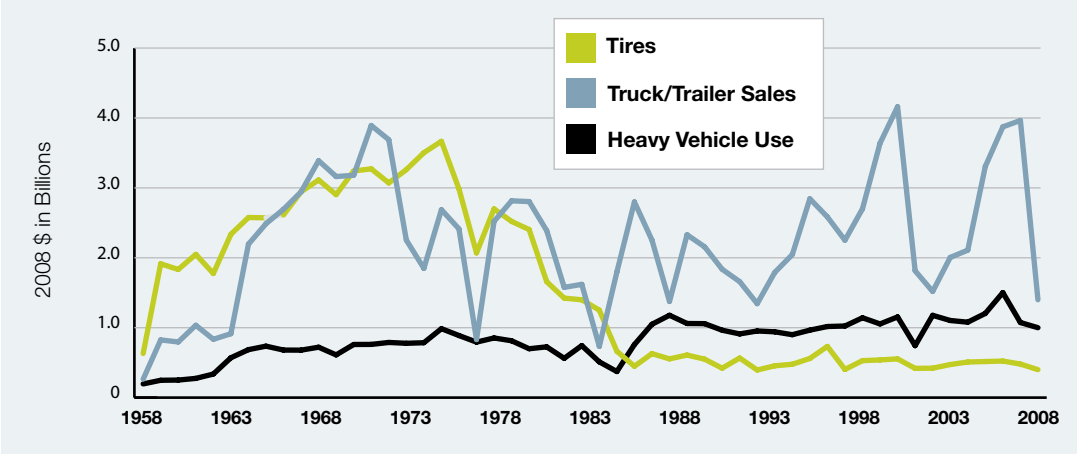
A common misconception is that increases in vehicle fuel efficiency also have led to declines in motor fuel tax purchasing power in the last 15 years. In reality, vehicle fuel efficiency increased rapidly from the mid-1970s to the mid-1980s, then declined moderately from 1987 to 2004, and only started to increase again in 2005. In fact, the average fuel efficiency of new 2008 light-duty vehicles (20.8 miles per gallon (MPG)) is still 1.2 MPG lower than the peak reached in 1987 (22.0 MPG).[22] (Light-duty vehicles category includes automobiles, sport utility vehicles, vans, and pick-up trucks.)

Other Taxes

Other, non-fuel-related federal taxes contributed $5.3 billion to the HTF in 2007. About $3.8 billion of this was raised through a 12 percent federal sales tax on the retailer's sales price for tractors over 33,000 pounds gross vehicle weight (GVW) and trailers over 26,000 GVW. Another $1 billion was raised through the federal Heavy Vehicle Use Tax, which requires trucks with a GVW of 55,000 pounds or more to pay an annual tax of $100, plus $22 for each 1,000 pounds over 55,000 pounds. The remaining $500 million was raised through a federal excise tax on tires, which charges 9.45¢ for each 10 pounds of maximum rated load over 3,500 pounds.[23]

The trends in non-fuel tax receipts since the inception of the HTF are shown in Exhibit 2–10. Unlike the motor fuel tax revenues, which have tended to grow fairly consistently over time, revenues from the truck-related sales taxes are more sensitive to economic cycles and exhibit much greater volatility. Truck tire tax revenues significantly declined between 1975 and 1985, illustrating the sudden impact of technological advancement (in this case, the widespread introduction of radial tires, which greatly increased tire life) as well as a 1984 change in the tax law that repealed tire taxes on vehicles under 33,000 GVW. From 1998 to

EXHIBIT 2-10: NON-FUEL HTF REVENUES OVER TIME (CONSTANT DOLLARS)



Sources: Historical data from FHWA Highway Statistics, Tables HF-10 and HF-210. 2007 Data from March 2008 Treasury Bulletin.

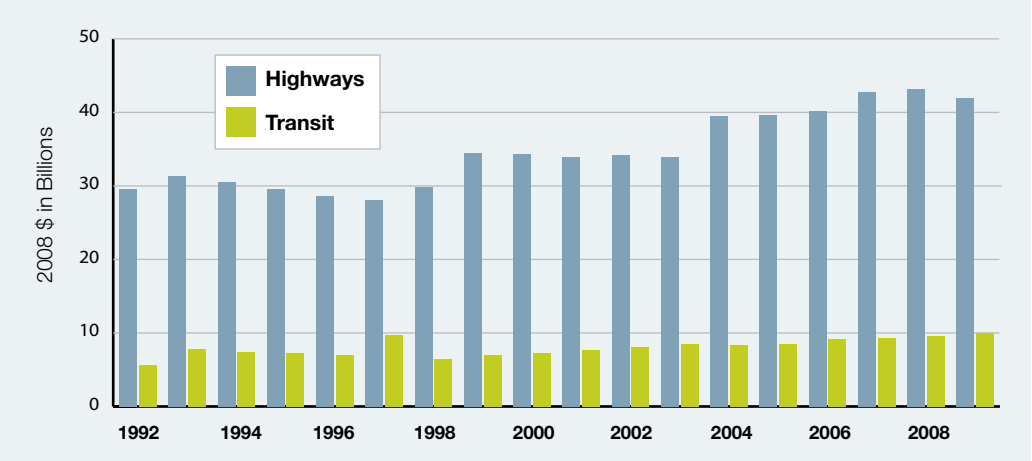
2007, growth in non-fuel-related revenues exceeded growth in the motor fuel tax revenues. As noted previously, however, the non-fuel tax revenues appear to have fallen precipitously, by about 46 percent, from 2007 to 2008, including a drop of nearly $2.4 billion in receipts from the truck and trailer sales tax.[24] This dramatic effect of recent economic conditions demonstrates the potential year-to-year volatility of this group of taxes.

Current Highway Trust Fund Expenditures

Over the last 15 years, Congress has consistently increased authorizations for HTF spending. These budget authorizations provide the basis for future obligations (commitments) and outlays (expenditures). Exhibit 2–11 shows that from the first year of the Intermodal Surface Transportation Efficiency Act (ISTEA, 1992) to the final year of SAFETEA-LU (2009), federal highway budget authorizations increased by 46 percent and federal transit budget authorizations increased by 85 percent in 2008 dollars. (Note that a portion of federal transit spending is funded from the General Fund instead of the HTF—about 15–20 percent in recent years.) The apparent 17-year growth largely disappears, however, when adjusted for the increases in vehicle and passenger miles traveled. After accounting for the overall growth in the economy, highway authorizations as a percentage of GDP have decreased by 6 percent since the first year of ISTEA, while transit authorizations have still grown, but only by 13 percent.[25]

Recent federal authorizing legislation for surface transportation has provided budget authority for highway and transit programs covering six years at a time. This budget authority, which is

EXHIBIT 2-11: HIGHWAY AND TRANSIT BUDGET AUTHORITY SINCE 1992 (CONSTANT DOLLARS)



Source: FHWA Fact Sheets on Highway Provisions

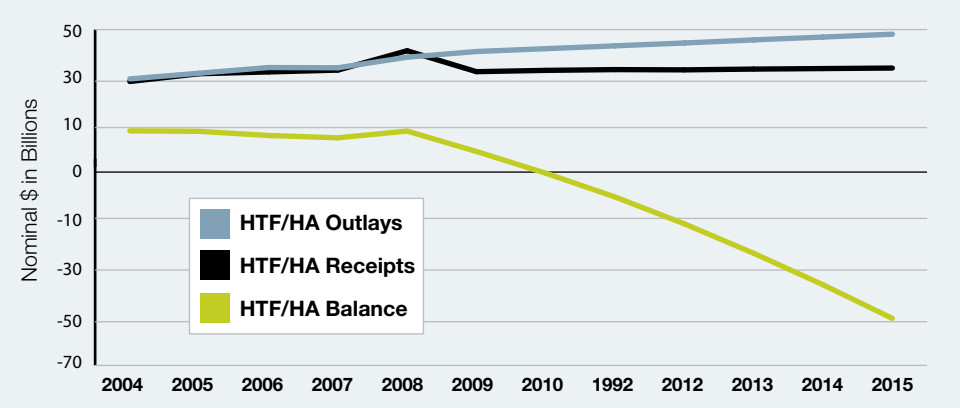
apportioned by formula or otherwise allocated annually to state and local grantees, is subject to annual limitations on the amounts that may be obligated or committed. Subsequent HTF cash expenditures depend on the annual obligation amounts and the rate at which those obligations are liquidated, which is determined by the nature of the activities and projects being funded.

In federal fiscal year 2007, HTF obligations totaled $41 billion for highways and $7.3 billion for transit, for a total of $48.3 billion. FY 2007 HTF cash outlays, resulting from obligations made in FY 2007 and previous years, totaled $39.4 billion: $35.2 billion for highways and $4.2 billion for transit. (These amounts do not include the transit obligations ($1.7 billion) and outlays ($5 billion) supported by the General Fund in FY 2007.)[26]

HTF Account Balances and Funding Implications

Between 1980 and 1995, HTF cash balances gradually grew from $11 billion to $19 billion.[27] Between 1996 and 2000, however, receipts substantially exceeded outlays, and the overall balance rose from $19 billion in 1995 to a peak of about $31 billion in 2000. With the economic downturn in 2001, however, revenues fell sharply. By 2005 revenues recovered to previous levels, although their growth rates slowed. And as noted earlier, the HTF revenues for 2008 appear to have fallen by about $3 billion compared with 2007. At the same time, both the Transportation Equity Act for the 21st Century and SAFETEA-LU substantially boosted federal highway and transit spending, causing the HTF cash balances to begin to decline sharply. The HTF overall cash balance (including both the Highway Account and the Mass Transit Account) was down to just over $15 billion at the end of 2007 and would have been below $9 billion at the end of 2008 without the $8 billion emergency infusion from the General Fund. (Without those funds, the Highway Account balance would have dipped perilously close to zero by late 2008 or early 2009.)[28]

EXHIBIT 2-12: HTF / HIGHWAY ACCOUNT CURRENT TRENDS



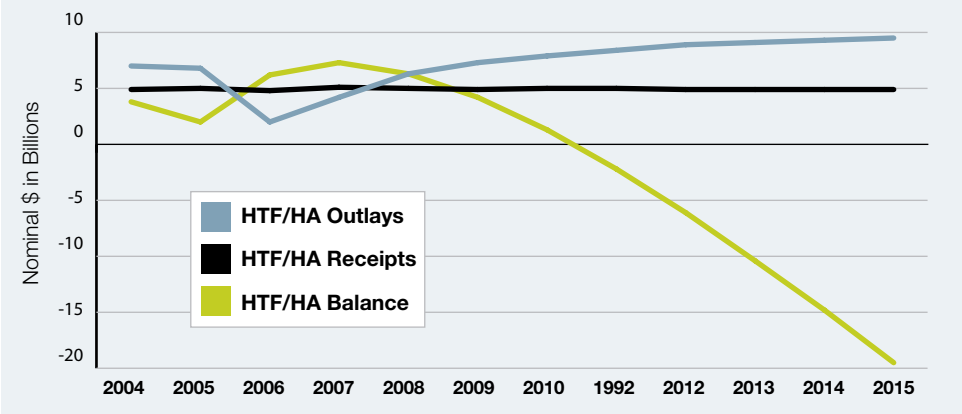
Source: Forecasts made by AASHTO using its federal HTF funding model and based on assumptions contained in the Midsession Review of the FY 2009 Budget

Even with the emergency General Fund infusion in September 2008, the Highway Account cash balance is estimated to fall to between $2 billion and $3 billion by the end of 2009. As shown in Exhibit 2–12, with the growing spread between current-law expenditures and receipts, federal highway program funding cannot be maintained at current levels beyond 2009, and the possibility cannot be dismissed that the Highway Account will run short of liquidating cash before the end of FY 2009.[29]

The current trends in federal transit expenditures and receipts practically mirror those on the highway side. The Mass Transit Account balance is estimated to fall to between $4 billion and $5 billion by the end of 2009 and to just $2 billion by the end of 2010. Exhibit 2–13 shows that current-law federal transit program funding cannot be maintained beyond 2010.[30]

This HTF "solvency crisis" is the result of SAFETEA-LU funding authorizations (through FY 2009) leading to annual outlays that increasingly exceed the capacity of the HTF to meet

EXHIBIT 2-13: HTF / TRANSIT ACCOUNT CURRENT TRENDS

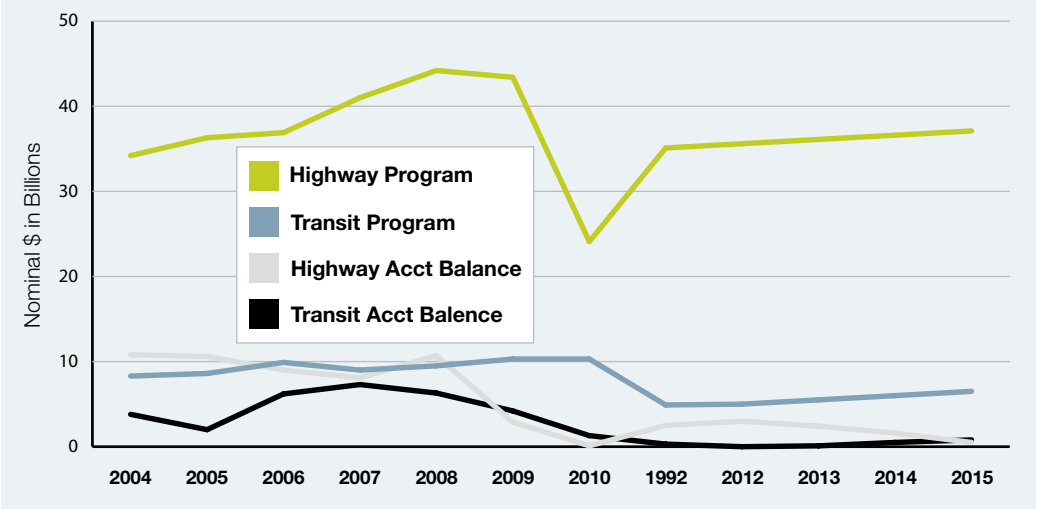


Source: Forecasts made by AASHTO using its federal HTF funding model and based on assumptions contained in the Midsession Review of the FY 2009 Budget.

them through new revenues and existing balances. Since the HTF cannot incur negative balances (negative values in graphs are shown only for illustrative purposes), Congress must decide either to provide additional funding to cover the looming shortfalls in coming years or to reduce federal highway and transit spending dramatically to levels that can be supported by current-law receipts. As illustrated in Exhibit 2–14, without an influx of additional revenues to the HTF the necessary reductions in federal spending will be severe: the highway program would have to be cut by about 45–50 percent from FY 2009 to FY 2010, with only a partial recovery in subsequent years; the transit program would have to be cut by about 50–55 percent from FY 2010 to FY 2011, again with only a partial recovery thereafter. These major reductions would be required because of the multi-year expense reimbursements typically associated with federal-aid capital projects. In any given year, most of the outlays (expenditures) result from prior-year funding commitments. This means that to suddenly reduce outlays to a level supportable by incoming HTF receipts, the current-year funding commitments must be cut drastically to accommodate the liquidation of prior-year commitments. Once the current-year funding commitments have been so reduced, the funding commitments in subsequent years can approximate future receipts to stay within the HTF revenue curve. Essentially, future federal funding has to be reduced significantly from recent authorizations in order to be supported by current-law HTF revenues that are barely growing.[31]

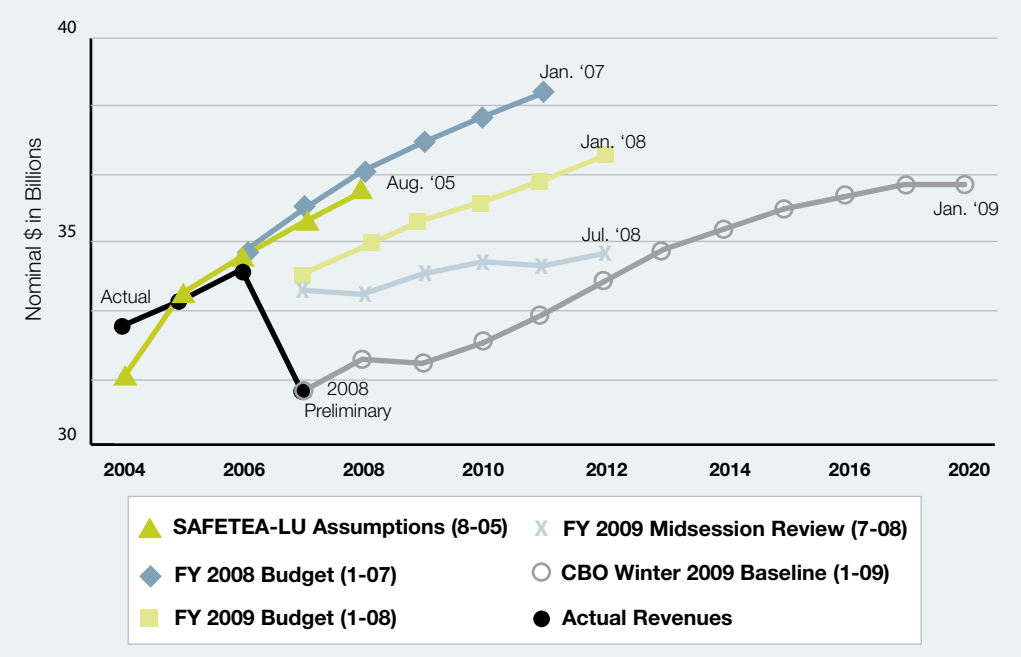
Moreover, there may well be mega-trends at work, collectively undermining the assumptions on which these HTF projections are based. It is quite possible that conventional thinking about fleet turnover, the use of alternative fuel vehicles, and other factors will no longer be valid and that the

EXHIBIT 2-14: POTENTIAL FEDERAL FUNDING LEVELS UNDER CURRENT LAW



Source: Forecasts made by AASHTO using its federal HTF funding model and based on assumptions contained in the Midsession Review of the FY 2009 Budget.

EXHIBIT 2-15: HTF / HIGHWAY ACCOUNT REVENUE PROJECTIONS SINCE SAFETEA-LU



trends in these assumptions will move in the wrong direction (from the perspective of revenues) more quickly, thereby reducing current law revenues much more quickly.

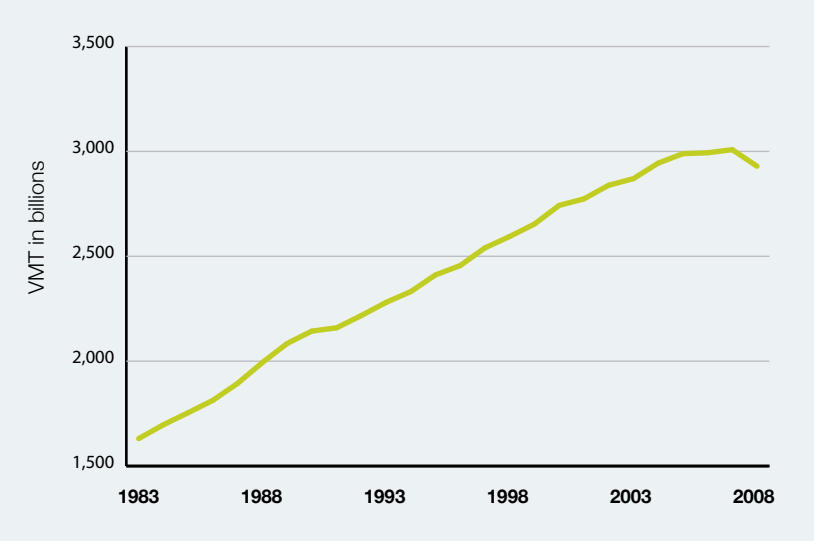
Highway Trust Fund Revenue Projections

A 2006 report by the Transportation Research Board on the future of the fuel tax concluded that the current highway finance system (including the HTF) will remain viable for some period of time, but it also predicted that motor fuel consumption and associated revenues could decline by 20 percent by 2025.[32] Since that report was released, fuel prices have fluctuated wildly and, despite their recent drop, speculation about much higher long-term prices has sharpened concerns about the future viability of the fuel tax in supporting the national surface transportation system. At a minimum, there is currently great uncertainty about the level of HTF funding that could be sustained by current-law tax rates and revenue sources over the next 20–30 years.

Official estimates of HTF revenues have been steadily adjusted downward in recent years. Exhibit 2–15 shows this progression of revenue estimates by comparing the most recent forecast for the Highway Account—the CBO Winter 2009 Baseline Estimates (published in January 2009)—with other estimates prepared during the preceding three years: the receipt assumptions underlying the SAFETEA-LU authorizations (from summer 2005), the FY 2008 and FY 2009 budget estimates (developed in January 2007 and January 2008, respectively), and the estimates contained in the Midsession Review of the FY 2009 Budget (developed in July 2008). As illustrated, estimated Highway Account receipts for the period covering FY 2009–12 dropped 12 percent in nearly three years. And even the most recent estimates may well understate the full decline in revenues that may occur if volatile fuel prices and poor economic performance in the near term worsen this already deteriorating outlook.

In developing its own estimates of future HTF revenues, the Commission evaluated a combination of short- and long-term factors. In the short term, motor fuel price volatility combined with a weak economy could have a considerable negative impact. Exhibit 2-16 shows that VMT growth slowed

EXHIBIT 2-16: ANNUAL VEHICLE MILES TRAVELED



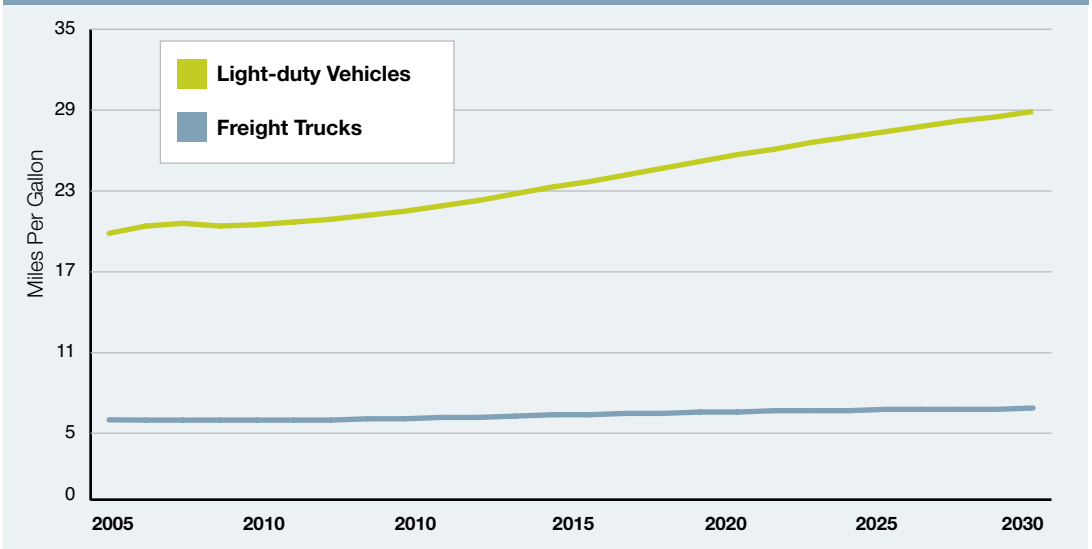
Source: FHWA Travel Monitoring: August 2008 Volume Traffic Trends

in 2005 and actually began to decline at the end of 2007. In fact, total VMT for the first 10 months of 2008 declined 3.5 percent from the same period a year earlier.[33] Moreover, people also are shifting to more fuel-efficient vehicles in response to more volatile fuel prices.

In the long term, confidence in the sustainability of existing HTF sources is even weaker than in the short term. Most experts that study fuel consumption and travel trends view the recent decline in VMT as a temporary trend and expect travel growth to resume a trajectory of about 1.5–1.8 percent per year for the foreseeable future due to factors such as population growth, economic growth, and land use patterns. The primary driver of future uncertainty about HTF revenues is therefore not travel growth but rather average vehicle fuel efficiency. This measure, which has actually dipped slightly over the last 10–15 years, is expected to improve significantly in the future.

As illustrated in Exhibit 2–17, the U.S. Energy Information Agency estimates that fuel efficiency for all light-duty vehicles will steadily increase, from just over 20 average weighted MPG in 2008 to nearly 29 MPG in 2030. The fuel efficiency of freight trucks also is expected to improve, albeit at a slower rate, from about 6 average weighted MPG in 2008 to nearly 7 MPG in 2030.[34] And this assumes that there is no major paradigm shift in vehicle fuel technology (such as affordable electric cars or hybrid heavy-duty trucks), public policy, or public attitudes that encourage people to reduce their long-term travel habits or shift to more efficient vehicles more quickly. Given the growing concern about climate change and fuel price volatility, such changes are quite possible

EXHIBIT 2-17: EIA PROJECTED LIGHT-DUTY VEHICLE AND FREIGHT TRUCK MPG



Source: Energy Information Administration, Annual Energy Outlook: Transportation Sector Key Indicators and Delivered Energy Consumption, 2009 Early Release

and, in fact, likely. Either separately or in combination, dramatic changes could lead to a much more rapid deterioration in the long-term viability of the current HTF funding sources.

Developing a meaningful long-range year-by-year estimate of HTF revenues poses a significant challenge, in light of the wide range of uncertainty about key factors that influence motor fuel tax receipts. In response to Congress's request for a long-term forecast of HTF revenues under current law, the Commission offers what it considers to be a reasonable range of revenue estimates based on two scenarios:

- A ***Baseline Forecast*** that builds on recent official estimates about key variables like VMT growth and vehicle fuel efficiency
- A ***Conservative Forecast*** that assumes greater fuel economy improvement and thus lower fuel consumption and reduced revenues

The Baseline Forecast projects current-law HTF net revenues to grow from $36.4 billion in 2008 to $46.2 billion in 2035, reflecting an average annual growth rate of 0.9 percent. Given a conservative estimate of 2 percent annual inflation for future costs (see Box 2–2), federal program purchasing power under this scenario in 2008 dollars would drop to $27.1 billion by 2035, a 25.5 percent decline from 2008.

The Baseline Forecast does not bode well for future federal funding of the nation's surface transportation programs, and yet it may in fact prove overly optimistic. The forecast is based on the assumption that vehicle fleet turnover rates will continue at historical levels and thus severely limit how fast average vehicle fleet efficiency can improve. But what if turnover rates change? What happens to motor fuel consumption if future oil prices, new technologies, and/or concern about climate change lead to a fundamental shift in views about vehicle obsolescence and the public's willingness to invest in high-efficiency or alternative fuel vehicles? In the Commission's opinion, this "change scenario" is well within the realm of real possibility.

The more significant drop in future HTF funding anticipated under a change scenario is difficult to assess. By its nature, this kind of scenario negates the use of existing trend-line methodologies for estimating future motor fuel consumption, and more aggressive forecasts of average vehicle fuel efficiency growth are speculative at best. Given the absence of recognized vehicle efficiency forecasts based on major shifts in vehicle choice, the Commission opted to develop a Conservative Forecast based on future MPG levels that were simply believed to provide reasonable and informative "what if" scenarios. Specifically, the Commission evaluated the impact of 2035 MPG levels that are roughly 50 percent higher than the official U.S. Energy Information Agency forecast for light-duty vehicles and 25 percent higher for freight trucks (45 and 9 MPG, respectively). The Commission selected a less aggressive change in freight truck efficiency on the advice of industry experts.[35] (See Exhibit 2–18.)

The Conservative Forecast leads to nominal HTF tax receipts by 2035 that are 21.9 percent lower than the Baseline Forecast ($36.1 billion vs. $46.2 billion). This translates into annual federal program purchasing power by 2035 of just $21.2 billion in 2008 dollars, a 41.8 percent decline from 2008 (compared with a 25.5 percent decline for the same period under the Baseline Forecast). These two revenue forecasts are shown in Exhibit 2–19 and summarized in Exhibit 2–20.

It is important to reiterate that changes in technology, policy, and individual behavior could well lead to even less fuel consumption and even lower HTF revenues over the next 20–30 years.

EXHIBIT 2–18: VEHICLE FUEL EFFICIENCY, BASELINE AND CONSERVATIVE FORECAST ASSUMPTIONS

	Baseline Forecast		Conservative Forecast	
	Light-duty Vehicles	Freight Trucks	Light-duty Vehicles	Freight Trucks
2008	20.4 MPG	6.0 MPG	20.4 MPG	6.0 MPG
2035	31.2 MPG[36]	7.0 MPG	45.0 MPG	9.0 MPG
Avg. Annual Growth Rate of MPG	1.6%	0.6%	3.0%	1.5%

Significantly higher fuel prices coupled with faster implementation of new technology enabling widespread use of electric or alternative fuel vehicles would produce much less revenue.

Maintaining Federal Investment Purchasing Power

Congress asked the Commission to estimate the level of funding required to "ensure that federal levels of investment in highways and transit do not decline in real terms." The Commission interpreted this to mean the 2008 federal highway and transit program funding (obligation) levels, including the General Fund support for transit. Such an estimate is a projection of future purchasing power and derived from assumptions about long-term inflation. As explained previously, the Commission used 2 percent for that purpose in this report.

Applying a 2.0 percent long-term average annual inflation rate, the combined federal highway and transit program funding level of $53.6 billion would need to grow to $91.6 billion (in nominal terms) by 2035 for current program purchasing power to be maintained. As illustrated in Exhibit 2–21, the HTF revenue forecasts do not come close to achieving this. The Baseline Forecast revenue gap grows from $17.3 billion in 2008 to $45.3 billion by 2035, with a cumulative shortfall of $827 billion over the 28-year period. The Conservative Forecast produces a revenue gap that grows to $55.5 billion by 2035, with a cumulative shortfall of $975 billion. To the extent average annual inflation exceeds the assumed 2.0 percent, the revenue gaps will grow that much larger.

EXHIBIT 2-19: HTF BASELINE FORECAST VS. CONSERVATIVE FORECAST (HIGHER MPG ASSUMPTION)

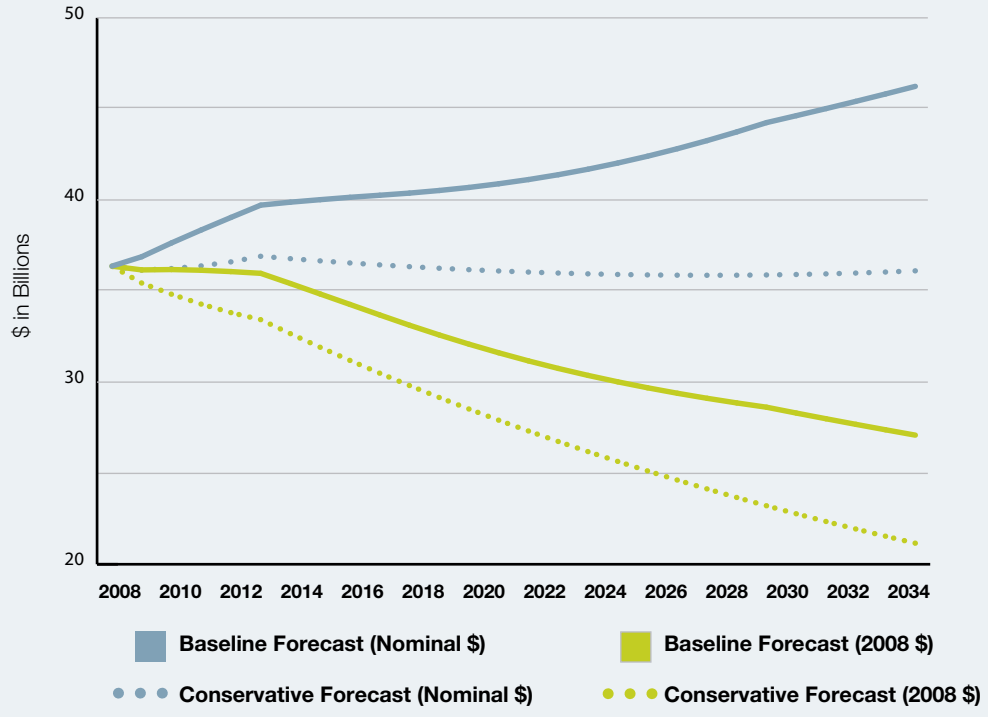


EXHIBIT 2-20: HTF FORECAST SUMMARY

	2008 Revenues	2035 Revenues	Average Annual Revenues 2008-2035	Cumulative Revenues 2008-2035	Average Annual Revenues 2010-2015	Cumulative Revenues 2010-2015
Baseline Forecast						
Nominal $	$36.4	$46.2	$41.5	$1,161	$39.1	$235
2008 $	$36.4	$27.1	$31.8	$891	$35.8	$215
Conservative Forecast						
Nominal $	$36.4	$36.1	$36.2	$1,013	$36.6	$220
2008 $	$36.4	$21.2	$28.1	$786	$33.5	$201

Data Sources and Growth Assumptions

Baseline Forecast

- Light-duty Vehicle Annual VMT Growth = 1.6%[a]
- Freight Truck Annual VMT Growth = 1.8%[a]
- Light-duty Vehicle Annual MPG growth = 1.59%[b]
- Freight Truck Annual MPG growth = 0.59%
- No change in tax rates

Conservative Forecast

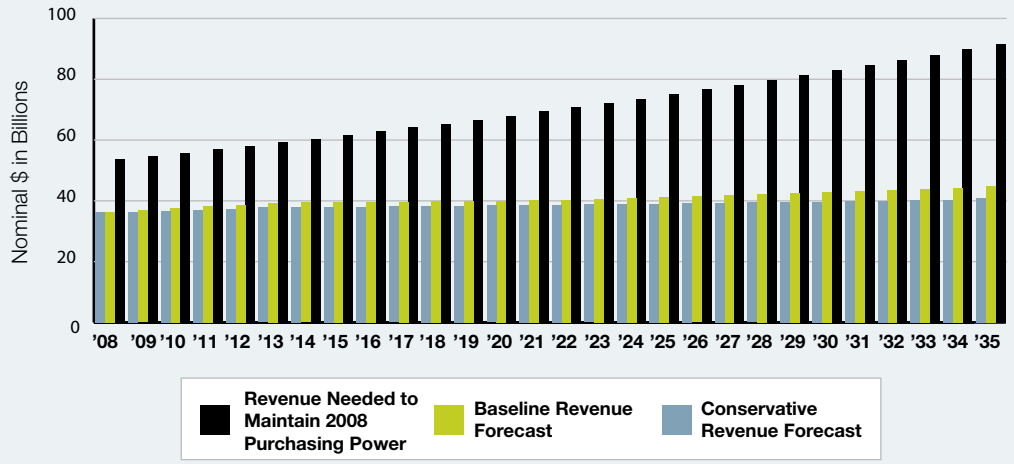
- Light-duty Vehicle Annual MPG growth = 3.0%[c]
- Freight Truck Annual MPG growth = 1.5%
- Other Assumptions Same as Baseline Forecast

a. Average of the guidance provided by the Federal Highway Administration and rates used in December 2008 estimates of the U.S. Energy Information Agency (EIA).

b. EIA, "Table 7. Transportation Sector Key Indicators and Delivered Energy Consumption," Excel sheet, December 2008, at www.eia.doe.gov/oiaf/aeo/excel/aeotab_7.xls

c. The Conservative Forecast MPG growth assumption for light-duty vehicles is the compound annual growth rate required to go from 20.4 MPG in 2008 to 35.0 MPG in 2035. The MPG growth assumption for freight trucks is assumed to be 9.0 based on expert opinion.

EXHIBIT 2-21: ANNUAL FEDERAL REVENUE NEEDED TO MAINTAIN CURRENT HIGHWAY AND TRANSIT PROGRAM PURCHASING POWER, 2008–35



III. SURFACE TRANSPORTATION INVESTMENT NEEDS

Forecasts of long-term federal surface transportation capital investment needs include two key considerations. First, there is the matter of estimating the nation's total highway and transit investment needs. Second, there is the question of what share of this total investment should be a federal responsibility.

Recent Estimates

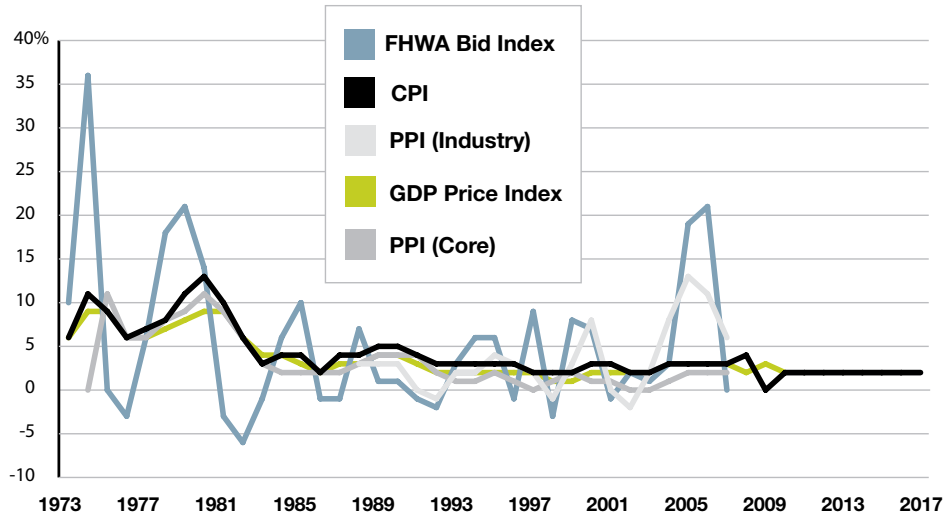
The U.S. Department of Transportation is required by law to estimate biannually the costs to "maintain" and "improve" the existing highway and transit systems and document the findings in its *Conditions and Performance* (C&P) report. This report is intended to provide decision makers with an objective appraisal of the physical conditions, operational performance, and funding mechanisms for highways, bridges, and transit systems. The most recent edition is the 2006 C&P report, released in early 2007 and based on 2004 data. But those cost

BOX 2–2: ADJUSTING FOR INFLATION

Calculating the present value of forecasted investment needs and revenue streams requires making an assumption about future inflation trends. The Commission examined various possible indices for making inflation adjustments, including:

- Consumer Price Index for all Urban Consumers
- Producer Price Index for Highway and Street Construction
- Core Producer Price Index
- GDP Implicit Price Deflator
- Other indices created by industry organizations

Long-term trends for the various measures are similar, although the indices more specifically targeted to highway and street construction are more volatile. The selection of an inflation-adjustment metric was driven by the goal of making a variety of different revenue and expenditure forecasts over a very long time horizon. The Commission was more concerned with capturing long-term growth than predicting short-term movements. Despite the differences in historical data, available published forecasts for the CPI-U, the GDP Implicit Price Deflator, and the Global Insight Pricing and Purchasing Service Highway Construction Cost Index were similar. All three indices projected inflation to average between 2.0 and 2.2 percent through 2018. Given the relative consistency of the available projections, the Commission chose to use 2.0 percent as a conservative assumption in adjusting estimates for future inflation.



Historical CPI -U, Industry PPI for Highway and Street Construction, and Core PPI (finished goods less food and energy) as published by the Bureau of Labor Statistics. CPI-U and GDP Price Index Forecasts from Congressional Budget Office Economic Projections. FHWA Bid Index is Composite Index of Price Trends for Federal-Aid Highway Construction, 2008.

estimates were updated in a National Cooperative Highway Research Program (NCHRP) study, which revised inflation assumptions to account for higher-than-expected construction costs in recent years. The NCHRP-adjusted estimates have been converted to 2008 dollars and are summarized in the first two columns of Exhibits 2–22 and 2–23. They show future annual highway capital investment needs (for all levels of government) ranging from $112 billion to $158 billion, and future annual transit capital investment needs ranging from $21 billion to $31 billion.[37]

The National Surface Transportation Policy and Revenue Study Commission developed a series of "medium" and "high" estimates of capital investment needs in its 2008 final report. These estimates were developed with the same analytical tools used for the C&P report and included scenarios with varying investment priorities and system performance goals:[38]

- **Base Case**—assessed the capital investment costs assuming continuation of existing policies, programs, and trends
- **Scenario 1: Maximum Operations**—focused on aggressive application of operations strategies such as ramp metering, traveler information, incident management, and transportation management center deployment
- **Scenario 2: Travel Demand and Energy Efficiency**—built from Scenario 1 but also assumed widespread use of road pricing in congested areas
- **Scenario 3: Aggressive System Expansion**—focused on expansion of mixed-use facilities
- **Scenario 4: Exclusive Passenger and Freight Facilities**—emphasized construction of new, separate freight and passenger rail facilities
- **Scenario 5: Maximum Technology**—explored the bounds of what new technologies could do but was not fleshed out to the same extent as the other scenarios due to the lack of supporting data

As a result of the varying implications of these investment scenarios, the needs estimates developed by the Policy Commission covered

EXHIBIT 2–22: AVERAGE ANNUAL HIGHWAY CAPITAL NEEDS AND GAP ESTIMATES, 2008-35

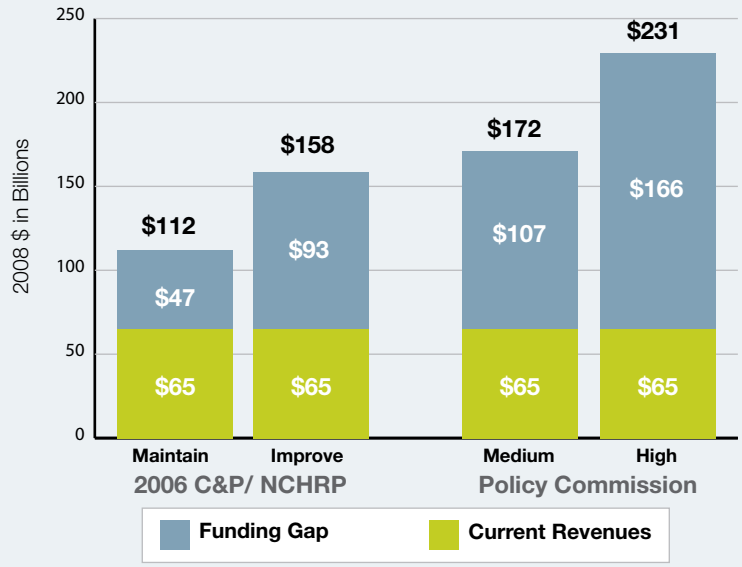
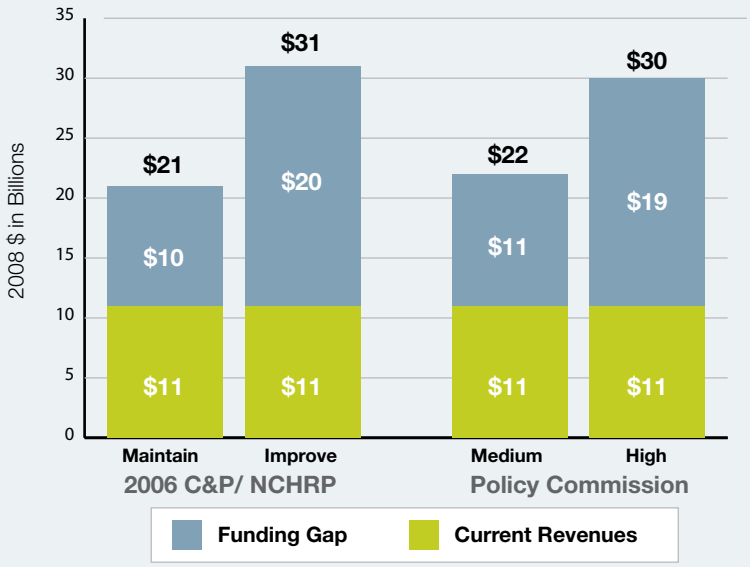


EXHIBIT 2-23: AVERAGE ANNUAL TRANSIT CAPITAL NEEDS AND GAP ESTIMATES, 2008-35



a broad range: estimates of medium highway investment strategy costs ranged from $142 billion to $201 billion annually, and high investment strategy costs ranged from $195 billion to $268 billion annually (converted to 2008 dollars).[39] Transit investment needs were estimated only for the Base Case and Scenarios 2 and 3, with a range of $18 billion to $27 billion annually for the medium investment strategies and $25 billion to $36 billion annually for the high investment strategies (all figures in 2008 dollars). The combined averages of the Policy Commission estimates for highways and transit under the medium and high investment strategies are presented in the two right-hand columns of Exhibits 2–22 and 2–23 for comparison with the 2006 C&P report/NCHRP study findings.[40]

Exhibits 2–22 and 2–23 also show current revenues, which are the average annual revenues estimated to be available from all levels of government (federal, state, and local) to make the needed capital investments. These amounts—about $65 billion for highways and $11 billion for transit—are averaged over the 2008–35 period and expressed in 2008 dollars.[41] Thus, based on the 2006 C&P report/NCHRP study and the Policy Commission estimates, the spectrum of annual average funding gaps suggested by recent forecasts ranges from $47 billion to $166 billion for highways and $10 billion to $20 billion for transit.

Financing Commission Updated Estimates

In light of the time that has elapsed and changes that have occurred since the 2006 C&P report/NCHRP study and the Policy Commission estimates were developed, the Financing Commission—with valuable input and technical assistance from the Federal Highway Administration—developed its own estimates to respond to its congressional mandate to examine needs for HTF resources. This effort resulted in a Base Case Investment Scenario, which provides an update to total and federal long-term capital investment needs for highways and transit based on current policies and programs and the historical federal/non-federal spending roles. The Commission also examined investment needs assuming an alternative strategy, as described later in this section, including aggressive implementation of road pricing and greater use of public transportation.

Base Case Investment Scenario

The Base Case Investment Scenario reflects the spending levels that would be required to sustain a business-as-usual approach to federal surface transportation investment. Key considerations that went into the development of this scenario include the following:

- The highway "cost to maintain" estimates were developed with the same basic tools, methodologies, and assumptions used for the C&P report, with adjustments to accommodate a longer time horizon.

- The highway "cost to improve" estimates were developed by setting the threshold for economically justified projects at a higher benefit-cost ratio to reflect current fiscal constraints and the desire to invest in only the highest priorities. The C&P report uses a benefit-cost ratio of 1.0 for including projects in its standard "need to improve" cost estimates. This typical threshold implies that any project that can be economically justified is considered a needed improvement. The Commission's updated estimates use a benefit-cost ratio of 1.2, which raises the bar for potential investments to be considered essential for significantly improving system performance. Using this higher ratio, the Commission's updated "need to improve" cost estimates are reduced by about 10 percent relative to the needs estimates that would have been generated with a 1.0 threshold.

- For transit investment needs, the Commission used estimates developed for a recent Transit Cooperative Research Program (TCRP) study. This approach was chosen because of concerns that the C&P report methodology, which relies on input from metropolitan planning organizations' long-term plans, is overly influenced by financial constraint requirements and does not adequately account for recent cost increases and ridership demand.[42] The TCRP study relies significantly on historical growth in passenger miles traveled in estimating future needs, and the assumptions incorporate fluctuations in international commodities costs within the transportation industry. Therefore, in the Commission's scenarios, both the "cost to maintain" and the "cost to improve" estimates are based on the TCRP study cost assumptions and average annual ridership growth of 2.4 percent (the average annual growth from 1995 to 2007).[43] It is also important to note that the methodology used to develop the transit "cost to improve" estimates was based on the cost to achieve desired vehicle replacement cycles and to increase the speed of service for underperforming systems; the methodology does not include the application of benefit-cost ratio floors.

EXHIBIT 2-24: BASE CASE NEEDS FORECAST

(all figures in billions of 2008 dollars)

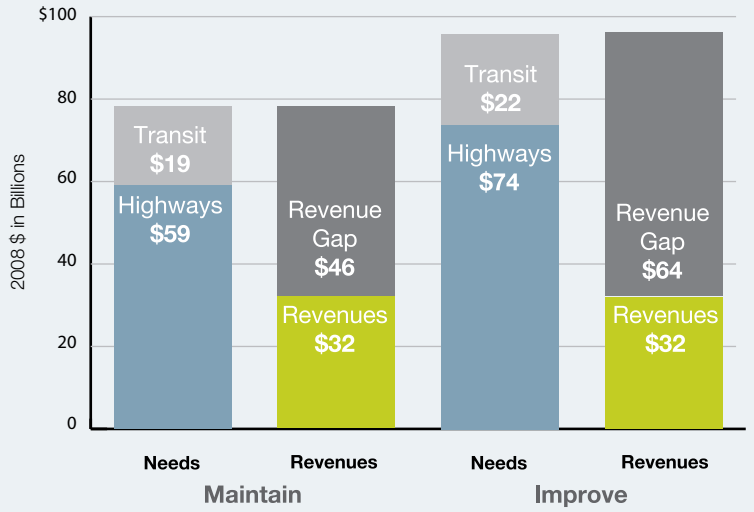
	Need to Maintain Scenario		
	Total	Federal	State/Local
Highways	$131	$59	$72
Transit	$42	$19	$23
Total	$172	$78	$95
Revenues	$76	$32	$44
Gap	$(96)	$(46)	$(50)
	Need to Improve Scenario		
	Total	Federal	State/Local
Highways	$165	$74	$90
Transit	$49	$22	$27
Total	$214	$96	$118
Revenues	$76	$32	$44
Gap	$(138)	$(64)	$(73)

Note: Sums may vary due to rounding

- All estimates in the Base Case Investment Scenario assume the federal share of highway and transit capital investment will be maintained at the 45 percent historical average.

Exhibit 2–24 summarizes the results of this Base Case Investment Scenario. Total annual capital investment (from all sources) needed just to maintain current conditions and performance is estimated to average $131 billion for highways and $42 billion for transit, in 2008 dollars. This translates into annual federal highway and transit spending requirements of $59 billion and $19 billion, respectively, for a total of $78 billion. Using the Baseline Forecast of average annual HTF revenues of $32 billion (2008 dollars in the 2008–35 period), the resulting annual federal investment gap for highways and transit is $46 billion. In addition, the total average annual spending needed to go further and improve the system under the Base Case Investment Scenario is $165 billion for highways and $49 billion for transit. The associated annual federal funding requirement is $96 billion for highways and transit combined, leaving an annual federal revenue shortfall of $64 billion.

EXHIBIT 2–25: BASE CASE NEEDS AND REVENUES



As illustrated in Exhibit 2–25, the Baseline Forecast of average annual federal HTF revenues of $32 billion (2008 dollars) is only 41 percent of the estimated amount of federal spending needed to maintain the nation's highways and transit systems and a mere 33 percent of the estimated annual amount

EXHIBIT 2-26: SUMMARY OF LONG-TERM NEEDS AND REVENUES (2008-35 ANNUAL AVERAGE)

(billions of 2008 $ unless otherwise noted)

	Need to Maintain			Need to Improve		
	Total	Federal	State/Local	Total	Federal	State/Local
Investment Needs						
Highways	$131	$59	$72	$165	$74	$ 90
Transit	$42	$19	$23	$49	$22	$27
Total	$172	$78	$95	$214	$96	$118
Baseline Revenue Forecast						
Revenues	$76	$32	$44	$76	$32	$44
Gap	$(96)	$(46)	$(50)	$(138)	$(64)	$(73)
MFT (¢/gal) to Close Gap	53¢	25¢	28¢	76¢	36¢	41¢
VMT Tax (¢/mile) to Close Gap	3.2¢	1.5¢	1.7¢	4.6¢	2.1¢	2.4¢
Conservative Revenue Forecast						
Revenues	$67	$28	$39	$67	$28	$39
Gap	$(105)	$(49)	$(56)	$(147)	$(68)	$(78)
MFT (¢/gal) to Close Gap	58¢	27¢	31¢	81¢	38¢	44¢
VMT Tax (¢/mile) to Close Gap	3.5¢	1.6¢	1.9¢	4.9¢	2.3¢	2.6¢

Note: Sums may vary due to rounding

needed to improve conditions and performance (using a benefit-cost ratio threshold of 1.2).

Exhibit 2–26 compares the Base Case investment needs with both of the revenue forecasts. To better demonstrate the magnitude of the results, it also shows the motor fuel tax increase or, alternatively, the fee level required on a per-mile basis (referred to as a VMT fee) that would be needed at the federal and state/local levels to close the associated funding gaps. (Note that these estimated tax levels are for illustrative purposes only and are not Commission recommendations.) These conversions to cents per gallon and cents per mile are rough approximations based on the average 2007–08 motor fuel tax yields of about $1.8 billion per penny (all motor fuels) and the 2008 total vehicle miles traveled of about 3 trillion (all roads).[44]

The federal tax rate on all motor fuels would need to be increased by 25–27¢ per gallon to address the federal funding shortfall just to maintain the system. Funding the investment needed to improve the system would require a federal fuel tax increase of about 36–38¢ per gallon. Alternatively, a federal VMT fee (charged on all roads in addition to the existing HTF taxes) of a 1.5–1.6¢ per mile would generate the federal share of the funding needed to maintain the system. And a federal VMT fee of 2.1–2.3¢ per mile would be needed to generate the additional federal funding required to improve the system.

In terms of total highway and transit investment needs (from all levels of government), maintaining the system would require a fuel tax increase of about 53–58¢ per gallon or the equivalent of a VMT fee of about 3.2–3.5¢ per mile. Improving the system would require a fuel tax increase of about 76–81¢ per gallon or the equivalent of a VMT fee of about 4.6–4.9¢ per mile.

The long-term highway system performance that could be achieved by 2035 under the Base Case Investment Scenario (assuming sufficient revenues were provided to address the funding gap) would include the following:[45]

- **Need to Maintain—**The adjusted average user costs (these are the cost per mile of operating a vehicle and include consideration of investment impacts on costs for items such as fuel, insurance, and repairs) would remain the same in constant dollar terms, average delay would increase by 6.2 percent, pavement conditions would deteriorate by 4.8 percent, and the backlog of needed bridge investment would remain unchanged.[46]

- **Need to Improve—**The adjusted average user costs would improve slightly (1.5 percent reduction), average delay would decrease by 0.9 percent, pavement conditions would improve by 14.9 percent, and the backlog of needed bridge investment would be fully addressed.

Looking at near-term needs and revenues also creates a strong call for action. As summarized in Exhibit 2–27, the federal HTF current-law revenues under the Baseline Forecast total just $235 billion (in nominal dollars) over the 2010–15 period (an average of $39.1 billion per year). The federal share of cumulative needs under the Base Case Investment Scenario, meanwhile, ranges from $509 billion (to maintain the system) to $632 billion (to improve the system). The annual federal funding gap, therefore, ranges from about $43 billion to $71 billion in nominal dollars for the six-year period.

EXHIBIT 2-27: FEDERAL SHORT-TERM NEEDS AND REVENUES

Year-by-Year Federal Revenues and Needs Estimates: 2010-15 (billions of nominal $)

	2010	2011	2012	2013	2014	2015	Total
Baseline Revenue Forecast	$38	$38	$39	$40	$40	$40	$235
Need to Maintain							
Base Case Scenario	$81	$82	$84	$86	$87	$89	$509
Funding Gap	$(43)	$(44)	$(45)	$(46)	$(47)	$(49)	$(274)
Need to Improve							
Base Case Scenario	$100	$102	$104	$106	$108	$111	$632
Funding Gap	$(62)	$(64)	$(65)	$(67)	$(68)	$ (71)	$(397)

Note: Sums may vary due to rounding

Alternative Investment Strategy

The Baseline Scenario essentially mirrors the federal government's current role of "Continued Significant Federal Investment." (See Box 2–3.) The Commission, however, also considered how investment requirements might change if certain funding principles and investment strategies were aggressively applied to transform the federal program. In particular, the Commission wished to explore the potential investment effect of a federal investment strategy modeled after the "Targeted Investment Role Enhanced with Additional Policies Focused on Driving Innovation and Efficiency." Specifically, the Commission evaluated what federal needs might look like if aggressive use of road pricing were coupled with greater use of technology and other management tools that should result in more efficient investment in and use of the transportation system.

To illustrate the long-term potential of such a transformative approach, the Commission developed an Alternative Investment Strategy that assumes comprehensive road pricing is immediately applied to all congested facilities. Other considerations and/or assumptions that went into this alternative analysis included the following:

BOX 2–3: FUTURE FEDERAL ROLE AND IMPACT ON INVESTMENT NEEDS

Examining the federal role in surface transportation was not explicitly within the Commission's scope, but any discussion of federal transportation funding and financing policies must be undertaken in the context of potential federal investment responsibilities. Thus, in conjunction with evaluating needs and the associated investment gaps, the Commission considered the range of options for the shape and focus of federal highway and transit investment going forward; four illustrative options are described below. (The Commission does not explicitly endorse any of these options, but it found that they provided a meaningful framework for considering the range of potential federal funding requirements in this chapter. Congress, in its upcoming deliberations, will decide which federal role should serve as the foundation for the next federal transportation program authorization period and beyond.)

- **Devolution (Minimal Role)—**This alternative is premised on the fact that, despite federal funding and oversight, the vast majority of roads and all transit systems are developed, constructed, and managed at the state and local level. Thus, under this alternative, the federal role would be extremely limited, perhaps to supporting and enforcing standards and research and development (R&D). It suggests that federal fuel (and other) taxes should be greatly reduced, leaving states and localities primarily responsible for most of the funding and financing of the surface transportation system.
- **Continued Significant Federal Investment (Current Role)—**This alternative is premised on the idea that the federal government would remain the central figure in funding the comprehensive needs of the transportation system and thus should directly fund and set policy for the national transportation network. Effectively supporting this role would require raising significantly more federal revenues—perhaps through a wide array of means, including both direct and indirect user charges. Regardless of the level of federal funding, however, this alternative assumes that current federal policies and programs would be reformed, not merely extended, to ensure effective use of national resources.
- **Targeted Investment (Smaller and More Focused Role than Current)—**This alternative assumes the federal government would retain responsibility for national standards, R&D, and funding to ensure system performance but on a smaller share of the overall system, focused principally on the core network (critical roads, nodes, corridors, and public transportation networks, and homeland security). This alternative would require additional federal resources but would be less significant than fully supporting the currently articulated federal role. This alternative also recognizes the need for some cross-subsidization and reallocation of resources at the federal level to achieve certain national network benefits, but it stresses the importance of ensuring that funding sources—particularly for highway funding—have as close a relation to system use as feasible.
- **Targeted Investment Role Enhanced with Additional Policies Focused on Driving Innovation and Efficiency—**This alternative assumes the federal government would support national standards and R&D and would promote system performance on a core network (critical roads, nodes, corridors, and public transportation networks, and homeland security). This alternative also would require additional federal resources but would be less significant than fully supporting the currently articulated federal role. In addition to reallocating some resources at the federal level to achieve certain national network benefits, it also emphasizes the need to make investments that increase innovation and efficiency, particularly at the state and local level. This alternative responds to institutional barriers and political hurdles to innovation, including charging system users more directly, by providing incentives for more aggressive development and implementation of management approaches, operating technologies, and pricing mechanisms.

- The same basic tools, methodologies, and assumptions that are used to evaluate similar road pricing scenarios for the C&P report were applied, with adjustments to accommodate a longer time horizon.
- Highway investment priorities that emphasize operations strategies to improve system performance were assumed.
- As with the Base Case Investment Scenario, the highway "cost to improve" estimates incorporate a 1.2 benefit-cost ratio as a threshold for determining improvement needs.
- Transit investment needs were expanded to accommodate both organic ridership growth as well as anticipated travel diversion caused by road pricing. Although it is not possible to determine with precision the degree to which road pricing will increase transit ridership,

both the "need to maintain" and "need to improve" cost estimates were increased from the spending required to accommodate the historical 2.4 percent average growth rate in annual ridership to levels compatible with annual average ridership growth of 3.53 percent, which would accommodate a doubling of transit ridership within 20 years.[47]

- The federal share of highway investment potentially could change. For the purposes of this analysis, the Commission considered the impact of a change from 45 percent of total capital spending needs to 80 percent of needed investment on the National Highway System (excluding federal spending on routes outside that system). This scenario variation would concentrate federal-level spending on the highest-priority roadways, with the federal-eligible system decreasing from 985,128 miles (the current federal-aid highway system) to 163,467 miles (the current National Highway System).[48] As with the Base Case Investment Scenario, the federal share of transit investment would remain at an amount equal to 45 percent of total capital spending needs, the recent historical average.

The Commission cautions that this Alternative Investment Strategy is not realistic (at least in the near term) and probably represents a theoretical lower limit on needed system investment. The results, however, may be instructive in the context of what could be achieved in the long run if comprehensive road pricing (e.g., through a vehicle miles traveled charging system) ultimately were embraced by policy makers and the public. The scenario is based on the assumption that all congested highways would be priced immediately; in reality, such wide-scale road pricing likely could not be implemented for many years—nor is it clear how comprehensive such an effort should or would be. Also, to achieve the estimated reductions in needed investments under the Alternative Investment Strategy, the average congestion charge imposed on individual vehicles would need to be more than 30¢ per mile (in 2008 dollars) and be levied on about 20 percent of all vehicle miles traveled.[49] It is assumed that congestion charges would be imposed by state and local governments and thus would not provide a source of federal funding. They could, however, provide significant means to supplement or replace existing state and local funding sources in congested areas.

The results of this hypothetical analysis indicate that such an approach could lead to significantly reduced long-term investment needs (all figures in 2008 dollars):

- The total annual level of spending needed to maintain system performance drops by 26 percent, from $172 billion (Base Case Scenario) to $128 billion (Alternative Scenario); highway investment needs fall by more than 42 percent, from $131 billion to $76 billion, while transit investment needs rise by 24 percent, from $42 billion to $51 billion.

- The total annual level of spending needed to improve system performance drops by about 15 percent, from $214 billion to $183 billion; highway investment needs decline by nearly 28 percent, from $165 billion to $119 billion, while transit investment needs increase by nearly 28 percent, from $49 billion to $63 billion.

- Assuming the federal share of total investment remains at the historical 45 percent for both highways and transit, the annual federal funding needed to maintain the combined system falls from $78 billion to $57 billion and the annual federal funding needed to improve the combined system falls from $96 billion to $82 billion. If the federal highway funding role were narrowed, however, to cover 80 percent of the investment needs of the National Highway System (instead of 45 percent of

EXHIBIT 2–28: AVERAGE ANNUAL CAPITAL NEEDS AND GAP ESTIMATES, FEDERAL GOVERNMENT, 2008–35 (in 2008 dollars)

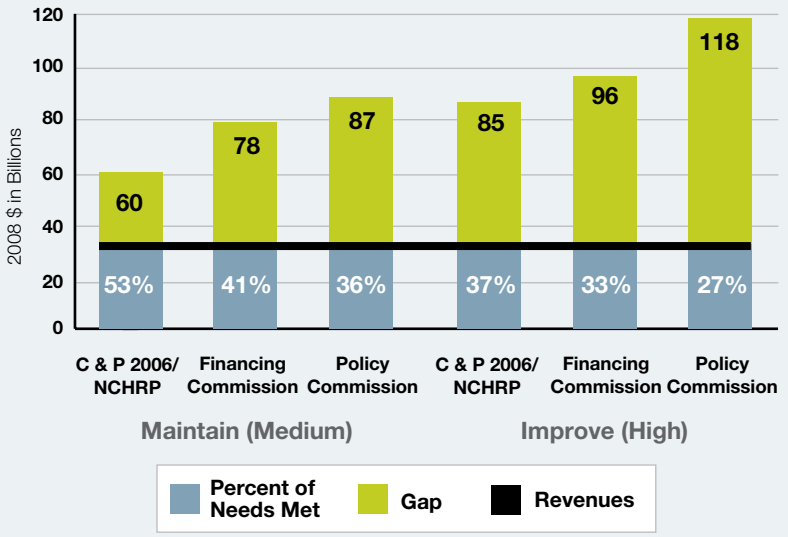
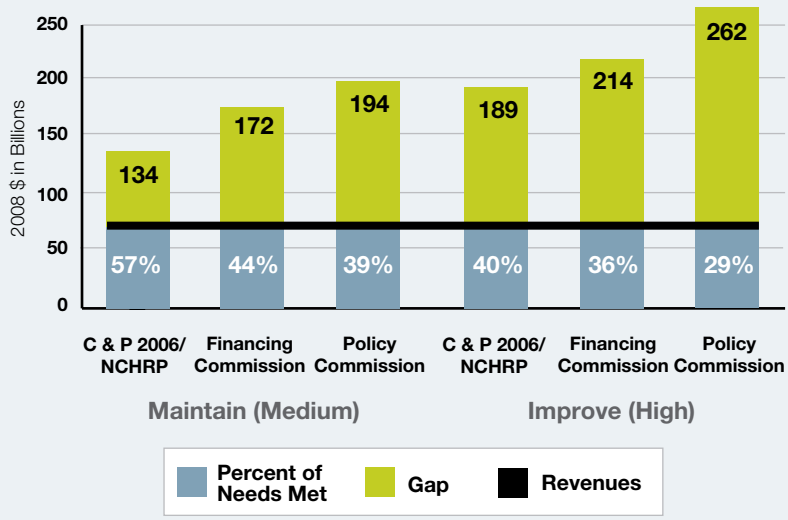


EXHIBIT 2–29: AVERAGE ANNUAL CAPITAL NEEDS AND GAP ESTIMATES, ALL LEVELS OF GOVERNMENT, 2008–35 (in 2008 dollars)



all highway capital investment needs), then the annual federal funding levels required to maintain and improve the combined system would fall further to $40 billion and $65 billion, respectively.

The long-term system performance that could be achieved by 2035 under the Alternative Investment Strategy would obviously vary based on a wide range of considerations (e.g., the speed of congestion pricing implementation), but it is estimated to include the following:[50]

- **Need to Maintain—**For the overall system, adjusted average user costs would remain even in constant dollar terms, average delay would decrease by 1.8 percent, pavement conditions would improve by 12.9 percent, and the backlog of needed bridge investment would remain unchanged.

- **Need to Improve—**The adjusted average user costs would be reduced by 2.2 percent, average delay would decrease by 9 percent, pavement conditions would improve by 9.8 percent, and the backlog of needed bridge investment would be fully addressed.

IV. CONCLUSION

The current state of U.S. surface transportation funding and investment paints a troubling picture. While highway and transit investment by all levels of government has grown somewhat in recent years, it has not kept pace with system demand, and the backlog of needed investment continues to expand. At the same time, the federal HTF faces a near-term solvency crisis, exacerbated by recent reductions in federal motor fuel tax and truck–related user fee receipts. Both problems will persist until Congress addresses the fundamental fact that HTF revenues under current law are inadequate to support current federal program levels.

Looking to the future, estimates of surface transportation investment needs and current revenues developed by the Commission and other sources uniformly show a widening highway and transit funding gap over the next 25 years. As summarized in Exhibits 2–28 and 2–29, current spending by both the federal government and the nation as a whole is only about one-third to one-half of the amount required to adequately maintain the

system and make key improvements. And, as illustrated in this chapter's gap analysis under different investment scenarios and revenue projections, addressing future needs through conventional approaches would require significant increases in motor fuel taxes—placing even greater reliance on a funding source that is unsustainable in the long run. Thus, while an immediate increase in existing federal revenue sources is an essential short-term step, long-term solutions must involve new ways of funding surface transportation infrastructure.

Endnotes

1. Spending data are from Federal Highway Administration (FHWA) *Highway Statistics*. Unless stated otherwise, inflation adjustments are made using the Consumer Price Index for All Urban Consumers (as reported by the Bureau of Labor Statistics) and constant dollar amounts are expressed in 2008 dollars.
2. The year 1988 is used as the starting point for comparison because it is the first year for which accurate national spending data on transit are available. This does not imply that the real federal funding levels in 1988 are considered ideal or even adequate.
3. FHWA, *Highway Statistics* 2006 (Washington, DC: U.S. Department of Transportation (DOT), 2008).
4. Spending data are from American Public Transportation Association (APTA), *2008 Public Transportation Fact Book* (Washington, DC: June 2008).
5. Ibid.
6. Spending data from Congressional Budget Office (CBO), *Issues and Options in Infrastructure Investment* (Washington, DC: May 2008). Data on gross domestic product are as reported by the Bureau of Economic Analysis.
7. Spending data are from the CBO Testimony on *Issues and Options in Infrastructure Investment*, May 8, 2008, Tables W-1 and W-2.
8. FHWA, op. cit. note 3
9. Ibid.; 2005 and 2006 transit data from APTA, op. cit. note 4, Part 2: Historical Tables 34–36.
10. FHWA, 2006 *Status of the Nation's Highways, Bridges, and Transit*: *Conditions & Performance* (Washington, DC: DOT, 2007), Chapter 6.
11. Ibid.; FHWA, op. cit. note 3, Table HF-10.
12. FHWA, op. cit. note 10.
13. Government Accountability Office, *Trends in Federal and State Highway Investment* (Washington, DC: June 2003).
14. APTA, op. cit. note 4, Tables 35 and 39.
15. Office of Management and Budget, *Budget of the United States Government, Fiscal Year 2009* (Washington, DC: 2008).
16. APTA, *Primer on Transit Funding* (Washington, DC: 2008).
17. Historical data from FHWA, op. cit. note 3; 2007 revenues from *U.S. Treasury Bulletin*, March 2008.
18. DOT, "Highway Trust Fund Revenue Falls $3 Billion in Single Year as Americans Drove Almost 11 Billion Fewer Miles This September," press release (Washington, DC: November 19, 2008).
19. Preliminary data for 2008 from the U.S. Treasury, *FY 2008 Highway Consolidated Report*, unaudited income statement; 2007 data from *U.S. Treasury Bulletin*, op. cit. note 17.
20. FHWA, op. cit. note 3, Tables FE-210 and FE-101A.
21. *U.S. Treasury Bulletin*, op. cit. note 17.

22. U.S. Environmental Protection Agency, *Fuel Economy Trends: 1975 through 2008* (Washington, DC: September 2008).

23. *U.S. Treasury Bulletin*, op. cit. note 17. Congress enacted changes to the structure of the tire and HVUT taxes in the American Jobs Creation Act of 2004, but the yield of the taxes was not appreciably changed.

24. Preliminary data for 2008 from the U.S. Treasury, op. cit. note 19; data for 1998–2007 from *U.S. Treasury Bulletins*.

25. FHWA Fact Sheets.

26. *U.S. Treasury Bulletin*, op. cit. note 17.

27. FHWA, op. cit. note 3, Table FE-210.

28. Prior-year data from *U.S. Treasury Bulletins*; 2008 preliminary data from the U.S. Treasury, op. cit. note 19.

29. These figures were developed by the American Association of State Highway and Transportation Officials using its federal Highway Trust Fund (HTF) funding model and based on assumptions contained in the *Midsession Review of the FY 2009 Budget*. As the 2008 preliminary actuals have come in under the revenue estimates contained in the Midsession Review, Exhibit 2–12 likely understates the HTF (Highway Account) solvency risk and funding potential under current law.

30. These figures were developed by the American Association of State Highway and Transportation Officials using its federal HTF funding model and based on assumptions contained in the *Midsession Review of the FY 2009 Budget*. As the 2008 preliminary actuals have come in under the revenue estimates contained in the Midsession Review, Exhibit 2–13 likely understates the HTF (Transit Account) solvency risk and funding potential under current law.

31. Ibid.

32. Transportation Research Board (TRB), *The Fuel Tax: Alternatives for Transportation Funding*, Special Report No. 285 (Washington, DC: 2006).

33. FHWA, *Travel Monitoring: August 2008 Volume Traffic Trends* (Washington, DC: 2008)

34. The term "freight trucks" is a category used by the U.S. Energy Information Administration (EIA) and includes medium to heavy trucks; in Exhibit 2–17 it refers to tractor units for semi trucks. EIA, "Table 7. Transportation Sector Key Indicators and Delivered Energy Consumption," Excel sheet, December 2008, at www.eia.doe.gov/oiaf/aeo/excel/aeotab_7.xls.

35. Cristiano Façanha and Jeff Ang-Olson, ICF International, paper presented at "Policies to Reduce Green House Gases from Freight Movements," FHWA Innovations for Tomorrow Workshop, January 2009.

36. The Energy Independence and Security Act of 2007 requires average fuel efficiency for new light-duty vehicles to reach 35 MPG by 2020 (49 CFR Parts 531 and 533). But based on historical vehicle turnover rates, the average efficiency of the entire fleet is expected to be only 31 MPG by 2035 (based on extension of EIA forecast through 2035; EIA, op. cit. note 34.

37. National Cooperative Highway Research Program, "Future Financing Options to Meet Highway and Transit Needs," Project No. 20-24(49) (Washington, DC: TRB, September 2006).

38. The *Conditions & Performance* report estimates are based on investment needs for all highways, including state and local facilities that are not part of the federal-aid highway system and are thus ineligible to receive federal funding. Conversely, the Policy Commission highway estimates are only for needs on the federal-aid highway system.

39. Estimates in the Policy Commission report were developed in 2006 dollars; they have been converted here to 2008 dollars.

40. The figures presented as the Policy Commission's average annual investment estimates were derived by averaging the high (Scenario 4) and low (Scenario 2) estimates.

41. Estimate assumes the ratio of federal to state/local funding in 2008 maintains the historical 45/55 ratio.

The resulting state/local total capital spending estimate for 2008 ($44 billion) is then held constant through 2035. The ratio of highway to transit capital spending used the 2006 split: 86 percent highways/14 percent transit.

42. The 2006 *Conditions & Performance* report transit estimates are based on what the Commission considers to be a low average annual ridership growth assumption of 2 percent.

43. For transit, the "need to maintain" estimates include the costs to continue current vehicle replacement cycles (maintaining the current average age of the public transportation fleet and other assets) and to sustain current system performance (maintaining current operating speeds and accommodating new riders). The "need to improve" estimates include the costs to shorten vehicle replacement cycles (replacing the public transportation fleet according to Federal Transit Administration–recommended replacement cycles) and to improve the speed of underperforming facilities (bringing both passenger densities and operating speeds up to national averages).

44. It is estimated that during the 2008–35 period the annual motor fuel tax yield per penny will rise only slightly above the current yield (in nominal terms) to $2.06 billion. Total vehicle miles traveled will increase to about 5 trillion, based on estimates supplied by the FHWA.

45. Highway Economic Requirements System and National Bridge Investment Analysis System. Estimates of comparable transit performance statistics were not available.

46. The Adjusted Average User Costs statistic estimates changes in user costs attributable to changes in overall system conditions and performance. It excludes projected reductions in user costs attributable to improved fuel economy. Pavement condition improvement is measured by changes in the average International Roughness Index rating for all roads.

47. Cambridge Systematics, Inc., *State and National Public Transportation Needs Analysis* (Bethesda, MD: September 2008).

48. FHWA, op. cit. note 3, Table HM-16.

49. Estimates derived from FHWA model runs using the Highway Economic Requirements System and the National Bridge Investment Analysis System.

50. Highway Economic Requirements System and National Bridge Investment Analysis System. Estimates of comparable transit performance statistics were not available.

3

TRANSPORTATION FUNDING AT A CROSSROADS

Existing Sources and New Revenue Options

In light of the enormous nationwide transportation investment challenges, the Commission sought out and methodically evaluated new and innovative strategies to address the nation's future surface transportation needs.

Congress specifically charged the Commission with identifying and evaluating new and expanded mechanisms for increasing federal Highway Trust Fund (HTF) revenues. Thus, in its search for new approaches, the Commission emphasized options that could be viable at a national level or, in some cases, where federal policy and programs could help states and local governments raise new revenues. This chapter describes the Commission's methodology for evaluating alternative revenue mechanisms and documents the results of the evaluation.

I. EVALUATION CRITERIA

Building on the funding principles outlined in Chapter 1, the Commission established a comprehensive set of criteria to support consistent and objective consideration of alternative revenue mechanisms. In coming to its conclusions, the Commission applied these evaluation criteria to a large set of options derived from numerous sources, as described in later sections of this chapter. Although the Commission focused on evaluating options at the federal level, most of the evaluation criteria generally are applicable at the state and local level as well, so the evaluation approach followed here also will be of value as a model for state and local policy makers who wish to use the framework to conduct their own evaluation with scoring and weightings that are specific to their own situations.

Following is a brief overview of the evaluation criteria considered by the Commission in carrying out its assessment of individual revenue mechanisms. Application of these criteria in turn informed the Commission's recommendations. These criteria are not rank-ordered but rather are presented in logical subcategories as follow:

- **Funding Stream Considerations**, including the overall revenue-raising potential, sustainability, and flexibility of the funding approach
- **Implementation and Administration Considerations**, including the political and legal viability of a particular approach as well as the ease and relative cost of initial implementation, ongoing administration, and enforcement
- **Economic Efficiency and Impact Considerations**, such as the ability of the mechanism to promote efficient use of the system and internalize any adverse side effects
- **Equity Considerations**, including application of the user/beneficiary pays principle and consideration of equity across income groups and geography
- **Applicability to Other Levels of Government**, focusing on the potential applicability of various funding approaches beyond the federal level to state and local government

Inevitably, some criteria conflict with one another, such that the ultimate assessment of any mechanism requires some amount of balancing and weighting across the criteria. The Commission factored this into its analytical approach, as discussed further in this and subsequent chapters. Further, the Commission recognizes that Congress as well as state and local policy makers will want to go through their own evaluation processes, applying their own balancing across criteria and relative weighting among them. The Commission offers this chapter as a template for such exercises.

Revenue Stream Considerations

In this criteria category, the Commission considered the revenue-raising potential of individual mechanisms as well as related factors of sustainability, flexibility, and justification for dedication.

Congress as well as state and local policy makers will want to go through their own evaluation processes, applying their own balancing across criteria and relative weighting among them.

Revenue Potential—*the extent to which the mechanism's revenue potential at politically viable rates matches investment needs over the target time frame.*

Revenue potential is a measure of an individual mechanism's ability to generate significant revenue using politically and economically viable rates. This seemingly straightforward criterion becomes more complex when revenue potential is considered in the context of specific investment needs. For instance, a mechanism considered in the context of funding for the overall surface transportation system must generate significant revenue, such as can be achieved by the gas tax, in order to score high on this criterion. But a mechanism considered in the context of a subcomponent of the overall system, such as port access improvements, could generate much less revenue and still score relatively high. This criterion is further complicated by the imbedded and necessary assumption of what constitutes "politically viable" rates. For instance, while a 25¢ increase in the federal motor fuel tax rates could raise enormous revenue ($45 billion per year in 2008 dollars), today many transportation funding experts believe that such a rate lies beyond the realm of political viability. Similarly, doubling the sales tax on trucks and trailers could raise $3.5 billion annually, but since truck sales are elastic and highly cyclical, such a policy could have a negative impact on truck sales in already adverse economic times. The Commission balanced these considerations to arrive at its final conclusions regarding the relative revenue potential of alternative revenue mechanisms.

Sustainability—*the extent to which the mechanism self-adjusts or can be adjusted easily by system operators or policy makers from year to year in order to meet needs, including but not limited to adjusting for inflation.*

This criterion focuses on a specific revenue mechanism's ability and likelihood either to provide organic revenue growth without specific action or to be adjusted over time to keep pace with inflation as well as funding demand changes. This evaluation factor also incorporates the *relative scalability*, or the extent to which the mechanism can be scaled upward or downward to meet specific funding demands or at specific levels of government; *stability,* or the extent to which the mechanism provides a stable source of funding without significant deviation, for instance based on economic downturns or changes in travel behavior; and *predictability*, meaning that to the extent there may be variations in revenue generation, they are predictable and manageable, such as those created by seasonal variations.

It is important to note that to provide a baseline evaluation, application of this criterion assumes that the revenue mechanism being evaluated is not indexed for inflation. In most cases, use of indexing would improve the sustainability of an existing or potential funding mechanism. Indexing is considered as a separate option in this chapter, as an overall strategy applicable to many funding mechanisms.

Flexibility—*the extent to which the mechanism is appropriate for a wide (and potentially changing) range of investments and can be redirected to meet changing objectives, market dynamics, technology options, etc.*

Given the shifting demands of our transportation system, this criterion focuses on the relative ease with which a revenue mechanism can be adjusted and applied to shifting uses or transportation investment categories. Broad-based mechanisms such as the gas tax or general taxes, for instance, tend to have considerable flexibility, while more narrowly focused mechanisms, such as facility-specific tolls, generally are inherently less flexible. That said, current Highway Trust Fund resources come from a variety of sources and their use is co-mingled.

Justification for Dedication of Revenues to Surface Transportation—*the extent to which it is appropriate to dedicate revenue from a particular mechanism to a specific use or set of uses, whether surface transportation generally or discrete subsets of surface transportation investment.*

This criterion measures the strength of the argument for dedicating revenues from a specific funding source to surface transportation or, where appropriate, to a specific transportation investment or category of investments. The more closely aligned a mechanism is to its use, the stronger the case that can be made. For example, an argument can be made for dedicating toll revenues from a specific transportation facility directly to that facility or at least to the system of which it is a part. Conversely, dedicating a portion of a general tax, such as a corporate income tax or broad-based sales tax, exclusively to transportation or even to specific transportation investments can be more difficult (though, based on states' experiences, still possible) to justify.

Implementation and Administration Considerations

In this category, the Commission considered a range of criteria that focus on the general ease and cost of initial implementation and the ongoing administration of individual mechanisms. An important first criterion in this category is the general political viability of initially instituting and sustaining a particular mechanism.

Public Acceptance and Legal/Political Viability—*the relative feasibility of gaining public and political acceptance of the mechanism compared with other mechanisms.*

This is a make-or-break criterion, since a revenue mechanism must of course be accepted before it can be implemented. Political viability, however, can change over time—what was once considered taboo can become quite acceptable after some change in circumstances, including appropriate public education efforts. For example, motor fuel taxes were originally considered strictly a state source of transportation funding. When federal fuel taxes were proposed, there was great opposition from the states; now the states are strong advocates of increasing the federal motor fuel taxes. Technological advances, such as electronic tolling or smart cards on transit systems, that can ease the burden on the payer by reducing or eliminating the delay or other hassles associated with paying the charge also have improved public acceptance of certain mechanisms.

This criterion also includes consideration of a specific mechanism's viability in the context of current law and what is required to make implementation legally feasible. This is particularly important when a mechanism is being considered by one level of government but requires legal authorization from another level, such as when a local government requires authorization from the state to impose a new tax or user charge.

Appropriateness for Federal Use—*the appropriateness of federal implementation, including consideration of the impact on lower levels of government if the federal government imposes or increases a certain charge or set of charges.*

This criterion addresses the overall appropriateness of a particular mechanism for implementation at the federal level for national use. It also incorporates consideration of the extent to which federal implementation could crowd out state and local revenue-raising mechanisms or cause other unintended impacts on these other jurisdictions.

Ease/Cost of Implementation and Administration—*the ease and cost to implement and administer relative to other mechanisms and to the revenue-raising potential.*

This criterion focuses on the initial implementation of a new mechanism and its related start-up costs as well as the ongoing cost of administration. These costs should be considered not only in absolute dollar terms but, more important, in relation to the revenue-generating potential of the mechanism. For example, a revenue mechanism that would generate limited funding but be quite expensive to implement or administer would score low on this criterion. Alternatively, if a mechanism were costly to implement but raised substantial revenue, it could still score relatively well on this criterion.

Ease/Cost of Compliance—*the extent to which the mechanism minimizes evasion and the cost of enforcement compared with other alternatives.*

Evasion by intended payers is a potential issue with any revenue mechanism. This criterion evaluates the ease of evasion and the extent to which enforcement costs can be minimized and compliance assured, recognizing that absolute 100 percent compliance will not be achievable with any mechanism.

Economic Efficiency and Impact Considerations

This category focuses on a particular mechanism's ability to help achieve an efficient outcome in terms of both use of the system and investment as well as its ability to incorporate all costs, including indirect adverse impacts.

Promotion of Efficient Use (Consumption) and Investment (Production)—*the extent to which the mechanism provides incentives for efficient use of the system by influencing travel choices and behavior and, in turn, efficient investment in response to the funding demand signals and based on transparent performance-based criteria.*

Individual revenue mechanisms should encourage efficient system use to the greatest extent practical by influencing individual users' vehicle and travel choices and behavior, with charges that match the costs to use the system, including higher costs of traveling during the most congested periods and for roadway wear and tear. Encouraging efficient system use can in turn reduce the need for additional infrastructure investment. Revenue mechanisms that are tied more closely to system use also can promote investment decisions that respond more closely to higher levels of need, especially if these decisions are based on performance goals that are comparable across the various modes in the system. This is not to say that willingness of certain users to pay is the only investment decision factor.

Individual revenue mechanisms should encourage efficient system use to the greatest extent practical by influencing individual users' vehicle and travel choices and behavior.

Creates and/or Mitigates Adverse Side Effects and Enables Charges—*the extent to which the mechanism causes and/or mitigates adverse side effects and can facilitate appropriate charges for such effects.*

This criterion focuses on two aspects. First, it addresses the ability of an individual revenue mechanism to internalize any adverse side effects of the transportation investment being funded, such as pollution, noise, congestion (and associated time loss/economic impact), and other indirect impacts caused by either the revenue mechanism itself or the transportation investment being made. This requires users to pay not only system use costs but also costs imposed externally. Second, this criterion assesses whether a mechanism encourages unwanted behavior such as avoiding vehicle registration or deferring vehicle safety improvements. Achieving a high score on this criterion requires both the ability to accurately assess the costs involved and a mechanism that appropriately applies those costs to those paying the charge. A low score implies that the mechanism could potentially encourage unwanted behaviors.

Equity Considerations

This category focuses on considerations of equity across potential revenue mechanisms, including the user pays principle as well as income and geographic equity.

User/Beneficiary Equity (User/Beneficiary Pay Principle)—*the extent to which the mechanism can be structured to charge those who directly use or otherwise benefit from the funded investment.*

This criterion focuses on a mechanism's ability to create a direct connection between use of the funded investment and the individuals who should bear the cost of that investment by virtue of their direct use or benefit.

Equity Across Income Groups—*the extent to which the mechanism limits costs for those who face the most difficulty in paying, including but not limited to the avoidance of regressive tax structures.*

Equity across income groups refers to the relative burden placed on individuals across the economic spectrum and considers individuals' ability to pay. Consideration of income equity generally discourages the use of regressive funding structures (those that place a disproportionate burden on lower-income groups) and toward more progressive forms.

There will be instances where some amount of cross-subsidization may be required and appropriate to ensure important and necessary system improvements and to meet equity and other policy goals.

Geographic Equity—*the extent to which the cost allocation/impact of the mechanism can be structured to match the geographic distribution of the benefit of the funded investments.*

Geographic equity refers primarily to the extent to which the cost burden can be structured to match the benefit in terms of geography. There will be instances where some amount of cross-subsidization may be required and appropriate to ensure important and necessary system improvements in places that are geographically disadvantaged in terms of population density, for instance. Examples include areas where people must drive long distances to conduct normal daily activities and areas with relatively small population bases supporting

highway infrastructure that is valuable to the rest of the country as part of a cohesive national system.

Applicability to Other Levels of Government

Although the Commission primarily focused on options to support federal transportation funding responsibilities, it also considered the relative applicability of individual mechanisms across all levels of government. The results of this assessment are included in this chapter for the benefit of those readers with an interest in state and local funding responsibility.

In coming to its conclusions, the Commission applied all these evaluation criteria to a large set of funding options derived from numerous sources, as described in later sections of this chapter. The Commission's focus was to evaluate funding options at the federal level. To the extent that a particular mechanism being addressed is also suited, or perhaps better suited, to state or local implementation, this is noted. Moreover, the evaluation criteria applied at the federal level generally also are applicable at the state and local level and thus are of value to state and local policy makers.

II. IDENTIFICATION OF FUNDING OPTIONS

Since the Highway Trust Fund is the current core funding mechanism for federal surface transportation investment, the Commission first considered options to increase revenues derived from existing HTF sources. The federal motor fuel tax as the primary revenue mechanism, however, poses long-term sustainability concerns. The Commission therefore emphasized identifying new sources that could supplement or replace federal motor fuel taxes in the long term and ensure the ongoing sustainability of the HTF through mechanisms that are suitable, practical, and scalable at the federal level.

The list of potential revenue mechanisms considered by the Commission was developed from the extensive body of existing research on surface transportation funding options. Sources included the following: the National Surface Transportation Policy and Revenue Commission's Final Report and working papers; studies conducted by the Transportation Research Board, the Congressional Budget Office, the Government Accountability Office, and various state departments of transportation; and position papers developed by interest groups such as the American Association of State Highway and Transportation Officials, the American Road and Transportation Builders Association, the American Trucking Associations, and the American Public Transportation Association.

III. EVALUATION METHODOLOGY

The Commission used a five-point scoring system across all evaluation criteria, with 1 being the lowest score (very inconsistent with the criteria) and 5 being the highest score (very consistent with the criteria). The scoring system was then applied in one of two ways, depending on the nature of the funding option evaluated. For most options, a low score meant the option ranked poorly and a high score meant it ranks well under the associated criterion. However, for the criterion that assesses whether the option "enables charges for adverse side effects," scores of 1 or 2 implied the option encourages unwanted behavior, a 3 was neutral, and a 4 or 5 meant it discourages unwanted behavior. For comparison purposes, the Commission used a uniform

approach to the evaluation of revenue potential, whereby each mechanism was evaluated based on both a single unit percent, fee, or increase increment believed to be feasible, as well as the percent increase or fee required to raise $1 billion annually.

The Commission also established weightings for each of selected evaluation criteria. These weightings, listed in Exhibit 3–1, are presented as each criterion's fractional multiplier (that is, its share of the total weight of all multipliers, which adds up to 1.0) and therefore represent the Commission's opinions about the relative importance of individual criteria. The multipliers were then applied to the raw scores for each option to establish a total weighted score.

IV. EVALUATION OF OPTIONS

This section provides the Commission's assessment of potential surface transportation funding options. For each option, the section includes a brief description of the revenue mechanism, identifies specific pros and cons, and then presents the raw and weighted scores in a summary evaluation table at the end of each section. (Chapters 4, 5, and 6 provide further details on mechanisms that were selected for more in-depth analysis.)

A few general observations can be made from this assessment process:

- The existing HTF revenue sources score relatively well.
- Several options could raise significant revenues with rates or fees that would appear to be feasible.
- There is strong justification for several new and existing options to provide a flexible, dedicated source of federal funding for surface transportation.
- Options vary widely with respect to both their level of sustainability and their scoring for the various equity considerations.
- Few options score well with respect to economic efficiency considerations.

EXHIBIT 3-1: CRITERIA WEIGHTING FACTORS

Criteria	Weighting	Criteria	Weighting
Revenue Stream Considerations		Implementation & Administration Considerations	
Revenue potential	0.14	Public acceptance/political viability	0.09
Sustainability	0.08	Appropriateness for Federal use	0.07
Flexibility	0.045	Ease/cost of implementation & administration	0.07
Justification for dedication	0.045	Ease/cost of compliance	0.045
Economic Efficiency/Impact Considerations		Equity Considerations	
Promotion of efficient investment	0.07	User/beneficiary equity	0.10
Promotion of efficient use	0.14	Equity across income groups	0.035
Enables charges for adverse side effects	0.035	Geographic equity	0.035
Total			1.00

Expanding Existing Highway Trust Fund Sources

The current sources of dedicated HTF funding, evaluated in Exhibit 3–2, include federal motor fuel taxes and several truck-related user fees. The clear strength of these sources is their well-established history of raising flexible yet dedicated revenues for highways and transit and their easily and inexpensively implemented rate increases (despite political unpopularity).

- **Motor Fuel Taxes—**Federal motor fuel tax rates are currently 18.4¢ per gallon for gasoline, gasohol, and special fuels and 24.4¢ per gallon for diesel.[1] The tax is collected at fuel distribution points rather than at the pump, and the cost of the tax is incorporated into the fuel price paid by consumers at the pump. Federal motor fuel taxes were last increased, by 5¢ per gallon, in 1993. A 1¢ per gallon increase on all motor fuels would raise approximately $1.8 billion annually (based on 2007–08 average), thus a 0.56¢ rise in motor fuel taxes (3 percent increase for gasoline, 2.3 percent for diesel) would raise $1 billion per year.[2] A detailed assessment of motor fuel taxes is provided in Chapter 4.

MOTOR FUEL TAX

- Description – ¢/gallon tax on gasoline, special fuels, and diesel
- Yield – 1¢/gal= $1.8 billion
- Tax to raise $1 billion annually = 0.56¢/gallon
- Conclusion – Strong option

Pros

- Yields significant revenue with a small percentage impact on total motor fuel price
- A user fee (the tax is not paid unless motor fuel is purchased), with an indirect relationship between tax and user benefits/impacts
- Strong history as a dedicated, flexible source of funding that is easy and cost-effective to administer
- Opportunity for increased motor fuel taxes to encourage users to conserve, which has positive effects with respect to environmental, congestion mitigation, and national security goals

Cons

- Sustainability issues: in short term, fixed-rate structure of motor fuel tax leads to reduced purchasing power; in long term, shift to high efficiency and alternative fuel vehicles will reduce motor fuel consumption
- Strong public opposition to motor fuel tax increases (particularly when oil price spikes occur)
- Limited relationship between tax revenues and infrastructure investment, thus does not encourage sound investment practices
- Comparatively regressive tax
- Tax only indirectly related to use—that is, closely related to the amount of use (tax cost per mile) but not to type of facility or time-of-day choices; further, poor proxy for pavement damage costs since there is no weight-based characteristic to the motor fuel tax charge except for poorer fuel efficiency (e.g., for heavy trucks) or for congestion costs
- Adverse geographic equity considerations, since people in rural areas generally travel more

- **Truck and Trailer Sales Tax—**A federal sales tax of 12 percent is imposed on the retail sales price for the first sale of all tractors and trucks over 33,000 pounds gross vehicle weight (GVW) and trailers over 26,000 pounds GVW, including parts and accessories associated with the sale. A 1 percent increase in the tax rate would raise about $219 million annually (based on 2007–08 aver-

TRUCK AND TRAILER SALES TAX

- Description – Excise tax as a percent of gross new truck and trailer sales
- Yield – 1% = $219 million
- Tax to raise $1 billion annually = 4.57%
- Conclusion – Strong option

age), thus a 4.57 percentage point rise in the tax rate to 16.6 percent (an increase of 30 percent in the total tax imposed) would be required to raise $1 billion per year.[3]

Pros

- Strong sustainability: sales tax yields generally rise with inflation, and changes in vehicle technology unlikely to reduce revenues
- Strong history as a dedicated, flexible source of funding that is easy and cost-effective to administer
- Reasonably acceptable from a public/political perspective (although strongly opposed by those directly affected)
- Tax at national level creates a level playing field (as opposed to taxing state-by-state)
- Focus of tax on heavy vehicles helps recover costs of their impact on the system

Cons

- Revenue potential limited by the large percentage increase in tax rate required to raise significant revenues (the existing 12 percent tax is already perceived as high) and the large impact of the tax on individuals and businesses
- Unstable and highly cyclical revenues that will become less sustainable in the near term if the economic recession continues
- No relationship between tax paid and either the extent of system use and facility or travel time decisions
- Federal sales taxes generally not popular
- May reduce ability of state and local governments to raise their sales taxes
- Potential impact of increased taxes on new truck/trailer sales and undesirable consequences, such as increased use of older vehicles and disincentives to purchase add-on equipment, which could have adverse safety and/or environmental impacts
- Raising truck taxes without a corresponding new fee imposed on light vehicles (e.g., a gasoline tax increase) potentially viewed as discriminating against trucks

- **Truck Tire Tax—**A federal tax is imposed on the purchase of all tires with a maximum rated load over 3,500 pounds. The tax is justified in part because it helps to recover some of the additional system damage costs caused by heavier vehicles. The current tax rate is 9.45¢ for every 10 pounds of maximum capacity that exceeds 3,500 pounds. An increase of 1¢ per 10 pounds of maximum capacity would raise about $45 million annually (based on 2007–08 average), thus the current rate would need to be increased by 22.2¢ per 10 pounds of maximum capacity to raise an additional $1 billion per year.[4]

TRUCK TIRE TAX

- Description – Excise tax on new truck and trailers
- Yield – 1¢/10 lbs load capacity = $45 million
- Tax to raise $1 billion annually = 22.2¢/10 lbs capacity
- Conclusion – Strong option

Pros

- Moderately strong correlation between tax and user benefit/impact; while tax does not consider time of travel or facility choice, does charge increased taxes for greater wear on roads
- Strong history as a dedicated, flexible source of funding that is easy and cost-effective to administer
- Reasonably acceptable from a public/political perspective (although strongly opposed by specific interests)
- Tax at national level creates a level playing field (as opposed to taxing state-by-state)

Cons

- A large percentage increase required to raise significant revenue
- Potential undesirable consequences of increased taxes, such as discouraging timely replacement of worn-out tires, which could adversely affect safety
- Some sustainability issues: current fixed-rate structure of tax nonresponsive to inflation and potentially eroded further if technological advances extend tire life
- Not fully related to system costs since trucks with more axles (i.e., tires) would pay higher tax but may cause less pavement damage
- Raising truck taxes without a corresponding new fee imposed on light vehicles (e.g., a gasoline tax increase) potentially viewed as discriminating against trucks

- **Heavy Vehicle Use Tax (HVUT)—**An annual fee is imposed on all trucks 55,000 pounds GVW or greater. The tax rate is $100 plus $22 for each 1,000 pounds of GVW in excess of 55,000 pounds, up to a maximum annual fee of $550 (thus, all trucks with GVW greater than 75,000 pounds pay the maximum). This tax is justified in part because it helps to recover some of the system damage costs caused by heavier vehicles. A 10 percent increase in both the base rate and the fee for vehicle weights in excess of 55,000 pounds (assuming a concurrent increase in the ceiling) would yield about $103 million annually (based on 2007–08 average), thus the base and variable tax rates would need to be nearly doubled (an increase of 97 percent in the total tax imposed) to raise an additional $1 billion per year.[5]

HEAVY VEHICLE USE TAX

- Description – Capacity-based tax on trucks 55,000 GVW and greater
- Yield – 10% increase (base and variable amount) = $103 million
- Tax to raise $1 billion annually = 97% increase in existing rates
- Conclusion – Strong option

Pros

- Strong correlation between tax and user benefit/impact (charges for negative impacts)
- Strong history as a dedicated, flexible source of funding
- Tax at national level creates a level playing field (as opposed to taxing state-by-state)

Cons

- Large percentage increase required to raise significant revenues
- Some sustainability issues: current fixed-rate structure of tax nonresponsive to inflation
- Raising truck taxes without a corresponding new fee imposed on light vehicles (e.g., a gasoline tax increase) potentially viewed as discriminating against trucks
- History of compliance and administration issues, since it requires fairly extensive self-reporting by owner-operators and/or trucking firms; raising rates could lead to increased compliance issues

- **Indexing Existing Sources –** Three of the four primary HTF funding sources (the motor fuel tax, the tire tax, and the Heavy Vehicle Use Tax) are flat rate taxes, which means revenues do not rise with inflation or keep up with other factors that influence revenue levels and investment needs (e.g., improvements in vehicle fuel efficiency or growing capacity and reconstruction needs). One option considered in the past but never implemented at the federal level is to index the tax rates for one or more of these mechanisms to inflation and/or some other barometer of funding needs. At a minimum, such an approach would ensure the purchasing power of the HTF is maintained. Broader indexing approaches could adjust rates based on the funding levels needed to sustain a selected level of sys-

EXHIBIT 3–2: EVALUATION OF EXPANDING EXISTING REVENUE MECHANISMS

	Revenue Option							
	Moter Fuel Taxes		Truck & Trailer Sales Taxes		Truck Tire Taxes		HVUT	
Criteria	Raw	Weight	Raw	Weight	Raw	Weight	Raw	Weight
Revenue Stream Considerations								
Revenue potential	❺	0.70	❷	0.28	❶	0.14	❷	0.28
Sustainability*	❷	0.16	❹	0.32	❸	0.24	❹	0.32
Flexibility	❺	0.225	❺	0.225	❹	0.18	❹	0.18
Justification for dedication	❺	0.225	❺	0.225	❺	0.225	❺	0.225
Implementation & Administration Considerations								
Public acceptance/political viability	❷	0.18	❹	0.36	❹	0.36	❸	0.27
Appropriateness for federal use	❺	0.35	❹	0.28	❹	0.28	❺	0.35
Ease/cost of implementation & administration	❺	0.35	❺	0.35	❺	0.35	❹	0.28
Ease/cost of compliance	❹	0.18	❺	0.225	❺	0.225	❸	0.135
Economic Efficiency/Impact Considerations								
Promotion of efficient investment (production)	❷	0.14	❷	0.14	❷	0.14	❷	0.14
Promotion of efficient use (consumption)	❸	0.42	❷	0.28	❸	0.42	❸	0.42
Creates/mitigates/charges for side effects	❸	0.105	❷	0.07	❷	0.07	❸	0.105
Equity Considerations								
User/beneficiary equity	❹	0.40	❹	0.40	❹	0.40	❹	0.40
Equity across income groups	❷	0.07	❸	0.105	❸	0.105	❸	0.105
Geographic equity	❷	0.07	❸	0.105	❸	0.105	❸	0.105
Overall Score/Weighted Rating	49	3.575	50	3.365	48	3.24	48	3.315
Applicability to level of government	F,S,L		F,S		F,S,L		F,S	

5 = Excellent, 4 = Very Good, 3 = Good, 2 = Fair, 1 = Poor; F = Federal, S = State, L = Local

**As noted earlier, for the purposes of a baseline comparison, the scores on Sustainability do not assume indexing (unless built into the mechanism, as with sales taxes). Indexing is discussed separately in this chapter as an overall strategy that is applicable to many funding mechanisms.*

tem performance. Indexing all three flat taxes yields the same pros and cons described above for each, with the exception that sustainability issues are substantially resolved (except in relation to the impact of alternative fuel vehicles). A broader description of indexing is provided in Chapter 4.

- **Ending HTF Diversions and Exemptions –** Over the last two decades, the level of revenues that should have been allocated to the HTF has been reduced because some motor fuel tax receipts have been used to support the General Fund and because of certain tax exemptions. Since 1998, the allocation of motor fuel tax revenues to the General Fund has stopped, but there are still numerous provisions that provide exemptions from paying motor fuel taxes, such as those for fuel used by state governments and political subdivisions, nonprofit education organizations, and emergency vehicles; for fleet operator evaporation allowances; and for motor fuels used off-road for agricultural purposes (on the assumption that most agricultural fuel use does not reflect use of the transportation system).

In 2007, combined exemptions and rebates reduced potential motor fuel tax receipts by more than $1.5 billion.[6] These exemptions both add to the growing surface transportation funding deficit and, in some instances, diminish the user/beneficiary pay aspect of federal HTF sources. Exemptions, moreover, may reduce the incentive for exempt users to conserve energy, either by driving less or by driving more fuel-efficient vehicles. These

considerations, however, must be balanced against the public policy objectives that serve as the rationale for the various exemptions, considering each specific exemption individually because of the differences in rationale associated with each one. For example, exemptions for governments and political subdivisions (which include many emergency vehicle operators) are based on a long-standing principle of intergovernmental relations—that governments do not tax each other. Because some of these policies and associated rationales for exemption go beyond its purview, the Commission simply raises the issue of competing demands here for consideration by Congress.

Vehicle-related Sources

A broad range of driver and vehicle-related taxes, fees, and charges are used at the state and local levels to generate dedicated transportation revenues. These include fees for issuing drivers' licenses and vehicle registrations, vehicle property taxes, various forms of vehicle-related sales taxes and imposts, and citation surcharges. The Commission determined through an initial assessment that two mechanisms simply would not make sense as federal revenue options, so they were not considered:

- **Vehicle Inspection and Traffic Citation Surcharges—**State vehicle inspection requirements and traffic citation practices, as well as underlying laws and regulations, vary widely. This lack of state-to-state consistency would make it virtually impossible to attach a uniform national surcharge to these revenue mechanisms.

- **Vehicle Personal Property Taxes—**A few states levy an annual property tax based on estimated vehicle values. Given the fact that most states do not levy this tax, the high degree of complexity associated with administering it at a national level, the unpopularity of large lump sum tax payments (as opposed to spreading taxes out over the year), and the potential for a federal tax to impinge on the revenue-raising ability of the few states that already use it as a source, there are too many barriers for this to be viable as a national surface transportation funding source.

Moreover, these mechanisms are flat taxes that do not vary by system use, thus they do not bear a direct relationship to use of the system or the generation of external costs.

The vehicle-related sources deemed worthy of further consideration, and evaluated in Exhibit 3–3, were vehicle registration fees, driver's license surcharges, and various vehicle-related sales taxes and fees. These mechanisms all incorporate some relationship to transportation but do not charge directly for system or individual facility use.

- **Vehicle Registration Fees—**All states impose annual vehicle registration and related fees, and at least half the states raise more than a quarter of their dedicated transportation revenues through this mechanism. The structure of registration fees varies widely, from a flat per vehicle fee to a schedule of rates based on factors such as vehicle type, weight, age, horsepower, and value. While comparing state fees is difficult, a recent study estimated that the national average for total registration and related fees paid for a mid-size car (in 2008) was $185.38 per year.[7] Based on a flat-fee approach, a national annual vehicle registration fee of $1 for light-duty vehicles (includes automobiles and light trucks) and $2 for trucks could yield roughly $366 million per year; thus an annual fee of about $2.75 per car and $5.50 per truck would be required to raise $1 billion per year.[8]

VEHICLE REGISTRATION FEES

- Description – National annual vehicle registration fee on automobiles and trucks
- Yield – $1 autos/$2 trucks = $366 million
- Tax to raise $1 billion annually = $2.75 autos/$5.50 trucks
- Conclusion – Strong option

Pros

- Small federal fee (in comparison to existing state fees) could raise significant revenues
- Fees could have strong sustainability if indexed or tied to vehicle value
- Fees well-established as flexible, dedicated transportation funding source at the state level
- Potential to piggyback fee implementation/compliance on state fee administration with little additional cost
- Could charge (at least indirectly) for adverse impacts, such as carbon emissions, by increasing annual fee based on average vehicle fuel efficiency rating

Cons

- Vehicle-related taxes (e.g., vehicle personal property taxes) are particularly unpopular
- Vehicle fees and the level of associated revenues raised provide no incentive for users to use the transportation system more efficiently or for agencies to invest in the highest needs
- For trucks, national registration fees potentially viewed as double taxation due to the existing HVUT mechanism
- Potential for increased fees to create disincentives to register vehicles
- A federal registration fee, if significant, could limit the capacity of state/local governments to raise their fees to fund transportation investments

- **Driver's License Surcarge—**All states charge a fee for issuing drivers' licenses. In some cases, the fee simply recovers the cost of administering the licensing programs. In many states, however, license fees also are used as a source of funding for transportation or other purposes. An average annual fee of $1 per licensed driver would raise about $208 million per year; thus an annual rate of just under $5 would be required to raise $1 billion per year.[9]

DRIVER'S LICENSE SURCHARGE

- Description – Annual surcharge on all licensed drivers
- Yield – $1/license = $208 million
- Tax to raise $1 billion annually = $4.81/license
- Conclusion – Weak option

Pros

- Significant revenues produced from fairly small fee
- Fees well-established as flexible, dedicated transportation funding source at state level
- Potential to piggyback fee implementation/compliance on state fee administration with little additional cost

Cons

- Likely to have strong public and political opposition
- Implementation potentially challenging, given variations in state licensing practices
- Federal fee could limit capacity of state/local governments to raise their fees to pay for transportation investments
- Weak relationship between fees and efficient system use/investment
- Potential to create disincentives to obtain a license
- Poor social equity

- **Vehicle Sales Tax—**A national vehicle sales tax would most likely be levied as a percentage of the total sales price for either all new or new and used vehicle purchases (similar to the existing sales tax on trucks and trailers). A 1 percent sales tax on new vehicles would currently raise about $446 million annually; the same tax on both new and used

vehicles would raise about $828 million annually. To raise $1 billion annually, a 2.2 percent tax on new vehicle sales or a 1.2 percent tax on new and used vehicle sales would need to be imposed.[10]

VEHICLE SALES TAX

- Description – Sales tax on new and used light-duty vehicle sales
- Yield – 1% of new/used vehicle sales = $828 million
- Tax to raise $1 billion annually = 1.2%
- Conclusion – Moderate option

Pros

- Modest tax rate, with a small annualized cost to consumers, could raise significant revenues
- Tax rates could vary to encourage/discourage purchase of different types of vehicles
- Strong sustainability, since tax revenues likely to grow in line with gross domestic product (GDP)
- For most purchases, buyers could likely incorporate one-time cost of the tax into vehicle financing and amortize repayment of the tax over multiple years
- Justifiable as a flexible, dedicated source of funding for surface transportation

Cons

- Very limited relationship between vehicle sales taxes and system use/facility investment
- Political willingness to impose a tax that would increase automobile prices likely to be low, at least until the U.S. auto industry recovers
- Sales taxes typically viewed as revenue mechanisms for state/local governments; potential for this tax to significantly impinge on capacity of those governments to raise their taxes
- Creates new administrative and compliance issues

- **Auto-related Sales Tax—**Similar to the vehicle sales tax, a national sales tax could be established on all products and services related to vehicle use, including parts and accessories, lubricants, and repairs. A 1 percent national sales tax would currently raise about $400 million annually; thus a 2.5 percent sales tax would be required to raise $1 billion per year.[11]

AUTO-RELATED SALES TAX

- Description – Sales tax on vehicles-related products and services
- Yield – 1% of sales = $400 million
- Tax to raise $1 billion annually = 2.5%
- Conclusion – Weak option

Pros

- Reasonably small percentage tax could raise significant revenues
- Strong sustainability, since tax revenues would likely grow in line with GDP
- Justifiable as a flexible, dedicated source of funding for surface transportation

Cons

- Significant administrative and compliance issues: in several areas definition of auto-related goods and services subject to interpretation, which creates opportunity for evasion; maintaining and enforcing these definitions likely to be arduous; in addition, unable to piggyback tax on existing administration mechanisms in states that do not impose sales taxes
- Social equity issues
- Little relationship between vehicle sales taxes and actual system use/facility investment
- Limited public acceptance and political viability
- Sale taxes typically viewed as revenue mechanisms for state/local governments rather than the federal government

- Potential to create disincentives to repairs and thus undesirable safety/environmental effects

- **Auto-related Tire Taxes—**A national tax on light-duty vehicle tires would provide a counterpart to the existing truck tire tax and could be imposed as either a sales tax or a fixed fee on new tire sales. A $1 per tire tax (imposed on both new car and aftermarket tires) would raise about $280 million annually; thus a $3.60 per tire tax would be required to raise $1 billion per year.

AUTO-RELATED TIRE TAX

- Description – Tax on new tires for light-duty vehicles
- Yield – $1/tires = $280 million
- Tax to raise $1 billion annually = $3.60/tire
- Conclusion – Strong option

Pros

- Potential to raise a modest level of revenue without significantly increasing the cost of tires
- Strong sustainability, since tax revenues would likely grow in line with GDP
- Justifiable as a flexible, dedicated source of funding for surface transportation that would not be overly burdensome to implement and administer
- Moderately strong relationship between tax user benefit/impact

Cons

- While a reasonable relationship between tire sales taxes and overall system use exists, there is no relationship between taxes paid and decisions about travel time or facility type, nor is there an opportunity to influence the efficiency of facility investment decisions with tax
- Potential undesired impact on safety by discouraging timely replacement of worn tires

- **Bicycle Tire Taxes—**There is currently no national mechanism to raise funds specifically dedicated to improvements to bike and pedestrian facilities. Consistent with the user pays principle articulated by the Commission, bicyclists should pay to support bike paths. The most effective approach would be to institute a national sales tax on bicycle tires, whether they are on new bicycles or purchased as replacement items.

BICYCLE TIRE TAX

- Description – Tax on bicycle tires
- Yield – $5/tires = $75 million
- Tax to raise $1 billion annually = n/a
- Conclusion – Weak option

The principal logic for a federal tax on bicycle tires, as opposed to a state tax, is the same as that for a federal truck tire tax. Consumers can easily go to another state (either physically or through mail-order) to purchase tires if the after-tax price is too high in one state. In fact, many bicycles and bicycle tires are purchased online and thus are not easily taxed on a state-by-state basis.

Assuming a federal bicycle tax excludes the sale of tires for children's bicycles, a $5 per tire tax could raise approximately $75 million per year and, if provided to states with the requirements that states match the funds dollar for dollar, could support a $150 million per year program to maintain and expand bicycle paths across the nation.

Pros

- Strong sustainability, since tax revenues would likely grow as bicycle use expands
- Justifiable as a dedicated source of funding for bike and pedestrian improvements
- Federal tax is an appropriate method to capture and allocate revenues when a large percentage of goods are purchased out of state through online and mail order purchases

- Although collection mechanism would need to be created, tax would be fairly inexpensive to administer and collection would be fairly straightforward to administer and enforce
- Moderately strong relationship between tax user benefit/impact

Cons

- Would not raise a large amount of revenue, even in the context of current federal bike and pedestrian path spending levels
- May not enjoy strong public or political support
- Limited flexibility on use of funds
- Could lack geographic equity if spending is concentrated (i.e., in urban areas)

EXHIBIT 3–3: EVALUATION OF VEHICLE-RELATED TAXES AND FEES

	Revenue Option											
	Vehicle Registration Fee		Driver's License Surcharge		Vehicle Sales Tax		Auto-related Sales Tax		Automobile Tire Tax		Bicycle Tire Tax	
Criteria	Raw	Weight	Raw	Weight	Raw	Weight	Raw	Weight	Raw	Weight	Raw	Weight
Revenue Stream Considerations												
Revenue potential	5	0.70	4	0.56	4	0.56	4	0.56	5	0.70	1	0.14
Sustainability	4	0.32	4	0.32	5	0.40	5	0.40	3	0.24	4	0.32
Flexibility	5	0.225	5	0.225	5	0.225	5	0.225	5	0.225	2	0.09
Justification for dedication	5	0.225	5	0.225	5	0.225	5	0.225	5	0.225	5	0.225
Implementation & Administration Considerations												
Public acceptance/ political viability	2	0.18	1	0.09	2	0.18	2	0.18	3	0.27	3	0.27
Appropriateness for federal use	3	0.21	2	0.14	2	0.14	2	0.14	4	0.28	4	0.28
Ease/cost of implementation & administration	4	0.28	4	0.28	3	0.21	2	0.14	4	0.28	4	0.28
Ease/cost of compliance	4	0.18	4	0.18	3	0.135	2	0.09	4	0.18	4	0.18
Economic Efficiency/Impact Considerations												
Promotion of efficient investment	2	0.14	2	0.14	2	0.14	2	0.14	2	0.14	2	0.14
Promotion of efficient use	2	0.28	2	0.28	2	0.28	2	0.28	3	0.42	2	0.28
Creates/mitigates side effects	3	0.105	2	0.07	3	0.105	2	0.07	2	0.07	4	0.14
Equity Considerations												
User/beneficiary equity	3	0.30	3	0.30	3	0.30	3	0.30	4	0.40	4	0.40
Equity across income groups	2	0.07	2	0.07	3	0.105	2	0.07	3	0.105	3	0.105
Geographic equity	3	0.105	3	0.105	3	0.105	3	0.105	3	0.105	3	0.105
Overall Score/ Weighted Rating	47	3.32	43	2.985	45	3.11	41	2.925	50	3.64	45	2.96
Applicability to level of government	F,S,L		F,S		F,S,L		F,S,L		F,S,L		F	

5 = Excellent, 4 = Very Good, 3 = Good, 2 = Fair, 1 = Poor; F = Federal, S = State, L = Local

New Motor Fuel–related Taxes

In addition to considering increases to current federal motor fuel tax rates, the Commission identified and assessed other mechanisms for taxing motor vehicle fuels that are either currently used in some states or discussed as options at the national level. The Commission dismissed three options after initial consideration:

- **Windfall Profits Tax—**The Commission considered the potential for using a windfall profits tax on oil companies to fund surface transportation but concluded that the one-time nature of the mechanism would create an unsustainable and highly variable funding source that is inconsistent with the Commission's congressionally mandated funding principles. The Commission also was concerned that such a tax would ultimately be passed on to the consumer (thus making it more of an indirect fee than the current HTF funding mechanisms) and could have unintended consequences, such as creating a disincentive to companies for increased energy investment.

- **Petroleum Franchise Tax—**The Commission also considered a petroleum franchise tax, which shifts the collection of motor fuel taxes from the retail level to the wholesale level, but determined it would be less transparent and offer no advantages over the existing motor fuel tax methodology. Moreover, because it would be imposed earlier in the distribution channel, a petroleum franchise tax would have adverse equity considerations and would have a less clear argument for full dedication to surface transportation since petroleum is used for more than vehicle fuel production.

- **Mineral Severance Taxes—**"Severance" taxes are currently imposed at both the federal and state levels for the extraction of natural resources (including oil) from public lands, typically based on the quantity or value of the resource removed or produced. Although an additional tax presumably could be charged on oil and provide a sizable source of dedicated funding for surface transportation, the Commission determined that the option is not viable for several reasons: the oil severance tax is already viewed as an important source of funding for other state and federal activities; increasing the tax could have undesirable consequences with respect to foreign oil independence; and the tax would be highly indirect (i.e., the same tax would be imposed on the oil regardless of whether it were used for motor fuels, heating oil, or other uses).

The potential approaches deemed worthy of serious consideration, and evaluated in Exhibit 3–4, were carbon-related taxes, imported oil taxes, and motor fuel sales taxes.

- **Carbon Tax/Cap and Trade Program—**In the context of surface transportation, a national carbon tax would be essentially a penalty for the amount of emissions produced by a vehicle, most likely translated into an added cost per gallon on fuel, imposed by the federal government (presumably through the existing motor fuel tax collection mechanism). Similarly, a cap and trade program likely would mean that large carbon users (e.g., motor fuel producers) would have to buy offsets associated with the carbon their products produced and these would then be passed on in the form of higher motor fuel costs.

  In the case of a carbon tax, the amount of revenue that could be generated would depend on the approach used to set the tax rate and the way in which the tax would be

implemented. In the case of a carbon trading system, revenue would depend on the amount of allowable carbon emissions, the cost to produce non-carbon alternatives, and the amount of carbon allowances permitted for auction (as opposed to allowances grandfathered to existing users). It is important to note the long time frame envisioned for collection of any revenue from a cap and trade system; such a program would not be a feasible option in the short term. For illustrative purposes, the following are some facts, figures, and considerations related to a potential tax:[12]

CARBON TAX/ CAP AND TRADE

- Description – Tax on carbon in motor vehicle fuels
- Yield = depends on tax structure
- Conclusion – Strong option

- Gasoline/diesel generates about 25/28 pounds of carbon dioxide per gallon.[13]
- The European spot price for carbon dioxide credits has ranged from $20 to $40 per ton or 1¢ to 2¢ per pound.
- This equates to a "cost" of 25/28¢ to 50/56¢ per gallon.
- Based on current motor fuel tax yields, carbon taxes or cap and trade levies imposed at recent European spot prices for carbon dioxide credits would yield gross revenues of nearly $46–92 billion per year.
- There are widely varying opinions about how the full cost of carbon should be calculated and how the revenues should be used.

This estimate does not assess the likely reductions in consumption due to price elasticity (to both carbon-related tax proceeds and existing motor fuel tax receipts). Thus, actual net revenues are likely to be lower (to what degree, however, is not fully understood, but given that past increases in gas prices of this magnitude have not had much effect on gas consumption, the reduction is not likely to be large at least until alternative fuel vehicles become more cost-effective). Assessing the percentage of carbon-related tax proceeds that would be allocated to surface transportation also is difficult. The pros and cons of a carbon tax generally mirror those of a motor fuel tax increase to the extent that resulting tax proceeds flow to transportation. The cap and trade approach to raise transportation revenues has the potential additional disadvantage of not being specifically tied to transportation, since it would be imposed on a broader scale.

- **Tariff on Imported Oil—**A tax on imported oil could be charged as either a fixed amount per barrel of oil or as a percentage on the value of imported oil. The former offers the advantage of providing a fairly stable revenue stream, while the latter would act to help reduce demand during periods of high oil prices. Based on the amount of oil imported in 2007, a $1 per barrel import tax would raise $4.4 billion; thus a 23¢ per barrel tax would be required to raise $1 billion per year.[14]

IMPORTED OIL TARIFF

- Description – Tax on imported oil
- Yield – $1/barrel = $4.4 billion
- Tax to raise $1 billion annually = 23¢/barrel
- Conclusion – Strong option

Pros

- Potential for a small tariff (as a percentage of total cost per barrel) to raise significant revenues
- Revenue flexibility likely to mirror that of motor fuel taxes, but because imported petroleum also is used for products not related to transportation (e.g., home heating oil), could be more difficult to justify dedicating all of the tax proceeds to surface transportation
- Could be used as an indirect means to tax carbon
- Promotes U.S. energy independence

Cons

- Although implied relationship between oil imports and motor fuel consumption, broad nature of tax creates limited user pay/benefit relationship, since tax would be imposed on both system users and non-users (e.g., home heating oil would be taxed for transportation); also raises geographical equity issues as colder regions would subsidize warmer ones
- Could raise broader free trade issues
- Possible sustainability issue if dependence on foreign oil is reduced

- **Sales Tax on Motor Fuels –** A national sales tax on motor fuels could be imposed on a percentage basis. A handful of states currently impose a motor fuel sales tax, most in the 4–6 percent range, as a supplement to a traditional cent per gallon tax. The revenue generation potential of a national motor fuel sales tax would be driven by several variables—primarily the price of fuel, the basis for the tax (e.g., whether the sales tax is imposed on the full price of fuel, including state motor fuel taxes or whether these taxes would be netted out of the cost basis), and the imposition of tax ceilings or floors. A national sales tax of 1 percent imposed on the full retail cost of motor fuels (based on a gas price range of $2–4 per gallon) could raise $3.6–7.2 billion annually; thus a sales tax of 0.14–0.28 percent would be required to raise $1 billion per year.

SALES TAX ON MOTOR FUELS

- Description – Sales tax on gasoline/diesel sales
- Yield – Depends on fuel prices
- Tax to raise $1 billion annually = Depends on fuel prices
- Conclusion – Strong option

Pros

- Small percentage tax raises significant revenues
- Sustainable in short term
- Like existing motor fuel taxes, provides flexible, dedicated transportation funding source at the state level

Cons

- Motor fuel price volatility can lead to unpredictable year-to-year revenue levels
- Unsustainable in long term due to shift toward fuel-efficient and alternative fuel vehicles
- Political/public resistance can build during fuel price spikes; sales tax rate could potentially be adjusted automatically to counter price volatility but this would reduce revenue predictability and stability
- Tax only indirectly related to use; closely related to amount of use (tax cost per mile) but not to type of facility or time-of-day choices

Broad-based Taxes and General Fund Revenues

As a contrast to targeted transportation-related taxes and fees, the Commission also looked at potential broad-based funding strategies, including a general national sales tax, dedicated personal and business income taxes, a national property tax, and a dedicated annual transfer from the General Fund of the U.S. Treasury. These options, evaluated in Exhibit 3–5, are spread over a large base and thus have the potential to raise large amounts of revenue with relatively small new or expanded taxes. They also, however, exhibit poor direct beneficiary/user pay correlation attributes. As part of its deliberation, the Commission dismissed a dedicated national property tax from consideration given (among other reasons) the implementation challenges associated with such a tax.

EXHIBIT 3–4: EVALUATION OF NEW MOTOR FUEL-RELATED TAXES

	Revenue Option					
	Carbon Tax		Imported Oil Tariff		Sales Tax on Motor Fuels	
Criteria	Raw	Weight	Raw	Weight	Raw	Weight
Revenue Stream Considerations						
Revenue potential	❺	0.70	❺	0.70	❺	0.70
Sustainability	❷	0.16	❷	0.16	❷	0.16
Flexibility	❺	0.225	❺	0.225	❺	0.225
Justification for dedication	❺	0.225	❸	0.135	❺	0.225
Implementation & Administration Considerations						
Public acceptance/ political viability	❷	0.18	❸	0.27	❷	0.18
Appropriateness for federal use	❺	0.35	❺	0.35	❸	0.21
Ease/cost of implementation & administration	❺	0.35	❸	0.21	❸	0.21
Ease/cost of compliance	❹	0.18	❹	0.18	❸	0.135
Economic Efficiency/Impact Considerations						
Promotion of efficient investment	❷	0.14	❷	0.14	❷	0.14
Promotion of efficient use	❸	0.42	❸	0.42	❸	0.42
Creates/mitigates side effects	❸	0.105	❸	0.105	❸	0.105
Equity Considerations						
User/beneficiary equity	❹	0.40	❷	0.20	❹	0.40
Equity across income groups	❷	0.07	❸	0.105	❷	0.07
Geographic equity	❷	0.07	❷	0.07	❷	0.07
Overall Score/ Weighted Rating	49	3.575	45	3.27	44	3.25
Applicability to level of government	F,S,L		F		F,S,L	

5 = Excellent, 4 = Very Good, 3 = Good, 2 = Fair, 1 = Poor;
F = Federal, S = State, L = Local

- **National General Sales Tax—**A broad-based national sales tax would presumably operate similarly to general sales taxes imposed at the state and local levels, with the tax based on a percentage of net purchase prices for retail items. Such a tax would likely require a complex set of policy decisions about what goods and services should be excluded from the tax base (e.g., foods, clothing, health care, etc.). It is estimated that a tenth of a percent national sales tax would raise $3.3 billion annually; thus a tax of only 0.03 percent is required to raise $1 billion per year.[15]

GENERAL SALES TAX

- Description – General sales tax on all retail purchases
- Yield – 0.1%=$3.3 billion
- Tax to raise $1 billion annually = 0.03%
- Conclusion – Weak option

Pros

- Small percentage tax raises significant revenue
- Strong sustainability: revenues should rise at least proportionally to inflation
- Flexible revenues use

Cons

- General nature of tax makes it more difficult to justify dedicating revenues to surface transportation
- Major implementation, administrative, and compliance costs/hurdles; unlikely to be viable unless implemented in conjunction with a major overhaul of U.S. tax policy
- Complexity and challenges of imposing tax means an unlikely near-term option
- Concept of a national sales tax historically unpopular
- Highly regressive tax
- Sales tax revenues more susceptible to volatility than other revenue mechanisms
- Very weak with respect to economic efficiency and equity criteria; bears no relationship to system use, geographic considerations, etc.
- No direct relationship between tax and transportation use and thus little opportunity to create efficient system investment or use
- No relationship to the cost of adverse side effects

- **Dedicated Income Taxes—**A national income tax for transportation could be created fairly easily and inexpensively by adding an across-the-board increase to current personal and/or corporate income tax rates. A tenth of a percent increase in the personal income tax rate (or diversion of existing taxes) would currently provide $1 billion in annual revenues for transportation.[16] A tenth of a percent increase or diversion of business income taxes would provide approximately $350 million annually; thus an increase or diversion of 0.3 percent would be needed to provide $1 billion annually.

DEDICATED INCOME TAX

- Description – Personal or business income tax
- Yield – 0.1% personal income tax = $1 billion
- Yield – 0.1% business income tax = $350 million
- Tax to raise $1 billion annually = 0.1% personal/0.3% business
- Conclusion – Weak option

Pros

- Small percentage tax raises significant revenue
- Strong sustainability: fairly inflation-neutral and flexible
- Easy/inexpensive to administer/enforce (piggybacks on existing tax)
- Income taxes considered to be relatively progressive

Cons

- General nature of tax makes it more difficult to justify dedicating revenues to surface transportation
- Strong public and political opposition
- Very weak with respect to economic efficiency and equity criteria; bears no relationship to system use, geographic considerations, etc.
- Potential for dedication to have negative impacts on the federal budget if taken from existing revenues or if it limits increases in general taxes that could address other needs

- **General Fund Revenues—**Congress could allocate revenues from the General Fund of the U.S. Treasury to the HTF, either based on pre-established levels or determined through the annual appropriation process. In fact, portions of the federal-aid highway program have at times been financed through the General Fund (e.g., demonstration projects and the Emergency Relief Program), and the transit program continues to receive General Fund

allocations. The amount of funding that could be provided for transportation from the General Fund is obviously large, but it also must be considered in light of the current significant overall budget deficit of the United States government. The same pros and cons as listed for dedicating a portion of income taxes apply, except for political viability, which is much higher since it would not be associated with a tax increase.

EXHIBIT 3–5: EVALUATION OF BROAD-BASED TAXES AND GENERAL FUND REVENUES

	Revenue Option					
	General Sales Tax		Dedicated Income Tax		General Fund Allocations	
Criteria	Raw	Weight	Raw	Weight	Raw	Weight
Revenue Stream Considerations						
Revenue potential	❺	0.70	❺	0.70	❺	0.70
Sustainability	❺	0.40	❺	0.40	❸	0.24
Flexibility	❺	0.225	❺	0.225	❺	0.225
Justification for dedication	❶	0.045	❶	0.045	❶	0.045
Implementation & Administration Considerations						
Public acceptance/ political viability	❶	0.09	❶	0.09	❹	0.36
Appropriateness for federal use	❷	0.14	❺	0.35	❺	0.35
Ease/cost of implementation & administration	❶	0.07	❺	0.35	❺	0.35
Ease/cost of compliance	❶	0.045	❺	0.225	❺	0.225
Economic Efficiency/Impact Considerations						
Promotion of efficient investment	❶	0.07	❶	0.07	❶	0.07
Promotion of efficient use	❶	0.14	❶	0.14	❶	0.14
Creates/mitigates side effects	❶	0.035	❶	0.035	❶	0.035
Equity Considerations						
User/beneficiary equity	❶	0.10	❶	0.10	❶	0.10
Equity across income groups	❷	0.07	❹	0.14	❸	0.105
Geographic equity	❷	0.07	❷	0.07	❷	0.07
Overall Score/ Weighted Rating	29	2.20	42	2.94	42	3.015
Applicability to level of government	F,S,L		F,S		F,S,L	

5 = Excellent, 4 = Very Good, 3 = Good, 2 = Fair, 1 = Poor;
F = Federal, S = State, L = Local

Freight-related Taxes

The Commission explored several revenue options that specifically target freight-related activities. These options, evaluated in Exhibit 3–6 and discussed further in Chapter 5, include new mechanisms such as a national container fee and freight-related sales tax, as well as the expansion or diversion of existing sources, such as customs duties and the harbor maintenance tax. While the Commission's focus is on identifying overall federal revenue sources and not on suggesting how funds might be allocated, the discussion of these options includes recognition that a significant portion of the revenues from any or all of these sources would likely need to be dedicated to freight-oriented projects and programs. For all of these sources, either individually or in some combination, it is anticipated that dedicating the resulting funds would greatly improve their viability. For the port-related options, it is also assumed that a further targeted intermodal investment fund would be the appropriate mechanism.

- **Container Fees—**A national container fee could be established on some or all containers moving through a U.S. port. A $10 fee on every container moving through a U.S. port would currently raise about $500 million annually; thus a $20 fee per container would be required to raise $1 billion annually.[17] If the charge is only assessed on imports, it can be expected to raise approximately one-third less revenue.

CONTAINER FEES

- Description – Fee on containers moving through U.S. ports
- Yield – $10/container = $500 million
- Tax to raise $1 billion annually = $20/container
- Conclusion – Strong option

Pros

- Raises a moderate level of funding
- Moderate implementation, administration, and compliance costs
- Strong sustainability
- Justifiable as a flexible, dedicated transportation funding source

Cons

- Does little to promote efficient system use
- Potential constitutional and international trade law conflicts
- Could be viewed as discriminating against international shippers
- Limited applications of tax; benefits mostly limited to states with large port facilities

- **Freight Waybill Tax—**A freight waybill tax essentially would be a sales tax on freight shipping costs. It estimated that a tenth of a percent tax on all truck freight waybills would raise about $620 million annually and a similar tax on waybills for all modes would raise $740 million. The tax rates to raise $1 billion per year would thus be 0.16 percent and 0.14 percent, respectively.

FREIGHT WAYBILL TAX

- Description – Sales tax on freight bills
- Yield – 0.1% truck/all modes = $620 million/$740 million
- Tax to raise $1 billion annually = 0.16%/0.14%
- Conclusion – Moderate option

Pros

- Small percentage tax rate raises significant revenues
- Strong sustainability
- Justifiable as a flexible, dedicated transportation funding source

Cons

- Does little to promote efficient investment or system use
- Would require significant effort to implement and administer tax, particularly if applied to private carriers, as discussed further in Chapter 5
- Weak relationship between tax and adverse impacts/user benefits, in part because of potential difficulty of imposing on captive freight activities, but also because shipping costs, and thus the tax, more tied to value of goods shipped than their

weight, while weight determines wear and tear on the system
- Could lead trucks to pay more than their fair share

- **Harbor Maintenance Tax—**The harbor maintenance tax was established in 1986 as the source of funding for the Harbor Maintenance Trust Fund, which provides funding for, among other things, U.S. Army Corps of Engineer harbor activities (particularly dredging) and St. Lawrence Seaway Development Corporation operations and maintenance costs. The tax is currently applied as a 0.125 percent ad valorem fee on the value of passenger tickets and declared commercial cargo loaded onto or unloaded from vessels using federally maintained harbors. (As a result of a court challenge, the export portion of the tax was found to be unconstitutional and halted in 1998.) The current tax raised $1.4 billion in 2007. Increasing the tax to 0.135 percent (an additional one one-hundredth of a percentage point) would raise another $110 million per year; thus an additional tax of 0.089 percent would be required to raise $1 billion annually.[18] Another option is to reallocate a portion of existing funds, which have historically been underutilized for surface transportation.

HARBOR MAINTENANCE TAX

- Description – Ad valorem fee on passenger tickets and declared value for commercial cargo
- Yield – 0.01% = $110 million
- Tax to raise $1 billion annually = 0.089%
- Conclusion – Moderate option

Pros
- Strong sustainability
- Few if any incremental implementation, administration, and compliance costs of increased tax

Cons
- Does not raise significant revenues
- Existing tax has faced several legal challenges
- Adverse incentive effects, potentially encouraging diversion of cargo that could be carried by coastal shipping onto already crowded coastal highways and encouraging construction of ever-larger vessels that require expensive dredging of harbors
- By taxing waterborne activities, potential weak connection to surface transportation unless strictly dedicated to port-related investments

- **Customs Duties—**A transportation infrastructure surcharge could be added to the existing customs duty fee schedule, with the associated revenues dedicated to transportation. Customs duties are imposed at varying rates on various imported goods passing through U.S. international gateways and currently go to the General Fund of the U.S. Treasury. Total customs duty receipts are expected to grow by nearly 7 percent per year for the next 10 years, which could create room for dedicating a portion of these funds to transportation. The imposition of a 1 percent transportation surcharge on customs duties would provide approximately $286 million annually for transportation; thus a 3.5 percent allocation or surcharge would be required to raise $1 billion per year.[19]

CUSTOMS DUTIES

- Description – Surcharge on all customs duties
- Yield – 1% = $286 million
- Tax to raise $1 billion annually = 3.5%
- Conclusion – Strong option

A number of interest groups, as well as the Policy Commission, have suggested that given the role transportation infrastructure plays in facilitating the import of goods, a portion of current customs duties should be allocated to support transportation investment. Although there are certainly justifications for doing so, such an approach would not raise additional revenues for the government and would thus effectively be a General Fund transfer.

Pros

- Small percentage diversion/increase provides significant revenues
- Sustainable and potentially justifiable for dedication to surface transportation
- Little or no additional cost of implementation, administration, or compliance
- High geographic equity if funding is spent on infrastructure to support ports

Cons

- Potential to raise international trade and tariff issues
- Does little to promote efficient investment or system use
- Little or no relationship between tax and adverse impacts/user benefits
- Diverts or expands a mechanism that is currently used and viewed as an important U.S. General Fund revenue source

- **Weight and Distance Taxes—**Freight-related use also could be taxed through the imposition of an excise tax based on either the weight of freight moved (a ton-based tax) or as a function of both weight and distance (a ton-mile tax). Variations of these taxes have been imposed by a few states in the past, but there has not been an equivalent tax imposed at the federal level. It is estimated that a 1¢ per ton assessment on freight moved by trucks would raise $107 million annually; a similar tax on freight moved by all modes would raise $155 million. Thus a tax of 9.45¢ per ton or 6.35¢ per ton (respectively) would be required to raise $1 billion per year. A tenth of a cent per ton-mile assessment on freight moved by trucks would raise $1.2 billion annually; a similar tax on freight moved by all modes would raise $4.2 billion. Thus a tax of 0.08¢ or 0.02¢ per ton-mile (respectively) would be required to raise $1 billion per year.

WEIGHT AND DISTANCE TAXES

- Description – Tax on truck freight movements
- Yield – 1¢/ton = $107 million
- Yield – 0.1¢/ton-mile = $1.2 billion
- Tax to raise $1 billion annually = 9.45¢/ton; 0.08¢/ton-mile
- Conclusion – Weak option

Pros

- Potential for both approaches to raise a reasonable amount of revenues (as discussed further in Chapter 5)
- Justifiable as a flexible transportation funding source dedicated to surface transportation
- Potential positive impact on efficient system use
- Strong link between impacts on the system and taxes paid; however, less so for a ton tax, since tax is only tied to vehicle weight and not also to distance vehicle is driven

Cons

- Likely to face strong political opposition from truckers/rail companies and shippers
- Impact of tax heaviest on shipment of low-value bulk items (e.g., natural resources and agricultural products); as a result, could cause mode shifts due to high price sensitivity for bulk goods movement
- The ton tax, since not distance-based, would shift disproportionate share of burden to short-haul truckers
- Significant implementation, administration, and compliance issues/costs
- Not likely to be a short-term option due to political and administrative hurdles
- Does little to promote efficient investment

EXHIBIT 3–6: EVALUATION OF FREIGHT-RELATED REVENUE OPTIONS*

	Revenue Option											
	Container Fees		Freight Sales Tax		Harbor Maintenance Tax		Customs Duties		Freight Ton-Based Tax		Freight Ton-Mile Tax	
Criteria	Raw	Weight	Raw	Weight	Raw	Weight	Raw	Weight	Raw	Weight	Raw	Weight
Revenue Stream Considerations												
Revenue potential	❷	0.28	❺	0.70	❷	0.28	❹	0.56	❹	0.56	❹	0.56
Sustainability	❹	0.32	❺	0.40	❹	0.32	❺	0.40	❸	0.24	❸	0.24
Flexibility	❹	0.18	❺	0.225	❸	0.09	❹	0.18	❹	0.18	❹	0.18
Justification for dedication	❹	0.18	❺	0.225	❸	0.135	❹	0.18	❺	0.225	❺	0.225
Implementation & Administration Considerations												
Public acceptance/ political viability	❹	0.36	❷	0.18	❸	0.27	❸	0.27	❷	0.18	❷	0.18
Appropriateness for federal use	❹	0.28	❹	0.28	❺	0.35	❺	0.35	❹	0.28	❹	0.28
Ease/cost of implementation & administration	❹	0.28	❷	0.14	❺	0.35	❺	0.35	❶	0.07	❶	0.07
Ease/cost of compliance	❹	0.18	❷	0.09	❹	0.18	❹	0.18	❶	0.045	❶	0.045
Economic Efficiency/Impact Considerations												
Promotion of efficient investment	❸	0.21	❷	0.14	❸	0.14	❸	0.21	❷	0.14	❷	0.14
Promotion of efficient use	❷	0.28	❷	0.28	❷	0.28	❷	0.28	❸	0.42	❹	0.56
Creates/mitigates side effects	❸	0.105	❷	0.07	❷	0.07	❷	0.07	❸	0.105	❸	0.105
Equity Considerations												
User/beneficiary equity	❹	0.40	❷	0.20	❸	0.30	❸	0.30	❷	0.20	❷	0.20
Equity across income groups	❸	0.105	❸	0.105	❸	0.105	❸	0.105	❸	0.105	❸	0.105
Geographic equity	❹	0.14	❸	0.105	❸	0.105	❸	0.105	❸	0.105	❸	0.105
Overall Score/ Weighted Rating	49	3.30	44	3.14	45	3.09	50	3.54	40	2.855	41	2.995
Applicability to level of government	F,S		F		F		F		F,S		F,S	

5 = Excellent, 4 = Very Good, 3 = Good, 2 = Fair, 1 = Poor; F = Federal, S = State, L = Local

**For revenue options that are dependent upon utilization of a targeted investment fund as a basic premise for feasibility, such a fund is assumed for evaluation purposes (e.g., for all freight-related funding mechanisms and more specifically those more narrowly targeted to intermodal port and harbor-related investment).*

Targeted Tolling and Comprehensive Road Pricing Options

The Commission considered a broad range of targeted tolling and pricing as well as comprehensive road pricing options. Targeted tolling and pricing approaches refer to direct user fee mechanisms that are administered at the local, regional, or state levels and focus on pricing access to and/or distance traveled on individual facilities or regional networks. These approaches, which include various forms of tolling and cordon pricing, generally are considered as means for state and local governments to fund highway and transit infrastructure investments, particularly in urban and other congested areas. Comprehensive road pricing, alternatively, could be imposed at the federal level (e.g., via a vehicle miles traveled (VMT) fee approach) or, alternatively, at the state level, to pay for broad-based transportation infrastructure investments. This section provides an overview of the Commission's assessment results and an evaluation of options in Exhibit 3–7. A detailed discussion of targeted tolling and pricing and comprehensive road pricing options is provided in Chapter 6.

- **Facility-level Tolling and Pricing—**Roadway tolling can be applied at the state and local level in a wide range of fashions, including turnpikes, which are individual (generally long-distance) facilities that charge a fee for use; "single links," which are facilities such as bridges, tunnels, or connector roads; and "managed lanes," or highway lanes that are devoted to carpoolers, public transit vehicles, and toll-paying users, including but not limited to High Occupancy Toll (HOT) lanes and HOT networks, or systems of high-occupancy vehicle lanes.

FACILITY-LEVEL TOLLING AND PRICING

- Description – Application of tolls and/or pricing to fund specific investments
- Potential Revenues – Could be significant in applicable situations, depends on breadth of use
- Other Considerations – Only applicable at state and local levels and not in all situations
- Conclusion – Strong option

Pros

- Can raise substantial revenues as an option for states and localities to raise their non-federal shares and pay for state-only investments, but only in areas where traffic volumes make it cost-effective to implement
- Once established, revenues from toll facilities tend to be stable and well suited (and often required) to be dedicated to transportation, often to the toll facility or toll road system itself; potential to increase sustainability if toll rates adjusted as necessary to account for inflation, including through automatic toll rate adjustment mechanisms
- In some instances, can generate excess revenues (beyond debt service and operations costs) that are flexible and can be used for a broad range of transportation purposes
- Potential for electronic toll collection and other tolling technologies to improve compliance enforcement and offer user benefits such as improved travel speeds and toll discounts that, over time, can help to offset the associated costs of the technology to the consumer
- If toll rates are set to manage congestion, can help maximize the efficiency of the existing network
- Reasonable income equity if non-toll alternatives such as transit are available; although in areas where neither transit nor non-tolled highway options are available, all highway users pay more and lower-income drivers potentially disproportionately affected
- Establishes a high level of user-beneficiary equity if the toll rates reflect the benefits derived by the user
- Tolled turnpikes, where built in regional or national goods movement corridors, can provide highway capacity through rural regions that otherwise could not afford it

Cons

- As general rule, facility-level tolling not a broad-based means for raising transportation revenues in rural areas with low traffic volumes
- Significant upfront political and public resistance to facility-level tolling that creates substantial implementation barriers and often takes time to overcome, particularly in cases where existing facilities are being converted to tolled facilities; tolling of new facilities or expanded capacity on existing facilities tends to gain broader public and political support
- Depending on geography, potential for unfair pricing, particularly toward out of region/state users
- Possible diversion of traffic to less safe, lower-order roads, depending on the toll rates and the location/condition of alternative routes

- Comparatively higher capital and administrative costs for toll collection than non-tolled facilities
- May have negative impacts on non-discretionary system users, such as some freight travel or others who have minimal options to change the time, location, or mode of travel

- **Cordon Pricing—**This is a state or locally imposed option whereby drivers can be charged for access to cordoned areas through tolls at certain boundaries or through the sale of passes to drive in the cordoned area. Cordon pricing could not be implemented on a national scale and, like facility-level tolling, is not viewed as a means for providing federal surface transportation funding. While the principal function of cordon pricing is to manage demand and reduce congestion during peak hours, it also generates revenues.

CORDON PRICING

- Description – Imposition of access charges for designated urban areas
- Potential Revenues – Low in terms of national needs, but could be significant relative to local needs
- Other Considerations – Only has potential in a small number of U.S. metropolitan areas
- Conclusion – Weak option

Pros

- May be possible to raise significant levels of revenue through cordon pricing, but there are limited areas in the nation where establishment of a cordon pricing scheme is feasible (e.g., places like New York, Boston, and San Francisco)
- Revenues from cordon pricing well suited to be dedicated for transportation purposes and can be used flexibly to address different types of transportation needs
- Can offer strong geographic equity if revenues are spent where they are raised

Cons

- Not an appropriate means for raising transportation revenues in rural areas with low traffic volumes
- Significant implementation and administration costs and hurdles
- Because funds raised are not linked inherently to a specific investment, may be little or no relationship between revenues from cordon pricing and system investment decisions, although such connections can be created through the implementation process
- Cordon fees designed to reduce congestion in the center of some dense metropolitan areas; therefore, may not be structured to generate substantial revenue to fund more comprehensive regional transportation networks
- Establishing cordon pricing rates that are high enough to achieve demand management goals likely to pose significant political challenge

Comprehensive Roadway Pricing Strategies at Federal and/or State Level

Comprehensive pricing refers to the imposition of direct user fees that apply on all roads and all driving in the form of mileage-based user fees, also known as vehicle miles traveled fees. These charges can either be a flat fee (e.g., a fixed number of cents per mile, regardless of where or when the travel occurred), a variable fee based on user choice considerations such as time of travel, congestion levels on a facility, type of road traveled on, type and weight of the vehicle, and vehicle emission levels, or a combination of these factors.

MILEAGE-BASED USER FEE (VMT FEE)

- Description – A universal flat charge per mile for travel, could be imposed on selected or all roadways (could also include state or local charges)
- Yield – 1¢ per mile (all vehicles, all roads) = $30 billion
- Tax to raise $1 billion annually = 0.033¢ per mile
- Conclusion – Strong option

- **Mileage-based user fee (VMT)—**Drivers can be charged for the total number of miles traveled, regardless of the road used or the time of day. The fee can be

charged in a number of ways. Oregon instituted a pilot program that charged a fee by measuring odometer changes through additional on-board equipment and that collected fees through gas stations (in lieu of charging the fuel tax). Germany has a system of charging trucks tolls for miles traveled, exhaust emissions, and number of axles. The charges are calculated using on-board global positioning satellite system equipment and wireless communication devices. A related method, used in Israel, the Netherlands, and the United Kingdom, is pay-as-you-drive insurance. The fee is collected monthly based on odometer readings transmitted by a wireless device.

Pros

- Could be implemented at national level, as a federal funding source, and could raise significant revenues
- Revenue stream from VMT pricing highly sustainable since it would not be influenced by increasing vehicle fuel efficiency or use of alternative fuels
- Like current federal motor fuel tax, proceeds from federal VMT pricing appropriate for dedication to surface transportation, but could be used flexibly to meet those investment needs
- Opportunity to set prices to cover full costs of using the system, leading to more efficient use of the system
- Alignment of user benefits with payment by users of the road network paying the mileage charges

Cons

- Public and political acceptance of pricing, at least initially, likely to be low due to the extent of the paradigm shift in how people are charged for transportation and concerns/perceptions about privacy implications of pricing implementation and enforcement
- Considerable costs and challenges (institutional, administrative, and cultural) of implementing a nationwide mileage charging system; but as technology and experience with pricing improves, at least some of these challenges likely to diminish
- Unless implemented in conjunction with major federal program reforms that use price and volume signals to prioritize investment decisions, a new VMT pricing scheme would do little to improve the efficiency of system investment
- Depending on how pricing levels are set, may create poor income and geographic equity
- No real-world experience with implementation and enforcement of pricing on a nationwide basis; full range of potential issues and hurdles that could be encountered currently unknown
- Wide-scale shift in emphasis from taxing fuels to taxing travel distance represents a major change to the traveling public (simply implementing a flat price per mile fee will require public education and take time to gain acceptance; incorporating additional factors such as congestion and emissions costs into a VMT pricing scheme, particularly if done all at once, will increase the complexity and challenges of achieving public and political acceptance)
- Time frame required to implement a VMT pricing system prevents it from being solution to short-term federal funding needs

EXHIBIT 3-7: EVALUATION OF FACILITY-LEVEL TOLLING & PRICING AND OF COMPREHENSIVE PRICING OPTIONS

	Revenue Option					
	Facility Level Tolling & Pricing Pricing Mechanisms		Cordon Pricing		VMT Mechanism	
Criteria	Raw	Weight	Raw	Weight	Raw	Weight
Revenue Stream Considerations						
Revenue potential	❹	0.56	❷	0.28	❺	0.70
Sustainability	❹	0.32	❷	0.16	❹	0.32
Flexibility	❹	0.18	❹	0.18	❺	0.225
Justification for dedication	❹	0.18	❹	0.18	❹	0.18
Implementation & Administration Considerations						
Public acceptance/ political viability	❸	0.27	❷	0.18	❷	0.18
Appropriateness for federal use	❷	0.14	❶	0.07	❺	0.35
Ease/cost of implementation & administration	❸	0.21	❷	0.135	❶	0.07
Ease/cost of compliance	❹	0.18	❸	0.135	❹	0.18
Economic Efficiency/Impact Considerations						
Promotion of efficient investment	❺	0.35	❶	0.07	❺	0.35
Promotion of efficient use	❹	0.56	❸	0.42	❺	0.70
Creates/mitigates side effects	❷	0.07	❸	0.105	❺	0.175
Equity Considerations						
User/beneficiary equity	❺	0.50	❹	0.40	❺	0.50
Equity across income groups	❸	0.105	❸	0.105	❸	0.105
Geographic equity	❺	0.175	❺	0.175	❸	0.11
Overall Score/ Weighted Rating	52	3.8	39	2.6	56	4.14
Applicability to level of government	S,L		S,L		F,S,L	

5 = Excellent, 4 = Very Good, 3 = Good, 2 = Fair, 1 = Poor;
F = Federal, S = State, L = Local

- If states do not choose to switch from gas tax to a VMT charge system for state revenues, cost of dual administration of both a gas tax system and a VMT system could create higher overall tax and fee implementation costs on combined basis

Other Usage/Impact Taxes and Fees and Private Contributions

To complete its comprehensive assessment of potential surface transportation revenue options, the Commission considered several that were deemed more appropriate for addressing targeted needs, unviable at the national level but potential state/local options, or simply infeasible for a variety of reasons (but did not fit into the major option categories discussed above). For the most part, these include mechanisms that are either currently used at the state and/or local level or have been suggested by other groups with an interest in increased transportation funding. The following is a brief discussion of the remaining options.

- **Passenger Facility Charges—**The federal Passenger Facility Charge (PFC) Program allows the collection of PFC fees of up to $4.50 for every enplaned passenger at commercial airports controlled by public agencies. Airports use these fees to fund Federal Aviation Administration–approved projects that enhance safety, security, or capacity, that reduce noise, or that increase air carrier competition. Revenues from these charges can be used for highway and transit capital expenses, although these investments must meet fairly rigorous tests with respect to their role in exclusively providing access to aviation facilities. Increasing the cap on PFCs could thus provide local governments with a means to raise money for highway and transit access to airports. The rules and practices regarding which activities are eligible for PFC funding also could be broadened to include surface transportation that is not exclusively used for airport access.

- **Development and Impact Fees—**The Commission broadly supports strategies that impose targeted sales taxes, property taxes, developer assessments, and so forth on individuals and businesses that directly benefit from specific transportation investments. These strategies, however, are most appropriate at the local level and have a limited if any role as national funding mechanisms.

- **Proceeds of Asset Sales, Leases, and Concessions—**As with development and impact fees, the Commission supports state and local government efforts to monetize assets as long as the proceeds are used for transportation, but it views these activities as mechanisms for raising state and local revenues rather than as a means for providing a stable source of long- term federal funding.

- **Federal Tax on Local Transit Fares—**The Commission notes that transit fares are already direct user charges, and they already fund a significant portion of operating expenses and some capital expenses for those systems. The Commission believes that transit fares should continue to be set locally, based on market conditions in each local transit market. Local transit systems generally try to set transit fares so as to maximize revenues, taking into account the need to keep fares affordable for low-income users. A federal tax would interfere with appropriately balancing these objectives. The Commission also dismissed this option for practical reasons: transit agencies already face stiff opposition to raising fares sufficiently to cover operating costs. Federal policy might appropriately include incentives for local governments to set fares efficiently. And, as a related matter, federal policy might reduce the current parking subsidies that exist in the tax code (employers can provide parking to their employees as a pre-tax benefit), at least to the point where they are equal to subsidies for transit, while also expanding subsidies to other commuting modes, such as telecommuting, walking, or biking, by providing a fixed amount of income in pre-tax form.

- **Federal Tax on Parking Fees—**As with a federal tax on transit fares, this revenue mechanism is a good example of charging users directly. Again, the disadvantage of a federal tax on local parking fees is that it would in effect require an across-the-board fee increase for all parking systems to maintain the same revenue level. The Commission believes that parking fees should be set locally, based on market conditions in each local parking market. Parking fees should be set so as to make efficient use of available parking capacity and to minimize congestion caused by motorists cruising for parking spaces. A federal tax would interfere with appropriately balancing these objectives. The Commission also dismissed this option for practical reasons: the variation in ownership of parking facilities and parking rates from state to state makes it impossible to implement an equitable national surcharge. Federal policy might appropriately include incentives for local governments to set parking fees efficiently.

- **Tourism Taxes—**These include sales taxes, surcharges, and fees for rental cars, hotels, and other tourism-related activities. While there is a reasonably strong relationship between these sources and transportation infrastructure (particularly with respect to rental car usage), these sources are widely used as a state and local revenue source. As such, the Commission determined that the imposition of federal taxes, fees, or surcharges on these activities would simply cut into the revenue capacity of state and local governments.

- **Tobacco, Alcohol, and Gambling Taxes—**These taxes (frequently referred to as "sin taxes") are often considered at the state and local levels since they can raise significant revenues and tax products/activities that can lead to undesirable outcomes. Although taxing tobacco and alcohol at the federal level would be much more viable than taxes on gambling, these options have little if anything to do with transportation and were deemed inappropriate as sources of long-term surface transportation funding at the federal level.

V. CONCLUSION

The evaluation of existing and potential new revenue options reinforces the fact that there is no "silver bullet" for addressing the federal surface transportation funding challenge; all approaches have their strengths and weaknesses. Nonetheless, the assessment does provide insight into the relative attractiveness of various options. Based on the Commission's initial screening, weighting of criteria, and consensus scoring of different funding approaches, the options fall into four categories of viability:

The evaluation of existing and potential new revenue options reinforces the fact that there is no "silver bullet" for addressing the federal surface transportation funding challenge.

- **Strong—**Options with a weighted total score of 3.24 to 4.21. These mechanisms are viewed as the most likely ones for raising future federal surface transportation revenues or for federal actions to help enable states to raise state-level revenues.

- **Moderate—**Options with a weighted score of 3.0 to 3.23. These mechanisms are considered potential sources, but they present major concerns in one or more areas.

EXHIBIT 3–8: REVENUE OPTION EVALUATION SUMMARY*

Strong	Moderate	Weak	Not Applicable/ Seriously Flawed**
Federal Options			
• Vehicle miles traveled fee • Automobile tire tax • Motor fuel tax • Carbon tax/cap and trade • Customs duties • Truck/trailer sales tax • Vehicle registration fee • Heavy Vehicle Use Tax • Container fee • Tariff on imported oil • Sales tax on motor fuels • Truck tire tax	• Freight waybill tax • Vehicle sales tax • Harbor maintenance tax • General fund transfer	• Freight ton-mile tax • Driver's license surcharge • Bicycle tire tax • Dedicated income tax • Auto-related sales tax • Freight ton-based tax • General sales tax	• Vehicle inspection and traffic citation surcharge • Vehicle personal property tax • Windfall profits tax • Petroleum franchise tax • Minerals severance tax • Federal tax on local transit fares • Federal tax on local parking fees
State and Local Options Benefiting from Federal Action			
• Facility level tolling and pricing	• Proceeds of asset sales, leases, and concessions	• Cordon area pricing • Passenger facility charges	• Development and impact fees • Tourism-related taxes • Tobacco, alcohol, and gambling taxes

**For revenue options that are dependent upon utilization of a targeted investment fund as a basic premise for feasibility, such a fund is assumed for evaluation purposes (e.g., for all freight-related funding mechanisms and more specifically those more narrowly targeted to intermodal port and harbor-related investment).*

*** State and local options in this category may have applicability but there is no relevant federal action or role.*

- **Weak—**Options with a weighted score below 3.0. These mechanisms are considered to have low potential or present major concerns in multiple areas.

- **Not Applicable—**Options that were considered by the Commission but deemed to either have serious flaws or be inappropriate as a federal mechanism or not suited for federal encouragement of state and local action and thus not considered further.

The results of applying these categories to the various options are summarized in Exhibit 3–8, which lists both federal options (by viability category) as well as state and local options that federal action could help facilitate. The summary chart also lists those options that may be viable at the state or local level but for which there is no federal applicability or role. Chapters 4, 5, and 6 discuss relevant revenue options that further, and Chapter 8 offers specific related recommendations.

Endnotes

1. One tenth of 1¢ of motor fuel taxes is dedicated to the Leaking Underground Storage Tank Trust Fund; 18.3¢ of gasoline tax and 24.3¢ of the diesel tax go to the Highway Trust Fund. (Tax rates on special fuels vary, but average to about 18.4¢ per gallon.)

2. Based on the average U.S. Treasury and Joint Tax Committee revenue estimates for 2008.

3. Ibid.

4. Ibid.

5. Ibid.

6. *U.S. Treasury Bulletin*, July 2008.

7. Idaho Department of Transportation, *State-by-state Comparison of Annual Motor Vehicle Registration Fees and Fuel Taxes, 2008* (Boise, ID: 2008).

8. Figure based on Federal Highway Administration (FHWA), *Highway Statistics 2006* (Washington, DC: U.S. Department of Transportation, 2008) for all vehicle registrations and assumed new $1 registration for light vehicles and $2 for heavy trucks. Assumed annual increase of 1.84 percent, which was average annual increase for 1996–2006 in the number of motor vehicles in the United States, per FHWA.

9. Based on FHWA, op. cit. note 8, on number of drivers. Adjusted 2006 figures by 1.28 percent, which was average annual increase for 1996–2006 in the number of licensed drivers in the United States.

10. Analysis based on data from the U.S. Census Bureau, Table 2 - Estimated Annual Retail and Food Services Sales by Kind of Business: 1992 through 2006, at www.census.gov/svsd/retlann/pdf/sales.pdf.

11. Based on U.S. Bureau of Economic Analysis, *2007 Personal Expenditure Data for Motor Parts and Accessories and Lubricants*.

12. Figure of $30/ton based on several sources, including Jeffrey Ball, "Bank of America Puts a Price on Carbon" (blog), *Wall Street Journal*, February 13, 2008, and Point Carbon, at www.pointcarbon.com.

13. U.S. Environmental Protection Agency, *Emission Facts: Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel* (Washington, DC: February 2005).

14. Oil import data derived from U.S. Energy Information Administration, "U.S. Net Imports by Country," at tonto.eia.doe.gov/dnav/pet/pet_move_neti_a_ep00_IMN_mbblpd_a.htm.

15. National Cooperative Highway Research Program (NCHRP), "Future Financing Options to Meet Highway and Transit Needs," Project No. 20-24(49) (Washington, DC: Transportation Research Board, September 2006), p. 108, estimates that if all states were to impose a 0.5 percent sales tax dedicated to transportation, it would generate an average of $10.5 billion a year over the 2007–17 period.

16. The Congressional Budget Office (CBO) reports that revenues from personal income taxes were $1,044 billion in 2006, or 8.0 percent of the gross domestic product (GDP). Estimate assumes a 1 percent share of personal income taxes. CBO also reports that revenues from corporate income taxes were $354 billion in 2006, or 2.7 percent of GDP. Estimate assumes a 1 percent share of corporate income taxes. CBO, Letter to Hon. Kent Conrad, Chairman, Committee on the Budget, May 18, 2007.

17. Based on data from American Association of Port Authorities Web site, "U.S./Canada Container Port Traffic in TEUs (2000–2007)," at www.aapa-ports.org.

18. According to a February 2008 report, the Harbor Maintenance Fee generated $1.4 billion in Fiscal Year 2007. Government Accountability Office, *Federal User Fees: Substantive Reviews Needed to Align Port-Related Fees with the Programs They Support* (Washington, DC: February 2008), p. 15.

19. NCHRP, op. cit. note 15, estimates that customs duties would generate average annual revenue of $1.9 billion at 5 percent, or $3.9 billion at 10 percent.

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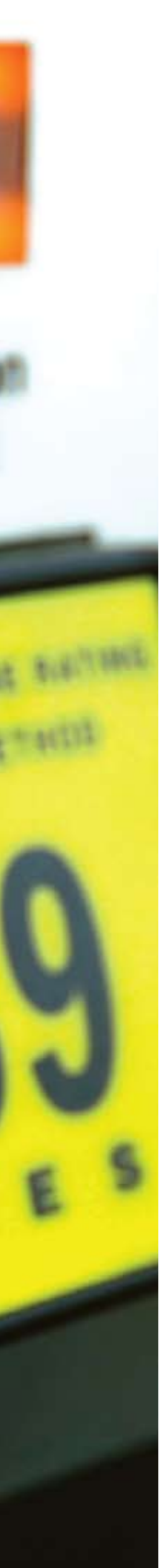


4

PAYING BY THE GALLON

Motor Fuel Taxes

Although motor fuel taxes (MFTs) are central to the surface transportation funding structure, they have both advantages and disadvantages that policy makers should consider in developing the future federal funding strategy.

This chapter summarizes the key strengths and weaknesses of motor fuel taxes, with an emphasis on the extent to which they can be used to meet both short-term and long-term investment needs.

I. OVERVIEW OF FEDERAL MOTOR FUEL TAXES

Federally imposed motor fuel taxes are primarily cents-per-gallon excise taxes imposed on the consumption of gasoline, diesel, and special fuels. The origin of federal fuel taxes as a transportation funding source can be traced back to the passage of the Federal-Aid Highway Act and the Highway Revenue Act in 1956. (A 2¢–per-gallon federal MFT existed prior to 1956, but it was not linked to funding for highways or transit.) The two acts established the Federal Highway Trust Fund (HTF), increased the federal motor fuel tax to 3¢ per gallon, created new highway user fees such as truck sale and tire taxes, and dedicated the revenues to the HTF. Federal motor fuel tax rates have been increased sporadically over the years, with the last increase occurring in 1993. (See Exhibit 4–1.)

EXHIBIT 4-1: FEDERAL MOTOR FUEL TAX RATES (CENTS PER GALLON)

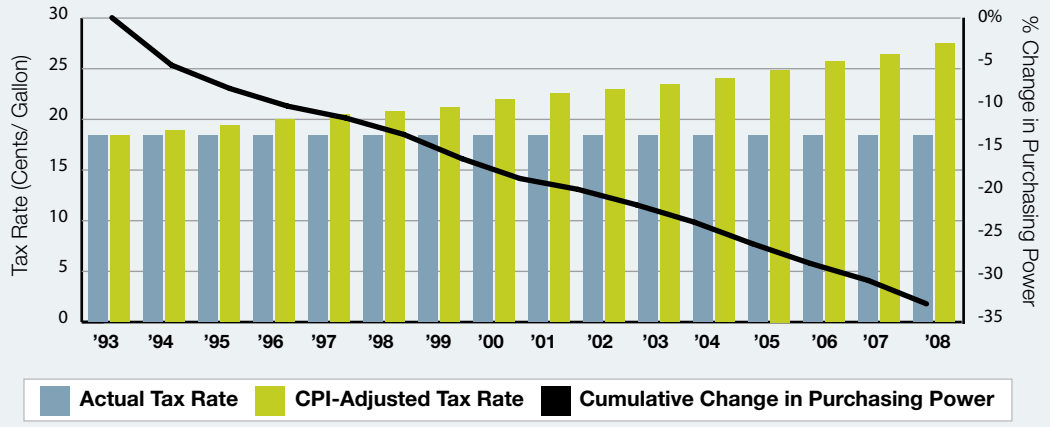
	Gasoline Tax Rate		Diesel Tax Rate	
Date	Nominal	2008 Equivalent	Nominal	2008 Equivalent
1956	3.0	23.7	3.0	23.7
1959	4.0	29.6	4.0	29.6
1983	9.0	19.4	9.0	19.4
1984	9.0	18.6	15.0	31.1
1987	9.1	17.2	15.1	28.6
1990	14.1	23.2	20.1	33.1
1993	18.4	27.4	24.4	36.3
1996*	18.3	25.1	24.3	33.3
Current	18.4	18.4	24.4	24.4

** The 0.1¢-per-gallon MFT for the Leaking Underground Storage Tank Trust Fund was temporarily suspended in 1996.*

Despite the occasional increases in motor fuel tax rates, the fixed cents-per-gallon structure of the tax means that the purchasing power of MFT revenues begins to decline immediately after any increase. As illustrated in Exhibit 4–2, the actual purchasing power of the gasoline tax has declined 33 percent since 1993.

Exhibit 4–3 lists the current total federal fuel tax rates, including amounts not credited to the HTF. These taxes are generally not collected directly from the end consumer; they are paid at major distribution points (known as "the Rack") and then become part of the overall price passed down through the supply pipeline to the consumer.

EXHIBIT 4-2: FEDERAL GASOLINE TAX RATE AND LOSS IN PURCHASING POWER



In total, the contribution of federal motor fuel taxes to the HTF averaged $35.7 billion in 2007 and 2008—$25.4 billion from taxes on gasoline and other fuels and $10.3 billion from diesel taxes.[1]

EXHIBIT 4-3: CURRENT MOTOR FUEL TAX RATES

Tax Type	Current Rate
Gasoline and Gasohol	18.4¢ per gallon
Diesel	24.4¢ per gallon
Special Fuels	
General Rate	18.4¢ per gallon
Liquefied Petroleum Gas	18.3¢ per gallon
Liquefied Natural Gas	24.3¢ per gallon
M85 (from Natural Gas)	9.25¢ per gallon
Compressed Natural Gas	18.3¢ per 126.67 cubic feet

At the same time that nominal motor fuel tax rates have increased over the years, the range of investments supported by the HTF has expanded, and revenues at times have been diverted to non-transportation purposes. Beginning in 1983, a Transit Account was established within the HTF, with 2.86¢ per gallon of gasoline and diesel fuel taxes allocated to fund it. In 1987, the Leaking Underground Storage Tank Trust Fund was established with 0.1¢ per gallon of each motor fuel tax (except for liquefied petroleum gas and liquefied natural gas), equaling $226 million in 2007.[2] In addition, a portion of MFTs have occasionally been allocated to the General Fund of the U.S. Treasury. Specifically, the Omnibus Budget Reconciliation Acts of 1990[3] and 1993 each allocated some or all of the tax increases to the General Fund as follows:[4]

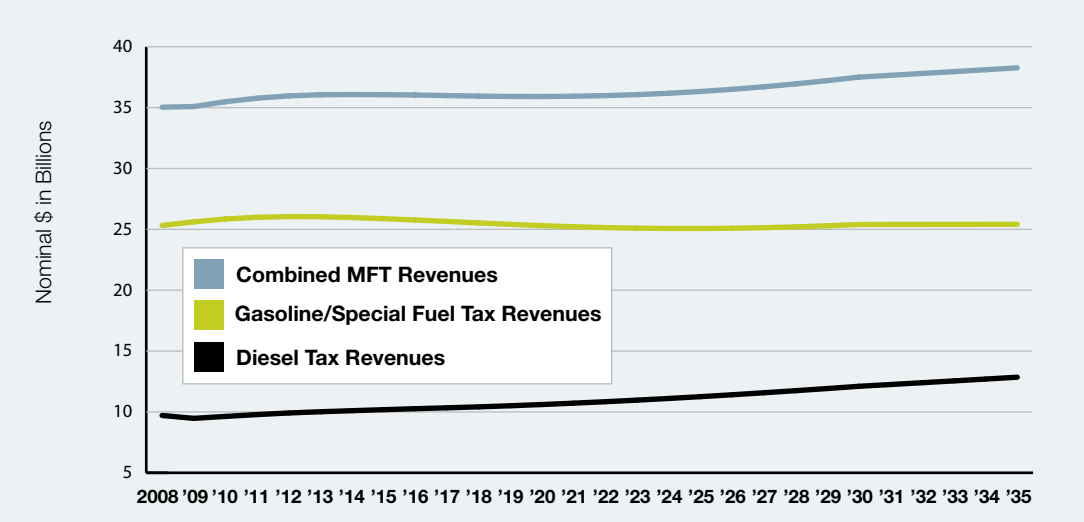
- 1990 to 1993: 2.5¢ per gallon (all fuels)
- 1993 to 1995: 6.8¢ per gallon (all fuels)
- 1995 to 1997: 4.3¢ per gallon (all fuels)
- 1997 to 2003: 2.5/3.1¢ per gallon for gasohol only (rate varied by ethanol content)

II. CURRENT MOTOR FUEL TAX OUTLOOK

There is no clear consensus on future federal motor fuel tax revenue levels if current rates are maintained. Due to the cents-per-gallon structure of current federal MFTs, revenue levels are a direct function of fuel consumption. This consumption is driven by two factors – the amount of travel and vehicle fuel efficiency (miles per gallon, MPG).

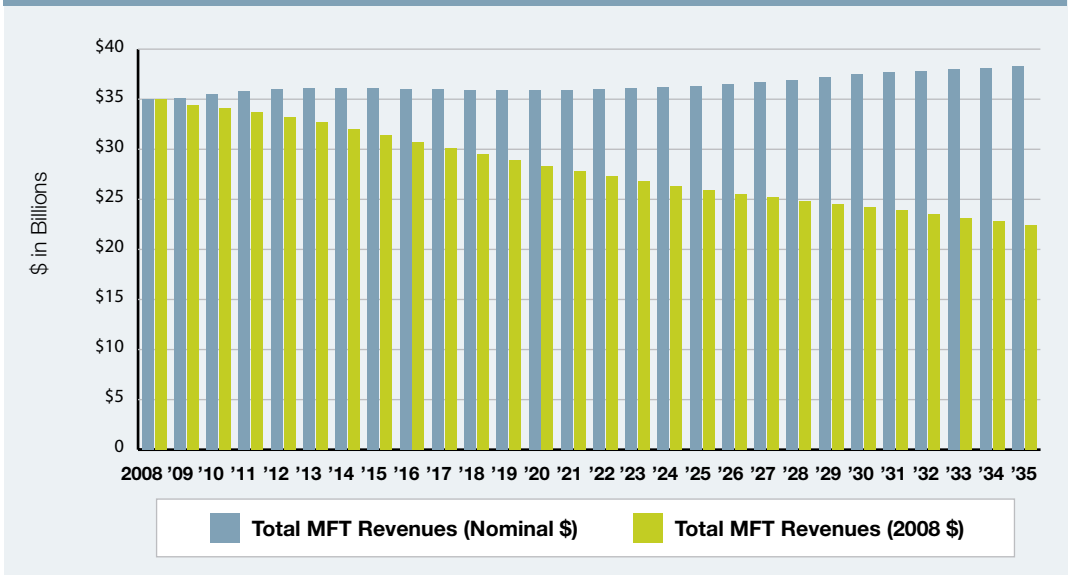
The Federal Highway Administration (FHWA) estimates that vehicle miles traveled (VMT) will maintain an average annual growth rate of 1.5–2.0 percent over the long term as economic expansion and population growth continue to generate demand for highway travel.[5] At the same time, however, the most recent U.S. Energy Information Agency estimates predict that the average fuel efficiency for all light-duty vehicles on the road will grow from 20.4 MPG today to 28.9 MPG by 2030, an increase of 42 percent, while that for freight trucks will grow from 6.0 MPG to 6.9 MPG, an increase of 15 percent.[6] The combined effect of these anticipated trends is that at current tax rates, total nominal tax revenues will continue to grow, although at a slower rate than inflation. (Thus the purchasing power of the generated revenues will actually decline and will decline even further as a share of VMT.) The growth that does occur will largely be due to steady nominal growth in diesel tax proceeds. (See Exhibit 4–4.) Nominal gasoline tax revenues will only experience moderate growth over the next 25 years and are actually expected to dip for a period until the growth in travel (due in large part simply to population growth) offsets the effect of fuel efficiency improvements on total gas consumption. As illustrated in Exhibit 4–5, the growth in total federal motor fuel tax revenues will be insufficient to keep up with inflation. Thus while annual nominal fuel tax revenues are expected to climb to $38.3 billion by 2035, the value of these revenues in 2008 dollars will only be $22.4 billion.

EXHIBIT 4-4: FEDERAL MOTOR FUELS TAX REVENUE FORECAST



An alternative view, documented in the 2006 Transportation Research Board (TRB) report entitled *The Fuel Tax Report and Alternatives for Transportation Funding*, is that motor fuel tax revenues will remain reasonably stable and viable over the next 10–15 years but will then begin to decline significantly as vehicle fuel efficiency improves and the availability and use of alternative fuel vehicles expand.[7] (See Box 4–1.) The TRB Fuel Tax study was issued prior to the recent volatility in oil prices and economic turmoil and was based on the assumption that demand for travel is highly inelastic and will thus continue to grow at the long-term rates forecast by FHWA. Recent transportation data, however, indicate that Americans are driving less. Total VMT for October 2008 declined 3.5 percent from a year earlier, and travel for the first 10 months of 2008 was 3.5 percent below the comparable period in 2007, a nearly unprecedented decline. People also are switching to alternative fuel vehicles faster than expected. For the first 10 months of 2008, sales of light trucks declined much more dramatically than overall light-duty vehicle sales, and sales of hybrid vehicles decreased the least. (See Exhibit 4–6.) As a result of these trends, federal MFT receipts are expected to remain flat or even decline slightly over the over the next 5–10 years.[8]

EXHIBIT 4-5: TOTAL MOTOR FUEL TAX REVENUES 2008-35 NOMINAL VS. 2008 DOLLARS



It also is important to note that the official medium- to long-term estimates of fuel consumption and associated tax revenues may be overly optimistic about MFT sustainability. Specifically, these estimates use vehicle fuel efficiency and travel growth assumptions that reflect conventional thinking about regulatory requirements, fleet turnover, and other related factors that influence fuel consumption. New possibilities and

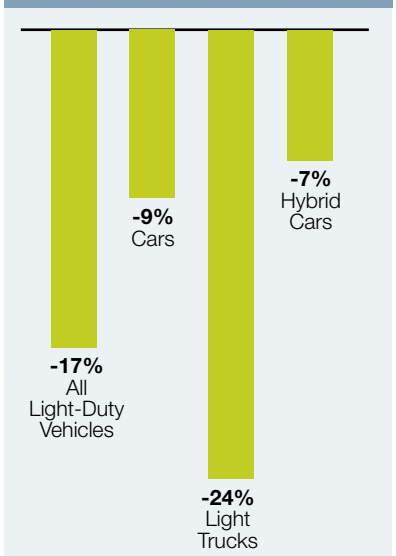
BOX 4–1: KEY FINDINGS FROM THE TRANSPORTATION RESEARCH BOARD'S 2006 SPECIAL REPORT ON THE MOTOR FUEL TAX

The most recent comprehensive national assessment of motor fuel taxes was performed by the Transportation Research Board through the Committee for the Study of the Long-Term Viability of Fuel Taxes for Transportation Finance. The goals of the study were to assess the implications of recent trends for traditional highway and transit finance, identify financial alternatives, and suggest ways to overcome barriers to acceptance of new approaches. Major conclusions and recommendations of the study related to motor fuel taxes included the following (note: these findings and recommendations are those of the study's authors and not necessarily endorsed by the Commission):

- **Current Funding Capacity—**The current highway finance system should be able to support some growth in capacity and service improvements but not at a rate that will reduce congestion.
- **Long-term Tax Revenue Erosion—**A 20 percent reduction in average vehicle fuel consumption per mile is highly possible by 2025, but this is dependent on increased regulatory efficiency standards (at or beyond 30 MPG for light-duty vehicles by 2020) as well as higher fuel prices.
- **Factors Limiting Fuel Efficiency Gains—**Progress in vehicle efficiency and associated reductions in motor fuel consumption will be limited by the tendency of consumers to maintain or increase vehicle size and performance, the long lead time needed to bring more fuel-efficient vehicles into large-scale production, and very slow turnover of the vehicle stock.
- **Erosion of Established Highway Finance Practices—**The historical strength of the federal highway program is being threatened by the use of highway user fees for non-highway purposes and the impacts of inflation.
- **Lessening of Public Support—**Due to program changes that redirect funds to less compelling purposes (e.g., maintenance and reconstruction) and broader social trends, including the "tax revolt," the public and legislatures are more reluctant to support fuel tax rates and fees necessary to sustain the surface transportation system.
- **Poor Promotion of Efficient Investment—**The current finance system fails to ensure that individual projects are economically justified, which has led to poor prioritization and investment practices and has in turn eroded public support for motor fuel tax increases.
- **Need to Maintain and Reinforce the Existing User Fee Finance System—**During the interim period, while alternatives such as more direct road pricing are developed and implemented, the federal government should increase current indirect user fee rates, eliminate motor fuel tax exemptions, and develop mechanisms to capture taxes on alternatively fueled vehicles.
- **Recognition that Travelers Would Benefit from a Transition to Pricing—**The first step in moving to a pricing system where fees are based more on travel than on the level of consumption of gasoline is to adjust current user fee rates to better align payments with costs and to begin a definitive move toward comprehensive road pricing.

emerging market conditions, such as major advances in fuel efficiency, development and wide-scale roll-out of alternative fuel vehicles, and future oil price shocks, combined with growing concern about the environment and rapidly developing policy initiatives to reduce petroleum dependence and greenhouse gas emissions, could lead to unprecedented changes in the national vehicle fleet and associated fuel consumption. Much of this will depend on technological uncertainties that are hard to model and predict. If, for example, robust car batteries are developed that allow passenger vehicles to travel relatively long distances on one charge, it is certainly conceivable that there could be a radical change in the vehicle fleet away from gasoline- and diesel-powered vehicles to electric-powered ones.

EXHIBIT 4-6: CHANGE IN VEHICLE SALES: 2007–08
(JANUARY TO NOVEMBER)



III. ALTERNATIVE MOTOR FUEL TAX APPROACHES

While much of the discussion of fuel tax policy options focuses on simply increasing tax rates as a one-time measure, as has been done in the past, many groups also advocate indexing the rates to institutionalize annual adjustments and at least maintain the purchasing power of the generated tax revenues. Under current law,

federal motor fuel taxes are not indexed to inflation, thus the real (as opposed to nominal) rate declines every year as inflation erodes its purchasing power and reduces its cost to consumers. In essence, it has been the de facto national policy since 1993 to reduce federal fuel taxes each year in real terms. As noted earlier, the federal gasoline tax has lost 33 percent of its purchasing power to general inflation since 1993, the last time it was raised.

The current MFTs are set as fixed rates per gallon of fuel purchased. These could instead be structured as a sales tax on the amount paid for the fuel. A number of states tax fuels on this basis now, including (to varying degrees) California, Georgia, Hawaii, Illinois, Indiana, Michigan, and New York.[9]

A motor fuel sales tax would have both a negative and a positive effect compared with the current practice. The disadvantage is that revenues generally would be much more volatile—as fuel prices fluctuate, so will transportation revenues (although it might be possible to compensate for this volatility). A related drawback is the impact on consumers, who would have to pay more as prices rise. (A sales tax could be designed to be phased out as retail prices reach certain levels, but this could also create further instability in HTF revenue levels.) Although there are ways to mitigate this disadvantage (e.g., through tax ceilings and floors), these tend to increase the complexity and cost of administration and implementation and may require occasional legislative actions, depending on the mitigation approach and the magnitude of market price changes. The primary advantage of sales taxes is that they are more closely related to inflation than volume-based taxes are, and thus the long-term revenues would be greater and more closely aligned with increasing transportation investment costs.

The primary advantage of sales taxes is that they are more closely related to inflation than volume-based taxes are.

IV. STRENGTHS AND WEAKNESSES OF MOTOR FUEL TAXES

As with other existing and potential new surface transportation funding options, taxes on motor fuels exhibit a range of strengths and weaknesses. This section identifies and briefly discusses these pros and cons from both a short-term and a long-term funding perspective. This set of advantages and disadvantages addresses all possible motor fuel tax–related options, including increasing the current tax, indexing it, and applying some kind of alternative sales tax structure.

Strengths

- **Short-term and Medium-term Revenue Potential—**Despite the immediate impacts of fuel price volatility and economic turmoil and the growing use of high efficiency and alternative fuel vehicles, current motor fuel tax rates will continue to provide significant levels of funding for surface transportation in the near and intermediate term. This is particularly true for diesel tax revenues, since growth in truck travel will be more sustained through fuel price cycles, since fuel efficiency for freight trucks will improve more slowly than for automobiles, and since there is less potential for shifting trucks to alternative fuels. The latest available HTF projections—from the FY 2009 Budget Mid-session Review and the CBO Summer 2008 Baseline, as well as the Commission's own estimates—show fuel receipts mainly steady in nominal terms at about $35 billion per year through

2013 (Budget Review) or 2018 (CBO). Based on these estimates, an across-the-board increase of 1¢ per gallon in federal MFTs (increases of 5.4 percent in the current federal tax for gasoline and 4.1 percent for diesel) would raise an estimated $1.8–1.9 billion annually for the next 5–10 years.

- **Historical Basis for Tax—**Dating back to the early parts of the twentieth century at the state level and to 1956 at the federal level, motor fuel taxes have been viewed by the public and political leaders as an appropriate way to fund transportation investment. Although the level of public and political support for these taxes has declined in recent years, there is still wide-ranging recognition and appreciation of the transportation investments that MFTs have facilitated.[10] This in turn serves to bolster support for federal fuel taxes to continue as a dedicated source of funding for transportation purposes.

- **Flexible Use of Funds—**Federal motor fuel tax receipts are determined by motor fuel consumption, meaning travel on all highway system elements, including local roads, contributes to revenue levels. The fact that tax revenues are not directly attributed to individual facility or system component use (and are thus an indirect user charge) provides strong justification for the revenues to be used in a wide variety of ways that provide highway user benefits, including investments in non-highway modes that improve the performance of the overall surface transportation system.

- **Administrative Costs/Ease—**Because federal MFTs are paid at the fuel terminal level rather than at the pump (and tax costs are then passed onto the consumer), collection of taxes is both straightforward and inexpensive. Estimates of the cost to administer and enforce federal motor fuel taxes range from 0.2 percent[11] to 1.0 percent of gross receipts.[12] (By comparison, the national personal income tax requires an estimated 0.4 percent of gross receipts to administer and more than 3.2 percent to enforce.)[13] In addition, since the costs of administering the federal MFTs are relatively fixed, increasing fuel tax rates would create no additional ongoing administrative burden.

- **Ability to Charge for Negative Environmental Impacts, Particularly Carbon Dioxide Emissions—**Historically, the sole purpose of federal motor fuel taxes has been to raise revenues for highway and transit spending purposes. However, the costs of some negative impacts from vehicle use could easily be imputed into the overall tax amount. In particular, the social cost of carbon emissions or other negative environmental impacts from the burning of liquid fossil fuels could be added to the price of gasoline and diesel in the form of an increase in the current federal fuel taxes. This would be appropriate, since the cost of carbon emissions (and to a lesser degree other pollutants) per gallon of fuel consumed is the same, regardless of the time of day or location where travel occurs. Using fuel taxes to charge for other negative impacts, such as adding to congestion during peak hours or pavement damage by vehicles, would not be feasible since there is little correlation between fuel consumption (and thus tax paid) and time-of-day travel decisions or pavement damage.

- **User Pay/Benefit Correlation—**Although many experts call the fuel tax an indirect user fee, there is a better connection between the benefits a system user receives (i.e., how much they use the system) and the amount of fuel taxes he or she pays than with some other funding options or proposals, such as using general sales tax proceeds or

General Fund revenues. There also is a strong public perception that fuel taxes (at least at current levels) are an appropriate source of funding for the Highway Trust Fund.[14]

Weaknesses

- **Unsustainable in the Long Term—**The sustainability of fuel taxes, particularly on gasoline, gasohol, and specialty fuels (gas taxes), as the primary source of federal surface transportation funding beyond the next 10–15 years is questionable, at least without significant increases in tax rates. The optimistic case—based on official government forecasts that average light-duty vehicle efficiency will increase gradually though 2030 and that vehicle travel will grow at a slow but consistent rate—is that without a change in the rates charged, gas tax revenues will experience slow nominal growth over the long term and decline in real (constant dollar) terms. These estimates of average vehicle fuel efficiency are based on assumptions related to the new Corporate Average Fuel Efficiency (CAFE) standards, historical trends in fleet turnover, and conventional influences on travel behavior. They do not reflect the potential impact of major advances in vehicle fuel efficiency and alternative fuel vehicles, future spikes in oil prices, or greater public concern about and government action to address climate change and dependence on imported oil. Although it is not currently feasible to substantiate the combined effect of these factors, they could converge to greatly reduce the long-term effectiveness of gas taxes (at current rates) as a source of funding for transportation. As noted, however, significant improvements in the fuel efficiency of freight trucks are expected to occur at a much slower rate, thus diesel tax revenues are a much more sustainable source of long-term funding for the HTF.

- **Declining Public/Political Support for Increases—**Historically, motor fuel taxes have enjoyed a reasonable degree of public acceptance compared with other forms of taxation, largely due to the close relationship between tax payment and benefit and to general public support for highway system construction. In recent years, however, support for motor fuel taxes (particularly for any increases) has been greatly diminished. As noted in the TRB Fuel Tax report, this decline in support can be partially attributed to dilution of the original user-pay concept of the fuel taxes through earmarking practices, to funding diversion away from surface transportation investments, and to de facto devolution of responsibilities to local governments that tend to rely on non-user fees to fund transportation. The decline also can be attributed to the transition in agency missions to less publicly appreciated goals (e.g., maintaining versus building the system), to perceived inefficiencies in transportation spending, and to broader political trends such as general opposition to any tax increases.

- **Weak Promotion of Efficient Use and Investment—**The current surface transportation funding system, with taxes on motor fuels as the cornerstone, is not optimal for promoting efficient system use or investment. This is a particularly relevant limitation in urban areas, where being able to maximize the efficient use of constrained capacity is critically important. Although it is generally true that users pay more fuel taxes the more they drive, those tax-related costs are not linked to time of travel or facility choices and do not necessarily recover the full costs of an individual's travel decisions (for example, total system costs of driving on congested roads is more than driving on uncongested ones). Thus, fuel taxes at current rates are not optimal for influencing efficient system use beyond the extent that they can reduce total driving. But even this effect is severely muted by the relatively low level of the current tax (compared with the total cost of fuel) and its relatively hidden nature.

An additional factor limiting efficient use is that numerous federal provisions provide exemptions from paying MFTs for certain users such as state governments and political subdivisions, nonprofit education organizations, and emergency vehicles; for fleet operator evaporation allowances; and for motor fuels used off-road for agricultural purposes. Although these various exemptions and refunds had valid political support and economic rationale in the past, the Commission believes that Congress should review and re-evaluate those reasons in light of current circumstances and current levels of HTF reduction. They also reduce HTF revenues, with combined exemptions and refunds totaling more than $1 billion in 2007.[15]

Because revenues from the gas tax are not related to where the vehicle is driven or the costs of providing the roads in that area, motor fuel taxes can also lead to less efficient system investment, particularly in urban areas with high congestion levels where direct user fees could pay for most or all of new project costs. As a result, efficiency in the choice and prioritization of projects depends on administrative and political choices that may not be closely related to "where" the revenues are raised. In particular, Congress has required, and the U.S. Department of Transportation and the states and local governments have implemented, planning and programming processes that take into account numerous factors, including economic development, pavement preservation, and environmental issues. Although these requirements have been credited with greatly improving project prioritization and selection, they are reactive in nature and may still not lead to the most efficient investments being made, since investments are often made, to accommodate congestion caused by inefficient travel decisions by users.

Reliance on motor fuel taxes provides only a weak proxy for capturing the costs of environmental damage and other negative impacts such as congestion and system wear and tear.

- **Charging for Negative System Impacts—**Reliance on motor fuel taxes generally provides a weak proxy for capturing the costs of environmental damage and other negative impacts such as contribution to congestion and system wear and tear. As an indirect user fee, fuel taxes do bear some relationship to both emissions and wear and tear on the system. But while heavy trucks with fewer axles pay more in fuel taxes than lighter trucks with more axles, the added costs of wear and tear they impose normally exceed the added revenue from the higher fuel consumption. Likewise, while vehicles with poor fuel efficiency pay more in fuel costs and fuel taxes, the added costs from pollution normally exceed the added revenue from higher fuel consumption.

- **Regressive Taxation—**In general, lower-income individuals spend a larger share of their income on fuel taxes than wealthier individuals do. Thus the fuel tax is highly regressive. As noted in a recent report by the Tax Foundation, the gas tax burden on families earning less than $10,000 per year is more than 10 times the burden on families earning more than $150,000 per year (as a share of income).[16] Similarly, a 2007 study by the Texas Office of the Comptroller compared the incidence of different taxes, using the Suits Index,[17] and found that gas taxes are more regressive than several other taxes, including a general sales tax. A mitigating consideration is that lower-income individuals on average drive significantly fewer miles than people in other income groups.[18]

- **Compliance Considerations—**Although progress has been made to stem fuel tax evasion in recent years through legislative changes and increased enforcement efforts, compliance remains a concern. As detailed in a recent study by the Montana Depart-

ment of Transportation, several approaches are being used to avoid paying state and federal gas and (especially) diesel taxes, ranging from inappropriate use of agricultural exemptions to reporting fraud and outright theft.[19] The total amount of revenue lost to fuel tax evasion (federal and state combined) has proved difficult to quantify, but it could exceed $1 billion annually (3.5 percent of total federal motor fuel tax revenues).[20]

V. CONCLUSION

Motor fuel taxes have a long history as the preeminent funding source for surface transportation investments. During the second half of the twentieth century, federal motor fuel taxes provided a reliable source of funding, first for highways alone and later for transit as well. During much of this period the federal focus was on creating a national transportation system, and taxes on motor fuels provided an expedient and practical means for funding the needed infrastructure. The public and political leaders recognized the importance of this endeavor and generally supported the need for fuel taxes and the link to transportation investment. In recent years, however, fuel tax revenues have significantly lagged behind the level of investment required to sustain a world-class transportation system.

Looking forward, a variety of factors are converging to challenge the preeminence of motor fuel taxes as the primary source of surface transportation funding.

Looking forward, a variety of factors are converging to challenge the preeminence of MFTs as the primary source of surface transportation funding. Due to a combination of travel growth, system deterioration, increasing construction costs, and lack of indexing, fuel tax revenues are becoming increasingly inadequate to meet investment needs. This inadequacy will likely be exacerbated as improved fuel efficiency and the development of alternative fuel vehicles reduce fuel consumption. Moreover, the public's willingness to pay for the required investments through an increase in motor fuel taxes appears to be weak and may be declining. At the same time, the growing need to maintain and adequately fund a national transportation system will heighten the importance of developing a funding approach that will meet future system improvement and maintenance needs. In urban congested areas, it is possible that charging users of the system more directly will not only raise revenues but also influence driver behavior and lead to reductions in both congestion levels and the investment that is needed.

The bottom line conclusion of the Commission is that motor fuel taxes are currently the most viable federal funding source for surface transportation investment and will likely remain so for several years. The inability of these taxes, particularly at current rates, to meet future investment needs, however, clearly raises questions about their long-term sustainability.

Endnotes

1. Data for 2007 from *U.S. Treasury Bulletin*, March 2008; data for 2008 from September 2008 Reports on the Highway Account of the Highway Trust Fund from the Bureau of the Public Debt. These are gross receipts, prior to various refunds, tax credits, and transfers.
2. Congressional Research Service, *Leaking Underground Storage Tank Trust Fund*, Report for Congress 97-472 E (Washington, DC: August 1997).
3. The Budget Reconciliation Act of 1990 allocated existing motor fuel tax revenues to the General Fund.
4. Federal Highway Administration (FHWA), *Financing Federal Aid Highways* (Washington, DC: 2007), Appendix.

5. Travel growth rates provided by FHWA, Office of Legislative and Governmental Affairs.

6. Energy Information Administration, *Annual Energy Outlook 2009 Early Release* (Washington, DC: U.S. Department of Energy, December 2008), Table 7.

7. Transportation Research Board (TRB), *The Fuel Tax Report and Alternatives for Transportation Funding* (Washington, DC: 2006).

8. Highway Trust Fund estimates contained in both the FY 2009 Budget Midsession Review (July 2008) and the Congressional Budget Office Summer 2008 Baseline (August 2008) show very little change in forecast receipts through 2013 and 2018, respectively.

9. National Cooperative Highway Research Program, "Future Financing Options to Meet Highway and Transit Needs," Report 20-24(49) (Washington, DC: TRB, September 2006).

10. TRB, op. cit. note 7.

11. Jonathan R. Peters and Jonathan K. Kramer, "The Inefficiency of Toll Collection as a Means of Taxation: Evidence from the Garden State Parkway," *Transportation Quarterly*, vol. 57, no. 3 (summer 2003), pp. 17–31.

12. HDR, Inc., *Comparing Administrative Costs of Collecting Highway Revenues: Fuel Tax vs. Direct User Charges*, prepared for U.S. Department of Transportation, December 2008.

13. Peters and Kramer, op. cit. note 11.

14. Gabriel Roth, "A Road Policy for the Future," *Regulation*, vol. 26, no. 1 (spring 2003), p. 59, states that a national poll conducted by Andrews McKenna Research in 2002 found that 89 percent of Americans believe highway taxes should be used to fund highway needs.

15. *U.S. Treasury Bulletin*, July 2008.

16. Tax Foundation, *Paying at the Pump: Gasoline Taxes in America* (Washington, DC: October 2007).

17. The Suits Index ranges from +1.0 to –1.0, with a 0.0 indicating that the tax burden is perfectly proportional to income at all quintiles. At the extremes, a +1.0 would indicate an extremely progressive tax and a –1.0 would indicate an extremely regressive tax. In the Texas Comptroller Study, MFTs received a Suits Index score of –0.25 while general sales taxes received a –0.18.

18. Elaine Murakami and Jennifer Young, "Daily Travel by Persons with Low Income," paper prepared for NPTS Symposium, Bethesda, MD, October 29–31, 1997, p. 11.

19. Montana Department of Transportation, *Determining the Current Rates of Motor Fuel Tax Evasion for the State for the State of Montana* (Helena, MT: November 2006).

20. Office of Transportation Policy Studies, FHWA, "Fuel Tax Evasion," at www.fhwa.dot.gov/policy/otps/fueltax.htm, viewed October 2008.

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PAYING FOR THE TON

Freight-Related Charges

This chapter details the Commission's exploration of alternative ways to fund the freight industry's share of the HTF, recognizing that Congress will need to determine whether to increase the freight industry's relative share of the nation's highway investment.

This chapter expands on the preliminary evaluation of highway-oriented, freight-related revenue mechanisms introduced in Chapter 3 and compares possible new mechanisms to those currently supporting the federal Highway Trust Fund (HTF). The objective of this focus on freight-related funding mechanisms is twofold. First, it is a response to calls from many sources to address the need for increased investment to improve the reliability, predictability, and cost-effectiveness of goods movement. Second, it identifies the need for Congress to assess whether imbalances that have been documented in past studies between the burden that freight-carrying vehicles (especially heavy commercial vehicles) impose on the system and the funds they generate for the HTF still exist.[1]

Freight is transported by both highway and heavy rail, as well as through other modes. The trucking industry shares the nation's highway system with other users and this system is built, operated, and maintained predominantly by public agencies. Investment in this system is supported at the federal level by gasoline taxes paid by automobile users and trucking-related fees such as diesel taxes and truck sales taxes. The freight rail industry, in contrast, operates almost exclusively on private, dedicated networks that the industry itself pays for directly out of privately raised and funded capital budgets. Since trying to raise public highway and transit investment revenues from the rail industry presents an inherent conflict with the principle that users or beneficiaries should pay, the Commission has focused its consideration of new freight-related revenue options on mechanisms related to the trucking industry and shippers that use trucking for all or some part of their goods movement.

Many of the nation's freight-related investment needs do not get addressed through current federal policies and funding programs.

Although the Commission's focus is on identifying potential sources of revenue and not on suggesting how resulting funds might be allocated, the discussion of freight funding options includes recognition of the likely need for a significant portion of the revenues from certain freight sources to be dedicated to freight-oriented congestion and intermodal or border crossing projects and programs. As evidenced by the limited last-mile investments around ports, the general lack of focus on alleviating freight bottlenecks, and the calls by many stakeholders for a "national freight program," many of the nation's freight investment needs do not get addressed through current federal policies and funding programs.

In freight transportation, there is one nearly universal truth: almost every unit of freight reaches its final destination via truck. Yet alleviating freight congestion bottlenecks and addressing the "first mile" or "last mile" linking public to private freight infrastructure are frequently not part of the federal-aid highway system and may even be overlooked by state and local transportation planners. Because any freight-related revenue mechanism becomes an operating cost for the freight industry, visible benefits are necessary to generate the industry support required to make the mechanism politically viable. Thus, dedicating a significant portion of the freight-generated funds for freight purposes would greatly improve their political viability.

I. GOODS MOVEMENT ON THE NATIONAL SURFACE TRANSPORTATION SYSTEM AND IMPLICATIONS FOR FUNDING

Understanding the nature of the freight industry is essential to evaluating specific freight funding alternatives. International goods movement involves multiple modes that move freight from origin to destination, includes stops or transfers at nodes along the way, and uses a network of federal, state, local, and private infrastructure.[2] In the United States, for example, nearly 25 million containers and trailers full of products (such as electronics, mail, food, paper products, clothes, appliances, textiles, and auto parts) are moved using more than one mode, likely a combination of rail, ocean shipping, and trucking.[3] For domestic freight, however, nearly 70 percent of shipments (by tonnage) are made by truck.[4] As noted in the Commission's *Interim Report*, a growing economy and population, together with reduced rail capacity and the speed and convenience of single-mode movement, have significantly increased the amount of freight carried on the highway system.[5]

A diversity of business models exist within the trucking industry, based on vehicle configurations, ownership structures, and cargo characteristics. Vehicle configurations vary widely: in 2005, over 26 million trucks hauled nearly 11 billion tons of freight, but only 3 million of these trucks were Class 8 vehicles—primarily the large "18 wheeler" truck and trailer combinations weighing more than 33,000 pounds that many people associate with freight transportation.[6] In fact, about 90 percent of freight-carrying vehicles are smaller trucks such as 20-foot "bobtail" trucks, parcel delivery vans, or large single-purpose commodity carriers (e.g., cement trucks).[7]

The ownership structure of trucking fleets also varies. There are large national and regional publicly owned companies that operate the less-than-truckload sector of the industry on scheduled services that cross the country, as well as truckload carriers that haul freight in a single truck from one origin to one destination. There also are commodity haulers that specialize in carrying raw materials such as grain, gravel, and timber. Most of these carriers own their trucks, and their drivers are employees. But there also are large public companies that rely on owner-operators (individuals who typically own and operate one vehicle) to move their freight. There are captive shippers and contract carriers owned by or performing services under contract to companies such as large retailers or food and beverage distributors, working exclusively on moving the products of those companies both long and short distances. Finally, there are parcel delivery services that use a combination of vehicles and a mix of employee drivers and owner-operators. Owner-operators are prevalent in all parts of the trucking industry and may contract with a single truck line or with multiple lines to keep their trucks running and generating revenue.

Over-the-road trucking, or long-distance haulers, have significantly different business models (in terms of revenue per load or per ton, revenue per mile, cost per mile, driver productivity, and fuel efficiency) than drayage drivers who charge per short trip to move goods in and out of ports to intermodal terminals and customer facilities. The business models also vary for time-sensitive local freight firms and for parcel delivery operators that move goods from local warehouses or airports to their final destination.

Cargo characteristics are equally important differentiators. Freight can differ by volume and value, by whether it includes component parts or finished products, by hazardous or non-hazardous material, and by form (i.e., solid, liquid, or gas). Transportation costs

vary by the freight shipment mode. Industries characterized by low value-to-volume or value-to-weight products such as agricultural crops and coal rely on modes with lower transportation costs, such as rail or water (which also are slower and less reliable) to keep costs in line with product value. In contrast, industries characterized by high value-to-volume or -weight products rely on modes that can provide speed and reliability, typically truck or air, in order to minimize inventory carrying costs.

The implications of this diversity—and the reason that this chapter commences with this overview—is that lumping freight movements together into a single category of "goods" or "vehicles" can generate misleading conclusions based on oversimplifications of both the truckers' and shippers' ability to pay and the user impacts on the system. Any single approach to deriving revenues from freight-related users of the transportation network may miss some users entirely or disproportionately burden one type of carriage or shipper over another, regardless of the impact on the transportation system.

II. POTENTIAL REVENUE SOURCES BASED ON FREIGHT TRANSPORTATION ACTIVITIES

The Commission explored a wide range of freight-related funding mechanisms, including existing sources and potential new sources described in various funding and finance studies.[8] This section provides a brief review of a "short list" of options. (The Commission considered other freight-related taxes, including value-added taxes (VATs), but because it was determined that any shift to a VAT-type funding mechanism would require a major change in national tax policy and would only occur as part of a much broader tax initiative, this was not considered relevant as a stand-alone transportation funding option.)

Revenue Option Overview

Existing Federal Truck-related Taxes: These mechanisms are levied without direct correlation to cargo carried and serve as a source of general funding for highway and (in the case of diesel taxes) transit. Combined, these sources generated $14.4 billion in revenues in 2007 and 2008 based on the following rates:

- **Diesel Taxes:** 24.4¢ per gallon, with receipts from 2.86¢ going to transit and from 0.1¢ going to the Leaking Underground Storage Tank Trust Fund
- **Heavy Truck and Trailer Sales Tax:** 12 percent of the retail sales price for tractors and trucks over 33,000 pounds gross vehicle weight (GVW) and trailers over 26,000 pounds GVW
- **Truck Tire Tax:** 9.45¢ per each 10 pounds over 3,500 pounds in maximum tire load rating
- **Heavy Vehicle Use Tax (HVUT):** annual tax on trucks 55,000 pounds and over GVW, $100 plus $22 for each 1,000 pounds (or fraction thereof) in excess of 55,000 pounds (maximum tax of $550)

Diesel taxes and (less consistently) other truck-related charges also are used at the state level to raise revenues for surface transportation investment. In 2006, for instance, the trucking industry paid $19.6 billion in state highway user taxes, accounting for 27.8 percent of total highway user–based taxes collected.[9]

Customs Duties and Fees: The U.S. Customs and Border Patrol imposes custom fees at varying rates on a range of imported goods passing through U.S. international gateways. All revenues from custom fees currently go to the General Fund of the U.S. Treasury. These fees began as a processing and/or inspection fee for air and sea passengers, commercial trucks, rail cars, private vessels, and durable mail packages and for customs broker permits.[10] A portion of the revenues from existing customs duties potentially could be dedicated to transportation infrastructure tied to the movement of those goods—effectively a transfer from the General Fund. Alternatively, and assumed for this purpose, a transportation use surcharge could be added to the existing custom duty and fee schedule and dedicated to freight transportation infrastructure.

Any single approach to deriving revenues from freight-related users of the transportation network may miss some users entirely or disproportionately burden one type of carriage or shipper over another.

Freight Waybill Tax: A freight waybill tax would serve as a sales tax on the shipping costs for freight. Such a tax could be modeled on the aviation system tax, in which passenger and freight users who rely on the same infrastructure and carriers all contribute to fund the system. The air-freight waybill tax currently provides 5 percent of contributions to the federal Airport and Airway Trust Fund.[11]

Weight-Distance Tax: Weight-distance taxes are fees imposed on the miles traveled by specific vehicle classes, commonly referred to as vehicle miles traveled (VMT) fees, which take into account the weight and load of a vehicle and essentially impose a premium on heavier vehicles to recover the added wear and tear they cause to the system.[12] Also referred to as a "ton-mile tax" in some cases, this tax can be based on a combination of the actual weight being carried for each trip and the number of miles traveled, on the weight of the truck and the number of axles, or on the average vehicle weight plus load weights. Oregon has been charging heavy trucks a weight-mile tax since 1947 and currently does so in lieu of fuel taxes for this vehicle class.[13] Kentucky, New Mexico, and New York also use variations of the weight-mile tax in combination with fuel tax for their highway use taxation. A tonnage tax would be charged on the gross weight of the vehicle and would be charged either per trip or on an annual basis. The disconnect from miles operated makes this fee structure similar to the HVUT, serving as a penalty for the added stress put on the highway by the very heavy vehicles but not reflecting how much the vehicle is used. Charging on a per trip basis addresses use but makes charging and collecting difficult.

Container Tax: A per container fee could be collected at port gates or via a toll collection system in the immediate vicinity of a port and dedicated to an intermodal investment fund. The Port of Long Beach currently charges container fees to fund the Alameda Corridor project.

Harbor Maintenance Tax: The harbor maintenance tax is an existing revenue mechanism, similar to customs duties and fees, that supports the federal Harbor Maintenance Trust Fund through an ad valorem tax on the value of passenger tickets and declared commercial cargo loaded onto or unloaded from vessels using federally maintained harbors.[14] The current tax is largely used to pay for harbor dredging and thus primarily (and appropriately) benefits deep-draft ocean-going vessels carrying cargo on trans-oceanic routes. The Harbor Maintenance Tax could be increased and dedicated to an intermodal investment fund (or existing revenues from the tax could be redirected to such a fund).

Revenue Option Evaluation

As with any revenue mechanism for funding surface transportation investment, the freight-related revenue options just described have various advantages and disadvantages. This

section provides an evaluation and comparison of these options based on the evaluation criteria described in Chapter 3.

Revenue Potential

In addition to a general discussion of the revenue-raising potential of each mechanism, for comparative purposes the revenue potential of individual mechanisms is addressed in the context of the rate that would be required to raise $1 billion in revenue.

Customs Duties and Fees: Imposition of a 3.5 percent transportation surcharge would provide approximately $1 billion annually.[15] An increase in the Customs Merchandise Processing Fee by 70 percent also would yield $1 billion annually.

Freight Waybill Tax: A small percentage tax rate could raise significant revenues with strong sustainability. A 0.1 percent tax on all truck freight waybills would raise about $620 million annually; thus a 0.16% rate would raise $1 billion per year.[16]

Weight Only or Weight-Distance Tax: Based on the experiences of four states that currently implement weight-distance charges, revenues should grow at a stable pace with minor fluctuations due to gross domestic product and VMT changes. A 0.1¢ per ton-mile assessed on freight moved by trucks would raise $1.2 billion annually; thus a tax of 0.08¢ per ton-mile would be required to raise $1 billion per year. For a weight-based tax, a 1¢ per ton assessment on freight moved by trucks would raise $107 million annually; thus a tax of 9.45¢ per ton would be required to raise $1 billion per year.

Container Tax: The fee level and scope (for example, whether applied to all containers—imported and exported, loaded and unloaded—or not) and overall container volume will affect the revenue potential of this mechanism. Stability of the source will depend on import and export volumes and tends to be tied to economic growth. If imposed today, a $10 fee on every container moving through a U.S. port would raise approximately $500 million annually; thus a $20 fee per container would be required to raise $1 billion annually. If imposed only on imports, it can be expected to raise approximately one-third less total revenue.

Harbor Maintenance Tax: Imposition of an additional 0.089 percent to the current ad valorem tax rate would provide approximately $1 billion annually.[17] Such an increase would represent a 75 percent rise in the current tax rate of 0.125 percent. The harbor maintenance tax is highly sustainable since the tax basis increases with both inflation and freight/passenger traffic volume.

Implementation Issues: Administrative and Legal

This section addresses the key administrative and legal issues associated with implementing the various revenue options.

Customs Duties and Fees: Allocating a portion of existing customs duties would require no major administrative effort or expansion of legal authority. While it should be relatively straightforward from an administrative perspective to increase the revenues coming from these mechanisms, the challenge is whether such mechanisms would be consistent with international rules governing trade. Such mechanisms, since they apply only to imports, might be seen by international trading partners as an unfair or inappropriate tariff and a potential violation of World Trade Organization rules. Further, these fees do not reach the U.S. exporters who generate much of the local highway use around the ports.

Freight Waybill Tax: A freight waybill tax would be generally expensive to administer due to the high number of taxpayers and the associated filing, auditing, and enforcement requirements. Private fleets would not be assessed the fee unless waybill-like costs were estimated and imputed to the private company, which would create added complexity and cost. In addition, the waybill is typically paid by the receiver of goods; however, in some cases it is paid by the benefiting cargo owner outside of the United States; thus determining how and from whom to collect the tax could be complex.

Weight Only or Weight-Distance Tax: The administrative costs of these taxes appear to be quite high, and some states that previously used ton-mile taxes have repealed them.[18] Oregon's weight-mile tax rates are based on the average weight carried by a vehicle of each class, so it is only necessary to keep track of mileage rather than mileage and weight. Interstate carriers keep track of mileage, such that this method appears to reduce administrative costs on the part of the interstate trucker but relies on the accuracy of self-reporting. For non-interstate truckers, this mechanism would be a new and relatively costly administrative burden. Also, based on findings from a recent study, evasion has been an issue for states with weight-distance taxes.[19] Tonnage taxes, if paid on vehicle weight alone, are somewhat simpler to administer but still require substantial self-reporting and carry with them compliance challenges like those for the HVUT.

Container Tax: In general, there has been little analysis of how a national-level container tax would be imposed and implemented, so it is difficult to assess how challenging implementation would be. Actual collection complexity would depend on how the fee is applied (types of containers, who pays), how and through what organization(s) it is collected, and how the proceeds are used.[20] Duplicative container fees at individual ports coupled with a national fee would be administratively burdensome for shippers; pre-emption of states' ability to impose container charges could be a problematic prerequisite, especially since such a fee could be used to help states fund relief of port congestion. Legally, the fee would have to be structured to avoid being interpreted as a duty on international trade activities, which is an issue with the harbor maintenance tax.

There has been limited analysis of how a national-level container tax would be imposed and implemented, so it is difficult to assess how challenging implementation.

Harbor Maintenance Tax: While increasing the harbor maintenance tax on passenger tickets and domestic freight would not require major administrative effort or expansion of legal authority, the portion of the tax imposed on imports could create issues with international rules governing trade (similar to issues associated with increasing customs duties and fees). Further, these taxes do not reach the U.S. exporters who generate much of the local highway use around ports.

Payment versus Use/Benefit Issues

This section addresses the relationships between the tax/charge paid, the costs imposed on the transportation infrastructure network, and the specific benefits for the payer.

Customs Duties and Fees: These mechanisms could be structured to relate to system use. For example, the fee revenues could be dedicated to infrastructure needs at or in the vicinity of ports of entry, including border crossings or seaports. An infrastructure customs fee also could have the benefit of addressing border infrastructure needs that arise from both homeland security and transportation infrastructure requirements that create chokepoints. In this case, there would be high geographic equity if funding were

spent on infrastructure to support ports from which duties are collected, but low user equity since exporters would not pay but would use the roads. Further, if duties were returned uniformly to the regions from which they would be collected, the value-added of federal redistribution is most likely quite low.

If the funds were not dedicated for port-related improvements, however, there would be little relationship between system use and payment. If this were the case, a narrow base of fee payers would provide benefits that accrue broadly across the nation. As such, the mechanism would do little to promote efficient investment or system use. This would be even truer if the revenues were obtained by diverting to the HTF existing payments going into the General Fund. Moreover, diversion of existing customs duties and fees would make funding more susceptible to the unpredictability of the annual appropriations process associated with General Fund revenues.

Freight Waybill Tax: Such a tax would be an indirect user fee, but with less connection to use than the current motor fuel tax. The correlation with use depends on the relationship between the freight fee and system use, which generally reflects distance but more heavily equates to the underlying value of the freight and any special services being provided (e.g., time-specific delivery).

Weight-Distance Tax: Ton and ton-mile taxes closely correlate system use and costs, including the costs that freight trucks impose on highways. These taxes, however, do little to promote targeted investment at key points of the system affecting efficiency, such as bottlenecks. Such a tax would be better suited as a funding source for system-wide maintenance.

Container Tax: A container tax potentially would miss movements at inland waterways and at cross-border or other ports of entry, and it could potentially not account for non-containerized freight movements (bulk cargo). Such a tax also could disadvantage U.S. ports in competition with those in Mexico or Canada (where containers can be moved easily via train across borders). Finally, such a tax does little to promote efficient investment or system use.

Harbor Maintenance Tax: As with the customs duties and fees options, a harbor maintenance tax increase could be structured to relate to system use if the proceeds were dedicated to infrastructure needs at or near ports of entry, particularly seaports. In this case, there would be relatively high geographic equity and a reasonable level of user equity if funding were spent on infrastructure to support ports. If the funds were not dedicated for port-related improvements, however, there would be little relationship between system use and payment, since a narrow base of fee payers would provide benefits that accrue broadly across the nation. As such, the mechanism would do little to promote efficient investment or system use.

Differential Economic Impacts

This section reviews issues related to the differential economic impacts of the various taxes, fees, and charges on particular freight categories, on Beneficial Cargo Owners or industry sectors, or on freight in relation to passenger vehicle user groups. ("Beneficial Cargo Owners" refers to the importer of record, who physically takes possession of a cargo at the destination and does not act as a third party in the movement of such goods.)

Customs Duties and Fees: Customs duties and fees fail to capture domestic-only goods movements and exports. In addition, trade agreements render many imports duty-free, thus the burden of the fees would fall disproportionately on certain goods. While this option would be reasonable for a small dedicated intermodal fund, the large gaps in coverage make it a poor broad-based funding method.

Freight Waybill Tax: By taxing total transportation costs rather than mode-by-mode services, the differential economic impacts among modes or within each mode would be limited. Thus, a freight waybill tax appears reasonably equitable. The tax, however, would be related to transportation costs, not system use. More important, without the implementation of an imputed waybill on captive shippers, the tax would miss as much as half of the goods movement industry. The process of resolving this gap creates significant implementation and administration costs and would be subject to evasion.

Weight Only or Weight-Distance Tax: Weight-based taxes that use the actual weight of the shipment for determining tax levels will place a larger tax burden on low-value/high-weight commodities. Conversely, high-value/low-weight products would pay very little, even though their shipment adds to road use and traffic congestion. If the weight tax is based on the gross vehicle weight rating only and not on actual weight carried, then the short-haul/low-use trucks pay a very disproportionate share of the total tax bill. Weight-distance taxes could potentially cause freight movers to reroute around high tax areas and increase traffic and road use in low tax areas. Similar to the weight tax, a weight-distance tax could alter industry economics, as it would be highest on shipments of low-value bulk items such as natural resources and agricultural products that rely on low-cost transportation to be competitive. Unlike the weight tax, however, this difference would be greater for the longer-distance product movements.

An infrastructure customs fee also could have the benefit of addressing border infrastructure needs that arise from both homeland security and transportation infrastructure requirements that create chokepoints.

Container Tax: Since a container tax would be imposed generally on shippers, it would not account for non-containerized movements such as bulk shipments of commodities or large pieces of equipment like tractors, generators, or windmill blades. A per-container fee, rather than a value-based tax, disadvantages high-volume/low-value shippers, and if a fee were also imposed on "deadhead" loads (return trips without freight) these effects would be magnified. Also, container fee collection on international movements may require incorporating the freight forwarder into the collection system. While the container tax is a possibility for funding intermodal projects, its limited coverage makes it a weak option for large-scale funding needs.

Illustration of Annual Costs: To illustrate the differential impact these options could have on different types of carriers, the Commission estimated the additional annual costs that would be incurred under the trucking-specific mechanisms for two hypothetical categories of Class 8 Trucks (i.e., standard 80,000-pound maximum load semi tractor trailers) if rates for each option were set at a level to raise $5 billion annually (the amount currently raised by the non-fuel, freight-related taxes contributing to the HTF and also, coincidentally, roughly the amount raised by a 13¢ increase in the diesel tax, which would re-establish the purchasing power of the diesel tax lost since the last increase in 1993). The Commission used the $5 billion funding level for this comparison to demonstrate the magnitude of each tax if it were used to contribute significantly to the current funding gap or, for illustrative purposes only, to replace the four existing non-fuel-related freight

EXHIBIT 5-1: ILLUSTRATIVE COSTS TO TRUCKERS

Freight Tax Option	Tax Unity/ Yield	Rate to Raise $5 Billion	Impact on Typical Long Haul Truck		Impact on Typical Local Distribution Truck	
			Annual Cost	% of Revenue	Annual Cost	% of Revenue
Diesel Tax	1¢/gal = $404 million	12¢/gallon	$2,500	1.1%	$1,200	1.0%
Tire Tax	1¢/10 lbs = $45 million	$1.11/ 10 lbs	$2,088	0.9%	$1,044	0.8%
Heavy Vehicle Use Tax	10% = $103 million	490% increase	$2,695	1.2%	$2,695	2.2%
Freight Way Bill Tax	1% tax = $5,972 million	0.84%	$1,890	0.8%	$1,050	0.8%
Ton Tax	1¢/ton = $113 million	44¢/ton	$619	0.3%	$2,475	2.0%
Ton-Mile Tax	0.1¢/ton-mile = $4,020 million	0.124¢/ton-mile	$2,616	1.2%	$698	0.6%

Source: Data on estimated mileage, revenues, tire usage/costs, and average loads and deadhead mileage for illustrative examples developed through conversations with American Trucking Associations officials and other trucking industry experts.

taxes and charges. To provide a complete analysis, the required increase and associated impact of raising an additional $5 billion from the tire tax and the Heavy Vehicle Use Tax also were assessed. (The impacts of the container tax or customs fees were not included in this analysis since they are not directly imposed on truckers.)

The first example is a long-haul trucker that averages 125,000 miles and generates $225,000 in freight fees (i.e., revenue) annually. The second example is a local delivery trucker (e.g., one that moves goods from a distribution center to individual stores) that averages 50,000 miles per year and generates $125,000 annually. As shown in Exhibit 5-1, only the diesel tax and the freight waybill tax would have an equitable impact with respect to revenue share. These differentials likely would be exacerbated by considering different types of goods and their associated values.

III. CONCLUSION

Diesel taxes and truck-related user fees contribute more than a third of the total revenues that are dedicated to the federal Highway Trust Fund. The Commission believes that this proportion should be at least maintained for general surface transportation investment purposes and that some increment to that funding level should be considered to pay for freight-related infrastructure. The Commission also believes that to the extent that port-related fees are used, it would be appropriate to dedicate resulting revenues to a more targeted intermodal freight investment fund. Further, the Commission suggests that the existing studies on the relative impact of freight on the highway system (i.e., cost allocation studies) be updated and critically evaluated to inform future freight-oriented taxation and user charge system decisions.

Based on the evaluation in this chapter, several possible freight-related revenue sources are worthy of consideration, but their relationship to system use and total revenue potential varies widely. In each case, administrative costs and legal issues should be weighed against revenue-raising potential. In some cases, taxes or fees would be suitable to investment in a single mode; for example, weight-distance taxes are most closely aligned with the impact of trucks on roads but are probably more expensive administratively than the current package of truck-related taxes. They also present potential compliance challenges. Other sources lend themselves to multi-modal investment, such as freight waybill taxes, but are not closely

related to system use and again have administrative, implementation, and compliance weaknesses. Still other approaches, such as customs fees or container taxes, are best suited to targeted improvements at or in the vicinity of ports of entry, but they fail to reach enough of the freight highway users to be useful as a broad-based source of revenue and are particularly ill suited as means of addressing most rural freight needs.

While the Commission has attempted to provide a qualitative assessment of the alternative freight-related revenue mechanisms, further quantification and analysis, exact legal research, and political analysis are needed for policy makers to make a final determination on each mechanism's ultimate value as part of a comprehensive surface transportation funding package.

In light of the various considerations raised in this chapter, and with the possible exception of a customs duties surtax or a container tax that could be used to fund an intermodal/border crossing program, the best way to increase funds from freight in the short term is by increasing the fees that the trucking industry currently pays into the federal Highway Trust Fund and in the medium term by moving to a vehicle miles traveled fee structure. (As noted in Chapter 6, such a system could be structured to charge by the number of miles traveled, axle weight, and specific roadway segment.)

As described in Chapter 8, this requires three actions. First, Congress should increase and, where relevant, index for inflation the current fees, including the diesel tax, truck tire taxes, and the Heavy Vehicle Use Tax paid by freight movers—with a portion of these fees being available only for freight-related investments. Second, Congress should commission a research study to assess the need for a modest shift toward freight-related users paying a higher share of total surface transportation infrastructure costs, particularly those imposed on the highway network. Finally, Congress should take steps in the near term to prepare for a transition to a VMT fee system for both trucks and passenger vehicles.

Endnotes

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4. American Trucking Associations, *U.S. Freight Transportation Forecast to…2018* (Arlington, VA: 2007).
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10. U.S. Customs and Border Protection, Department of Homeland Security, "User Fee Decals and Transponders," at www.customs.gov/xp/cgov/travel/pleasure_boats/user_fee/user_fee_decal.xml.

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12. USLegal, "Ton Mile Tax Law & Legal Definition," at definitions.uslegal.com/t/ton-mile-tax.

13. "Oregon Again Requires Weight Receipts in Trucks," *Motor Carrier News* (Oregon Department of Transportation), September 2008.

14. According to a February 2008 report, the Harbor Maintenance Fee generated $1.4 billion in Fiscal Year 2007; Government Accountability Office (GAO), *Federal User Fees: Substantive Reviews Needed to Align Port-Related Fees with the Programs They Support* (Washington, DC: February 2008), p. 15.

15. NCHRP, op. cit. note 8, estimates that 5–10 percent of customs duties would generate average annual revenue of $1.9 billion at 5 percent, or $3.9 billion at 10 percent.

16. ARTBA, op. cit. note 8.

17. GAO, op. cit. note 14, p. 15.

18. USLegal, op. cit. note 12.

19. Cambridge Systematics, Task 8 Technical Memorandum, "Analysis of Freight User Fee Funding Sources" (draft) (Cambridge, MA).

20. Ibid.

Photo courtesy of Florida DOT

6

PAYING BY THE MILE

Tolling and Mileage-Based User Fees

Most surface transportation infrastructure in the United States is not paid for by charging travelers according to when or how much they choose to use it.

Money for transportation projects is collected from a mix of taxes and fees, some of which are only indirectly linked to how much travelers use the transportation system and some of which have no relation to use. Annual vehicle registrations, for example, do not vary by the number of miles a vehicle is driven each year, while the difference in fuel efficiency between a hybrid-electric sedan and a full-size pickup truck means that per gallon taxes on motor fuels do not accurately reflect users' annual miles traveled. Neither registrations nor gas taxes reflect whether users opt to travel at times when congestion is the worst.

In the past, annual registration fees and fuel taxes collected from a few large wholesalers were justified because of their tamper-proof simplicity, low cost to collect, and convenience to the public. As information technology has evolved, however, new ways to price the use of roads, bridges, and tunnels are becoming a practical alternative to indirect taxes. By investing in a new generation of direct fee revenue collection systems, transportation infrastructure agencies can protect themselves from significant revenue losses caused by more fuel-efficient vehicles whose drivers pay less tax. In congested metropolitan areas, meanwhile, agencies can shift demand for travel to off-peak hours by changing user fees throughout the day, which may stimulate economic productivity and environmental quality by making travel times shorter and more reliable while reducing pressure to add capacity to handle congestion. And by charging heavy vehicles on the basis of axle weight and the type of road they are on, direct price signals can help reduce pavement damage.

Widespread acceptance will depend on clear evidence that the fees can be administered in ways that are fair and convenient for users and that are practical and cost-efficient for governments.

While direct user fees offer the promise of greater financial sustainability, more effective congestion management, and reduced roadway wear and tear, widespread acceptance will depend on clear evidence that the fees can be administered in ways that are fair and convenient for users and that are practical and cost-efficient for governments. At the same time, it must be recognized that no tolling or pricing strategy is appropriate in all circumstances or for all categories of investments and geographic areas.

Around the world, user fees have been implemented either at a targeted facility level or on a broader scale. Based on a review of actual examples as well as applied research and theory, this chapter examines the strengths and weaknesses of both targeted and comprehensive tolling and pricing approaches in the context of pursuing widespread implementation at the federal, state, or local levels as a supplement or replacement to traditional transportation funding sources.

I. TYPES OF DIRECT USER FEES

The various applications of tolling and pricing generally can be grouped into two types of approaches—either targeted tolling and pricing or comprehensive pricing—which are differentiated by the geographic scope of their application.

Targeted Tolling and Pricing

Across the United States and around the world, targeted tolls and pricing are a proven technique for charging users who travel on selected roads or within a regional transportation

network. Advances in technology are encouraging adoption of more sophisticated tolling and pricing practices. In the United States, targeted tolls are mostly used to pay for construction, maintenance, operation, and improvement of individual facilities and sometimes to manage congestion. Facilities that are subject to targeted tolling and pricing are access-controlled, and prices to use them are usually fixed. Examples of targeted tolling and pricing include charging to use selected highways, tunnels, or bridges; pricing access to designated congestion-free lanes; and charging to enter cordoned areas prone to heavy congestion.

Targeted tolling and pricing approaches refer to direct user fee mechanisms that are administered at the local, regional, or state levels and that focus on pricing access to and/or distance traveled on individual facilities or regional networks. Specific targeted approaches include tolling applications (such as a tolled bridge or highway), high occupancy toll (HOT)/managed lanes, and cordon pricing. Targeted tolling and pricing rates can be fixed as a set rate for facility access or for specific distances, or they can be variable, with dynamic rates that can change based on considerations such as type of vehicle or time of day/level of congestion (typically referred to as congestion pricing).

Targeted tolling and pricing are not feasible strategies for revenue generation at the federal level because they focus on specific roads or networks of facilities in defined geographic areas. They are nonetheless important tools that some states, localities, and regions use to generate funding for surface transportation investment. In addition, the systems and architecture that would be required to implement comprehensive pricing (see next section) at the federal level could be leveraged to facilitate broader use of targeted tolling and pricing—particularly congestion pricing—at the state and local levels. Targeted tolling and pricing options are evaluated in this report to highlight the circumstances in which these strategies may be useful and to set the context for recommending how the federal program could facilitate the further use of these strategies.

Tolling applications vary with respect to the approaches used to set toll rates and the nature of the tolled facility or network. Traditionally, tolled facilities have fallen into one of two categories:

- **Turnpikes—**A single road, typically a limited access highway, where every vehicle is charged for use. Many states have turnpikes as part of their state highway system, which in turn may be part of the Interstate system[1]
- **Toll bridges and other links—**Tolled individual facilities such as bridges, tunnels, or connector roads

Turnpikes and bridges/tunnels/links have been critically important components of the highway network in the states where they have been used. These facilities have generally used fixed charges intended to raise revenues and, in most cases, provide significant funding to support debt service, pay for maintenance, operations, and improvements specific to the tolled facility, and fund other transportation investments.

High occupancy toll lanes or managed lanes are relatively new types of tolled facilities implemented recently in a few urban regions in the nation. These facilities use the right of way of existing highways (either existing high occupancy vehicle (HOV) lanes or new additional lanes) and are dedicated for use by carpoolers, public transit vehicles, and

other users who are willing to pay a fee. The fee generally varies by time of day or level of congestion and facilitates better utilization of capacity while ensuring that traffic flow is adequately maintained.

Cordon pricing, also known as area or zone pricing, involves charging for access to a specific area by collecting tolls when vehicles enter it or by charging for a pass to drive in the cordoned area. In the few cases where it has been successfully implemented, cordon pricing generally has reduced the number of vehicles that enter an area. The approach also has its limitations; once a vehicle has paid for and entered a "zone," there are typically no restrictions or additional costs associated with how much or at what time an individual drives there. The application of cordon pricing can vary, with charges applied either only to visitors or to everyone operating a vehicle in a designated zone, including residents.

Comprehensive Pricing

Comprehensive pricing refers to the imposition of direct user fees that apply on all roads and all driving in the form of mileage-based pricing, also known as vehicle miles traveled (VMT) fees. These charges can be either a flat fee (e.g., a fixed number of cents per mile, regardless of where or when the travel occurs) or a variable fee based on considerations such as time of travel, congestion levels on a facility, type of road, type and weight of the vehicle, and vehicle emission levels. Or it can be a combination of flat and variable fees.

Because of their universal nature, comprehensive pricing strategies provide a better fit as a national funding strategy for surface transportation investment than do targeted tolling and pricing. Therefore, comprehensive pricing is evaluated throughout this chapter as a potential revenue-generating tool for the federal program.

Many tolling approaches in the United States are similar to VMT fee charges at the facility level (i.e., toll rate structures are either directly or loosely tied to distance driven on a tolled facility), but the development and implementation of a national comprehensive pricing system would represent a new way of raising surface transportation revenue. Short of implementing a full pricing approach, a distance-based charge could be applied to specific vehicle categories.

Another concept related to comprehensive pricing is pay-as-you-drive insurance, in which insurance premiums are based on vehicle miles instead of a traditional flat annual rate. While not a means for government to raise surface transportation revenues, pay-as-you-drive insurance would have similar effects as a mileage-based charge to pay for infrastructure since it would make a key element of vehicle use costs both more transparent and dependent on the decision to take individual trips. For example, a $375 annual premium becomes, on average, 3¢ per mile, and a $1,250 annual premium becomes, on average, 10¢ per mile.[2] A Brookings Institution study estimates that pay-as-you-drive insurance could reduce total miles driven nationwide by 8 percent, could lower total U.S. carbon dioxide emissions by 2 percent, and could save about two-thirds of U.S. households about $270 in insurance costs per year.[3] Wide-scale use of this insurance could provide an important first step in the transition to comprehensive pricing and would likely encourage people to combine trips and drive less, since they could visibly save money by doing so. Implementing pay-as-you-drive insurance, however, would require most states to change their insurance regulations.

II. EXPERIENCE WITH TARGETED TOLLING AND PRICING

The United States has made extensive use and has broad expertise with targeted tolling, but the history of toll use has also been marked by inconsistency. Prior to the Interstate era and the Federal Aid Highway Act of 1956, many of the major highways and bridges/tunnels in the country were funded through toll financing. Examples include the turnpikes in Pennsylvania, New Jersey, and Delaware and many of the bridges and tunnels in the New York metropolitan area. After 1956, however, the number of new facilities built as toll roads declined dramatically due to the focus on completing the Interstate system, the availability of federal funding to support investment, and the federal tolling prohibitions that went along with the use of this money.[4]

In recent years, with the growing gap between highway investment needs and available revenues as well as the development of easy-to-use and relatively inexpensive automated toll collection technology, toll roads and toll lanes have once again become an important means for funding investment in new highway capacity—in the last decade about one-third of all new limited-access lane miles built in the United States were tolled; in states such as Texas and Florida, the share is even higher. [5]

In the last decade about one-third of all new limited-access lane miles built in the United States were tolled; in states such as Texas and Florida, the share is even higher.

Modern tolling in the United States has occurred primarily in two forms. Tolling for new construction covers most tolling projects currently in development in the country and relates to the use of tolling to fund new capacity in the form of either new alignments or additional lanes for existing facilities. Examples of recent new toll alignments (so-called greenfield projects) include the Pocahontas Parkway in Virginia and the San Diego South Bay Expressway. The State Route 91 Managed Lanes Project in Orange County in California, which included the addition of two toll lanes in each direction parallel to existing non-tolled lanes, exemplifies the use of tolls to add new capacity to existing routes.

Tolling for rehabilitation or traffic management involves either imposing a toll on an existing bridge to help pay for its rehabilitation or replacement or converting HOV lanes to HOT lanes to make better use of existing underutilized capacity. Examples of these so-called brownfield projects include addition of tolls on the Tacoma Narrows Bridge in Washington and the Coleman Bridge in Virginia to pay for reconstruction or expansion and various HOT lane conversions in California, Colorado, Minnesota, and Utah.

Currently, there are 277 state and local toll roads, bridges, and tunnels in 32 states, totaling nearly 5,000, miles of roadway. Several more toll facilities are either in development or under consideration.[6] In 2006, these facilities raised a combined total of $17.2 billion in revenues from tolls, bond issues, concessions, and other sources. The toll portion of this total ($9.3 billion) represented 9.9 percent of total federal, state, and local highway user fee revenues (i.e., from motor fuel taxes, vehicles fees, and tolls).[7]

Although toll roads are usually perceived as only practical in cities and highly populated regions, they have been widely used to finance important system links between large cities by crossing through rural areas in states such as Kansas, Oklahoma, Pennsylvania, and New York. While the majority of U.S. toll roads (by number of facilities) are in urban areas, 52 percent of the country's toll road miles are in rural areas, mostly on the parts of the Interstate system as part of statewide tolling programs, not as part of targeted tolling efforts.[8] In addition, several toll road projects have been initiated or developed in recent

years in ex-urban areas. For example, Loop 49 in Texas, a 26-mile high-tech toll road loop through the rural areas surrounding the modest-sized city of Tyler, opened in 2006, and the North Texas Tollway Authority is building a toll road on State Highway 121 through rural Johnson County.[9]

Tolling also has been used extensively outside the United States; at least 46 countries operate toll facilities, with the most advanced examples in some rapidly developing countries.[10] For example, 100 percent of expressway miles in Mexico, South Korea, and Indonesia and 94 percent in Argentina are tolled, in large part because their expressway networks were developed relatively recently when automated toll collection technology was cheaper and more feasible.[11] In contrast, the United States began building its Interstate Highway System shortly after World War II, before electronic toll collection was available.

To date, cordon pricing has not been implemented in the United States. In 2007, as part of the Urban Partnership Program of the U.S. Department of Transportation (DOT), New York City developed a plan to become the first city in the United States to charge all motorists for driving into its congested core. The New York State legislature, however, declined to pass legislation necessary to authorize the program, in part because of concerns that the plan would be regressive and because they believed that the primary impact would fall on working-class residents outside Manhattan.[12]

Internationally, cities such as London, Oslo, and most recently Stockholm are using cordon pricing schemes in their city centers both to reduce congestion (or its growth) and to boost revenues for highway and transit improvements. The longest running experience is the Singapore Cordon Pricing program. This system, established in 1975, requires all vehicles entering the central part of the city (roughly 2.5 square miles) to display a window sticker and pay a fee to enter. This has dramatically reduced traffic in the center of the city but has created congestion problems around the periphery of the cordon zone.[13]

The London experience produced immediate congestion reduction benefits, which diminished with time, but much of the cordon pricing plan included the addition of bus lanes that have constricted available lanes for other traffic. While commercial and passenger vehicle congestion has increased, the average travel time by bus has improved dramatically. In addition, major and planned construction/upgrades have caused some traffic congestion that did not exist prior to implementation of the cordon pricing scheme. Thus, while traffic density and travel times for private vehicles may not have declined (for a variety of reasons), public transit improvements also should figure in the overall evaluation.

III. EXPERIENCE WITH COMPREHENSIVE PRICING

Domestic and international experience with comprehensive pricing is limited. In the United States, Oregon charges heavy vehicles a per-mile fee that varies with weight and number of axles. A number of other states also have some form of weight-distance tax for heavy vehicles.[14] In terms of true, comprehensive pricing, the most important current source of findings is the Oregon VMT Pricing Pilot Project conducted in 2006. This tested the viability of replacing motor fuel taxes with a mileage charge. The state DOT worked with two gas stations and 285 volunteer vehicles fitted with a device that recorded vehicle miles driven and transferred the mileage data to the participating gas stations' point-of-sale systems. The system then

BOX 6–1: LESSONS LEARNED FROM THE OREGON VMT PRICING PILOT

The Oregon DOT VMT pricing pilot was the first real-world experience (albeit a voluntary one) with comprehensive, distance-based pricing in the United States. The final report's findings include the following:

- **The concept is viable—**The pilot program demonstrated that existing technology can be used in new ways and that a mileage fee can be implemented to replace revenues from motor fuel taxes. At the conclusion of the pilot program, 91 percent of the program's participants said they would agree to continue paying the mileage fee in lieu of a motor fuel tax if the program were extended statewide.
- **Paying at the pump works—**The pilot program demonstrated that the mileage fee could be paid at the pump, with minimal difference in process or administration for motorists compared with how they pay the gas tax. Like the motor fuel tax, collection of the mileage fee can be embedded within routine commercial transactions, with the bulk of it prepaid by the distributor in the form of the motor fuel taxes.
- **The mileage fee can be phased in—**The study demonstrated that the mileage fee could be phased in gradually alongside the motor fuel tax, allowing non-equipped vehicles to continue paying the motor fuel tax while equipped vehicles pay the mileage fee. However, retrofitting existing vehicles with the necessary technology at this point will be relatively expensive and difficult.
- **Integration with current systems can be achieved—**The study demonstrated the ability to integrate two critical existing systems: the service station point-of-sale system and the state's current gas tax collection system.
- **Congestion and other pricing options are viable—**The study demonstrated that pricing could be varied for different zones and time of day and that appropriate fees could be charged. This proves that the mileage fee concept could support congestion pricing and the assessment/collection of local taxes and other "zone-oriented" features. Furthermore, the area pricing strategy applied in the pilot program produced a 22 percent decline in peak period driving.
- **Privacy can be protected—**The study demonstrated that privacy protection can be implemented, but there is a trade-off between privacy and information stored for enforcement and dispute resolution. Key privacy-related principles successfully integrated into the systems supporting the Oregon pilot included that no point location data could be stored or transmitted, that all on-vehicle device communication must be short range, and that the only centrally stored data needed to assess mileage fees were vehicle identification, zone mileage totals for each vehicle, and the amount of fuel purchased.
- **The burden on business is minimal—**While distributors and gas stations bear some new accounting burdens, administration is automated and can be integrated relatively easily into existing transaction processes.
- **There is minimal evasion potential—**The on-vehicle device was successfully configured so that tampering with it resulted in default payment of the motor fuel tax, thus negating the benefits of evasion efforts. This approach, however, will not address evasion issues associated with alternative fuel vehicles.
- **Implementation and administration costs are manageable—**Implementation and administration costs for an approach similar to that used in the Oregon VMT tax pilot would occur in three areas: Service stations would incur capital costs to procure necessary system equipment and modify point-of-sale systems as well as operating costs for communications with a central database. In-vehicle capital costs would be determined by auto manufacturers and included in the price of new vehicles (costs to retrofit vehicles with on-board units (OBUs) are estimated at about $150 per vehicle). The administering agency (e.g., the Oregon DOT) would incur operating costs for auditing and providing technical assistance to service stations and motorists. Estimated auditing costs would include service station audits ($1 million annually for all services stations in the state) and auditing of non-complying motorists ($2 million annually, although these expenses could be recovered through fines for non-compliance) and would be in addition to costs to administer the current motor fuel tax.
- **Public acceptance is not guaranteed—**Because all participants were volunteers, it is inappropriate to automatically assume their acceptance of the program would extend to the general public. In fact, volunteers indicated that they thought a smaller percentage of other people would find the system acceptable.

Source: James M. Whitty, Oregon's Mileage Fee Concept and Road User Fee Pilot Program: Final Report (Salem, OR: Oregon Department of Transportation, November 2007).

used the data to calculate the total mileage charge, remove the state gas tax, and adjust the vehicle's fuel bill accordingly.[15] The pilot project demonstrated that the concept of moving to a comprehensive pricing scheme is viable (see Box 6–1), but it also underscored that a variety of technical, administrative, and public concern hurdles will need to be overcome before comprehensive pricing could be implemented at statewide or national levels.

The University of Iowa Public Policy Center is currently conducting a national study to evaluate public response to a mileage-based road user charge system, but its results will not be available for some time. The study will include the installation of on-board systems in volunteers' vehicles in six regions across the country (San Diego, Baltimore, Austin, Boise, Research Triangle in North Carolina, and eastern Iowa). The aim of the study is to design a prototype road pricing system that is reliable, secure, flexible, user-friendly, and cost-effective and to assess vehicle operators' reactions to the system. [16]

The Puget Sound Regional Council in Washington State conducted relevant research on comprehensive pricing using volunteers with dashboard devices that tracked their travel and imposed variable "virtual" tolls (i.e., the tolls were not real). The data from this experiment were then used to support modeling, which evaluated the costs and benefits of various road pricing approaches from HOT lanes to congestion pricing on all freeways and major arterials. The research concluded that region-wide variable pricing in the form of optimal tolls on all freeways and arterial streets would result in significant travel time and vehicle operating cost savings for all income classes and could generate enough revenue to finance all identified regional transportation needs over the life of the current Metropolitan Transportation Plan.[17]

Internationally, Germany, Austria, and Switzerland have implemented various forms of comprehensive pricing, limited to trucks. In 2005, Germany, for example, began charging all heavy vehicles (i.e., trucks over 12 tons) for all miles driven on roughly 7,500 miles of motorways throughout the country.[18] Tolls are charged per kilometer based on a satellite Global Positioning System (GPS) for most vehicles, and they vary by axle number (trucks with more axles pay a higher toll since they presumably do more damage to the road)[19] and vehicle emission class (trucks that pollute more pay a higher toll). A manual online payment and on-road enforcement system is available for truckers who do not want to participate in the satellite-based system. Toll payments are in addition to existing motor fuel taxes and other fees; 50 percent of these revenues are spent on roads, 38 percent on rail, and 12 percent on waterways. Average tolls are 12.4 euro-cents per kilometer (equivalent to roughly 26¢ per mile at current exchange rates) and are adjusted based on vehicle emission characteristics. Initial findings from the pricing system indicate that the shift to more direct user charges has led to increased efficiency in Germany's heavy vehicle industry and provided benefits the German economy as a whole.[20] However, there are significant differences between the German and U.S. freight and logistics systems, and it cannot be assumed that the results of the program would be the same in the United States.

The Netherlands is a notable example of a comprehensive national road pricing system. Although still in the planning stages, implementation could begin as soon as 2012.

The Netherlands is another notable example of a comprehensive national road pricing system. Although still in the planning stages, implementation could begin as soon as 2012. The proposed pricing scheme would replace the current taxes on all vehicles (passenger vehicles and heavy trucks) with a fee per kilometer, based on vehicle environmental performance, coupled with rate increases for driving in congested regions at particular times. The program's intended goal is to maintain the average cost that road users currently pay in taxes, while increasing costs for those who drive more, drive in peak periods, and/or use more polluting vehicles and at the same time decreasing costs for those who drive less, drive in non-peak times, and/or use less polluting vehicles.[21]

IV. POTENTIAL ADVANTAGES OF TARGETED TOLLING AND COMPREHENSIVE PRICING

Tolling and pricing approaches have many positive attributes, particularly when used in conjunction with congestion pricing. This section provides a description of these advantages and evaluates how they apply to tolling, cordon pricing, and VMT taxes/comprehensive road pricing. It should be noted, however, that targeted tolling and pricing are most appropriate as tools that states, regions, or localities use to raise the non-federal share of surface transportation investment. The analysis of those options therefore is for use in that context. Comprehensive pricing is evaluated as an option for the federal level in the form of a fixed VMT charge to supplement or replace current federal motor fuel taxes (although states, localities, and regions could also use this tool if they choose).

The magnitude of funding will be driven by several considerations, including the extent of tolling and pricing, types of applications, and the toll rates that are set.

Revenue Potential

Tolling and pricing approaches (targeted and comprehensive) have the potential to raise significant levels of revenue for surface transportation both directly and by leveraging new revenue streams. The magnitude of this funding will be driven by several considerations, including the extent of tolling and pricing, types of applications, and the toll rates that are set. However, tolling and pricing have higher administrative and compliance costs than motor fuel taxes, which must be considered in evaluating the net revenue potential of these options.

Targeted Tolling and Pricing

Targeted tolling and pricing in the United States currently raises more than $17 billion annually,[22] but it could raise more if additional tolled facilities were added to the system and/or existing toll rates were raised to retrieve the full costs of system use (where fixed tolls currently do not fully cover costs) and/or to manage congestion. Still, it must be recognized that tolling is often resisted by the public, except to fund new options, such as the construction of new capacity, or to encourage more effective use of underutilized HOV lanes.

At first glance, the new annual revenues that could be raised realistically through tolling are small relative to the enormous need at the state and local levels. One recent estimate of future tolling potential is that expanded use of tolling by state and local governments would only raise an additional $9 billion over 10 years.[23] However, this figure was based on tolling and pricing opportunities in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users and on current political and administrative realities at the state level. If Congress lessened federal restrictions and increased federal incentives to encourage tolling, the contribution of tolling and pricing revenues to total national highway funding could be much higher. For example, tripling the current level of total annual toll road revenues over the next 20 years in constant dollar terms (the Commission recognizes this would be an ambitious achievement) could raise annual funding equivalent to almost half of current national highway capital expenditure levels.[24] To the extent that states are able to use toll revenue to fund some new projects, it expands their funding base and their ability to meet maintenance and reconstruction needs, as well as to build new projects using traditional revenue sources.

The use of tolling has increased in recent years, with one-third of all new limited-access lane miles built in the United States tolled, as previously noted.[25] For example, Florida has aggressively used tolling over the last two decades to help finance new capacity projects—to the point where toll revenues and other associated toll road receipts amount to over $1.2

billion annually and contribute nearly 14 percent of total highway capital and maintenance spending (including federal funding and bond receipts).[26] As a point of reference, if the rest of the nation implemented state and local tolling to the same degree as Florida does, total toll revenues would be on the order of $22 billion per year, or more than double current toll road revenues.[27] To put this figure in perspective, the added annual revenues would be equivalent to a 6¢ per gallon increase in motor fuel taxes. An even more optimistic estimate, from the Brookings Institution, estimates that applying tolls to all congested Interstates and freeways would raise $105 billion per year.[28]

These, of course, are scenarios involving aggressive and extensive use of tolling and should not be used by policy makers to defer increasing federal funding for surface transportation investment; if for no other reason, meeting the overall national need, as described in Chapter 2, requires much more significant revenue levels. Florida probably represents the high end of the possible range for tolling in the immediate to medium term. And the Brookings Institution estimate, while meaningful as a barometer of how much we as a nation underpay for transportation, is not likely achievable, at least in the short to moderate term. Given the difficulties, including political constraints, involved in moving to greatly expanded tolling, expectations that every state could or should replicate Florida's experience or that every congested freeway could be priced are not realistic.

Cordon and area pricing are applicable at the metropolitan or sub-state regional level. These strategies are typically not primarily designed to pay for the cost of transportation infrastructure, as tolling and road pricing are, but rather are designed to reduce vehicle traffic within an area to which entry is priced. However, cordon and area pricing can generate significant revenue for local transportation needs, including both highways and transit, but it also (currently) tends to be relatively expensive to implement and administer.[29]

Based on the most recent available information, cordon pricing systems generate annual gross revenue of $54 million in Singapore, $237 million in London, and $116 million in Stockholm.[30] And the proposed New York City program was expected to gross $564 million annually. Limited information, however, is known about the full costs of implementing and administering cordon pricing schemes. The London system cost £200 million (about $275 million at current exchange rates) to implement, with annual operating costs of £155 million (about $158 million).[31] The proposed New York City program was estimated to have $73 million in capital costs for collection system development and $62 million in annual collection, enforcement, and operating costs.[32]

Comprehensive Pricing

Comprehensive pricing rates—like toll rates—can vary, depending on their purpose. Pricing systems can be simple mileage charges designed to pay for certain infrastructure costs or more sophisticated systems used to also manage the road system more efficiently. While the Oregon pilot project identified technical, administrative, and institutional challenges to implementation of a true statewide or national comprehensive pricing system, the experience there also showed conceptually that a comprehensive road pricing system could fully or partially replace motor fuel taxes as the primary means of raising surface transportation revenues at the state and/or federal level.

The amount of net revenues that could be raised through a comprehensive pricing system would be driven largely by the established fee levels and the costs of administering the

EXHIBIT 6-1: ILLUSTRATIVE FEDERAL VMT FEE SCENARIOS

(all figures in 2008 dollars)

Needs Scenario	Estimated Federal VMT Fees (¢/Mile)[a]						Equivalent Fuel Taxes (¢/gallon)[b]		Required Annual HTF Revenues
	Charge on All Miles			Charge FAH Miles Only					
	LDVs	Trucks	Avg.[c]	LDVs	Trucks	Avg.[c]	Gasoline	Diesel	(billions)
Maintain Current Levels Scenarios									
2008 HTF Revenues	0.9¢	5.0¢	1.2¢	1.0¢	5.9¢	1.4¢	18.3¢	24.3¢	$ 36.4
2008 Federal Program Level	1.3¢	7.3¢	1.8¢	1.5¢	8.6¢	2.1¢	27.0¢	39.2¢	$ 53.6
Base Case Needs Scenarios									
"Need to Maintain"	1.9¢	10.6¢	2.6¢	2.2¢	12.5¢	3.0¢	39.0¢	59.9¢	$ 77.6
"Need to Improve"	2.3¢	13.2¢	3.2¢	2.7¢	15.5¢	3.7¢	48.4¢	75.9¢	$ 96.2

a. Estimated LDV and truck VMT charges maintain the current ratio of LDV and truck-related contributions to the HTF (i.e., revenues from federal gasoline and special fuel taxes versus federal diesel taxes plus truck user fees).

b. Equivalent motor fuel tax rates assume current truck-related user fees are maintained (indexed for inflation); motor fuel taxes are based on levels needed to maintain the current ratio of total LDV to truck-related contributions. Equivalent rates also assume and account for the extension of current motor fuel tax refunds and transfer levels.

c. Average VMT charges are simply total required revenues divided by all LDV and truck miles on the applicable system.

system. Thus, like the current motor fuel tax, the amount of revenue that comprehensive road pricing could generate depends on the extent of fee coverage and the fee level; for instance, prices could be established as a replacement for fuel taxes, as in the Oregon experiment, or they could raise more (or less) if desired. Several states have evaluated the implications of replacing their motor fuel taxes with VMT fees and, depending on the individual state's tax rates and on how the cost allocation between cars and trucks would be handled, have typically estimated that a fee of 1–2¢ per mile (average for light-duty vehicles (LDVs) and trucks) would be required.[33]

For illustrative purposes, the Commission evaluated potential scenarios associated with a national VMT fee system. (See Exhibit 6.1.) First, the Commission looked at what charges for light-duty vehicles (which includes cars, vans, and pickup trucks) and trucks (maintaining current LDV/truck contribution shares) would be needed either to replace the Highway Trust Fund (HTF) revenues based on current motor fuel tax and truck user fee rates or to fund the entire current federal highway and transit program. (Current federal program obligations exceed current HTF receipts by about $17 billion annually.)

If the fees were charged at a flat rate on all travel, regardless of where it occurred, the required VMT fees would need to be about 0.9¢ per mile for LDVs and 5¢ per mile for heavy trucks (an average of 1.2¢ per mile). The fees required to pay for the entire current federal program would be about 1.3¢ per mile for LDVs and 7.3¢ per mile for trucks (an average of 1.8¢ per mile). If the fees were only imposed on miles traveled on the current federal-aid highway (FAH) system, they would need to be about 18 percent higher. (The federal-aid highway system covers all highways that are eligible to receive federal funding—roughly one-quarter of all roads in the United States. (See Exhibit 6.2.) It in-

EXHIBIT 6–2: SYSTEM MILES AND VMT

System	Mileage	Annual VMT (in millions)		
		LDVs	Trucks	Total
All U.S. Roads	4,033,007	2,791,053	242,700	3,033,753
Federal-aid highway system	985,129	2,368,115	205,923	2,574,038

Imposition of a federal VMT charge on just federal-aid highway system miles (or some other subset) could create an opportunity for state and local governments to impose VMT charges on facilities not subject to the federal charge.

cludes all Interstates and other National Highway System routes, as well as more than 800,000 miles of other principal roads.)

The Commission also developed rough estimates of the VMT charges that would be required to raise sufficient revenues to address the 2008–35 average annual federal investment needs associated with the baseline investment scenarios as estimated in Chapter 2. These scenarios reflect the "Need to Maintain" and the "Need to Improve" if the historical federal share of all highway and transit investment needs (45 percent) were to continue. Again, the evaluation included consideration of VMT charges on all miles driven and on miles driven just on the FAH system. For VMT charges on all miles driven, the VMT fee to meet the "Need to Maintain" federal investment level ($77.6 billion) would be 1.9¢ per mile for LDVs and 10.6¢ per mile for trucks (an average of 2.6¢ per mile). The charges required for the "Need to Improve" federal investment level ($96.2 billion) would be 2.3¢ per mile for LDVs and 13.2¢ per mile for trucks (an average of 3.2¢ per mile). Again, if the fees were only imposed on miles traveled on the current FAH system, the charges would need to be about 18 percent higher.

These scenarios do not account for the additional fees that would likely need to be charged to recover the cost of administering a national VMT fee system. These costs are currently unknown but are expected to exceed the current costs for administering motor fuel taxes (about 1 percent of total revenues). To provide some perspective, applying the Dutch government's goals of 5 percent administrative costs and integrating these costs into the national VMT fee, the charge needs to increase in the range of 0.1¢ per mile for LDVs and 0.5¢ per mile for trucks.

It is also worth noting that the imposition of a federal VMT charge on just FAH system miles (or some other subset) could create an opportunity for state and local governments to impose VMT charges on facilities not subject to the federal charge. For example, if states were to impose VMT charges on all non-FAH route miles at the same rate as the federal government charges on the FAH system under the "Need to Maintain" scenario, resulting state revenues would total almost $14 billion annually.

Sending Accurate Market Signals to System Users

The current highway financing system relies heavily on motor fuel taxes at the federal level and on a mix of motor fuel taxes and other sources at the state and local level, including revenues unrelated to use, such as property taxes and sales taxes. To the extent the system is funded through mechanisms other than user fees, users are being subsidized by non-users (although non-users still benefit from the system). But even when they are funded by indirect user fees like fuel taxes, these typically do not recover the full costs of system use (i.e., the cost of building, maintaining, and operating the system, as well as costs associated with user contributions to congestion and other negative impacts, such as air pollution). Both practices lead to subsidies for system use. While some subsidies and cross-subsidies within federal, state, and local surface transportation funding systems are clearly reasonable, providing them shields users from paying the full cost of their system use and therefore does not promote efficient vehicle or travel choices. Motor fuel taxes send price signals that can influence people's overall choice about how much to drive and (to some degree) what vehicle to buy, but since the tax costs are roughly the same regardless of where or when a person travels, they do little to promote efficient decisions about system use, such as choosing to

travel at peak times when the benefit from the trip could be less than its full societal cost. Also, because fuel taxes are hidden in the overall price of gasoline, they tend to influence travel behavior less than more direct and more transparent price signals would.

System users do incur costs associated with congestion, including increased travel time, higher fuel usage, and lost productivity, but they do not pay for the delays their system use imposes on others, for increased emissions or for increased system wear and tear. For example, the incremental costs of driving on a congested urban freeway (versus an uncongested freeway) are much higher than what travelers currently pay through federal and state-local taxes (including the federal and state motor fuel taxes). Alternatively, when traveling at uncongested times, the motor fuel tax is the same but the impact on travel time of others may be zero. A recent study of the Washington, DC, area by Resources for the Future found that if users were to pay the full cost of driving, including the costs of congestion, air pollution, and other externalities, drivers in large U.S. cities would have to pay an additional 24.4–33.7¢ per mile during peak times.[34]

Unlike fuel taxes, direct user fees are a way to charge users a price better aligned with the full cost of their travel. Specifically, prices (whether for targeted tolling and pricing or comprehensive pricing) can be varied to incorporate both the costs of providing, maintaining, and operating the infrastructure and some or all of the costs of other considerations such as system damage associated with vehicle weight, congestion impacts, and vehicle emissions. This, in turn, can better inform the individual about the true cost of their travel choices—that is, the price for highway travel can help travelers make more efficient decisions about how and when they use existing transportation infrastructure. For example, if road prices are set higher during congested hours, some people will choose to travel at alternative times or on alternative routes, make fewer trips, use other modes of travel, or telecommute. However, many Americans (because of a lack of flexibility or a lack of alternative travel options) may not be able to make significant changes in their travel habits and requirements.

Charging users more for peak use and less for off-peak use, even if rates are set so that total net revenues are equivalent to existing net motor fuel tax revenues, creates incentives for more efficient road use. The scope and nature of pricing implementation, however, will influence the ability of pricing to send clear market signals. In terms of comprehensive pricing approaches, even a flat VMT charge likely would achieve some system efficiency benefits. Oregon's road pricing pilot project, for example, resulted in a 12 percent decrease in VMT even though the charge per mile was, on average, equivalent to what a person would pay for the same travel through motor fuel taxes.[35] The study found that even without additional charges for congestion, the increased transparency of system costs influenced driving decisions.

Research on the effects of pricing (whether targeted tolling and pricing or comprehensive pricing) on travel behavior shows that the benefits could include the following:

- **Shifting some vehicle trips from peak to off-peak periods—**Some trips taken during rush hour "peak periods" are discretionary, and many people have some flexibility in commute times. Variable pricing that makes off-peak travel cheaper could lead drivers to reschedule some discretionary trips or even change their commute times. Shifting travel times likely would be the largest effect, reducing peak time travel by perhaps as much as 25 percent.[36]

- **Reducing total vehicle trips and trip distances—**Increased cost transparency could lead drivers to combine trips (e.g., running several errands per trip rather than taking several trips) and plan their trips more carefully (e.g., consider closer destinations).

- **Increasing mode shift—**Pricing can lead drivers to choose different modes of travel, including carpooling, transit, and bicycling/walking, or to increase telecommuting.[37]

- **Improving reliability—**Pricing that proves to actually reduce demand in a meaningful way can improve travel time predictability and reliability by reducing the uncertainty of delays.

- **Reducing commercial services travel time—**Services that require moving about in congested cities face severe productivity losses as congestion increases. While road pricing could add to the direct cost of commercial services travel (depending on the relative prices paid through road pricing versus current fees and fuel taxes), improved infrastructure and reduced congestion likely would more than offset these added costs through higher productivity. The Eddington Commission in the United Kingdom estimated the effects of congestion pricing on freight and found commercial services industries would be net beneficiaries.[38] It also noted that businesses, in particular, accrue significant net gains from road pricing and that these cost savings get passed on to consumers in the form of lower prices. This reflects the fact that business users have relatively high values of time, so the value of time savings and reliability benefits from road pricing will generally exceed the cost of the charges. This is also true of freight traffic, but the Eddington Commission found that the positive impacts of road pricing on freight would be significantly lower.[39] Notably, the benefits calculated do not take into account the use of the public revenues that, if used to expand capacity, could lead to higher benefits for users.

According to recent research, a comprehensive pricing approach that incorporates variable pricing tied to travel demand levels (i.e., congestion pricing) could provide significant congestion benefits. One study estimated that region-wide congestion pricing could reduce peak travel by 8–20 percent.[40] A Brookings Institution study estimated that congestion pricing on the nation's Interstates and other freeways would reduce total vehicle miles traveled by 11–19 percent.[41] And a Federal Highway Administration (FHWA) report looking at results from its Value Pricing Pilot Program, which implemented tolling on a number of facilities nationwide, found that even targeted pricing can have a number of effects on driver behavior and traffic volumes, including changes in times, routes, or modes of travel; willingness to pay for faster travel times by traveling on toll lanes; reductions in peak-period traffic volumes; and more efficient use of highway capacity.[42]

Impacts on System Investment

Both targeted and comprehensive pricing/tolling potentially reduce congestion by promoting more efficient use of existing facilities. This in turn produces one of the most important potential benefits of pricing: a reduced need for future highway capacity expansion.

A few recent international studies and domestic analyses demonstrate that road pricing, through its ability to reduce congestion, could decrease the need for capacity expansion to handle peak hour traffic. A European Union report estimates that road pricing could lead to savings from a reduced need for construction of 30 billion to 80 billion euros per

year in the European Union as a whole.[43] A U.K. study estimated that universal road pricing in that country would reduce the need for new road capacity by 80 percent.[44] The U.S. DOT estimates that implementing comprehensive congestion pricing on all congested facilities in the United States (both on and off the federal-aid highway system) would reduce highway capital spending needs by $38 billion, from $89 billion per year to $51 billion.[45]

These cases are based on both a scope of congestion pricing implementation (that is, at all levels of government and in all parts of the country) and distance charges that may not be practical or realistic (at least in the near to medium term, and generally not in rural areas). And the European study reflects different transportation systems, cultures, and travel habits that may not be directly applicable to the United States. Taken in combination, however, the findings do show that pricing could reduce the need for highway investment.

The implementation of either more targeted tolling/pricing initiatives or comprehensive pricing could also improve the setting of priorities for capital investment decisions in the future. Currently, transportation planners predict future capacity needs by extrapolating trends related to travel, land use, demographics, economic development, and other relevant considerations. With pricing, the willingness of users to pay (or not to pay) to travel certain routes, including their willingness to pay higher prices during congested periods, helps provide additional signals about where more capacity is needed, similar to the signals that prices provide for the demand of other goods and services in the economy.

Environmental Benefits

Road pricing can potentially provide positive environmental results, although specific environmental results may be mixed. Congestion reduction effects do lower some pollutants by decreasing or eliminating stop and go driving in heavy traffic, but faster travel can also increase emissions of other pollutants.

Recent research that examined the effects of road pricing on a broad range of pollutants found that encouraging reduced vehicle travel and modal shifts would lead to a net reduction in emissions of all the pollutants examined.[46] In addition, by shifting more of the costs of driving to marginal costs and away from fixed costs (e.g., car registration fees, flat insurance rates only loosely related to miles driven, etc.), drivers would drive somewhat less, yielding environmental benefits. However, if comprehensive road pricing were not supplemented by some kind of charge on carbon emissions (such as a carbon tax), there would be some offsetting impacts because it would then become relatively cheaper to drive lower-mileage vehicles (since gasoline consumption would no longer be taxed).

Benefits for Transit

Many commentators argue that by requiring drivers to pay more of the full cost of travel, road pricing can increase transit ridership. Recent research that looked at how drivers in Portland responded to the Oregon mileage pricing pilot project found that program participants who lived near transit facilities reduced the peak hour miles they drove, presumably by taking transit for some trips.[47] Some research has also asserted that the increase in transit demand due to pricing could enable transit agencies to charge higher fares, thereby reducing per-passenger operating subsidies.[48]

Transit could also benefit from reduced roadway congestion through road pricing, which could lead to faster and more reliable bus transit services, thus increasing performance and making transit more attractive to a broader array of the public. Even pricing part of the network through a traditional turnpike or an HOT lane network can create a congestion-free route or network that buses can use to avoid traffic and provide higher-quality service.[49] For example, the HOT lanes on Houston's Katy Freeway allow much improved express bus services along that route.[50]

In most rural areas, however, travel speed is not impaired by congestion and is generally less important as a driver of transit demand than other factors such as the needs of low-income individuals to have access to jobs and other locations through means other than cars.

V. POTENTIAL DISADVANTAGES AND CITED POLICY CONCERNS

This section identifies and discusses potential disadvantages of targeted tolling and pricing and comprehensive pricing. As with all options for funding surface transportation investment, there are disadvantages to these approaches. These include stated concerns and perceptions about tolling and pricing; the Commission believes that some of these are valid and an ongoing concern, some could be managed or addressed, and some are inaccurate.

Public and Political Opposition to Tolling and Pricing

Many in the transportation community, including elected officials, believe that tolling and road pricing (targeted or comprehensive) are unpopular with the public. Indeed, a portion of the public earnestly opposes these approaches and sincerely believes they are inappropriate. The facts that the recent New York City cordon pricing initiative did not proceed and that no previously untolled Interstates have been successfully converted to toll roads (despite the availability of federal waivers to allow states to do so) indicate that strong opposition to some forms of tolling and pricing in the United States continues.

Past public opinion studies often concluded that public acceptance of tolls and road pricing was low, but that sentiment may be changing. More recent research suggests that public support for tolling and pricing in urban areas (and under certain circumstances) has improved. A recent report that reviewed existing opinion surveys related to tolling and pricing found that although several surveys show less than majority support for tolling and pricing (particularly at a statewide level or in rural areas), other studies show at least a small majority support for tolling and road pricing when the tolling is being used or being proposed as a means to pay for new capacity in urban areas, when the public can see a more direct relation between what they are paying and the services they are receiving, and when the public has become more accustomed to paying tolls (i.e., in California, Texas, and Florida).[51] The report goes on to note that public officials may underestimate public support for tolling and pricing because some opposition reflects a poor public understanding of the connection between raising additional transportation revenues through tolling and pricing and meeting transportation investment needs. (This is also true with respect to efforts to raise motor fuel taxes.) The report also notes that several surveys show weak public acceptance and poor understanding of congestion pricing.[52]

A significant observation from urban areas that have used tolling and pricing is that public approval grows with familiarity. In Stockholm, only 44 percent of the public approved of pricing

prior to a trial, but approval increased to 57 percent after the trial, and the public subsequently voted to make the system permanent.[53] Before London's congestion pricing system was put in place, only 39 percent of the public approved, but approval rose to nearly 60 percent after implementation.[54] The growing approval, however, may not extend to all new pricing initiatives, as exemplified by the recent failed efforts to expand congestion pricing to other areas in the United Kingdom.

Clearly, public reticence to accept tolling and pricing may create major challenges to expanded use of targeted initiatives at the state and local level and to development and implementation of comprehensive pricing at the federal level. Changing to a comprehensive, nationwide pricing system would be a significant change for users accustomed to a simple and nearly invisible motor fuel tax system that requires limited decision making about travel choices and their associated costs. Even a road pricing system like Oregon's, where the payment system does not change, entails new information about the costs of traveling at certain times and on certain roads. This requires people to know more and to make more informed and more frequent decisions about travel. Public opinion is critical to the success of pricing initiatives, as an FHWA report on the value pricing pilot program found.[55] Thus efforts to implement variable road pricing projects must emphasize measuring and understanding public opinion about pricing as well as shaping informational programs to address public concerns.

Changing to a comprehensive, nationwide pricing system would be a significant change for users accustomed to a simple and nearly invisible motor fuel tax system that requires limited decision making about travel choices and their associated costs.

Challenges to Setting Efficient Tolls and Road Prices

Setting the "right" toll for a targeted toll facility or network is straightforward in theory but often difficult in practice. First, setting tolls based on congestion, road damage, and other costs can be difficult, as the right prices are hard to determine and implement. Second, there is the potential conflict between the price that optimizes the use of the road or network and the price that generates sufficient revenue to pay for it, as the optimal price can vary over the life of the road.[56]

For targeted tolling and pricing, the most common tolling methods use a limited set of rates that do not vary by time of day and thus may not cover the full costs of system use. The cost of building, maintaining, and operating a road or network can be combined with information on traffic levels and theories on price elasticity, as well as other revenue goals and policies, to determine appropriate pricing. But setting pricing rates is politically challenging and incorporates a much greater range of issues than simple cost calculations. Some kinds of private participation may facilitate easier toll rate adjustments over time, but even concession arrangements typically include guidelines or restrictions on price setting.

Setting rates for a comprehensive road pricing system could present more challenges. Determining the optimal pricing system would require information on levels of congestion, its variation by location and time, and the amount of road damage a vehicle does. This in turn could lead to a complex set of prices that might be confusing to users. Prices set on this basis are not likely to generate exactly the revenue needed for maintenance and expansion of the existing system. Over time, the price signals could guide investment to bring these closer in line, but initial applications would likely be more problematic.

Identifying the optimal set of prices on a network is also complex and challenging. In particular, recent research indicates that setting the same price on all lanes of the same freeway may

not be appropriate. A Brookings Institution report examined ways to set prices, recognizing that drivers are not homogenous. It identifies the so-called limited two-route HOT network as providing the highest consumer gain. This option calls for tolling all lanes but at two different toll levels (one free-flowing and one more congested), with carpools free in either lane.[57] Extending these complications out to full road pricing would compound the complexity.

In addition, some jurisdictions may be tempted to set prices on particular roads to maximize revenue from out-of-jurisdiction travelers. For example, if a road traverses only part of a state, has a high share of out-of-state travelers, and there are few if any alternative routes, state officials may be tempted to set prices higher there in order to maximize revenue from non-residents.

Another hurdle is the interplay of comprehensive charges that could be implemented at various government levels. Technology can allow simultaneous federal, state, and local mileage charges via the same platform, but administering the distribution of funds and operating costs for the system would be more complex than current targeted tolling systems.

In spite of these challenges, pricing does not have to be perfect to be successful. While charging optimal price levels will be difficult, pricing is highly likely to lead to more effective management of the road system and to generate revenues that are closer to costs than the current surface transportation funding system produces. As one analysis of real-world experience with road pricing stated: "There is enough knowledge on the monetary values of externals costs to start with pricing reform in the transport sector. The remaining gaps are being filled rapidly by ongoing research."[58] While this statement may be overly dismissive of the challenges, costs, and complexities associated with implementing pricing, enough is known to move to the next level of planning for the introduction of comprehensive pricing in the United States at some point in the future.

Mobility Impacts

Many commentators passionately argue that traveling is a right, that roads are public goods, and that tolling or pricing limit that right and turn roads into private goods allocated only by the market. To be sure, traveling is a public good, but it is not a free one; it requires that individuals pay at least a portion of the costs associated with their travel, whether it is in transit fares, gas taxes, or other fees. Tolling to pay for new road capacity, improvements, or maintenance can certainly reduce some citizens' access to that capacity, whereas increasing motor fuel taxes to pay for that capacity may have an impact on overall travel but not on use of specific facilities. However, some steps could be taken to ensure that mobility is available for all users, such as setting different prices on different lanes of a facility

A related concern with pricing (both targeted and comprehensive) is that it could become a means of rationing use of roads—reducing congestion but ignoring signals that more supply is needed. But prices should ideally be set at the cost imposed by the additional driver, not at levels to drive large numbers of travelers off the system. Moreover, if a significant portion of revenues are reinvested in expanded highway and transit capacity (a critical component of a fair pricing approach), mobility should ultimately improve.

Balkanization of National Network

There are significant concerns that targeted tolling and road pricing implemented by states and localities will undermine the efficiency and consistency of the national highway network. Considering the many complications in price setting just described, states and cities could

decide to pursue radically different pricing approaches that create negative external effects, such as restricting interstate movement of goods or shifting traffic to an already congested facility in another jurisdiction through overly aggressive price setting.

The federal government is uniquely positioned to understand and place appropriate importance on the impact of transportation management and investment decisions on interstate commerce, goods movement, and nationwide mobility. A robust, well-maintained, well-operated National Highway System remains a crucial economic necessity and should be the central focus of federal transportation investment and pricing decisions as well as of any federal oversight of state and local actions affecting tolling of facilities on the national network.

If state and local governments begin to use targeted tolling to a much greater extent than they currently do—for example, by applying for a slot in the Interstate tolling pilot program—federal oversight should work to ensure that the pricing decisions do not conflict with interstate commerce laws or objectives. Also, given that not all states and localities will be able to use tolling to a significant degree (particularly in rural areas) and that comprehensive road or system pricing is years away, there is the risk that a wide-scale shift to tolling could create the perception that there is no longer a need to increase general federal investment in highways and transit. Such a sentiment could negatively affect needed highway and transit investment.

Route Diversion

Expanded use of targeted tolling would most likely occur first on freeways and major highways and may encourage traffic diversion onto unpriced arterials, causing congestion and associated problems on those networks. But the extent of diversion appears to depend on the price levels and availability of alternative routes. For example, research into how drivers in Spain reacted to toll increases on their national system of toll roads found that the more alternative routes there were, the greater was the diversion to avoid tolls.[59] Similarly, a study on the effects of toll rate increases on Ohio's turnpikes found that, as expected, the higher the toll rate, the greater the diversion. The problem was especially severe with truck traffic, where one-third to two-thirds of trucks chose to take congested alternate routes rather than pay a toll to use uncongested turnpikes.[60] Not only is this a problem of increased congestion on alternate routes, but diversion of heavy vehicles may create an additional problem since the tolled roads are typically built to higher standards than alternative routes. A heavy vehicle does less damage per mile on such roads than it does on roads built to lower standards. Hence, the diverted truck traffic may actually increase the amount of road damage. Diversion also could create operational problems due to the lack of width, clearance, or geometric characteristics (such as turning radii) on lower-order roads to accommodate heavy vehicles.

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Absent comprehensive pricing on all roads, the key to dealing with this is the toll level. If the toll is set at a relatively low rate and the toll road service is high quality, diversion is less likely. Paying for new capacity with tolls or converting HOV lanes to HOT lanes, however, does not create the same diversion problems, because free lanes are still available. Increased throughput on the priced lanes reduces the number of vehicles using the unpriced lanes, and the total volume of through traffic increases.

A comprehensive road pricing VMT system (where all roads in a given area are priced the same way) would not lead to any diversion and could actually lead to more efficient use where heavy vehicles, for example, travel more on roads designed to handle their weight, because the price per mile would be less than on roads not designed to carry heavy vehicles. But if, for instance, the federal roads were priced and the state roads were not, then diversion from the federal to the state system is likely to occur. This is why the ideal system is one where drivers pay a per-mile fee to travel on all roads.

Adverse Freight Industry Impacts

The trucking industry and others have expressed concern that targeted tolling and pricing and comprehensive pricing can have negative impacts on goods movement in the form of added net costs because of limited pricing flexibility, differences in tolling equity between national and local tolling and pricing initiatives, and disruptions to the competitive balance among different types of carriers. Targeted tolling and pricing, depending on how they are implemented, could lead to net increases in the direct costs for the goods movement industry, but so too would raising the truck fees currently going into the Highway Trust Fund. But if tolling and pricing reduce congestion and provide other benefits to the industry, it is possible they could lead to net decreases in overall costs. There are three key issues to consider with respect to these potential increased costs.

First, if targeted tolling and pricing raises costs for all users of the system—cars as well as trucks—in an equitable, across-the-board manner, and if the revenue raised is invested to improve transportation infrastructure, then the costs by definition would not unfairly be borne by the trucking industry. If the tolls are charged in a discriminatory fashion or the revenue is not invested in transportation, however, then the trucking industry could be unfairly disadvantaged, especially in relation to other freight modes.

Second, targeted tolling may raise prices on the overall trucking industry or specific segments of the industry in particular. If prices are set based on costs imposed on the system, then the trucking industry may be charged more than it is now. Even if the overall revenues from trucking are the same, some segments of the industry or kinds of trucks could pay more (while others pay less). To ensure that charges are appropriate and encourage efficient use, prices must be established through a sound analytical process that considers the findings from cost allocation studies as well as broader policy considerations. Unfortunately, this price setting objective can be difficult to achieve in practice (see the section on “Challenges to Setting Efficient Tolls and Road Prices”).

Even if these two concerns are mitigated, some representatives of the freight industry argue that the industry may not have the same flexibility as individual drivers to adjust to pricing. Specifically, they argue that their current business models do not readily allow drivers or carriers to benefit directly from higher speeds or improved trip reliability created by congestion pricing, nor can they always pass on added costs associated with tolling and pricing. Moreover, they argue that because shippers, not truckers, schedule product deliveries, truckers often do not have the ability to adjust system use in response to pricing signals. The pricing and scheduling inflexibility of truckers, however, is far from absolute. A study in New York found that, while they were influenced by the willingness of receivers to accept off-peak deliveries, some in the trucking industry do have some ability to change travel times in response to tolls.[61]

While the industry may not be able to pass along all the costs of targeted tolls to customers in the short run, especially under weak economic conditions, truckers should be able to do so in

the moderate and long term if the tolls are stable or changed with sufficient advance notice. Indeed, a Transport Research Board report argued that these costs could be passed on to customers,[62] and a study of the German heavy-vehicle toll system suggested that, overall, the trucking industry was able to do so.[63] In other words, stable, nondiscriminatory pricing, possibly supported by national information systems that let truckers and shippers know the likely costs of tolls for any particular route, should not adversely affect the trucking industry as a whole.

Third, a more significant issue concerns how targeted tolling and pricing is implemented. Certainly some states could implement tolls that are unreasonably high and targeted to out-of-state travelers, including long-haul truckers. As noted earlier, valid concern necessitates careful federal oversight accompanying wide-scale expansion of targeted tolling on the national network.

Many of the trucking industry concerns about targeting tolling and pricing and comprehensive pricing lie in how pricing is used and revenues are spent. Overall, if revenues from tolling and pricing lead to increased investment and improved system performance, it could increase truck productivity and efficiency in several ways. This, in turn, should lead to less congestion, improved traffic flow, and increased reliability—a key factor for successful use in just-in-time delivery.

If revenues from tolling and pricing lead to increased investment and improved system performance, it could increase truck productivity and efficiency in several ways.

The U.K. Eddington Commission found that the trucking industry would be a modest net beneficiary of targeted congestion pricing (with charges set at the marginal social cost of an extra vehicle on that section of road), even accounting for their increased payments. If some of these funds were also used to expand highway capacity, particularly on routes used more extensively by the trucking industry, the productivity benefits would be even larger. For example, truck-only toll lanes on a regional or larger scale that allow truckers to use heavier vehicles but make fewer trips provide a clear benefit. The opportunity to gain from these benefits, however, is not necessarily uniform across the trucking industry. Specifically, some truckers employ drivers at an hourly wage and therefore may see a cost reduction from travel time reductions, but others pay drivers by the mile or by the trip and would only realize a cost benefit if the time savings were large enough to allow another load to be carried.

Likewise, per-mile pricing would create incentives to combine shipments in ways that minimize trip mileage. For example, the German heavy-vehicle comprehensive road pricing system has led to a 10 percent drop in empty trucks on long-distance trips, a 7 percent increase in containers moved by train, and a 6 percent increase in the purchase of truck tractors that emit less pollution.[64] While the Commission does not make a direct comparison of the impacts on the German and U.K. freight industries to the impact on the United States of a comprehensive system (due to the differences in the freight and logistics systems of each country), this is an area that deserves attention and study as part of a transition to a comprehensive system.

Social Equity Concerns

Social equity concerns about tolling and pricing (whether targeted or comprehensive) have played a large role in debates about the fairness and viability of these direct pricing options.[65] The current tax system used to fund roads is already regressive. Fuel taxes paid directly or embedded in the cost of goods take a proportionately bigger share out of lower-income household budgets than they do out of the budgets of higher-income households, while

a shift to more efficient vehicles that pay less in fuel taxes is likely to be greater among the latter group.[66] There is also a substantial distinction between the overall distribution of the tax burden and the change in burden that may occur with a change in the funding mechanism. Much of the concern about social equity relates to low-income workers, who may face a substantial cost increase if they have to continue to drive as much during peak periods. However, the broader concern is the overall distribution of the tax burden in the long run. For the latter, the key question is whether a shift to comprehensive pricing at the federal level makes transportation funding more or less regressive and unfair than the current system.

The impacts of comprehensive pricing on social equity would be minimal or non-existent if current charges are simply replaced by a comprehensive VMT system that raises comparable revenues and covers additional system administration costs. However, the increased transparency of costs associated with road pricing could lead those who are more price-sensitive (particularly lower-income individuals) to perceive a higher cost and to travel less. A comprehensive VMT system could actually be more progressive than the gas tax to the extent that lower-income people drive less but still have the same fixed costs for driving (e.g., vehicle registration fees) or drive less fuel-efficient vehicles. And if road pricing also replaces non-user fee revenues, such as General Fund revenues that now go to highways, then on the whole individuals who travel less would experience a net financial benefit and those who travel more (on average, higher-income individuals) would experience a net financial cost.

If comprehensive VMT-based road pricing were implemented to increase total transportation revenues, people would pay more and the effects likely would be regressive, just as an increase in the motor fuel taxes would be. The increase in either revenue source would have a bigger impact on those with lower incomes—a regressive result.

The impact of targeted or comprehensive pricing on social equity becomes even more complex if pricing includes charges for emissions. Currently, because lower-income households tend to drive older, less fuel-efficient vehicles, gas taxes affect them more than they affect higher-income households driving newer, more fuel-efficient vehicles (assuming both drive the same number of miles). If a VMT charge were imposed with no offsetting charges for carbon or other emissions, these lower-income households would benefit, since they would be paying the same to drive as higher-income individuals with more fuel-efficient cars. If, however, additional charges were put in place to cover the costs of emissions, then these charges would affect lower-income households more than higher-income citizens, not controlling for differences in miles driven.[67] Research in this area, however, indicates that the impacts on the lowest-income households is reduced somewhat, since they tend to drive less and rely more on transit or other modes. As a result, lower-middle and middle-income range households as a group may feel the greatest proportional impact.[68] Those who are more price-sensitive, however, lose mobility more than others—with uncertain implications for the social cost and equity of that loss.

Results from the Oregon VMT pricing pilot project demonstrated that the social equity implications of comprehensive pricing are likely mixed.[69] First, to maintain parity with net revenues from current sources, the development and additional administration costs of a VMT system would need to be recovered through VMT charges. These additional costs would likely be amortized across all users, thus, on average, drivers could pay more to cover increased costs associated with the new revenue mechanism. It is possible, however, and indeed likely, that there will be offsetting efficiencies from a VMT system, such as reduced need for investment (at least in urban areas) and reduced pavement damage, which in turn

could result in lower overall costs for drivers for the same level of system performance.

Additionally, changing from a gas tax to a VMT charge would mean higher costs for some users and lower costs for others, mostly due to differing fuel efficiency of their vehicles. Those with more efficient vehicles may well pay more in VMT charges than fuel taxes, while those with less efficient vehicles may well pay less. According to some recent research, once people adjust to the VMT charge—some may change how often and how much they travel if the price of each trip is more transparent—the social equity of VMT charges and fuel taxes should be similar, and fine-tuning the way VMT charges are structured can help this result along.[70] But again, the forgone or delayed trips represent additional social costs that will have a greater impact on those least able to pay.

It is not clear if targeted pricing and congestion would have worse distributional impacts than current funding approaches. A Brookings study found that congestion pricing imposed on congested Interstates and freeways would lead high-income households (over $100,000 per year) to pay about three times more per year than households making $10,000–15,000 per year. But as a share of income, the lower-income households would pay 2.7 times more than highest-income ones. In general the study found that the higher the household income, the lower the share of income spent on congestion charges.[71] But it is important to note that the gas tax is regressive in much the same way.[72]

Moreover, even if direct taxes (tolling, pricing, and gas taxes) are regressive, individuals at all levels are not necessarily worse off. Researchers at Resources for the Future studied pricing in the Washington, DC, area and found that converting current HOV lanes to HOT lanes alone achieved 77 percent of the total social welfare gain (the overall net benefits to society) possible from tolling all lanes on all freeways. Additionally, all income groups benefited from the HOT lanes, in part because some users who value time more were more willing to pay to travel on the HOT lanes, freeing up space on the existing unpriced lanes. Moreover, the benefits were distributed more equitably by using HOT lanes than by tolling all lanes.[73]

There are clearly complex social equity issues associated with comprehensive pricing, some known and some perhaps still to emerge. But where such issues emerge, ideas for making road pricing more equitable have been developed and might be used by the federal or state governments when implementing a VMT pricing system. One study noted that the data from State Road 91 managed lanes in Orange County show that people value the time savings and reliability provided by the toll lanes in widely different ways and that individuals change their values depending on day of week, time of day, and circumstances of a trip.[74] In fact, only about 20 percent of those using the lanes at any particular time are everyday users. The other 80 percent use the lanes once or twice a week, when they value time or reliability more than the cost of the toll. The authors modeled the effects of charging different prices on each lane and found that if those prices are set right, the outcome is more equitable than pricing all lanes the same.

There are clearly complex social equity issues associated with comprehensive pricing, some known and some still to emerge. But where such issues emerge, ideas for making road pricing more equitable have been developed and might be used by the federal or state governments when implementing a VMT pricing system.

Taking a different tack, another Brookings report explores using lump sum payments to road users with lower incomes to compensate for the regressive effects of congestion

charges.[75] The users would still have to pay the charges, thus maintaining the incentive to change travel behavior and reduce congestion, but their total income would not be affected. Such a solution would, of course, be complex to design and administer and could only be implemented at the state and local government levels.

Rural Equity Concerns

The national system benefits from roads in and across rural states and areas. Without such roads, it would be difficult—if not impossible—to move people and goods between major urban areas, as is required for both a prosperous national economy and continued personal mobility.

Many people have expressed concern that broader use of tolling and pricing is inconsistent with the national interest in a strong surface transportation network in and across rural states and areas and that wide-scale use of pricing and tolling approaches could have negative equity impacts on rural citizens. The fact that residents of rural areas tend to have lower income levels than metropolitan residents and thus already pay a larger share of their income for transportation highlights the need to ensure that any new surface transportation funding strategies, including tolling and pricing, do not create additional equity issues.

The effects of a shift to VMT pricing on rural residents are complex and not yet fully understood; more study and analysis of potential rural equity issues under different pricing approaches is needed, especially given the relatively limited alternatives to driving long distances that are available to people in rural parts of the country.

In many if not most cases, traffic densities in rural areas do not support new road projects funded fully by tolls (this is often true in urban areas as well), despite the fact that rural roads are often less costly to construct per lane mile than roads in urban areas. And with implementation of comprehensive road pricing, if prices are based on the cost of system components used, rural drivers could have to pay more per mile than urban drivers because the costs would be spread over fewer users. For example, Montana has only 66 people per centerline mile of federal-aid highway compared with a national average of 311 people.[76] Without mitigation for population density disparities (and assuming relatively limited use by out-of-state travelers), rural citizens could have to pay road charges that are higher than those charged urbanites for traveling the same distance.

The impacts of a comprehensive pricing system on rural equity issues will depend on how it is implemented. If, for instance, a federal pricing system is established as a fixed rate per mile regardless of location or specific system cost (comparable to current motor fuel taxes), rural residents should generally not pay more than they do via the gas tax (recognizing that they already bear a relatively high burden based on the high number of miles they travel). If, alternatively, rates (either at the federal or state/local level) are adjusted based on specific system costs allocated by direct roadway use, then rural citizens could be adversely affected, as the per-mile cost for rural system components would likely be higher in many instances.

With respect to a flat (or universal) VMT charge, some context is required to understand the potential impacts. The Oregon road pricing pilot project found that rural residents drive about 10 percent more than urban drivers, and testimony before the Commission suggested that this differential may be larger in other rural states.[77] In addition, data from the 2001 National Household Travel Survey indicate that citizens in rural areas drive 34 percent more miles per year than people in urban areas, and the difference is even greater in rural western states.[78] Thus, when compared with citizens in urban areas, those in rural areas consume more fuel to drive the additional miles and currently pay more in annual motor fuel taxes. Shifting to a flat

VMT fee structure would not necessarily change this pattern, since rural citizens are indirectly paying by the mile now through the gas tax.

A key variable in making the comparison is vehicle fuel efficiency: rural citizens who drive relatively high-efficiency vehicles (i.e., consuming less fuel) could end up paying more than they do now based on the gas tax (assuming no adjustments for fuel efficiency). At least one study, however, has found that the vehicles of rural residents, on average, are less fuel-efficient than those of urban residents,[79] suggesting potential inequities caused by high-efficiency vehicle use may be limited in rural areas. In fact, drivers whose vehicles get below average miles per gallon will see a reduced cost of vehicle use following implementation of a national flat VMT fee. It is not clear, however, how vehicle choice in both rural and urban areas could change in the future.

Overall, the effects of a shift to VMT pricing on rural residents are complex and not yet fully understood; clearly, more study and analysis of potential rural equity issues under different pricing approaches is needed, especially given the relatively limited alternatives to driving long distances that are available to people in rural parts of the country. To be fair and equitable and to support national mobility goals, any comprehensive VMT fee structure will need to incorporate appropriate pricing approaches for all parts of the country (including low-density areas) so that travel is affordable to all citizens while still ensuring adequate funding is provided to support needed investment across the country.

Double Taxation Arguments

Tolling existing roads or lanes, or even new ones, is frequently argued to be double taxation, implying that drivers are unfairly taxed twice (through both tolls and fuel taxes). This argument, however, ignores the fact that motor fuel taxes do not pay for the full cost of providing the road network. Paying two different taxes to support an activity, unless the combined taxes exceed costs, is not implicitly unfair. Currently, people pay a vehicle registration fee as well as the gas tax to drive on roads. Indeed, an array of transportation funding sources, including tolls, are used by governments to pay for transportation systems. Tolls are one tool used to raise transportation revenues—in some cases, as the only way to fund modern roads, given insufficient standard transportation revenues.

Tolling and Pricing Deployment and Administration Costs

The costs of collecting motor fuel taxes are extremely low—about 1.0 percent of gross revenues.[80] This is largely due to the efficiency of the fuel tax payment process, which collects taxes at the gross distribution level and only involves about 1,400 payees.[81] By contrast, targeted tolling and pricing is currently expensive to administer (measuring administration costs as a percent of revenues), and the transition to national comprehensive pricing—depending on how it were implemented—would have both large initial costs for systems and infrastructure and higher administration costs due to the billions of transactions that would be required to bill and collect fees. But the additional costs of tolling and pricing must be weighed against the poor long-term sustainability of the motor fuel tax as our nation's primary source of surface transportation funding, the potential for greater efficiency and other ancillary benefits associated with pricing and tolling, and the fact that, particularly with comprehensive pricing, there are few if any other viable options for meeting long-term highway and transit spending needs.

Targeted Tolling and Pricing

To assess the administrative costs associated with targeted tolling and pricing, the Commission conducted an informal study of 12 "legacy" toll system operators in the United States with a mix of manual and electronic systems and a second group of U.S. toll road operators with more recent electronic toll-collection systems. Although the cost basis for all of the surveyed entities was not available for review, and may not have been comparable, the survey found costs for the legacy systems ranging from 14¢ to 38¢ per toll transaction, with collection costs averaging about 16 percent of toll revenue. The more modern electronic tolling systems reported lower costs of 6¢ to 15¢ per toll transaction, but they likely have higher capital costs.[82] In addition, the cost per capita of administering targeted tolling could be higher for rural areas due to low population densities, but the fact that toll collection areas would likely be located farther apart would offset this fact, at least to some degree.

Comprehensive Pricing

Unfortunately, little research or analysis has been completed on the full cost to develop, implement, and administer a comprehensive system. Based on what is known at this point, a comprehensive pricing system is likely to have three major cost components.

First, there will be the capital investment costs to enable the implementing agency (e.g., U.S. Treasury) to administer VMT charges. These will include costs for items such as hardware, system development, and start-up. These costs will likely be large—preliminary research conducted for U.S. DOT estimated initial agency capital costs in the range of $10 billion—but they would also likely be amortized over 20 or more years and could be lower due to declining information technology costs.[83]

Second, there is the cost associated with installing technology (e.g., GPS receivers/VMT charge calculators) in the vehicle fleet, which is currently difficult to assess. If done as standalone units that are retrofitted into existing vehicles, the cost would be relatively high. But if the necessary hardware were part of a broader vehicle technology platform that is installed in vehicles as original equipment on a large scale, the incremental cost to enable VMT pricing, on an individual vehicle basis, could be small. In addition, such technology would provide other ancillary benefits to travelers, like GPS–assisted navigation.

The third cost component of comprehensive pricing will be the recurring cost to administer it. Preliminary U.S. DOT research estimates that administrative costs for a national system of road pricing using GPS technology would be 1.7 percent of estimated revenues (equivalent to the cost of processing credit card transactions). Although this is more than the cost of administering the current motor fuel taxes, estimated at 1.01 percent of revenues,[84] it would still represent a comparatively inexpensive fee to administer.

The Oregon experiment provides another data point to inform this discussion. Under the pilot program, vehicles were retrofitted with on-board equipment that could identify where and when the vehicle was traveling, record the mileage by category, and communicate this information to the systems of participating gas stations when the vehicle was at the pump. These systems then made the appropriate adjustments to the driver's bill to account for VMT taxes. The annual cost to administer a similar system, deployed on a comprehensive statewide basis, is estimated to be $2 million, or about twice what it now costs Oregon to collect motor fuel taxes.[85] The Dutch government, which is implementing a nationwide comprehensive,

satellite-based VMT pricing system, aims to limit total transaction costs to less than 5 percent of revenue, although the current cost projections are higher.[86] However, it is important to point out that because a considerable share of the costs of any VMT system are fixed overhead costs (e.g., designing the system, writing the software, and maintaining the system), it will be cheaper per user in larger nations, as the fixed costs can be spread over a larger number of payers.

In general, pricing systems will likely be costly to develop and deploy, but they should be fairly inexpensive to administer. This is particularly true if the system is a comprehensive VMT-based system that enables charges for all users of particular roads.

Privacy Concerns

There is a very real concern among policy makers and the general public that a road pricing system that charges based on when and where individuals travel inherently threatens privacy. Indeed, if these systems are not designed and implemented properly, the threat to privacy could be very real. This leads to two significant challenges that must be overcome if comprehensive pricing is to be seriously considered in the United States: first, any system must ensure adequate safeguards to personal privacy; second, the public agency or agencies charged with implementing comprehensive pricing must gain the confidence of policy makers and the public that these safeguards exist and will be effective.

A great deal of thought has already gone into how a system could be structured to safeguard personal privacy. The Oregon pilot project, for example, placed strong emphasis on an architecture that would protect privacy, and the currently ongoing University of Iowa pilot project includes testing of system and privacy protection safeguards.

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Key system considerations that relate to privacy include: how information about where and when a vehicle traveled would be identified and recorded, who would physically own and control this information, and how and in what form the information would be communicated to the administering agency for billing and collection purposes. More research is needed on this, but most road pricing designs either currently in place or being discussed suggest that these considerations can be adequately addressed.

Specifically, these designs center on the use of an on-board unit (one in each vehicle) that would contain a GPS receiver that receives satellite signals enabling it to calculate vehicle location in real time and a computer that calculates the associated VMT charge. The key point is that the satellite signal is only a one-way signal “telling” the car receiver where it is, and therefore outside the vehicle there is no tracking of where individuals travel. In essence, this receiving function of a VMT system would function like the GPS devices that millions of Americans have already installed in their cars without worry of privacy loss.

The more critical question related to privacy is what happens to the travel information that is stored on the on-board unit. The Commission believes that such a system can and should be designed so that the information transmitted to the administering agency would only relate to the bulk charges due and would not include specific information about trip origins and destinations, routes, or time of travel. In other words, the administrating agency would only receive information that a particular vehicle owes a particular amount each month. It should

be noted that such a system would provide considerably more privacy than other information technology systems in our society, such as credit card and cell phone systems, where the relevant company knows not just how much a person owes but where the individual made purchases and what phone numbers were called (and, in fact, approximately where the person is when making a call). Moreover, information should be transferred from the vehicle to the administrative agency (or gas pump) in secure ways—for example, by encrypting the data transfer.

There is, however, a trade-off between the ability of users to monitor their usage for billing purposes and privacy concerns. Systems could be designed that do not store the on-board unit information about individual trips but instead record the amount of the cost. But this would not allow individuals to challenge their payments to administrative authorities. However, systems can be designed that would let travelers challenge charges in ways that then let the individual trip data be permanently deleted from the on-board unit.

Other studies have experimented with systems in which these data are uploaded along with the bulk payment information if travelers choose to have this done. The system employed in the Puget Sound region system maintains and can provide users with detailed information on priced travel. Hence, the user can easily check to ensure that they were appropriately billed for travel and contest any inappropriate charges. However, the detailed data required to provide this documentation mean that a record exists of all vehicle travel, which clearly has privacy concerns (e.g., this information, if it existed, could potentially be subpoenaed). Such systems can and should be designed so that the detailed trip data are fully and permanently deleted from the system after the charges have been made, as happens in the London congestion pricing system. And travelers should have the right to have only overall charge information transmitted if they so choose.

It is generally agreed that equipping all roads everywhere with the types of equipment used in current electronic toll collection application would be far too costly. Instead, most concepts for comprehensive pricing assume the use of an on-board unit consisting of a GPS receiver, software, and a wireless communications capability.

In contrast, the Oregon system only kept information on total mileage by category, and the categories were very general. Thus, the privacy issue was mitigated but a user had only limited ability to verify the accuracy of the charges.

The system developed for the Iowa pilot project has the capability to both protect privacy and provide detailed information when desired, but it is also more expensive. This system records all travel on encrypted files in the vehicle. Only the data about the amount of charges owed to each jurisdiction, however, are typically transmitted to the billing system. If users believe that there are errors in their bills, they have the option to open the encrypted file and provide the detailed data for review to the organization(s) receiving the payment. In addition, these systems could be easily designed to automatically delete travel data from the on-board unit after a certain date (e.g., 60 days after travel) to ensure an even greater level of privacy protection.

While the approaches just discussed indicate that privacy concerns could be adequately addressed and provide a strong foundation for developing new system configurations with improved privacy safeguards, much work still needs to be done before a national comprehensive pricing approach could be implemented. And even with better technical and institutional solutions to address privacy concerns, the question of how to gain policy-maker and public confidence in the proposed systems is still largely unanswered. In short,

the Commission appreciates that the privacy concerns associated with comprehensive pricing administration are both real and justified, but it believes that such systems can and should be designed to fully protect travelers' privacy and that additional research and public outreach on this issue are needed. (See the corresponding recommendations to address these needs in Chapter 8.)

Scaling the Technology

The technology needed to support broader use of targeted tolling and pricing, and even to implement comprehensive pricing, is largely available today. In fact, the demands of modern toll roads have led to the development of new tolling technologies in recent years that facilitate dynamic pricing and open road tolling with no toll booths and declining collection costs. In addition, the cost and functionality of on-board GPS units have evolved to the point where they could facilitate the implementation of comprehensive pricing. The major limitation is that current commercial-grade systems cannot reliably determine which lane a vehicle is in, which places constraint on a concept with variable lane pricing (e.g., for HOT lanes) that does not also include some additional infrastructure. Next generation GPS satellite systems, however, could solve this problem. A second issue is that GPS reception can be lost or can produce "multi-path" effects in urban areas with high-rise buildings. Further research is needed to understand the extent of these problems and possible solutions.

Today's electronic toll collection systems largely rely on in-vehicle transponders, which are "interrogated" by antennas mounted on overhead gantries. Since their introduction, the cost of toll-related transponders has declined consistently, to the point where $6–10 "sticker tags" are now being increasingly adopted to replace older $20 battery-powered tags.[87] A few toll systems, beginning with Toronto's Highway 407, offer the option of video tolling, in which the license plate number is videotaped and automatically read. To provide universal access (meaning a user does not have to subscribe to a system), the video tolling system must have access to relevant motor vehicle databases to create a bill. Most video tolling systems, however, require prior registration (or timely after-the-fact notification by the user, to avoid a fine). These systems have a low in-vehicle cost but relatively high roadway costs, especially in systems that charge per mile, in which case every entry point and every exit point must be equipped with gantries for the transponder antennas and for video enforcement (and possibly tolling) equipment.

It is generally agreed that equipping all roads everywhere with the types of equipment used in current electronic toll collection application would be far too costly. Instead, most concepts for comprehensive pricing assume the use of an on-board unit consisting of a GPS receiver, software, and a wireless communications capability. Such a transition would be easier and cheaper if the functional elements of such OBUs were mandated by the federal government prior to a decision about replacing fuel taxes with VMT charging, perhaps under the auspices of the Vehicle Infrastructure Integration effort, which has been under way for a number of years among the FHWA, various state DOTs, major auto companies, and equipment vendors. For example, pricing technology could be implemented in conjunction with a program such as IntelliDrive℠ (formerly known as the vehicle infrastructure integration program). IntelliDrive, as envisioned, will support secure communication between the vehicle and roadside to support mobility, traffic management, and traveler safety.[88]

Given the experience many states and localities already have implementing pricing and tolling options, Congress will need to address interoperability concerns quickly, lest states or regions implement equipment and technologies that will be incompatible and not easily retrofitted to any future national VMT-based charge technologies.

One model for implementing the VMT charge concept was simulated in an Oregon DOT experiment in 2006 and documented in the agency's 2007 final report. This model enlisted gas stations as part of the process, requiring that gas pumps be equipped to interrogate the OBU each time a motorist bought gasoline. This model would facilitate a long phase-in period during which some vehicles would continue to pay fuel taxes while others would pay VMT charges. During this process, systems would need to be designed to have non-liquid fuel vehicles transfer their charge information to payment collection authorities.

VI. CONCLUSION

Direct user charges in the form of mileage-based user charges are the most viable and sustainable long-term "user pay" option for the federal government to raise adequate and appropriate revenues to provide the federal share of funding for the system. Both real-world examples and academic research demonstrate that VMT fee systems have the capacity not only to raise needed revenues but also to provide additional benefits, including more efficient use of transportation infrastructure, reduced environmental and social externalities, and ancillary benefits to users in the form of information for drivers. Critically, a VMT fee system is the only option the Commission evaluated that, in addition to raising revenues, could actually reduce the amount of necessary additional capacity by improving the efficiency of current capacity use.

A transition from federal motor fuel taxes to a federal VMT fee system will present numerous political, technical, and technological challenges that will require broad stakeholder input throughout. These challenges, however, should not deter policy makers from committing to a paradigm shift and an aggressive course of action to implement a VMT-based charge system. Recommendations for specific congressional actions to facilitate this transition are included in Chapter 8.

States and localities also could choose to implement their own VMT-based charges, saving on administrative costs by piggybacking on the national system. And to meet more immediate funding demands, to the extent they wish to do so, states and localities are able to use direct tolling and pricing options, including conventional tolling as well as congestion and cordon pricing approaches to address urban congestion challenges. The primary federal role in furthering state and local governments' ability to use these techniques consists of limiting restrictions on their use and facilitating and encouraging states and localities to experiment where appropriate. Also, given the experience many states and localities already have implementing pricing and tolling options, Congress will need to address interoperability concerns quickly, lest states or regions implement equipment and technologies that will be incompatible and not easily retrofitted to any future national VMT-based charge technologies.

While the initial investment of capital—financial, intellectual, and political—needed in the transition to a VMT-based system may be significant, the Commission unanimously agrees that this is the best path forward. A VMT-based charge system is the best option for raising the revenues the nation needs and supporting the national policy goals to which we aspire.

Endnotes

1. With a few exceptions, Interstate highways cannot be tolled. The major exceptions are facilities that were built as toll roads prior to the creation of the Interstate and incorporated into the system. As such, tolling on these facilities was "grandfathered" in. In addition, Congress has granted the U.S. Department of Transportation (DOT) a limited number of restriction waivers as part of the Interstate Toll Pilot Program.

2. Example from Todd Litman, "Pay-As-You-Drive Vehicle Insurance: Converting Vehicle Insurance Premiums into Use-Based Charges," *Online TDM Encyclopedia*, Victoria Transport Policy Institute, updated 24 November 2008, at www.vtpi.org/tdm/tdm79.htm.

3. Jason E. Bordoff and Pascal J. Noel, *Pay-As-You-Drive Auto Insurance: A Simple Way to Reduce Driving-Related Harms and Increase Equity*, Hamilton Project Discussion Paper (Washington, DC: Brookings Institution, July 2008).

4. Federal Highway Administration (FHWA), "Toll Roads in the United States: History and Current Policy," at www.fhwa.dot.gov/ohim/tollpage/history.pdf.

5 Benjamin Perez and Stephen Lockwood, *Current Toll Road Activity in the U.S.: A Survey and Analysis*, (Washington, DC: Office of Transportation Studies, FHWA, August 2006), p. 2.

6. FHWA, Toll Road Information, at www.fhwa.dot.gov/ohim/tollpage.htm.

7. FHWA, *Highway Statistics 2006* (Washington, DC: U.S. DOT, 2008), Tables LGF-3B, SF-3B, and HF-10.

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9. On the SH 121 project, see North Texas Tollway Authority, at www.ntta.org; on Loop 49, see Texas DOT, at www.dot.state.tx.us/tyl/projects/SL49.

10. Based on a synthesis of information from the following sources: "Toll Roads Around the World," at en.wikipedia.org/wiki/Toll_roads_around_the_World; World Bank, "Tolled and Other Roads in Selected Countries," at www.worldbank.org/transport/roads/tr_docs/annex1.pdf; European Association of Tolled Motorway, Bridge and Tunnels, at www.asecap.com/english/pubinf-statcomp-en.html.

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12. U.S. DOT, "New York City Urban Partnership Agreement," at www.upa.dot.gov/agreements/newyorkcity.htm.

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14. Alison Conway and C. Michael Walton, "Policy Options for Truck User Charging," presented at the annual meeting of the Transportation Research Board, January 2009.

15. James M. Whitty, *Oregon's Mileage Fee Concept and Road User Fee Pilot Program: Final Report* (Salem, OR: Oregon Department of Transportation, November 2007).

16. University of Iowa, "National Evaluation of a Mileage-based Road User Charge," at www.roaduserstudy.org.

17. Puget Sound Regional Council, *Summary of the Puget Sound Regional Council's Examination of Transportation Pricing Strategies* (Seattle, WA: January 2002).

18. German Federal Ministry of Transport, Building and Urban Affairs, "Heavy Goods Vehicle Tolls in Germany," at www.bmvbs.de/en/Transport/Roads-,2075/HGV-toll.htm.

19. Ideally any vehicle miles traveled system for heavy vehicles would charge by axle weight, since this is the factor most correlated with pavement damage. Real-time axle weight sensors have been developed, but they would have to be fully tested before widespread deployment would be possible.

20. Claus Dolla and Axel Schaffe, "Economic Impact of the Introduction of the German HGV Toll System," *Transport Policy*, vol. 14, issue 1, January 2007.

21. Dr. Joris Al, General Director of The Netherlands' Centre for Transport and Navigation in the Ministry of Transport, presentation at ITIF Breakfast Forum, November 5, 2008.

22. FHWA, op. cit. note 7, Tables SF-3B and LGF-3B.

23. Cambridge Systematics, Mercator Advisors, Alan Pisarski, and Martin Wachs, *Future Financing Options to Meet Future Highway and Transit Needs*, NCHRP Web Only Document 102, 2006, at onlinepubs.trb.org/onlinepubs/nchrp/nchrp_w102.pdf.

24. Based on data from FHWA, op. cit. note 7, Tables HF-10, SF-3B, and LGF-3B.

25. Perez and Lockwood, op. cit. note 5, p. 2.

26. Calculated from data in FHWA, op. cit. note 7, Tables SF 3B, SF-2, LGB -3, and LGF-3B.

27. Ibid.

28. David Lewis, *America's Traffic Congestion Problem: Toward a Framework for National Reform*, Brookings Papers (Washington, DC: Brookings Institution, July 2008).

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32. These are only capital and operating costs associated with enabling administration of cordon charges and do not include other "program" costs such as significantly increased capital and operating spending for transit or other activities that were envisioned as an integral part of the overall cordon pricing initiative. U.S. DOT, op. cit. note 31.

33. Based on phone conversations with various state DOT officials.

34. Ian W. H. Parry, *Pricing Urban Congestion* (Washington, DC: Resources For the Future, November 2008), Table 2.

35. Whitty, op. cit. note 15, p. 43.

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38. *The Case for Action: Sir Rod Eddington's Advice to Government*, Executive Summary of Eddington Commission, op. cit. note 37, p. 5.

39. Eddington Commission, op. cit. note 37, p. 56.

40. Committee for Study on Urban Transportation Congestion Pricing, op. cit. note 13, Chapter 4.

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42. FHWA, *Value Pricing Pilot Program: Lessons Learned Final Report* (Washington, DC: August 2008).

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50. Poole and Balaker, op. cit. note 49, pp. 27ff.

51. National Cooperative Highway Research Program, *Compilation of Public Opinion Data on Tolls and Road Pricing* (Washington, DC: Transportation Research Board, 2008), pp. 1–2.

52. Ibid.

53. Ibid.

54. Environmental Defense Action Fund, Transport Workers Union Local 100, and Straphangers Campaign, "Congestion Pricing Facts," *Legislative Gazette*, March 2008; Zubin Jelveh, "The Stockholm Solution," *Conde Nast's Portfolio.com*, August 5, 2007.

55. FHWA, op. cit. note 42, pp. v–vi.

56. The efficient price will give incentives to avoid using the road or network at peak times (to reduce the need for added capacity) and to otherwise recognize the costs that driving creates. Economic theory says that if the capacity can be readily increased or decreased, then the revenue from efficient pricing should just pay for the cost of the road with the most efficient capacity. However, capacity increases are based on a long-term perspective and are implemented in the long term. For new capacity with little congestion, the price needed to promote efficient use may not be very high. As demand increases, the price to manage the use of the road or network should also rise. This may result in revenue below the cost of capital and operating costs for new facilities and revenue above those costs over time. Hence, there may be some trade-off between the need for a revenue stream to finance a road and the pricing system that best manages use of the road or network.

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68. E. Deakin and G. Harvey, *Can Transportation Pricing Strategies Be Used for Reducing Emissions?* California Air Resources Board Research Notes No. 98-1 (Sacramento, CA: June 1998).

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70. Ibid.

71. Lewis, op. cit. note 28, Table 6.

72. James M. Poterba, "Is the Gasoline Tax Regressive?" in D. Bradford, ed., *Tax Policy and the Economy*, Vol. 5 (Cambridge, MA: The MIT Press, 1991), pp. 145–64; see also edt.missouri.edu/Winter2007/Dissertation/KimH-042607-D/research.pdf.

73. Elena Safirova et al., *Welfare and Distributional Effects of Road Pricing Schemes for Metropolitan Washington DC*, Discussion Paper 03–57 (Washington, DC: Resources for the Future, 2003), p. 3.

74. Kenneth A. Small, Clifford Winston, and Jia Yan, *Differentiated Road Pricing, Express Lanes and Carpools*, Brooking Papers (Washington, DC: Brookings Institution, March 2006).

75. Lewis, op. cit. note 28.

76. FHWA, op. cit. note 7, Table HM-14; U.S. Census Bureau.

77. McMullen and Zhang, op. cit. note 69.

78. U.S. DOT, FHWA, National Household Travel Survey, at nhts.ornl.gov/tools.shtml.

79. Mark Cooper, "Rural Households Benefit More from Increases in Fuel Economy," Consumer Federation of America, Washington, DC, June 2007.

80. Based on preliminary analysis provided by the U.S. Department of Transportation.

81. Joseph R. Brimacombe, Deputy Director, Compliance Policy, Small Business and Self Employed Operating Division, Internal Revenue Service, Testimony Before the Full Committee of the House Committee on Ways and Means, Washington, DC, July 17, 2003.

82. Based on a survey of tolling authorities and tollroad management and toll technology firms in the United States conducted by the Reason Foundation and provided to the Commission. Publication by the Reason Foundation is forthcoming.

83. Based on preliminary analysis provided by the U.S. DOT.

84. Ibid.

85. Based on supplemental information provided by the Oregon Department of Transportation.

86. Al, op. cit. note 21.

87. See "Sticker Tags 'Doing Fine' Says Biggest User–Houston," *TollRoadsNews*, June 2007, and "Georgia Contracts with TransCore for Read-only Sticker Tags," *TollRoadsNews*, February 2005.

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7

ACCELERATING THE TRIP

Financing Programs and Policies

Preface: Financial Market Turmoil and Surface Transportation Infrastructure Financing

During the period of the Commission's investigative efforts, there has been a series of significant shocks and dislocations to the credit markets in the United States and worldwide, to a degree unprecedented in recent decades. This disruption continues and has made it difficult to finance many types of infrastructure projects, even for established issuers with usually reliable revenue streams and credit ratings. The length and severity of the current downturn are unknown. Indeed, the financial system may continue to experience stress and undergo adjustment for some time to come. It is reasonable to expect, however, that the functioning of the financial system will eventually improve over time. And the long-term outlook is positive for infrastructure financing, which many investors continue to view as a sound investment category. This longer-term perspective is the backdrop for the Commission's finance-related findings and recommendations.

Over the last three federal transportation legislation authorization periods—since enactment of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)—federal policy makers have developed or facilitated various project financing tools to enhance authorized funding levels for surface transportation investment. These federally facilitated techniques, including direct and indirect credit support, tax subsidies, and a variety of other financial incentives, have become important tools in helping states and other project sponsors stretch limited resources and accelerate critical investments.

This chapter reviews the range of current federal policies and programs aimed at facilitating financing and non-federal investment, including by the private sector. It also offers the Commission's assessment of the potential role of new and emerging financing tools and approaches, providing the context for the finance-related recommendations offered in Chapter 8. (As background, see Box 7–1 for commentary on terms of art in this field.)

I. PLACING FINANCING SOLUTIONS IN THE PROPER CONTEXT

A lack of funding (or revenue) is the fundamental, overarching problem our nation faces in meeting its transportation infrastructure investment needs. Current financial market conditions notwithstanding, we generally do not lack the means to raise capital from a combination of public and private sources. Nor do we lack mechanisms to monetize identified revenue streams and assets with various financing tools (i.e., turn future revenue streams into current investment capital through debt and equity investment).

Tax-exempt bonds are the traditional mechanism for the debt financing of transportation infrastructure in the United States. Because of their comparatively low interest rates, tax-exempt bonds typically have created a very low cost of capital for borrowers, enabling state and local governments to finance infrastructure development under attractive terms. The U.S. municipal bond market demonstrates significant size and depth, with annual issuance of $350–400 billion.

Other forms of capital used to a lesser but growing extent in the transportation sector include commercial bank financing, taxable bond financing, and private equity. While private-sector participation in transportation infrastructure financing has flourished in Europe, Australia, and Canada, the United States has been slower to use direct private investment—largely due to the availability of low-cost tax-exempt debt. Today a significant amount of equity (over $180 billion according to a recent study)[1] has been earmarked for infrastructure investments worldwide. To date, most investors in U.S. private-sector financial participation structures have been European and Australian investors, often coupling investment with direct project development and/or operating roles. Recently, however, U.S. pension funds, insurance companies, and other investors have begun to show interest in infrastructure investments as vehicles to potentially help them achieve their goal of matching long duration liabilities with long-term stable cash flows.

In sum, transportation infrastructure does not suffer from an inability to attract investment capital. To the contrary, transportation infrastructure generally is seen as an attractive, low-risk category for investors seeking long-term stable returns. Not all financing mechanisms are appropriate for all circumstances, however. For example, those financial tools that rely on monetizing a project's own revenues through direct financial participation by the private sector, such as privately financed toll roads, will add no value to a rural highway with limited traffic flow and thus without such revenue streams. These techniques can make valuable contributions to successfully financing turnpikes or other revenue-generating projects, particularly in instances where conventional tax-exempt bonds may produce insufficient upfront capital to construct the new revenue-generating asset. Such opportunities are generally more limited in rural parts of the country, where traffic volumes may not support their application.

BOX 7–1: TERMS OF ART

In many ways, use of malleable terminology like "innovative finance" and "public-private partnerships" has served the transportation industry well by encouraging consideration of the role these approaches can play in the appropriate circumstances. Using such terms, however, also carries some risk, including potential over-promotion by policy makers and private-sector advocates searching for viable solutions. Such over-promotion can mask the underlying reality: the fundamental need for new and greater revenue streams to meet mounting transportation investment needs. The Commission therefore supports a move away from these imprecise terms (or at least a more conscientious use of them) and toward the core underlying concepts so as to avoid obscuring the fundamental investment challenge, over-selling financing approaches as a "silver bullet" solution, and potentially misinforming the public. Moreover, financing tools that once seemed exotic or innovative are now considered conventional, and our terminology should reflect that. Following are some important specific clarifications on terminology.

"Innovative Finance." Financing tools do not generate new funds in and of themselves, but they can in some instances help to reduce upfront capital costs, achieve life cycle cost efficiencies, maximize capital formation for construction, accelerate project benefits, and facilitate the transfer of risk away from the public sector. Sometimes referred to simply as "innovative finance," government-sponsored financing initiatives—such as the Transportation Infrastructure Financing and Innovation Act (TIFIA) credit assistance program, the capitalization of State Infrastructure Banks, and administrative adjustments that have facilitated grant-anticipation borrowing—should be considered in this light rather than as a magic means to solve the infrastructure investment deficit.

"Public-Private Partnerships." Perhaps overused and sometimes misapplied, the term "public-private partnerships" has come to refer to everything from "plain vanilla" outsourcing of construction or other contracting arrangements to turning over nearly 100 percent of the infrastructure financing and delivery to the private sector—and everything in between. By defining the types of partnerships more precisely and considering the public and private responsibilities more carefully, policy makers can better assess their options for implementing and managing projects and programs. Like tools in the toolbox, each private-sector arrangement comes with its own suitability criteria, beneficial in certain applications and not in others—very much like more traditional finance tools.

Thus, potential financing tools must be carefully applied, with the full range of public policy goals in mind, to ensure each tool is brought to bear in appropriate circumstances. Further, financing solutions alone do not and cannot offer an adequate answer to our infrastructure investment challenge. These mechanisms play an important role in the Commission's menu of policy recommendations and can help public-sector agencies assemble upfront capital to meet construction needs by leveraging future revenue streams. This upfront capital, however, must be repaid over time. Thus, financing approaches can be part of the solution only if there first are sufficient supporting revenue sources, as in the case of direct user charges or other dedicated revenue streams. (See Box 7–2 for an illustration of the financing capacity of alternative finance approaches.)

General Principles Guiding the Use of Debt

Recently much has been written and said expressing caution about state and local governments' overall level of indebtedness—and in some instances, specifically their transportation-related debt. Some analysts have suggested that states and localities have borrowed more debt than is prudent, inferring that debt in general is a bad thing. Conversely, policy makers struggling to encourage greater infrastructure investment in some instances have promoted "alternative financing approaches"—i.e., greater indebtedness—absent adequate consideration of the underlying revenue streams. Debt, however, as a general rule, is neither a good thing nor a bad thing. Rather, debt is a tool that can be a part of the answer when used appropriately.

Following are four general principles that should guide the appropriate use of debt financing for a particular investment or set of investments. The principles should be considered together, not individually, and balanced with other policy factors:

- **Maximize Upfront Funding for Long-lived Capital Assets and Match Asset's Useful Life with Debt Term—**As the "golden rule" of public finance, debt financing is appropriate for funding capital assets with long useful lives. Conversely, pay-as-you-go funding (i.e., paying out of currently generated revenues or funds on hand) generally is most applicable to fund operations or assets with short useful lives. For assets with longer useful lives, debt financing of comparable duration to the useful life of the asset ensures that the burden of the capital costs is spread over an asset's life and is matched to available revenue streams—such as user fees, targeted dedicated taxes, or other ongoing revenues generated from direct users or other beneficiaries. In the context of comprehensive and ongoing capital programs such as those administered by state departments of transportation, applying the "golden rule" gets a bit more complicated. The subsequent principles in part address this added complexity.

- **Mitigate Major Capital Investment Spikes—**Debt can be used to smooth the impact of a particularly large one-time spike or general "lumpiness" of a capital investment program and help limit the extent to which other important projects or program elements are crowded out by the major project or set of projects.

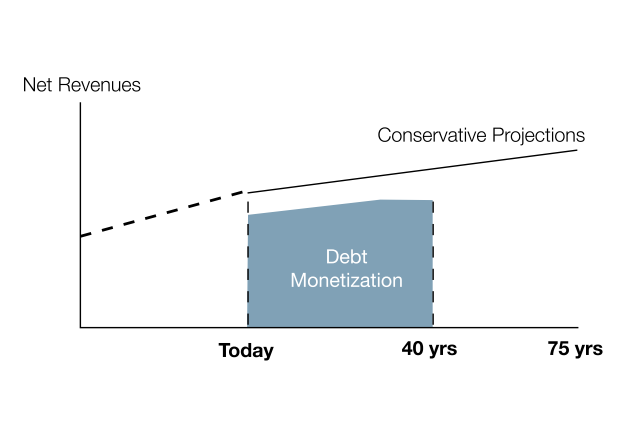
- **Accelerate Benefits and/or Reduce Costs—**Debt can accelerate investment in a major capital project. In many instances, financing costs are less than the construction cost inflation that would accompany deferred investment, thus reducing the overall project cost. Less quantifiable, but more important, are the economic and societal benefits that can be captured by using debt financing. Providing an asset earlier can provide environmental benefits (for instance, where the asset is a cleaner-fueled transit vehicle),

BOX 7–2. FINANCING CAPACITY OF ALTERNATIVE FINANCE APPROACHES

There are multiple structures available to fund transportation infrastructure investment. Beyond pay-as-you-go funding, these include various forms of debt finance and of private-sector financial participation. This Box provides simplified illustrations of the potential financing capacity with each approach.

Tax-exempt Debt Financing. Under tax-exempt debt financing approaches, future expected cash flows are leveraged, or borrowed against, in order to deliver upfront cash. States and localities routinely borrow a portion of the present value of a stream of cash flows (such as tax receipts or facility revenues). The amount of debt financing available is a function of several variables, including the length of a debt instrument, the amount of revenues supporting it, the expected growth rate of these revenues, and the stability or riskiness of the revenue steam by expressed as a discount rate and "coverage ratio," which is the multiple required over forecast revenues to satisfy debt investors. Traditional public finance debt markets tend to take a conservative view on expectations for the growth of these net revenues, often allowing only minimal growth to be factored into the debt finance structure.

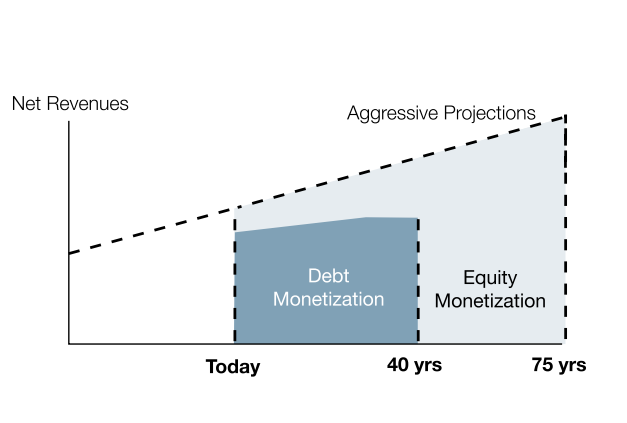
An illustrative debt-financed project might have a profile that looks like this:



Private-sector Financial Participation. Like tax-exempt debt financing, private-sector financial participation—in the form of debt or equity or a combination of the two—is another tool that can be used to leverage future revenues. Again, project sponsors (e.g., state and local governments) can leverage a future stream of cash flows in order to generate upfront proceeds. Depending on a number of assumptions, a strategy that includes equity investment can raise greater upfront proceeds than can debt financing alone. This is due to a number of key differences between private-sector financial participation and more traditional public finance strategies, including the following:

- First, equity investors are sometimes willing to look out over a longer time horizon than debt investors. Private-sector equity participants will invest in 50+ years (as much as 99 years) of expected revenues for a given asset. By contrast, debt investors will typically provide only 30 or 40 years of financing at a time.
- Second, equity investors are generally willing to "underwrite" higher growth rates than will debt investors. While the debt markets will assume minimal (and sometimes zero) growth of net revenues, equity participants are willing to contemplate much higher growth rates in their forecasts of return and take the associated risks.
- Third, equity providers in these structures have so far been willing to accept more aggressive assumptions, including lower required "coverage ratios," than their debt investor counterparts—again, balancing risk with return.

An illustrative project financed with both debt and private equity might have a profile that looks like this:



What this demonstrates is the potential ability to leverage the same project—with the same revenue streams—into a larger sum of upfront capital. It is important to bear in mind, however, that in the tax-exempt debt financing scenario, the non-monetized revenue streams are still generated and available for expenditure by the public sponsor over time; they are just not able to support the higher level of upfront financing that the private-sector financing scenario might afford in certain circumstances.

societal or safety benefits (for instance, improving an accident-prone highway or providing pedestrian or bike paths in a community), or economic benefits (such as roadway or transit investments that spur economic development in the surrounding area).

- **Match Costs to Benefits Over Time (Generational Equity)—**The above principles notwithstanding, committing future revenues and shifting the burden to future generations through debt financing requires careful balancing. On the one hand, future generations benefit from prior investments. On the other, future annual revenues will be committed to servicing debt. Consideration must be paid to the distribution of the financial burden between current and future payers relative to the distribution of benefit, often referred to as "generational equity" and one of the Commission's overarching guiding principles, as articulated in Chapter 1.

Taken together, these principles can help determine when and to what extent debt financing mechanisms can be appropriately used to help meet transportation infrastructure investment needs—avoiding having to forgo or delay the benefits—without overleveraging available revenue streams, overcommitting future users and taxpayers, or masking the true need for increased underlying funding.

Niche Opportunities to Fill Market Gaps

Government programs that facilitate or directly provide financing for infrastructure investment may be driven by one or more of the following objectives: to increase the overall availability of capital, to improve access to capital for the full range of viable capital investments seeking financing, to reduce the cost of capital, or to provide flexible financing for unique capital investment types. As noted earlier, in the United States there is no general lack of overall investment capital, so the first objective is largely met. There are, however, identified narrow gaps in the market primarily related to the other objectives: access to capital, cost of capital, and flexibility. Federal and state policy makers have addressed and could beneficially continue to address these objectives through government programs that exploit niche opportunities to provide several types of capital, including the following:

- **"Patient" Capital—**There is an identified shortage of private-sector capital willing to absorb the risk associated with revenue ramp-up for start-up toll roads or other project financings on a cost-effective basis. *(Direct federal credit programs were designed in part to address this market gap.)*

- **Affordable Capital for Small Projects or Equipment Purchases—**There is an identified gap in the capital markets for cost-effective sources of financing for relatively small projects, such as those undertaken by local governments, or capital purchases, such as those made by smaller transit agencies. (*Federal support for state-level revolving loan fund programs was initiated to help close this market gap*.)

- **Flexible Capital—**Some government programs are designed to facilitate access to a larger pool of investors as well as to specific categories of investors who have different and potentially more attractive requirements for particular types of projects, including a greater appetite for risk and more flexible payment terms. Gaining access to private equity and bank debt can, for example, in some instances increase the amount of capital that can be raised from a given revenue stream that would otherwise be subject to more limiting debt coverage ratios required for conventional tax-exempt debt. Where needed,

government programs also can be applied to fill this gap more directly. (*Changes in federal tax policy as it relates to private activity bonds and direct federal credit programs have been used together for this purpose.*)

- **Capital for Riskier Project Phases—**This generally includes the project definition, feasibility assessment, and environmental clearance phases, the outcome of which is typically outside the direct control of potential private investors such that they are generally unwilling to absorb this risk. (*To date, this gap remains largely unaddressed, leaving such investment to pay-as-you-go funding out of current tax receipts.*)

Real opportunities exist to address these and other identified market gaps or shortcomings. These should be pursued, however, only within a framework that fosters appropriate decisions and oversight aimed not only at effectively allocating scarce government resources but also protecting the long-term public interest in all respects. Further, as not all kinds of transportation infrastructure investments nor all areas of the country will be able to benefit from many of the financing tools described in this chapter; they will continue to require direct and conventional government funding support.

II. FEDERAL POLICIES AND PROGRAMS TO SUPPORT SURFACE TRANSPORTATION INFRASTRUCTURE FINANCING

As noted earlier, the term "innovative finance" has been used broadly to describe an array of policy initiatives and government finance programs introduced since the early 1990s and designed to enhance the flexibility of federal-aid pay-as-you-go funding, facilitate access to the capital markets, and encourage increased private-sector participation in project delivery. These programs are generally designed to leverage federal resources to attract non-federal sources and multiply the value of the initial federal investment. They should not be viewed as replacements to conventional capital market finance approaches but rather as viable enhancements in special circumstances.

To illustrate, the aggregate funding commitment for highway projects under relevant federal programs and initiatives during the 1995–2005 period was approximately $13 billion, which supported associated capital investment upwards of $30 billion.[2] As significant as these figures are, these programs directly supported less than 5 percent of the overall highway capital investment of $661 billion from federal, state, and local sources. In recent years the percentage has grown slightly, with most estimates in the 10 percent plus range,[3] suggesting that programs characterized as "innovative finance" have played an increasing yet still niche role in recent years.

This section reviews the range of current federal policies and programs, which includes both direct financing assistance provided by the federal government, such as direct federal credit, and federal policies and programs designed to facilitate private capital market financing, such as tax policy measures. There also is a range of grant management tools (e.g., advance construction, soft match, toll credits) that have been provided over the years to help states better manage their limited resources, but these are not addressed in this report in that they have more to do with how funds are spent than how they are raised.[4]

Direct Federal Credit

The Transportation Infrastructure Financing and Innovation Act and the Railroad Rehabilitation Infrastructure Financing (RRIF) programs administered by the U.S. Department of Transportation (DOT) provide direct loans and other forms of credit assistance to large-scale transportation projects with specifically dedicated revenue streams. (See Box 7–3.) This report does not directly address the RRIF program because its scope is beyond the Commission's primary focus on highway and transit investment. These tools are governed by the Federal Credit Reform Act of 1990. The federal government assumes the default risk associated with extending credit to borrowers, with the estimated cost of assuming this risk funded by the program or, in some cases, by individual borrowers or project sponsors. Loans typically are made based on the U.S. Treasury's borrowing cost. Credit instruments receive unique budgetary treatment among federal programs. Fiscal cost is measured with a present-value accrual framework rather than nominal dollar cash outlays (as with grant programs). The "subsidy premium" (or loan loss reserve) for the TIFIA program is funded by the Highway Trust Fund. Budgetary limitations in federal fiscal year 2009 and heightened program demand, however, spurred the TIFIA program to adapt and allow borrowers to pay their own credit subsidy (or a portion thereof) in order to secure TIFIA financing beyond the program resources then available.

State Infrastructure Banks and Other Revolving Loan Funds

State Infrastructure Banks (SIBs) specifically and revolving loan funds more generally are lending organizations initially funded, or capitalized, with federal grants and/or state funds and operated at the state rather than federal level. (See Box 7–4.) SIBs provide an opportunity to leverage federal and state resources by lending rather than granting federal-aid funds, which can then attract both non-federal public and private investment. SIB funds offer borrowers several advantages: the funds may be loaned on a low-interest basis; SIB loans can be secured by a subordinate lien on pledged revenues with flexible repayment terms; and they may be used to provide credit enhancement to projects through loan guarantees, reserve funds, and other means.

BOX 7–3: FEDERAL CREDIT (TIFIA)

The TIFIA program, enacted in 1998 as part of TEA-21 and expanded in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), provides credit assistance to major transportation investments in the form of direct loans, loan guarantees, and lines of credit and is designed to fill market gaps and leverage private co-investment by providing supplemental and subordinate capital to projects. TIFIA may cover up to 33 percent of eligible project costs. The TIFIA instruments may be subordinate to other debt obligations, and the payment schedule may be deferred.

As of December 2008, a total of $4.8 billion of TIFIA assistance was committed to 15 projects, facilitating over $18 billion of capital investment at a credit subsidy cost of just $345 million. Nearly a third of the borrowed funds have been prepaid in full, and there have been no defaults.

Source: Federal Highway Administration.

Grant Anticipation Borrowing

Grant anticipation borrowing (commonly referred to as GARVEE bonds for highways and GANs for transit) allows public agencies to securitize anticipated federal or state grant proceeds to generate upfront proceeds to fund capital outlays—or in simpler terms, to borrow against future federal and/or state funding. (See Box 7–5.) Borrowing against future grant proceeds for various purposes is neither a direct government lending program nor a new capability and is, in fact, relatively common among state and local governments, including historically for transit investment. The administrative mechanisms to effectively use GARVEEs for highway investment, however, were not in place until the passage of the NHS Act of 1995, which modified the federal reimbursement and eligibility process necessary to borrow against future highway funds.

Private Activity Bonds

Private activity bonds (PABs) allow private parties to issue tax-exempt debt based on the investment purpose of the bond

proceeds and subject to a series of limitations. (See Box 7–6.) Federal law generally prohibits debt issuers from financing highway and transit programs by combining tax-exempt debt or its proceeds with long-term private management contracts or private equity investment. This prohibition, written into the 1986 Tax Reform Act, includes exceptions for airports, solid waste facilities, and high speed rail because those infrastructure classes were attracting or expected to attract private-sector investment and management.

Given the potential application of PABs to surface transportation, Congress created a limited PABs demonstration program for highway/intermodal projects. Authorized by SAFETEA-LU, the program permits U.S. DOT to allocate up to $15 billion in PABs among qualified highway and surface freight transfer facilities. PAB designation allows the bonds to retain tax-exempt status despite a greater level of private involvement than is ordinarily allowed for these types of bonds. This allows projects with private-sector financial participation to obtain lower financing rates, eliminating one barrier to private-sector participation in transportation investment. PABs are intended to make private infrastructure investment eligible for the same federal tax exemption that state and local governments enjoy if they assume debt directly.

BOX 7–4: STATE INFRASTRUCTURE BANK PROGRAM

State Infrastructure Bank lending was first authorized by the National Highway System (NHS) Act of 1995, although federal rules have permitted states to use federal aid to fund loans in addition to direct expenditures (i.e., Section 129 loans) since ISTEA. All states, territories, and the District of Columbia are authorized to enter into cooperative agreements with the Secretary of Transportation to establish infrastructure revolving funds. In addition to initial capitalization grants, states may add up to 10 percent of their federal transportation funds for fiscal years 2005 to 2009 in several major program funding categories.

As of December 2008, 33 states and Puerto Rico had established SIB programs, with an aggregate amount of 609 loan agreements representing just over $6 billion in loan commitments. Five states (Arizona, Florida, Ohio, South Carolina, and Texas) account for approximately half of the total number of loan agreements and nearly 90 percent of the total loan amounts. This statistic, however, does not accurately reflect the extent of federal-aid deposited into the loan revolving accounts. The SIBs in some states, such as Arizona and South Carolina, rely principally on borrowing through the tax-exempt bond market rather than federal apportionments to obtain lendable funds. Loan repayments then are used to retire the debt that has been issued rather than being recycled into a "second round" of project loans. SIBs operating in this fashion are more properly viewed as state financing conduits rather than loan revolving funds.

Source: Federal Highway Administration.

The current credit crisis that has disrupted the tax-exempt markets could not have come at a more inopportune time for the new PABs program. As of late 2007, U.S. DOT had received applications and expressions of interest for PAB allocations that suggested full utilization of the authorized $15 billion by mid-2010. While one significant PAB transaction has closed its financing, the effective withdrawal of monoline credit enhancement necessary for tax-exempt debt has forced other project finance plans to turn instead to the commercial bank markets or to delay projects altogether. Nevertheless, it is anticipated that as the tax-exempt credit markets return generally, state and local transportation agency demand for PAB allocations should return as well.

Advantages, Disadvantages, and Opportunities for Refinement of Federal Financing Programs and Policies

Taken together, government-supported financing programs have either directly provided or helped to facilitate debt issuance for a select subset of transportation infrastructure investments and promise to continue to do so. These tools coincide with and have been supportive of emerging project delivery trends in the industry, including:

- Increased utilization of user fee and project financing approaches
- New institutions such as regional transportation authorities and financing entities

BOX 7–5: GRANT ANTICIPATION BORROWING

Highway Program GARVEE Borrowing

The NHS Act of 1995 provided the administrative mechanisms to effectively use grant anticipation borrowing (referred to as Grant Anticipation Revenue Vehicles, or GARVEEs) for highway investment. GARVEE bonds are debt obligations issued by a state or local entity, the principal and interest on which is repaid primarily with federal-aid funds. GARVEES technically represent a form of "advance construction" grant reimbursement, with annual principal and interest payments on the financed project (rather than the actual construction cost) treated as an eligible expense.

As of December 2008, at least 22 states plus Puerto Rico and the Virgin Islands had issued GARVEE bonds for approved federal-aid projects totaling about $9.3 billion (excluding refunding bonds). Additional states have passed enabling legislation authorizing the issuance of GARVEE bonds. In some cases, the GARVEE bonds are secured exclusively by the stream of pledged federal receivables, while in other cases they may be backed by other state revenues as well. In addition, some states have pledged future federal-aid reimbursements from other pay-as-you-go projects to secure debt issued for capital improvements that may or may not be federally eligible. These obligations are backed by an indirect grant reimbursement and are differentiated from direct-aid GARVEEs (and not explicitly tracked by the Federal Highway Administration).

Transit Grant Anticipation Borrowing

Transit agencies have used similar debt financing techniques—Grant Anticipation Notes (GANs) and capital leasing—to borrow against future Federal Transit Administration (FTA) grants. Debt obligations have been backed both by formula grant allocations (Section 5307) and by project-specific contracts (New Starts/Extensions under Section 5309).

According to the FTA, over $3 billion worth of GANs have been issued over the last 10 years by transit agencies in eight states. Because the federal transit grant program is neither as large nor as predictable as the federal-aid highway program, transit agencies have found it more difficult to issue long-term GANs or capital lease obligations without pledging additional resources to secure debt service.

Source: Federal Highway Administration,Federal Transit Administration

- The increased role of private-sector financial participation and concession agreements in providing new transportation infrastructure

These leveraging tools can play an important role in assisting state and local project sponsors in generating upfront cash to advance certain capital projects. While important, these tools are not without potential disadvantages and public policy concerns. One such concern is the fact that the tools can be misused, including the potential to over-leverage available and future resources. Another concern is the fact that providing these mechanisms is not without its cost in the form of potential lost federal revenue (i.e., through the extension of tax subsidies) and more direct budgetary costs. While not as significant as providing grants, the costs of these credit programs must be weighed against their benefits. Policy makers must determine whether the level of subsidy being provided is appropriate and necessary to achieve established policy goals. Finally, these mechanisms should not be seen as universally applicable to all projects or presented as a "silver bullet" solution to the underlying real investment gap.

The Commission has identified potential refinements to these federal programs and policies to enhance their capabilities and expand their reach, as described in this section. (See Chapter 8 for specific recommendations.)

Grant Incentives and Credit Support Programs and Policies

The TIFIA program and parallel SIB program for smaller projects have brought value to surface transportation infrastructure investment and are strong platforms for further leveraging limited federal resources. These programs can facilitate the development of user-backed and other revenue-supported projects and can attract additional capital from non-federal sources, including in the form of direct private-sector investment (discussed later in this chapter). An expansion of the TIFIA program to include incentive grants for pre-construction feasibility assessments and for capital cost gap funding could facilitate greater use of the TIFIA approach for toll and other revenue-supported projects by addressing market gaps related to riskier project phases, as well as providing gap funding to projects capable of partial (but not 100 percent) user-backed revenue financing.

The SIB program is a strong but underutilized mechanism that could reach a far greater number of smaller revenue-supported projects. An infusion of additional resources, perhaps

accompanied by the ability to provide targeted grant funding to projects along with stepped-up technical assistance, could take advantage of the SIB platform to reach a far greater number of smaller revenue-supported projects that are best addressed at the state level rather than through direct federal credit mechanisms geared for larger projects of national significance.

Tax Incentives, including Private Activity Bonds and Tax Credit Bonds

Tax incentives have played only a minor role in surface transportation investment to date, most recently through the 2005 SAFETEA-LU highway/intermodal PABs authorization described earlier. According to a paper prepared for the National Surface Transportation Policy and Revenue Study Commission, transportation spending consumes about 3 percent of the federal budget, but tax expenditures (representing the fiscal cost of tax incentives) for transportation purposes amount to only about 0.4 percent of the total estimated tax expenditures in coming years.[5]

Many tax incentives proposed in recent years have targeted certain projects types (e.g., freight and passenger rail) that do not benefit from existing grant or other assistance programs and for which there is a potential argument for some form of federal subsidy, distinct from that which existing credit programs can provide. These financial incentives are frequently used to subsidize desired activities and investments by state and local governments as well as the private sector that benefit the public.

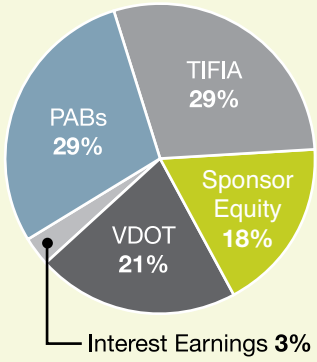
Private Activity Bonds

As noted earlier, PABs are an existing financing tool—albeit a newly available one for highway investment. A number of factors have been cited as potentially limiting the value or impact of this financing tool for surface transportation. The Commission believes that policy makers may wish to examine these issues in assessing the future role of PABs in the context of an expanded program.

BOX 7–6: PRIVATE ACTIVITY BONDS

SAFETEA-LU authorized U.S. DOT to allocate up to $15 billion in Private Activity Bonds among qualified highway and surface freight transfer facilities. **As of December 2008, U.S. DOT had approved allocations totaling nearly $5 billion for eight projects, and one project—the Capital Beltway HOT Lanes Project—had gone to market:**

Breakdown of Funding Sources



- The Capital Beltway/I-495 is a 64-mile limited access highway around the Washington, DC, metropolitan area with substantial daily commuter and business traffic between Virginia and Maryland.
- The project aims to improve conditions in one of the most congested U.S. regions through the construction of two additional high occupancy/toll (HOT) lanes in each direction (four lanes total) along 14 miles of the beltway's shoulder between the Springfield Interchange and just north of the Dulles Toll Road in Fairfax County.
- In addition to PABs, the project is using a combination of federal credit (TIFIA), state funding from Virginia, and private equity. The financing is supported by revenues from dynamic tolling. Use of the HOT lanes will be free to buses, three-person-plus carpools, and emergency vehicles.

Sources: U.S. DOT, Goldman Sachs.

- **Issuance Volume—**The $15 billion national limit on the highway/intermodal PABs authorized by SAFETEA-LU is likely to be consumed by major user-backed projects currently in the pipeline or being planned. Increasing the amount authorized would expand the reach of this financing tool.

- **Applicability of the Alternative Minimum Tax—**Like virtually all other private activity bonds, the interest on highway/intermodal PABs is subject to the Alternative Minimum Tax (AMT).[6] This narrows the market of potential investors and increases borrowing costs, thus reducing the financial attractiveness of these instruments. Particularly with

the current credit market disruption, the AMT "yield penalty" on PABs significantly restricts project sponsors' ability to obtain cost-effective financing. Removing the AMT is under consideration by policy makers and would encourage greater investment in user-backed infrastructure projects that benefit the public.

- **Restrictions on Land Acquisition—**The U.S. Tax Code requires that not more than 25 percent of bond proceeds be used to acquire land. Qualified highway or surface transportation facilities (e.g., new capacity toll roads) may require significant right-of-way (ROW) acquisition for project construction. Typically ROW acquisition costs amount to about 10–25 percent of total project costs and can occur months, if not years, in advance of final design and construction. As a result, more than 25 percent of the proceeds of any single bond issue sold early in the project life may be needed to help finance the acquisition of real property. Increasing the allowable percentage or eliminating the restriction could increase the number of projects eligible for PABs.

- **Limited Structuring Flexibility—**Many start-up toll roads do not generate sufficient revenue during the ramp-up period to fully cover the interest expense on borrowed funds. Tax regulation prohibits the accretion of interest on PABs, which is deemed to be working capital and a prohibited use of proceeds. This restriction limits the usefulness of PABs in project financings that require back-loaded repayments, where interest is deferred to accommodate the revenue profile and increase the amount of proceeds available to build the project. Eliminating the prohibition could increase PABs' attractiveness for start-up toll roads.

Tax Credit Bonds

Several recent legislative proposals call for the issuance of tax credit bonds, a form of debt financing that significantly subsidizes the borrowing cost of the project sponsor (debt issuer) by having the federal government pick up part or all of the interest expense through the provision of tax credits to the investors. This is accomplished through the issuance of hybrid debt instruments where the lender receives an annual return in the form of federal tax credits, in lieu of cash interest payments, plus return of principal at bond maturity. The borrower is responsible for repaying the principal from local revenue sources. The investor can apply the tax credits against its other federal tax liability. Since interest expense on long-term bonds may constitute as much as 75 percent of the financial cost of debt service in today's market environment, tax credit bonds provide the borrower (project sponsor) with a much deeper subsidy than do tax-exempt bonds.[7]

The potential efficacy of such proposals depends critically on how these bonds would be issued and what purposes their proceeds would fund. In general, the least expensive and easiest way for the federal government to raise capital is through Treasury's general borrowing programs. In the Commission's view, therefore, raising capital through direct federal issuance of tax credit bonds does not make sense.

Alternatively, proposals involving the issuance of tax credit bonds by state and local governments (or possibly other non-federal entities) may be an effective way to subsidize the cost of certain investments with public benefits. Existing programs of this type include the Qualified Zone Academy Bond program to help state and local governments finance public school modernization projects in low-income areas; the Clean Renewable Energy Bond program to promote investment in hydroelectric, solar, biomass, and other alternative energy

sources; and the Qualified Energy Conservation Bond program to help finance renewable energy research and development and various energy conservation projects. These programs require bond principal to be repaid by the non-federal issuer from project-related or other non-federal revenues. Recent testimony by various tax policy experts indicates that these types of programs can be effective and may be acceptable if the subsidy is carefully targeted and if they generally are subject to the same tax code restrictions as other "tax preferred" products like tax-exempt government and private activity bonds.[8]

Tax credit bonds could increase the funds available for infrastructure investment should policy makers determine that this deeper form of tax subsidy is desirable to help finance national-interest infrastructure. Any such tax credit bond programs, however, must be carefully targeted and consistent with established public policy objectives.

III. PRIVATE-SECTOR FINANCIAL PARTICIPATION

The private sector has long participated as a close partner with the public sector in designing and constructing surface transportation facilities, generally under individual contracts between public-sector sponsors and private firms with specific relevant capabilities. Individual private investors have also long been financial partners in transportation projects by purchasing tax-exempt bonds that support projects delivered by the public sector.

Today, the private sector is taking on far greater risk and responsibility through an emerging class of comprehensive contractual arrangements to not only deliver projects but also to operate, maintain, and finance them, thereby providing greater financial certainty and more efficient performance for the public sector. Because these financial arrangements are relatively new in the United States and can be quite complex, they have raised a number of policy issues and concerns.

This section briefly summarizes the forms that private-sector financial participation may take, identifies key advantages and disadvantages, and addresses related public policy concerns. The discussion of areas for potential refinement, particularly in terms of potential federal action, serves as the context for the Commission's specific recommendations in Chapter 8.

Forms of Private-sector Financial Participation

The private sector's participation in delivering surface transportation infrastructure can be viewed as a continuum, ranging from project delivery techniques (e.g., design-build contracting) to project maintenance (extended warranties) and long-term responsibility for financing and managing the operation of facilities (concession agreements). For long-term management contracts, private-sector participation typically takes the form of a lease rather than an outright sale. The state or local project sponsor enters into a multi-year agreement through which the private-sector partner obtains an exclusive concession to operate the facility pursuant to negotiated terms. The operator/investor (concessionaire) receives compensation either by obtaining the right to collect user charges or by receiving annual payments from the government entity that are funded through tax resources or, in some cases, a combination of taxes and user charges imposed directly by the government.

Concession arrangements fall into two broad categories or models: contracts primarily for the development of new assets or the expansion of the capacity of existing assets (commonly

referred to as "greenfield" projects) and leases of existing assets (often termed "asset monetizations," "asset securitizations," or "brownfield" projects). For new capacity projects, the public sector's primary motivation is often accelerating delivery of a critical transportation project that has the potential to be self-financed at least in part through direct user fees or supported by specifically dedicated conventional revenues. For asset monetization projects that have their own revenue streams, such as toll facilities, often the governmental owner's primary motivation is to secure an upfront payment that can be used for other purposes. The government is seeking to "monetize" the future stream of net toll or other revenues into an initial large cash payment. In both concession models, private-sector partners are generally chosen through a competitive procurement process.

New Capacity ("Greenfield") Concession Models

In order to develop new capacity, the private investor (or investors) generally agrees to finance, build, operate, and maintain the project, which the public sector continues to own. In the United States, the public sector increasingly has used different forms of contracts to accelerate project delivery, control development and/or life cycle costs, increase capital formation for construction, minimize public-sector exposure for claims and change orders, and/or achieve greater operation efficiencies.

In a minority of projects with particularly robust revenue potential, the concessionaire may be able to not only finance the improvements and cover all operating and maintenance costs but also provide the public-sector agency with an upfront concession fee and/or share a percentage of the facility's revenues over the concession period (commonly referred to as "revenue sharing"). Alternatively, for projects with less revenue potential the public-sector agency may be required to make a capital contribution to partially fund the project and reduce financing requirements to a level that can be supported by the toll or other available revenue stream. Once the project is constructed and open to revenue operation, the concessionaire collects the cash flow generated through tolls, other user fees, or revenue streams in accordance with a public sector agency-mandated rate mechanism. The concessionaire applies revenue to meet operating expenses, pay debt service, and make any needed capital improvements. Residual revenue represents the concessionaire's profit. The concession agreement will require the concessionaire to operate the facility within prescribed standards, satisfy any revenue-sharing arrangement, and return the facility to the public sponsor in a specified condition at the conclusion of the lease period. (See Exhibit 7–1 for a short list of examples of the toll concession approach in the United States).

Concession agreements are not limited to revenue-generating projects. For new capacity projects that do not generate user fee revenues and must instead be supported by tax revenues, governmental owners still may seek to outsource project development and operations and maintenance responsibility to reduce cost, transfer risk, or improve service. To the extent that payments to the concessionaire are conditioned on attainment of certain performance standards, they are termed "availability payments."[9] The availability payment concession approach is used widely in Canada, the United Kingdom, continental Europe, and Australia—and it is gaining interest among a number of transportation agencies in the United States.

Pre-development agreements—used less in other countries but more extensively in the United States to date—are sometimes used to advance the kinds of project that ultimately may become toll concessions or availability payment type projects. In these arrangements,

EXHIBIT 7–1: REPRESENTATIVE U.S. CONCESSION AGREEMENTS FOR SURFACE TRANSPORTATION PROJECTS WITH PRIVATE-SECTOR LONG-TERM OPERATING RESPONSIBILITY: NEW CAPACITY ("GREENFIELD") PROJECTS

Project and Location (year of transaction)	Contract Term	Description
91 Express Lanes (High Occupancy Toll) (2004) Orange County, CA	35 years	Development of new capacity toll project in 1993; sold to Orange County Transportation Authority in 2003. No public funds were programmed for this project at the time of the initial transaction. Private finance, with a cap on private return on investment and without public protection from potential losses, enabled the project to go forward.
Capital Beltway High Occupancy Toll Lanes (2008) Northern VA	75 years	Development of toll-backed new capacity express lanes within an existing highway whereby concessionaire will design and build the extra capacity and operate and maintain the HOT lanes. Private financing filled a significant gap in the project's finance plan unavailable from public sources.
Las Vegas Monorail (2000) Las Vegas NV	50 years	Development of new capacity transit project to accelerate project development and lock in long-term operations and maintenance costs early in the design phase. The first U.S. rail transit project to finance 100 percent of capital, operations, and maintenance costs with private investment.
SH 130 (Segments 5-6) (2008) Austin, TX	50 years	Development of 40-mile new capacity turnpike project that had languished with a $700 million gap in its finance plan. Private investors agreed to fund 100 percent of capital, operations, and maintenance costs and operate under an agreed toll rate schedule.
South Bay Expressway (2003) San Diego, CA	35 years	Development of new capacity turnpike project. The state had allocated no tax revenues to the project. By agreeing to finance 100 percent of the capital, operations, and maintenance costs (backed by toll revenues), the private partner was able to leverage limited federal and local funding as well as federal credit support to deliver the project, with a contractual cap on private-sector return on investment and no limit on potential losses.

Sources: Public Works Financing, Project Sponsors.

the private-sector party agrees to share costs and perform the preliminary environmental, technical, and financial analysis for one or more projects to determine project feasibility. In exchange, the public sector grants the private partner the exclusive right to negotiate for the right to implement the project, should the public sector approve it environmentally and choose to proceed. Public agencies use pre-development agreements for projects that are not yet cleared environmentally, to bring private-sector expertise in value planning and value engineering, and to assist in defining optimal facilities and achieving financial feasibility. Subject to validation of the reasonableness of the terms and conditions negotiated, the public sector ultimately may pay for or share in the costs of the analysis if the projects are deemed infeasible but they gain by accelerating the pre-development phase and by the application of private-sector development expertise. The implementing terms and conditions for a pre-development

agreement may take the form of a conventional design-build contract, an availability payment contract, or a toll concession.

Asset Monetization ("Brownfield") Concession Model

Asset monetizations (commonly referred to as "brownfield" concessions) are distinct from contracts intended primarily to develop a specific new facility or to add capacity to existing facilities and instead involve a private-sector party acquiring an operating interest in an existing transportation facility (whether currently tolled or not), such as a turnpike, toll bridge, or transit asset, in exchange for the right, for a fixed term, to collect the tolls, fares, or other revenues that the facility generates. For projects with positive net cash flow, such as toll facilities, the agreement typically calls for the private investor(s) to provide an upfront payment (or, less commonly, annual lease payments). The investor assumes the obligation to operate and maintain the facilities to agreed-upon standards and to hand the facility back to the public owner upon lease termination in a specified condition. (See Exhibit 7–2 for examples of recent asset monetizations of transportation infrastructure.)

As with new capacity concessions, in an asset monetization concession the public sector agency retains title to the facility, is relieved of operations and maintenance responsibilities, and benefits from a lump sum of money and/or periodic payments that can be used to fund other infrastructure projects or for other purposes. In exchange, the public sector relinquishes its right to future residual project revenues over the term of the lease. The private investor generally receives the right to collect tolls or other revenues in accordance with a public sector agency-mandated rate-setting mechanism or schedule. In some instances, private investors, by using equity, can form more upfront capital than conventional borrowing from the tax-exempt markets, even from the same toll revenue stream. In addition, where asset monetizations cap the toll rates the private sector can charge over the life of the contract,

EXHIBIT 7-2: REPRESENTATIVE U.S. CONCESSION AGREEMENTS FOR SURFACE TRANSPORTATION PROJECTS WITH PRIVATE-SECTOR LONG-TERM OPERATING RESPONSIBILITY: ASSET MONETIZATIONS ("BROWNFIELD")

Project and Location (year of transaction)	Contract Term	Description
Chicago Skyway (2005) Chicago, IL	99 years	Acquisition of existing toll bridge. The cash infusion provided by the transaction in 2006 allowed the city to retire debts, set up reserve funds, and earn an improved credit rating.
Indiana Toll Road (2006) Northern IN	75 years	Acquisition of existing toll road. The state used the funds to retire all of its debt associated with the Indiana Toll Road and to fund a 10-year statewide capital transportation program.
Northwest Parkway (2007) Northern Denver Suburbs, CO	99 years	Lease of five-year-old public toll road. The lease allowed the public-sector sponsor to pay off bonds, avoiding a potential default, and transfer future operations and maintenance costs to the private partner.
Pocahontas Parkway (I-895) (2006) Richmond, VA	99 years	Acquisition of six-year-old toll road developed by a non-profit corporation. The transaction allowed the State of Virginia to recoup its investment in the initial project, pay off bonds, save the costs of developing a companion project, and transfer the costs of operations and maintenance to the private partner.

Sources: Public Works Financing, Project Sponsors.

those capped rates typically permit regular cost-of-living type increases that avoid annual political review.

Transit projects generally are not strong candidates for the asset monetization approach, since they do not recover sufficient funds from farebox revenues to fully cover operating expenses, let alone recover capital costs. These projects nonetheless may be financed cost-effectively through a long-term concession if the private operator's cost structure requires lower subsidies or provides other benefits in comparison to conventional public procurement and operation.[10]

Advantages, Disadvantages, and Cited Public Policy Concerns Regarding Private-sector Financial Participation

While more commonly accepted for other forms of infrastructure, such as drinking water supply, solid waste disposal, and airport infrastructure, private-sector financial participation in surface transportation infrastructure has attracted the keen attention of policy makers, as evidenced by a recent report of the Government Accountability Office that focused on appropriate measures to protect national public interest.[11] The Commission believes there is no single overarching answer to the question of the appropriateness of private-sector financial participation. Each project's specific circumstances will determine the suitability of private-sector involvement in various aspects of project delivery, operations, and financing. This section outlines some of the potential advantages and disadvantages of such involvement and suggests best practices and appropriate public oversight measures to mitigate the key public policy concerns in this area.[12]

Potential Advantages

Each type of private-sector financial participation offers potential advantages in the right applications, though not in every instance. (And not all advantages are exclusive to long-term private concessions; some also may be attainable through public-sector project financing.) Their applicability will depend on the public sponsor's goals, the project's own characteristics, and market circumstances at the time. Among the potential advantages that properly structured and applied private-sector participation can help to achieve are the following:

- **Risk Transfer—**Private-sector participation provides an opportunity to shift certain project risks from the public sector to the private-sector partner, such as construction risk (risk of cost overruns or delays as well as risks associated with final design stage), performance risk (technical and operational feasibility risks), and revenue risk (risk of lower user demand than anticipated).

- **Project Acceleration—**By providing incentives for streamlined fast-track construction, often through design-build procurement approaches, private-sector participation can provide quicker project delivery once environmental permitting and other public approvals are in place. Faster project completion not only brings the improvement on-line sooner, it also reduces the project's exposure to construction cost inflation.

- **Operational Benefits—**A private operator whose compensation is performance-based has a strong incentive to strive for maximum operational efficiencies and to grow revenues by providing strong customer service. In addition, long-term agreements typically codify operating and maintenance standards, which assures perfor-

mance outcomes and allows private-sector innovation to achieve these outcomes rather than relying on government regulation, as used in projects delivered directly by the public sector.

- **Focus on Life Cycle Costs—**A concessionaire operating a non-tolled facility supported by availability payments is more likely to consider the project's total life cycle costs, since payments are conditioned on the concessionaire maintaining asset quality. The same advantage applies to toll concessions because aggregating responsibilities and control for long-term performance under a fixed incentive structure can promote efficiencies that bifurcated responsibilities inherent in conventional public-sector delivery may not. For instance, highway agencies facing near-term fiscal constraints may be more likely to follow short-term strategies that conserve cash outlays but increase asset life cycle costs over the long term.

- **Maximizing Capital Formation and Potential Payments to the Public Sector—**The borrowing capacity of government issuers is constrained by the market requirement that tax-exempt bonds demonstrate sufficient debt service coverage to receive an investment grade rating. Private investors' ability to draw on non-rated bank debt and investor equity can potentially allow a larger amount of a project's costs to be financed. Upfront payments, in turn, can create a pool of funds to advance other projects that would be deferred otherwise. In addition, a private operator generally will increase tolls or fares, within public-sector constraints, to maximize profits within those contractual limits. This willingness to set higher market-based toll rates also has the potential to facilitate upfront or annual concession fees to the governmental owner.

Potential Disadvantages and Cited Public Policy Concerns

As with the advantages just described, the potential disadvantages of private-sector financing are not present in every case and may be mitigated through contractual terms, government oversight, or other means. Several of the cited policy concerns appear to be more extensively associated with asset monetization transactions than with concession arrangements for new capacity projects.

The cited policy concerns fall into three categories: issues related to control of public assets and operational flexibility, issues of public stewardship, and financial equity considerations.

Control of Public Assets and Operational Flexibility

- **Impact on Regional Mobility—**Some policy makers express concern about ceding operational and pricing control of key transportation assets under long-term concessions. They have noted that state or regional transportation agencies may lose the ability to influence traffic patterns due to contractually agreed-upon road pricing adjustments by the concessionaire. Depending on the term of the lease, this limitation could persist for as much as 50 years or longer.

- **Potential Loss of Control—**Some fear that involving the private sector through a long-term contract gives up too much control of the public asset. While long-term agreements do in fact transfer many aspects of operating control to the private sector, the degree of the impact and the potential to reverse course in certain circumstances can be carefully prescribed and managed in the contractual arrangement. The inevitable tradeoffs

and associated risks can and should be managed to the benefit of the public through rigorous contracts with the private sector that dictate specific performance levels and recourses for non-performance that traditional direct public-sector delivery approaches would not provide.

- **Non-compete Clauses—**Critics have singled out as a concern the use of "non-compete" clauses, whereby the public-sector partner gives up its right to construct competing facilities in the vicinity of the leased transportation facility. This critically important issue can and should be handled through the contracting process, as demonstrated in recent transactions. States, for instance, can retain the absolute right to build and maintain any and all facilities at any time by agreeing to compensate the concessionaire for any significant adverse revenue impacts.

- **Foreign Ownership—**Based on recent transactions and the participation of foreign investors in the U.S. marketplace, there has been concern expressed about turning over operation of key infrastructure assets to foreign-controlled entities. As just noted, however, these arrangements should be governed by carefully constructed contracts and explicit government oversight. Potential national security issues should be fully addressed by existing federal laws governing foreign investment in critical infrastructure. Finally, foreign investors have owned or prudently and efficiently managed infrastructure facilities in the United States for many years, just as U.S. firms rely on the availability of open investment opportunities in other countries.

Public Stewardship

- **Transparency—**Addressing concerns related to the transparency of the concession process requires rigorous attention to creating transparent processes, avoiding unfair access to decision makers by private-sector entities, providing key documents to the public, and documenting all oversight procedures in a manner fully accessible to the public. This currently is handled through state procurement processes.

- **"Value for Money" (Cost-effectiveness)—**Recent asset monetizations by government toll road operators in Texas and Pennsylvania have demonstrated that both the private and the public sector can raise large sums of capital in anticipation of future revenue streams. There is, however, a recognized concern about how best to know whether public or private delivery is the most cost-effective approach and about assessing whether the public sector is getting the best deal possible, especially in cases of limited competition. Historically, public agencies borrowing through the tax-exempt municipal bond market have had access to a lower cost source of capital than private companies issuing taxable debt and equity investments. The yield differential has narrowed recently, due to market conditions and the introduction of tax-exempt private activity bonds and federal loan assistance for private concessionaries through U.S. DOT programs. In addition, as described earlier, equity investment may allow a greater sum to be capitalized up front than through investment grade municipal debt. "Value for money" comparisons of government versus private project delivery and financing can play a supportive role in determining the relative cost-effectiveness of public-private partnership proposals.

- **Economic and Labor Force Impacts—**Transportation improvements are seen by state and local governments as an important tool of economic development. Projects such as new interchanges or widened highways are intended to increase accessibility and facilitate economic growth, but they may not be profitable investments in and of themselves. A private operator may not be as sensitive or responsive to these public objectives unless they are addressed specifically in contract terms. Another economic impact of potential concern to policy makers is the effect on government employees' jobs and wage levels if a facility is converted to private management. The terms of the concession agreement can and should address these issues, but at a likely tradeoff to the financial value of the transaction.

Financial Equity

- **Use of Proceeds—**Policy makers and interested groups have expressed concern that upfront resources generated through the leasing of transportation infrastructure assets may be spent on other (non-transportation) government purposes, representing a diversion of resources away from meeting mobility and other transportation system needs. Government entities can and should mitigate this diversion by conditioning approval of an asset monetization transaction on the restriction of the use of proceeds to surface transportation purposes or even to a specific set of projects, corridor, or region. While this concern is not exclusive to long-term concessions (for instance, tax revenues presumptively dedicated to transportation or public-sector bond proceeds from existing toll revenues also can be rerouted to other projects, to balance budgets, or for other government purposes), it is a heightened concern in this new set of circumstances, including potentially longer terms.

- **Generational Equity—**Elected officials considering private-sector partnerships must thoughtfully examine the impact on future users and consider intergenerational equity concerns. Transferring the capital cost burden over time—or to future generations—is not unique to private-sector financial participation structures. Public-sector financing also transfers costs, although perhaps over relatively shorter time frames based on common debt terms, while pay-as-you-go structures place the funding burden wholly on current payers relative to future beneficiaries. Private participation structures can mitigate the impact of undue transfer to future generations either by ensuring that upfront payments are spent to benefit future populations or that capital improvements themselves benefit future populations and/or through mechanisms that share revenues over time. A mitigating strategy, currently used in Texas, involves the private-sector partner sharing revenues with the public-sector project sponsor over time in addition to, or in lieu of, an upfront payment. In using this approach, Texas policy makers concluded that they could afford deferring more capital investment now so as to allow greater capital investment later in the asset's life. Policy makers should give careful consideration to such potential mitigating measures.

- **Toll Rates—**Some policy makers have voiced concern that private-sector participation will result in higher tolls for what are essentially monopoly services, with adverse consequences for passenger and commercial users and with potential public spillover costs if traffic is diverted to non-tolled alternatives. While market pricing for roadway use is an admittedly complicated issue, toll rates should always remain under the ultimate control of the public sector through contract terms and toll regulation.

Opportunities for Refinement of Federal Policies Related to Private-sector Financial Participation

Because transportation project sponsorship is typically a state or local rather than federal responsibility, public-private partnerships are generally entered into by state departments of transportation or regional or local transportation agencies. The federal government nonetheless can help set appropriate safeguards to protect the public interest, provide technical assistance, and foster best-practice peer exchanges among the states.

States and localities are struggling now more than ever to fill the gap left unfunded by inadequate federal resources. This reality requires a very difficult decision to raise new revenues, use new tools, and/or delay much-needed capital improvements. Federal policy should be structured to afford states and localities substantial flexibility in making these decisions. The federal government also can play an important supporting role by providing technical assistance and fostering best-practice peer exchange.

States and localities are struggling now more than ever to fill the gap left unfunded by inadequate federal resources. This reality requires a very difficult decision to raise new revenues, use new tools, or delay much-needed capital improvements.

Regarding protection of the public interest and specific concerns expressed regarding asset monetizations, every project has its own facts and circumstances, and state and local officials will need to weigh financial considerations against other policy goals on a project-by-project basis. Since private-sector investment in existing assets does play a fundamentally different role than in new capacity projects, transportation officials will have to address three central questions: Is it in the public's best interest to lease the facility? If so, what is an appropriate lease term or duration? And how should proceeds received by the public sector be used and/or limited? To the extent that these fundamental questions can be answered in a manner that supports the positive assessment of general feasibility and public interest, the Commission recognizes the targeted role that asset monetization transactions may be able to play for states and localities in managing their transportation infrastructure assets.

In terms of the appropriate lease term for asset monetizations, the longer the lease term, the greater the potential value to a concessionaire and therefore the higher the bid price. Policy makers will need to balance financial policy and the public interest. As a general rule, the Commission considers it appropriate to limit lease terms to the lesser of 75 years or the remaining estimated useful life of the facility (at the time of the transaction). Leasing proponents have claimed that bid prices may be as much as 10–20 percent higher if the concessionaire can claim tax ownership (including depreciation and amortization benefits) from leasing the facility. On that basis, applying a 120-percent rule to this guideline consistent with the standard for tax ownership (i.e., a maximum term equal to 120 percent of the useful life of the asset to be financed) may be appropriate. On the question of how the proceeds received by the public sector should be used, the Commission believes that such proceeds should be limited to surface transportation investment purposes in the state or other relevant jurisdiction (as explained more fully in Chapter 8).

Once these fundamental questions are addressed, the legal and procurement issues are similar for asset monetizations and new capacity projects, and the suggested government oversight guidelines quite similar. Box 7–7 summarizes legal and procurement issues attendant to both concession types entered into by state and local governments. While no one solution works for every project, the table includes general guidelines based upon prior experience in transportation and other sectors, lessons learned, and the

policy debate to date. Many of these restrictions are already provided for through existing state and local procurement and ethics processes, so this set of guidelines is not meant to imply adequate protections do not already exist in many cases. Further, the federal government should be judicious when considering direct regulation of private-sector financial participation, recognizing that consistent with state and local responsibility for project delivery, this role is in the purview of these levels of government. There also are myriad state-specific procurement and related open records laws that must be considered. Preserving states' ability to apply appropriate standards to particular circumstances in each state is important in developing federal oversight.[13]

BOX 7-7. GUIDELINES FOR GOVERNMENT OVERSIGHT OF PRIVATE-SECTOR FINANCIAL PARTICIPATION

Topic	Potential Guideline
Planning	Projects with potential as public-private partnerships should be included in the long-term transportation planning of public entities, and the use of public-private partnerships should complement but not be limited solely by such planning, in order to encourage innovation.
Value-for-Money (Cost Effectiveness) Assessment	Public entities should undertake an analysis of the potential project to determine whether the use of a public-private partnership provides value compared with traditional public works delivery methods. Using best practices, the analysis would account for factors such as the public entity's life-cycle cost for the work and its ability to finance the capital for construction and financing leverage provided by the private entity, the risks shifted to the private entity, design and construction quality, schedule, capacity to perform, and potential for additional scope.
Conflict of Interest	Public entities should have conflict-of-interest policies in place regarding the use of outside consultants to ensure the integrity of the procurement process and that outside advisors are providing services in the best interest of the public entity.
Transparency: Procurement Process and Proposals	Final documents soliciting qualifications and proposals from private-sector entities should be made available to the public. Essential portions of solicited proposals for public-private partnerships should be disclosed after the conclusion of successful negotiations with a selected proposer or upon the termination of the procurement. Confidential and proprietary information contained in the proposals should not be subject to public disclosure, in order to encourage proposers to disclose as much information to the public entity as needed without the risk of losing a competitive advantage in the marketplace due to subsequent public disclosure.
Transparency: Agreements	Prior to execution of a concession agreement, key terms should be made available to the public, taking into account proprietary information. The final terms of any agreement for a public-private partnership should be available for public review after execution.
Treatment of Unsolicited Proposals	Unsolicited proposals may provide public entities with insight into infrastructure solutions that may not have been previously considered. While the Commission believes there should be no prohibition to the submittal of unsolicited proposals, it also recognizes the consideration of these proposals can be lengthy and costly. Therefore, the public entity receiving the proposals should review them but not be required to engage in any lengthy consideration process. If the public entity decides the unsolicited proposal has merit, it should be required to invite competing proposals and evaluate all proposals against specified criteria.
Concession Term	Agreements should be limited to a term appropriate for the project. Generally, the Commission considers term limits equal to the lesser of 75 years or the remaining estimated useful life of the facility (at the time of the transaction) as reasonable to allow private entities an adequate return on investment without imposing high costs on the public. Longer terms should be examined carefully in relation to the trade-off between raising more capital and control considerations.

(BOX 7-7, continued)

Topic	Potential Guideline
Early Termination for Convenience	The agreement should permit the public entity to buy back the facility during the lease term upon payment of fair market value for the facility.
Environmental Approvals	Infrastructure created through public-private partnerships should be subject to state and federal environmental regulations. Procurements for projects should be allowed to proceed prior to final environmental approvals, with the risk of delays or denial allocated appropriately among the parties without prejudicing any alternative, including the no-build alternative.
Performance and Handback Standards	The public entity should consider and have in place appropriate performance security to ensure completion of the design and construction work, which need not be 100 percent of the value. Outcome-based performance specifications should be permitted for the design, construction, operation, and maintenance of the facilities to allow for innovation and efficiency. The public entity should provide adequate oversight and/or inspection to ensure compliance. The agreement should set forth the standards the facility must meet or be brought up to at the end of the term of the agreement to ensure the facility at reversion is in an appropriate state of repair, given its anticipated life expectancy.
Facility Access	The agreement should prohibit the closing of facilities or portions thereof except for specifically enumerated instances, such as for routine and capital maintenance or accident clean-up. Any unpermitted closure should result in a default under the agreement for which the public entity may immediately enter and take control of the facility to reopen and continue operations, until such time as such breach is cured. The agreement should provide for the facility to be opened for evacuations for certain periods during declared emergencies. Public entities should consider limited restrictions on uses—for instance, truck-only lanes or non-truck lanes—based on the nature and location of the facility.
Competing Facilities	Public entities should not be barred by contractual arrangements from building and maintaining facilities contemplated in their long-term plans. States can retain the absolute right to build any and all facilities at any time by agreeing to compensate the concessionaire for any significant adverse revenue impacts.
Toll Rate Setting	Procurements and resulting agreements should specify how toll rates are to be set and adjusted over time. This information and resulting toll schedules should be publicly available (including methods for any variable rate-setting). The option of variable/dynamic pricing should be available when necessary to ensure level of service.
Revenue Allocation	Public entities should have discretion to impose caps on rates of return on investment, to share revenue over time, or to receive capital contributions for construction at the outset.
Financial Reporting	Private entities should provide yearly reporting regarding the performance of the facility, including matters such as toll revenues and the number and types of vehicles that used the facility.

IV. COMMENTARY ON NATIONAL FINANCING ENTITY PROPOSALS

Some policy makers and industry participants have proposed creating a national infrastructure bank or investment corporation in order to help address pressing infrastructure investment needs. These proposals appear to be driven by two primary objectives:

- Accelerate investment in critical infrastructure (through debt financing mechanisms and/or General Fund transfers)
- Improve the allocation of limited resources by the federal government to those important investments deserving national attention

Although these investment and allocation objectives may be laudable, the means by which they would be achieved need to be clarified. Proposals to create a new special-purpose financing entity need to adequately address key questions about how the stated objectives would be achieved and why the proposed mechanism(s) would be the best way to achieve those objectives. (See Box 7–8.) Moreover, as with including some amount of infrastructure funding in an economic stimulus package, there is a risk that the focus on new or enlarged financing techniques may be seen as a substitute for generating revenue by raising taxes, expanding tolling, or developing other sources. The institutional mechanisms being proposed, whatever their merit, will not in and of themselves directly address the core problem of insufficient revenue to support needed investment.

The Commission understands policy makers' desire to begin to address the transportation infrastructure "underinvestment problem" and improve on the current federal funding mechanism. In assessing the current approach and potential options, the Commission recognizes the inherent value of the "user pays principle"—the link between who pays fees and taxes and who benefits from the improvements funded by those sources. Generally, the Commission believes that link should be strengthened, not weakened, and that the nation as a whole is not investing enough in surface transportation infrastructure—that current and future needs are significantly greater than existing resources. It acknowledges that existing resources are not always invested in an efficient manner through current procedures and programs (mindful that the Commission's mandate does not explicitly include that problem).

Assistance provided to certain projects through a new financing entity should supplement, not supplant, the federal support already available through existing programs and should be provided more efficiently with a stronger focus on accountability and performance. Policy makers and project sponsors may identify critical infrastructure requiring additional funding in order to get built or properly maintained. And they may identify the need for new or larger federal subsidies in doing so. For example, the government could provide more "front-end" assistance to help sponsors of major projects assess their feasibility and conduct planning and permitting activities prior to construction; it could enhance the TIFIA-type credit support provided for major projects through larger loans with more flexible payment features; or it could provide deeper subsidies through new tools such as tax credit bonds.

In order to justify the creation of a new special-purpose entity, the case must be made that the newly created entity will be more effective in delivering the financial subsidies than current programs. It might be argued that a new, separate entity with a narrow mission focused on

project finance could be more efficient in selecting projects and accelerating investments. It also might be easier to create a special conduit for federal funds with a new entity. This could be accomplished, for example, by either identifying new revenue sources to fund the entity's activities or creating a new category of discretionary spending from existing General Fund or Highway Trust Fund sources. A new special-purpose entity also might receive special budgetary treatment, operating rules, and regulatory oversight that some policy makers believe would improve its effectiveness. If policy makers determine that a new special-purpose entity should be created to help deliver the intended subsidies, the following guidelines should be considered:

- **The entity should use a series of objective evaluation criteria to improve the selection of infrastructure projects to receive federal assistance.** This merit-based approach would give priority to those qualified projects yielding the highest societal returns. By using various policy tools (grants, credit assistance, and tax incentives), the entity could support a wide range of different projects having public, private, and nonprofit sponsors. The new entity should not be merely another financial assistance program – its focus on enhanced project evaluation should encourage sponsors to identity new revenue streams, promote more effective governance, and spur further innovation in project development and operations.

- **Assistance should be targeted to legitimate "investment gaps" such as projects or groups of projects that have national or regional significance or strong public benefits.** Rather than provide redundant assistance (including grants, loans, and guarantees), the new entity should incorporate the existing relevant programs and modify them as appropriate. For example, this might entail relocating the TIFIA credit program from the U.S. DOT to the new entity and enhancing its financing tools. The responsibility for allocating highway/intermodal private-activity bond issuance authority and recapitalizing the state infrastructure banks also could be relocated to the new entity. Policy makers could give the new entity the responsibility for allocating tax credit bond issuance authority, should they decide to authorize that form of tax subsidy to assist state and local sponsors of certain major sponsors.

- **Policy makers should be explicit about how the entity will be funded, based on the anticipated types and amounts of assistance to be provided.** This will depend significantly on how much grant assistance (rather than loans or other credit assistance) is provided to those projects that are not revenue-producing. Loans and other credit instruments will require some level of capital reserves. And even tax subsidies provided through private activity bonds or tax credit bonds, while not requiring discretionary resources, will result in tax expenditures having a budget impact. If the special conduit is a federal entity, policy makers could decide to fund it out of an existing or new discretionary spending category. Or they could decide to dedicate a new revenue source to fund its activities. Any new revenue source should be linked to the investments being subsidized, to the extent practical, and General Fund subsidies should be carefully targeted and well justified. For example, policy makers could identify one or more freight-oriented fees to fund assistance for goods movement projects.

BOX 7–8: KEY QUESTIONS ABOUT FINANCING OBJECTIVES OF INFRASTRUCTURE FINANCING ENTITY PROPOSALS

The Commission has identified the following key questions that policy makers should consider and be able to answer with respect to any new infrastructure financing entity. In order, these questions deal with:

1. The critical infrastructure improvements being targeted
2. The types of (existing or new) financing assistance necessary or helpful in accelerating the investments
3. The sources of revenue used to fund the investments and repay any financing assistance
4. The control over resource allocation
5. The federal budgetary impact and other policy issues

Targeted Investments

- What are the critical infrastructure investments being targeted that deserve federal attention and new or additional federal assistance?
- Are these projects too big to be funded by any single locality or state or otherwise need additional support?
- Do the public benefits warrant new or additional federal support?
- Do the projects not have access to existing government programs or other sources of funding? Or are those sources insufficient?

Financing Assistance

- Do the projects/investments have dedicated revenues (either user-backed or tax-backed) that can repay capital raised through borrowing?
- Do they have insufficient access to existing sources of financing (debt and equity that can be obtained through the capital markets or various public and private sources)?
- Are the revenue sources sufficiently limited or uncertain that the projects require new financing tools and deeper public subsidies in order to obtain financing?
- Is it necessary, appropriate, or more cost-effective to provide financing assistance at the federal level instead of the state or local level?
- Is the desired federal support addressing an "investment gap," such as a lack of development resources for major projects, or is it simply substituting for monies that could be raised at the state or local level through private capital markets?

Funding Assistance

- Do the projects/investments have insufficient dedicated revenues and instead require grant assistance or other subsidies tantamount to grants?
- If so, how much of this funding support should come from the federal government (due to broad public benefits or vital national interests)?
- Why can't such projects receive the appropriate federal support through existing programs?
- Is a new special-purpose entity proposed in order to help justify the imposition of new national-level revenue streams to fund new grants or other subsidies for the targeted projects?
- Will funding be derived from general sources, and if so what is the logic of not relying on fees paid by users or direct beneficiaries? And, would any general revenue support be a supplement to, not a replacement for, user fees?

Resource Allocation

- Who will control the allocation of resources (select projects)? Is the new special-purpose organization intended to be a federal or non-federal entity?
- Is the allocation of resources intended to be discretionary, on a project-by-project basis? Or is some extent of formula or minimum allocation desired to achieve "balance"?
- Is the initiative intended to specifically encourage or facilitate user-backed projects with some level of private participation in the development, financing, operation, and maintenance of the facilities?
- Is a new special-purpose entity proposed in order to "carve out" some federal resources from the current authorizations/appropriations process and/or remove the responsibility for allocating these resources from the U.S. DOT?

Budget Impact

- What is the budgetary cost of the proposal? If the entity is federal, its borrowing and spending activities will be scored as budget authority and outlays in the federal budget. If the entity is non-federal, the budgetary impact depends on the subsidies provided, potentially including how they are used. Depending on the entity's structure and the subsidies provided, will the scored budgetary cost be less than, similar to, or greater than that associated with providing the same level of assistance through existing agencies and programs?
- What is the economic cost of the proposal (the long-term present-value cost, beyond the near-term budget impact)? Are there long-term federal liabilities (direct or implied) associated with it?

- **Policy makers should consider the financial policy concerns introduced by the concept of a federal or national-level bonding program, including the relative cost effectiveness of this approach.** The obvious question that must be answered is, "Bonding against what revenue source(s)?" Debt issued by a federal entity and backed by the full faith and credit of the U.S. government is tantamount to additional General Fund borrowing and spending. While urgent national needs might justify some

level of general subsidies for certain improvements, the Commission does not recommend increasing reliance on general borrowing and spending as part of a sustainable long-term strategy for investing in transportation infrastructure. State and local governments commonly issue special revenue bonds to finance transportation infrastructure projects. At the federal level, however, the issuance of special-purpose debt is problematic for two reasons: Any new special-purpose borrowing program would be less liquid and more expensive (not counting the additional expenses associated with establishing and managing the new bureaucracy) than the Treasury's general borrowing programs. And even if a special-purpose entity issued non-recourse debt, it is doubtful such obligations would be free from an implied backing of the U.S. government. Alternatively, the entity could obtain lendable funds by borrowing from the U.S. Treasury through a direct federal credit program. In this way it would not need to issue its own securities in the credit markets. Nor would it need to be "capitalized" and maintain a substantial balance sheet, as would a start-up, stand-alone financial institution. Using federal credit would allow the entity to offer loans and guarantees at the lowest possible rates to project borrowers. It also only requires federal appropriations to fund a fractional reserve (the subsidy cost) for each of the loans it provides or guarantees. Offering federal credit assistance to project sponsors would be particularly advantageous in light of the volatility currently affecting the credit markets and the heterogeneous nature of the infrastructure assets to be financed.

Potential government credit assistance, financing incentives, tax subsidies, and direct funding contributions should be thought of as a continuum in terms of the degree of subsidy provided and should be carefully targeted to clearly identified investment needs or market gaps.

- **Policy makers should carefully consider how well a new entity would allocate discretionary resources relative to existing agencies and programs.** Implicit in some proposals is an assumption that a new entity, independent of the U.S. DOT and having a narrower mission focused on certain kinds of infrastructure investment, would be more effective in selecting projects and managing resources. It would be important for any new entity to acquire the expertise necessary to evaluate financing proposals from across modes or even among infrastructure sectors. Congress also must consider how a new entity would coordinate its activities with the U.S. DOT and other existing agencies and programs.

V. CONCLUSION

As described in this chapter, potential government roles supporting transportation infrastructure finance include increasing the overall availability of capital, reducing the cost of capital, improving access to capital, and enhancing the flexibility of available financial terms. Current adverse market conditions notwithstanding, the Commission believes that, over the longer term, there generally will not be a lack of investment capital for transportation infrastructure. There are, however, particular identified market gaps that federal and state policy makers should continue to address, including the need for "patient" subordinate or conditional capital for large projects financed with direct user fees and the need for low-cost capital for small projects with dedicated revenues. Identified opportunities also exist to deploy carefully structured tax and other financial incentives to encourage state and local project sponsors and potential private-sector partners to invest in certain projects that generate significant public benefits but that cannot be fully monetized by users or other direct beneficiaries.

Chapter 8 provides a number of specific recommendations to create new or expand upon current federal programs and policies designed to facilitate the financing of infrastructure projects by state, local, and private sponsors. These recommendations are based on the Commission's general findings:

- Individual finance-related recommendations will have very limited positive impact if they are not coupled with substantial net new resources for surface transportation; further, these new revenues should be strongly linked to use of the system.

- The federal government should work to help make appropriate new financing solutions available and generally encourage more financing flexibility where feasible and in the public interest, recognizing that no solution is one-size-fits-all.

- A new national financing entity, if carefully structured and targeted, may be positioned to improve the allocation of federal resources but will not solve the funding crisis facing the nation's transportation system. Looking beyond the current market disruption, the fundamental infrastructure investment problem is not a lack of capital sources; rather, it is a lack of underlying revenues (whether tax-backed or user-backed) to repay debt investors or provide a return to equity investors.

- There is an important continuing opportunity to take advantage of private-sector financial participation in accelerating the development of new transportation infrastructure ("greenfield" projects) with revenue generating capacity, contingent on proper attention to protecting the public interest. Asset monetizations ("brownfield" conversions), on the other hand, are more highly situational opportunities and will have a narrower role.

- Potential government credit assistance, financing incentives, tax subsidies, and direct funding contributions should be thought of as a continuum in terms of the degree of subsidy provided and should be carefully targeted to clearly identified investment needs or market gaps. Finally, while there has been considerable focus in recent years on the financing mechanisms and related government policies discussed in this chapter, it is important to bear in mind, as evidenced by the statistics provided here, that even if used to maximum benefit these tools are applicable to a relatively narrow range of projects and will not substitute for core funding programs.

Endnotes

1. "Private Sector Has US $180 b to Spend on Infrastructure," P3 Americas, January 21, 2009.

2. *Evaluation of Innovative Finance Tools as a Transportation Financing Mechanism*, paper prepared on behalf of National Surface Transportation Policy and Revenue Study Commission, January 2007.

3. National Cooperative Highway Research Program, *Future Financing Options to Meet Highway and Transit Needs* (Washington, DC: Transportation Research Board, December 2006).

4. More information on these tools can be found on the Federal Highway Administration Web site and in various reports to Congress.

5. *Evaluation of Tax-Preferred Investment Products as a Transportation Financing Mechanism*, paper prepared on behalf of the National Surface Transportation Policy and Revenue Study Commission, January 2007.

6. All private activity bonds (except certain 509(c)(3) bonds) are subject to the Alternative Minimum Tax under Section 57(a)(5).

7. *Evaluation of Tax-Preferred Investment Products*, op. cit. note 5.

8. Eric Solomon, Acting Deputy Assistant Secretary for Tax Policy, U.S. Department of the Treasury, Testimony Before the Subcommittee on Select Revenue Measures, House Committee on Ways and Means, March 2006.

9. The availability payment concession approach can be used for both new capacity and existing facilities but to date has shown greater applicability to the former.

10. For further discussion of the appropriate use of public-private partnerships for transit projects, see U.S. Secretary of Transportation, *Report to Congress on the Costs, Benefits, and Efficiencies of Public-Private Partnerships for Fixed Guideway Capital Projects* (Washington, DC: U.S. Department of Transportation (DOT), December 2007).

11. Government Accountability Office, *Highway Public-Private Partnerships—More Rigorous Up-front Analysis Could Better Secure Potential Benefits and Protect the Public Interest* (Washington, DC: February 2008).

12. In 2007, the Texas Legislature imposed a limited moratorium on toll roads developed through public-private partnerships in the state and formed a special committee to review and analyze public-private partnerships and make recommendations to the 2009 legislature. In December 2008, the Committee's report was published, concluding that public-private partnerships offered substantial benefits in appropriate cases for delivering and financing new highway capacity. Report of the Legislative Study Committee on Private Participation in Toll Projects, December 2008, at www.senate.state.tx.us/75R/Senate/commit/c820/c820.htm.

13. For additional discussion of these and other issues related to the oversight of public-private partnerships, including a survey of approaches used in actual transactions, see Federal Highway Administration, *Public Policy Considerations in Public-Private Partnership (PPP) Arrangements* (Washington, DC: U.S. DOT, January 2009).

8

THE PATH FORWARD

Policy Recommendations

The recommendations of the National Surface Transportation Infrastructure Financing Commission are based on a set of guiding principles that together can help achieve a national surface transportation system that is safe, effective, efficient, fair, and sustainable.

Six guiding principles have underpinned the Commission's evaluation of funding and finance alternatives and the resulting policy recommendations (see Box 8–1 and Chapter 1 for more detail). As noted throughout this report, applying these broad principles to achieve an effective and comprehensive funding approach requires careful consideration of a wide range of factors and some balancing among competing demands. The Commission has strived to achieve such balance in its final recommendations.

The Commission's recommendations focus primarily on funding strategies for federal investment in surface transportation, but they also address potential federal policy drivers to stimulate and facilitate state, local, and private investment. The Commission recognizes that because of the diversity of state and local funding needs, fiscal situations, and tax structures, among other factors, there is no one "silver bullet" solution. Rather, states and localities will have to continue to develop funding and finance packages that fit their individual situations. The federal government should work to enable the broadest set of options and to avoid impeding or preempting any available options at the state and local level. This basic tenet should guide federal action other than for a narrow set of circumstances, such as any policy that would impede the flow of interstate commerce.

As noted throughout this report, some issues are outside the stated scope of the Commission's charge, as articulated by Congress in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), relating to how the money is *spent* rather than

BOX 8–1: GUIDING PRINCIPLES

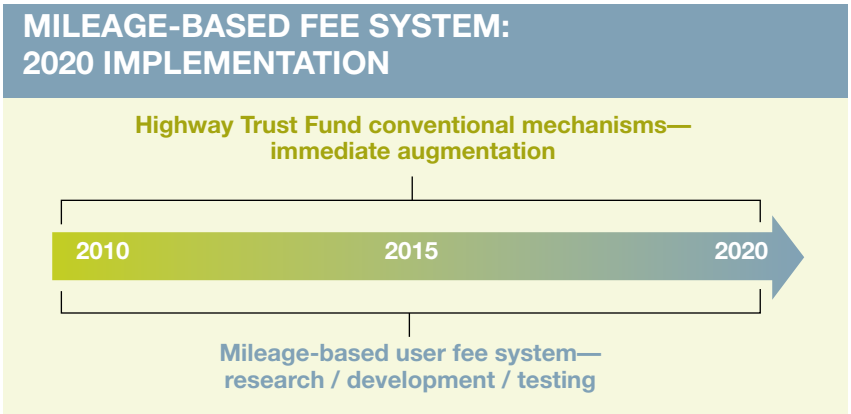
- The funding and finance framework must **support the overall goal of enhancing mobility** of all users of the transportation system. The range of mobility needs throughout the nation requires an intermodal transportation network that ensures easy access, allows personal and business travel as well as goods movement without significant delays, and permits seamless transfers and choices among complementary transportation systems and services.
- The funding and finance framework must **generate sufficient funding to meet national investment needs on a sustainable basis,** with the aim of closing a significant funding gap. The framework must enable the federal government to raise sufficient funds and also support the ability of other levels of government to raise sufficient funds and make appropriate investments.
- The funding and finance framework should **cause users and direct beneficiaries to bear the full cost of using the transportation system to the greatest extent possible** (including for impacts such as congestion, air pollution, pavement damage, and other direct and indirect impacts) in order to promote more efficient use of the system. This will not be possible in all instances, and when it is not, any cross-subsidization must be intentional, fully transparent, and designed to meet network goals, equity goals, or other compelling purposes.
- The funding and finance framework should **encourage efficient investment** in the transportation system—recognizing the inherent differences between and within individual states—such that investments go toward projects with the greatest benefits relative to costs.
- The funding and finance framework should **incorporate equity considerations**—for example, with respect to generational equity, equity across income groups, and geographic equity.
- The funding and finance framework should **support the broad public policy objectives of energy independence and environmental protection.** Revenue-raising mechanisms that charge the full cost of system use (including externalities such as carbon emissions) can support reduced petroleum consumption and improved environmental outcomes.

how it is *raised*. Because spending policy will have a direct bearing on the likely effectiveness of its revenue-raising recommendations, the Commission has offered some commentary on expenditure strategy in a few areas.

The Commission has focused on the need for additional investment in surface transportation and transforming the way we, as a nation, fund our transportation investments and, in so doing, recognizing the urgent need for fundamental reform. Of course, if accomplishing such a major change were easy, it would have already happened. Given the long-term nature of transportation infrastructure and the complex intergovernmental partnerships involved in the current funding framework, change of the magnitude the Commission envisions requires a deliberate and carefully constructed transition plan. That plan must embody a new vision for transportation funding centered on a robust direct user charge system to the greatest extent possible. The Commission recommends that the transition plan be a key component in the upcoming federal reauthorization cycle and recognizes that it will require significant work over at least the next two reauthorizations to aggressively yet systematically transition to a new funding model that is sustainable in the longer term. And while that transition plan is being put in place, in the short term we must take steps to address the immediate funding crisis through more conventional means. The transportation system and the nation cannot afford to wait.

OVERVIEW OF FINDINGS AND RECOMMENDATIONS

The Commission has reviewed a wide range of issues and options and, as noted above, has come to the conclusion that federal funding for surface transportation must be transitioned from the current indirect and increasingly ineffective user pay system of federal fuel taxes and vehicle charges to a more robust system that incorporates a more direct user pay structure. A direct user charge system can raise substantially greater revenues and is more sustainable in the long term. Further, the Commission has concluded that the most viable approach in the long run will be a system that is based directly on miles driven (commonly referred to as a vehicle miles traveled (VMT) fee system). This approach also will strengthen state and local governments' ability to assess charges that better capture actual costs with their own pricing systems where appropriate (e.g., based on time of day, location, vehicle weight, and fuel economy). The Commission recognizes, however, that such a transition cannot be made overnight and that the immediate needs are simply too critical to wait. The Commission therefore recommends a multi-pronged approach to meet both short-term and longer-term challenges:



- **Protect and Enhance the Highway Trust Fund (HTF).** The Highway Trust Fund has served us well and should be continued as the foundation for our user-based surface transportation funding system to ensure ongoing accountability.

- **Transition to a New Revenue System.** Recognizing the problems inherent in the current fuel tax–based system, particularly over the longer term, the Commission recommends shift-

ing to a system based on more direct user charges, using measures of miles traveled as the basis. This transition process should commence immediately and have as its goal deployment of a comprehensive new system by 2020.

- **Address the Near-Term Federal Funding Crisis.** Meanwhile, to address the immediate and critical investment gap, the Commission recommends one-time increases in and indexing of existing Highway Trust Fund revenue sources. These adjustments should be made in conjunction with the upcoming reauthorization of the federal surface transportation program.

- **Facilitate State and Local Investment.** Concurrently, the federal government should put in place policies that allow and encourage state and local governments to raise additional funds from targeted user-based mechanisms such as tolling and pricing. While other funding mechanisms undoubtedly are important at the state and local level, federal policy does not generally play a significant role with those.

Given the complexity inherent in transitioning to a new revenue system and the urgency of the need, the Commission recommends that Congress embark immediately on an aggressive research, development, and demonstration (RD&D) program. This would identify critical policy questions, gather information on such questions, and move forward with the transition based on this work.

As background to the specific policy recommendations, the Commission arrived at a number of critical findings.

- **The current federal surface transportation funding structure that relies primarily on taxes imposed on petroleum-derived vehicle fuels is not sustainable in the long term and may erode more quickly than previously thought.** Emerging energy and environmental policies and new vehicle technology (relating both to fuel efficiency and alternative fuels) are already driving down petroleum consumption by individed highway system users, and the rate of reduction is likely to accelerate over time.

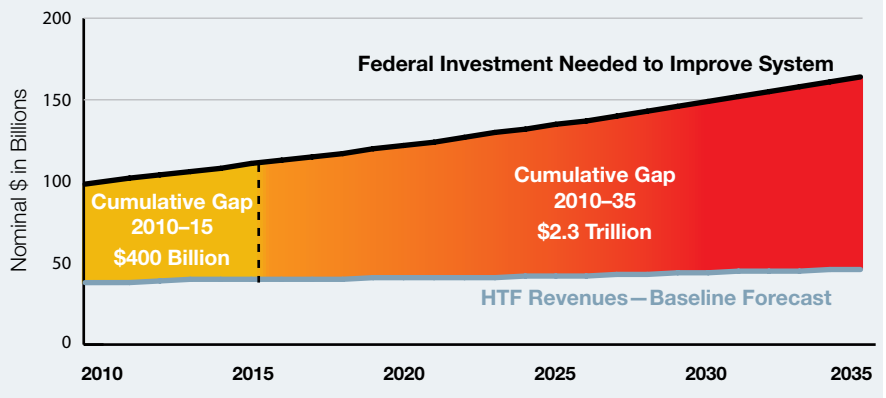
- **At current levels of taxation, the existing structure is unable to generate sufficient revenues to meet the federal share of demonstrated national system needs**—and the gap between revenues and needs will continue to widen. (See Exhibit 8-1.)

- **In the current environment, where needs far outstrip resources, state and local policy makers are struggling to meet the most basic requirements for simply maintaining the existing system.** They are particularly challenged when assembling funding for key improvements to the system, especially for the largest and most complicated capital improvements to the national network.

- **Among the key roles the federal government can play is to offer new incentives to help state and local officials overcome friction points in using new funding approaches, including but not limited to the option to charge tolls to construct new highway capacity in metropolitan areas and other types of direct user fees to the extent that states and localities find it appropriate and effective to use those strategies to raise their non-federal shares.** Offering the necessary incentives, grants, and policy support will require substantial federal resources. If conducted in conjunction with increases in current HTF revenue sources, however, this can be accomplished without taking

away resources from the core federal program and will enable existing federal HTF funds to go farther than they would otherwise.

EXHIBIT 8–1: A LARGE AND WIDENING GAP BETWEEN FEDERAL REVENUES AND INVESTMENT NEEDS, 2010-35 (in nominal dollars)



- **Properly structured financing techniques, including partnerships with the private sector, can provide important help by leveraging future revenue streams to meet upfront capital investment needs.** Such financing techniques, however, should not be expected to be a substitute for solving the true underlying problem: the need for immediate and significant revenue increases to begin to reverse the surface transportation investment deficit that has built up over at least the last few decades. Further, substituting financing for increased revenues may exacerbate the problem by masking the underlying funding deficit.

- **A funding and finance framework that relies on more direct forms of "user pay" charges such as a VMT fee system is the consensus choice for the future.** The Commission's extensive investigation into alternative funding approaches has proved to its satisfaction that a VMT-based system is the best available option for the next-generation federal revenue system. A properly calibrated VMT fee system could:

  - Make it more feasible to provide sufficient resources to fund a cohesive and comprehensive national surface transportation program, including necessary and important cross-subsidies for certain areas or user groups, such as rural highways, public transportation, or other critical investments
  - Be structured to more equitably allocate real system costs to those users placing the most demands on the system based on the belief that system use, not solely fuel use, is what affects the quality of our transportation system
  - Help optimize use of existing infrastructure and result in relatively lower overall capital investment needs
  - Avoid dependence on consumption of petroleum-derived fuels for its very existence, which is increasingly important given current and emerging energy and environmental goals that will drive increases in fuel efficiency

  In sum, if implemented correctly, a VMT-based system would be most consistent with the Commission's guiding principles for a new federal funding approach, as outlined earlier.

The individual policy recommendations presented in this chapter are structured to respond to the Commission's key findings and to achieve the required fundamental paradigm shift with the least disruption to current system users, recognizing that no transition is possible without some challenges or short-term dislocations.

The Commission's recommendations are organized in four broad categories:

- **Federal Revenue Strategy Recommendations—**including short-term and long-term recommendations to raise money for the federal portion of the national surface transportation system investment needs

- **Recommendations on Federal Policy Drivers to Facilitate Non-Federal Investment** (including for states' share of costs of the federal system and portions of the transportation system beyond the federal purview)—such as tolling provisions as well as finance and tax policy recommendations

- **Research, Development, and Demonstration Recommendations—**to support the broader recommendations and, in particular, to support the transition that is envisioned while minimizing disruptions to the system and its users

- **Additional Recommendations Related to Resource Allocation—**including a few observations about the allocation of federal resources that are closely related to the Commission's funding and finance-related recommendations

I. FEDERAL REVENUE STRATEGY RECOMMENDATIONS, INCLUDING EXISTING AND NEW SOURCES

This section outlines the Commission's recommendations for raising revenues to fund the federal share of national surface transportation investment both immediately and in the longer term. These recommendations are based on the analysis of individual revenue options detailed in Chapters 3, 4, 5, and 6. Chapter 3, in particular, groups options into the following four categories:

- **Strong Options—**the most feasible mechanisms for raising future federal surface transportation revenues or for federal action to help enable state and local governments to raise revenues

- **Moderate Options—**mechanisms that are considered as potential revenue sources but that present major concerns in one or more areas when considered as a federal option (some of these options are more effective and appropriate at the state or local level)

- **Weak Options—**mechanisms considered to have low revenue potential or that present major concerns in multiple areas

- **Seriously Flawed or Not Applicable Options—**mechanisms the Commission briefly examined but were deemed either to have serious flaws, be inappropriate as a federal mechanism, or not suited for federal encouragement of state and local action

Exhibit 8–2 categorizes the various federal options as well as those options for which federal action could help facilitate funding at the state or local level (by viability category). The chart also lists options that have no federal applicability or role (additional details can be found in Chapter 3).

EXHIBIT 8–2: REVENUE OPTION EVALUATION SUMMARY*

Strong	Moderate	Weak	Not Applicable/ Seriously Flawed**
Federal Options			
• Vehicle miles traveled fee • Automobile tire tax • Motor fuel tax • Carbon tax/cap and trade • Customs duties • Truck/trailer sales tax • Vehicle registration fee • Heavy Vehicle Use Tax • Container fee • Tariff on imported oil • Sales tax on motor fuels • Truck tire tax	• Freight waybill tax • Vehicle sales tax • Harbor maintenance tax • General fund transfer	• Freight ton-mile tax • Driver's license surcharge • Bicycle tire tax • Dedicated income tax • Auto-related sales tax • Freight ton-based tax • General sales tax	• Vehicle inspection and traffic citation surcharge • Vehicle personal property tax • Windfall profits tax • Petroleum franchise tax • Minerals severance tax • Federal tax on local transit fares • Federal tax on local parking fees
State and Local Options Benefiting from Federal Action			
• Facility level tolling and pricing	• Proceeds of asset sales, leases, and concessions	• Cordon area pricing • Passenger facility charges	• Development and impact fees • Tourism-related taxes • Tobacco, alcohol, and gambling taxes

**For revenue options that are dependent upon utilization of a targeted investment fund as a basic premise for feasibility, such a fund is assumed for evaluation purposes (e.g., for all freight-related funding mechanisms and more specifically those more narrowly targeted to intermodal port and harbor-related investment).*

*** State and local options in this category may have applicability but there is no relevant federal action or role.*

Immediate Action: Existing Highway Trust Fund Sources

The Commission views the following recommendations as necessary immediately in order to help stem the loss in purchasing power of the Highway Trust Fund and at least partially close the mounting gap between identified needs and available resources.

I-1. Congress should continue the Highway Trust Fund mechanism and take any necessary actions to help ensure its security and sustainability in the near and longer term. Such steps include the following:

I-1a. Ensure the integrity of the HTF is maintained on a going forward basis. This would reaffirm the intended link between direct and indirect user fees and transportation spending upon which the HTF is based.

In the future, the HTF should retain all dedicated surface transportation funding—with no funding, including interest payments, siphoned off into the General Fund. Prior to enactment of the Transportation Equity Act for the 21st Century, interest earned on HTF cash balances was credited to the HTF. This practice should be resumed and, going forward, any earned interest should be considered part of the protected resources of the HTF. Likewise, with limited exceptions to meet specific policy objectives such as funding for economic stimulus to

respond to periods of national economic downturns, natural disasters, or national emergencies, the HTF should be funded solely from user fees and taxes and not General Fund payments.

I-1b. Continue efforts to reduce or minimize tax evasion.

Since 1986, the Internal Revenue Service and the Federal Highway Administration have worked cooperatively to reduce fuel tax evasion by supporting changes in tax collection procedures and additional enforcement resources. Enforcement activities, which directly contribute hundreds of millions of dollars to the HTF and state transportation funds, should be continued and enhanced.

I-1c. Continue to align spending closely with receipts and to invest any residual balances in Treasury securities that generate modest annual interest income credited to the HTF.

As evidenced by the solvency crisis experienced by the HTF and the resulting stop-gap measures, it is critical that steps be taken to more carefully align HTF spending levels with receipts and to monitor the match between the two. This is especially critical in light of the greater volatility and potential decline of HTF receipts experienced recently and anticipated to continue.

I-2. Congress should immediately enact a modest 10¢ increase in the federal gasoline tax, a 15¢ increase in the federal diesel tax, and commensurate increases in all special fuels taxes as part of the transition to a new funding system. Once the transition is achieved, the fuel taxes should be replaced as the primary federal surface transportation funding mechanism. Given the magnitude of the immediate need, these increases should be made as a single step rather than in increments.

Far from a panacea and covering only a portion of the actual need, the recommended adjustments (see Exhibit 8-3) to these existing HTF sources would enable the current level of federal program funding commitments to be continued. They also approximate the amounts required to recapture the purchasing power lost to inflation since 1993, the last time federal motor fuel taxes were increased. The net new funds raised will play a critical role in helping to meet the very real near-term funding challenge and also help fund critical transition strategies.

The recommended 15¢ increase in the diesel fuel tax has two components: the first 13¢ would increase the current diesel fuel tax commensurate with the recommended increase in the gasoline tax; the remaining 2¢ increase would be used to create stepped-up funding specifically for freight purposes, which the Commission recommends be dedicated to freight-related investments such as, but not limited to, Interstate routes that run through congested areas and Interstate routes that provide national connectivity for freight movement, major corridors serving seaports and border crossings, and intermodal facilities. The Commission considered other options to secure increased funding for freight-related investments (see Chapters 3 and 5 for detailed discussion of

The proposed 10¢ gas tax increase to maintain the current federal surface transportation program level equals:

- **½¢ per mile**
- **$5 a month per vehicle**
- **$9 a month per household***

**Based on 1.89 vehicles per household and 11,818 miles driven per vehicle (2006 Highway Statistics), and 20.4 average MPG (EIA 2008 estimates).*

EXHIBIT 8–3: CURRENT MOTOR FUEL TAX RATES AND PROPOSED INCREASES

Motor Fuel Tax Type	Current Rate	Recommended Increase	New Rate (Base Year)
Gasoline and Gasohol	18.4¢ per gallon	10¢ per gallon	28.4¢ per gallon
Diesel	24.4¢ per gallon	15¢ per gallon	39.4¢ per gallon

these alternative approaches) but decided that, in the near term, the diesel tax increase (and adjustments to other freight fees already going to the HTF) would be the most cost-effective, fair, and least distorting means of securing these additional resources.

The Commission recognizes that the increases recommended here are not easy to achieve, especially in the context of the current economic recession, and that larger increases would be even more difficult. The Commission, however, views the increases as urgent and critical to begin to stem the degradation of the Highway Trust Fund. Together, these increases would translate into nearly $20 billion per year more than is collected today and would allow the federal government to fund its current commitments. Using the Base Case capital investment scenario presented in Chapter 2, this additional revenue would help close about 43 percent of the federal "cost to maintain" funding gap and about 31 percent of the federal "cost to improve" funding gap for the combined highway and transit system. Addressing the remaining annual funding gap at the federal level would require either more substantial increases or other revenue streams or both.

These increases in federal revenues are critical to immediately bolster the Highway Trust Fund and enable investments to at least slow system degradation. Further, efforts by state and local governments to maintain and increase non-federal revenues for surface transportation—whether through targeted tolling and pricing, fuel taxes, or other strategies—will enable an even higher level of overall investment, thereby supporting even more critical investments. All levels of government have important roles to play in ensuring a strong surface transportation system.

The Commission recognizes that some states may view increases in federal fuel taxes and funding as an opportunity to reduce state fuel taxes and spending or to avoid future state-level increases. The Commission encourages Congress and the U.S. Department of Transportation (DOT) to consider ways to address this "maintenance of effort" issue when formulating new programs and managing the intergovernmental funding partnership balance. Continuing to require a non-federal match will help address this concern.

I-3. Congress should index all federal motor fuel taxes to inflation on a going forward basis.

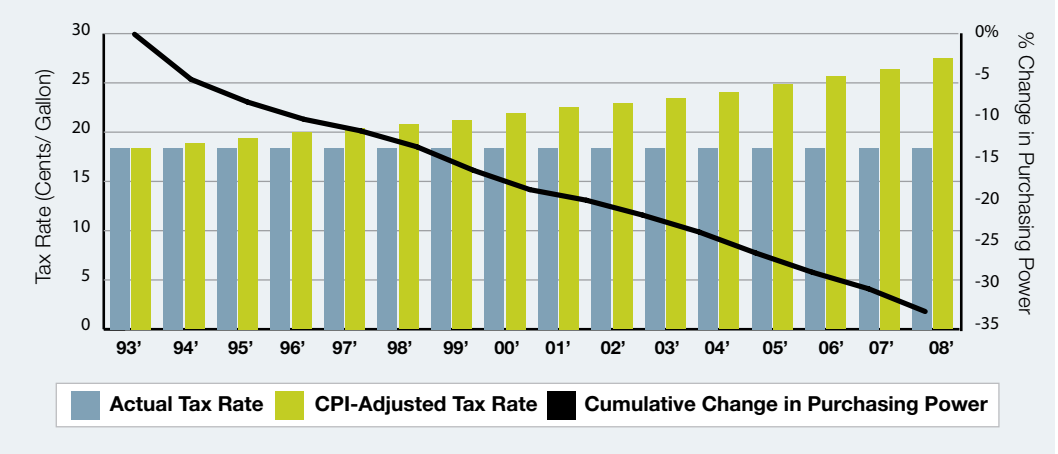
Indexing should be implemented to further stem the ever-increasing gap between investment needs and available resources. (See Exhibit 8–4.) While we may never close the gap to zero, the Commission strongly believes that indexing at least will help retard the growth in the funding gap that has occurred over the last few decades. The Commission examined various possible indices, including the following:

- Consumer Price Index, or CPI (using the CPI for all Urban Consumers, or CPI-U)
- Producer Price Index for Highway and Street Construction

- Core Producer Price Index
- Gross Domestic Product Implicit Price Deflator
- Other indices created by industry organizations

Although long-term growth trends for the various measures are quite similar, the indices more specifically targeted to highway and street construction tend to be significantly more volatile. (See Chapter 2.) The Commission therefore believes that the CPI would be appropriate to use in adjusting for future inflation because of its historical consistency with average growth rates of more targeted indices and the availability of longer-term index projections. The Commission recognizes construction costs—and thus investment needs—likely will vary, sometimes significantly, from the indexed revenue streams at certain points in time.

EXHIBIT 8-4: FEDERAL GASOLINE TAX RATE AND LOSS IN PURCHASING POWER



Source: FHWA 2006 Highway Statistics, Table FE-21B, indexed using CPI-U as reported by the Bureau of Labor Statistics.

I-4. Congress should maintain the current sales tax on tractors and trailers as well as the excise tax on heavy vehicle tires and immediately double the Heavy Vehicle Use Tax (HVUT) to account for the fact that it has not been increased since 1983, thereby recapturing the purchasing power of that tax. The HVUT and excise tax on truck tires should then be indexed to inflation (using the CPI) on a going forward basis. (Because the tax on tractors and trailers is a sales tax, it is already inherently indexed to inflation, at least with regard to prices of these items.). This approach parallels the recommended increases in fuel taxes.

The Commission considered several alternative freight-related revenue sources. (See Chapters 3 and 5.) With the possible exception of a customs duties surtax or a container tax that would specifically fund an intermodal/border crossing program, the Commission believes that the best way to increase funds from freight in the short run is by increasing the fees the trucking industry currently pays into the Highway Trust Fund and in the longer term by moving to a mileage-based fee structure. While the Commission is not affirmatively recommending imposition of a customs duties surtax or container tax as part of the broad-based funding solution, these are two policy measures, along with others the Commission ranks as possible options, that Congress may wish to consider, in particular for appropriately targeted investment categories.

In addition, Congress should commission a study to assess whether freight-related users pay an appropriate share of total surface transportation infrastructure costs, particularly the costs imposed by freight users on the highway network.

Transitioning to New Funding Framework: A Mileage-based Direct User Fee System

The following specific recommendations detail the Commission's general recommendation to begin transitioning immediately to a new federal revenue mechanism and to plan for full implementation in the shortest possible time. These recommendations should be considered in combination with the related and critically important RD&D recommendations addressed later in this chapter. Without such efforts, the transition simply will not be possible.

I-5. Congress should initiate the transition to a broad mileage-based direct user fee system (i.e., VMT fee system) as soon as possible and should establish 2020 as the date certain for comprehensive implementation. Congress should establish overall goals for the transition and outline specific transition steps to be taken over the next decade and incorporate these into in the next two federal program reauthorization cycles.

At a point in the future, the current fuel tax–based system will be simply unsustainable at any "reasonable" tax rates (due to increased fuel efficiency and new technology). Moreover, the time frame for this is likely to come much more quickly than previously thought due to a new invigorated focus on solving the greenhouse gas emissions challenge and advancing technological progress. Even absent a decline in future motor fuel consumption, there would be compelling reasons for shifting to a VMT-based system that supports more efficient pricing and use of our nation's surface transportation infrastructure.

The Commission recommends that Congress articulate a clear roadmap, with appropriate research, development, and demonstration testing for this transition beginning with the next reauthorization of the federal surface transportation program. We must move aggressively to make a VMT charge system the central means of funding the federal program, over time replacing fuel taxes and other current federal HTF sources.

The new system must be designed to provide a sustainable revenue source for the future that is capable of charging all types of vehicles regardless of whether they use motor fuel, electric motors, or alternative energy sources. The system should ultimately result in all vehicles—including personal automobiles and commercial vehicles—being equipped with a device that accommodates per mile charges. The system should be designed to be multimodal, adaptable with technology updates, capable of protecting private information, and able to serve as a single mechanism to be used for all transportation taxation and pricing, including:

- VMT fees for multiple jurisdictions, including federal, state, and local
- Toll facility charges (both public and private)
- Congestion pricing and managed lanes applications at the state and local level as desired
- Appropriate emission charges, if not handled through other means
- Transit fares via "mobile commerce" type technology (e.g., smart cards and mobile phones) that can be integrated with in-vehicle VMT fee technology
- Other vehicle-related charges, including charges on heavy vehicles, possibly based on axle weight

The national VMT fee system should also have the following basic characteristics (additional details can be found in Chapter 6):

- The VMT fee system must be reliable, secure, and enforceable and must protect against identity theft. It also must permit the efficient transfer of revenue among the federal government, states, local jurisdictions, and private service providers.

- In support of the dual objectives of ensuring transparency and maximizing the benefit of pricing signals, the VMT fee system must provide travelers and commercial vehicle operators with information on applicable rates, through a combination of roadway signage, in-vehicle devices, and the Internet (e.g., computers, cell phones, etc).

- The VMT fee system should provide a means for preserving privacy and allow for anonymous operations for motorists desiring such protection. The Commission has concluded that available and emerging technology will be able to accommodate the highest degree of privacy protections. Further, the VMT fee system should incorporate and offer the user choices of protections that may include but are not limited to allowing cash or cash card payment methods that separate use reporting from payer identity, limiting the amount or type of information collected, encrypting the information, or combining these approaches, with the ultimate choices factoring in the associated relative costs.[1]

- The VMT fee system should be designed to maximize cost-effectiveness. Recognizing that the system will initially have higher collection costs than current fuel taxes, all efforts must be made to reduce system costs, including for equipment and administration. The aim should be for the total annual net cost of operation to be less than 10 percent of the total revenue collected within a few years of implementation and less than 5 percent in the longer term.

- Finally, if there is a phased transition, the system must be designed so that during the transition highway users are not paying both the gas or diesel tax and the VMT fee simultaneously except to the extent that all or a portion of these motor fuel taxes are converted to a "carbon tax," in which case all users would be required to pay either the VMT fee and the "carbon tax" or the fuel tax (which would incorporate both charges).

I-6. Once implemented, mileage-based user fees should be set to meet the designated federal share of national surface transportation investment needs and be indexed to inflation.

At the federal level, the Commission believes that future mileage-based charges should be established and maintained at rates sufficient to fund the entire federal share of annual needs. Exhibit 8–5 illustrates the level of per mile charges that could meet this objective under the two Base Case needs levels reviewed in Chapter 2. For comparison purposes, it also provides illustrative fee levels required to match current HTF revenue levels, to match current federal highway and transit program spending levels, or to equal the Commission's recommended Augmented HTF Level via the motor fuel tax increase previously outlined. It should be noted that these scenarios do not incorporate any additional assessments for a "carbon tax" should Congress choose to use this mechanism for the purpose of reducing greenhouse gas emissions.

For illustrative purposes, to meet the "Need to Maintain and Improve" annual investment level ($96.2 billion in 2008 dollars according to the Commission's base case analysis), the federal

VMT fee assesed on all miles driven, regardless of the system where they occur, would be approximately 2.3¢ per mile for light-duty vehicles (LDVs) and 13.2¢ per mile for heavy trucks (an average of 3.2¢ per mile for all vehicles). If, alternatively, the VMT charges were limited to miles driven on the federal-aid highway system, the approximate fee would be 2.7¢ per mile for LDVs and 15.5¢ per mile for heavy trucks (an average of 3.7¢ per mile for all vehicles). In either case, those rates would need to be adjusted to account for inflation and changes in total travel. For point of comparison, they would be equivalent to a 48.4¢ per gallon federal gas tax and 75.9¢ per gallon federal diesel tax. However much revenue Congress decides to raise at the federal level, the Commission believes it is critical to move forward with a VMT fee system.

These scenarios do not account for the additional amounts that would likely need to be charged to recover the cost of administering a national VMT fee system. These costs are currently unknown but are expected to exceed the current costs for administering motor fuel taxes (about 1 percent of total revenues). To provide some perspective, the additional fee needed to cover administrative costs equal to 5 percent of total national VMT fee revenues would be in the range of 0.1–0.2¢ per mile.

A comprehensive road pricing system, as envisioned here, would allow greater fine-tuning of individual fees than the current fuel tax–based system permits. As a result, it may be necessary to establish a body that advises Congress on the federal rates. Such a body could review and propose adjustment to differential charges by vehicle class and weight, location, and other factors, as appropriate. Further, since there may be disputes among jurisdictions regarding non-federal VMT charges or situations where such charges could place an undue burden on interstate commerce, consideration should be given to establishing a quasi-judicial body with specific expertise on VMT rate setting to address such situations.

EXHIBIT 8-5: ILLUSTRATIVE ESTIMATED FEDERAL VMT FEES TO MEET NEEDS

(all figures 2008 dollars in billions)

	Estimated Federal VMT Fees (¢/mile)[a]						Equivalent Fuel Taxes (¢/gallon)[b]		Required Annual HTF Revenues
	Charge on All Miles			Charge FAH Miles Only					
Needs Scenario	LDVs	Trucks	Avg.[c]	LDVs	Trucks	Avg.[c]	Gasoline	Diesel	(billions)
Maintain Current Levels Scenarios									
2008 HTF Revenues	0.9¢	5.0¢	1.2¢	1.0¢	5.9¢	1.4¢	18.3¢	24.3¢	$ 36.4
2008 Federal Program Level	1.3¢	7.3¢	1.8¢	1.5¢	8.6¢	2.1¢	27.0¢	39.2¢	$ 53.6
Augmented HTF Levels	1.4¢	7.7¢	1.9¢	1.6¢	9.1¢	2.2¢	28.3¢	39.3¢	$ 56.4
Base Case Needs Scenarios									
"Need to Maintain"	1.9¢	10.6¢	2.6¢	2.2¢	12.5¢	3.0¢	39.0¢	59.9¢	$ 77.6
"Need to Improve"	2.3¢	13.2¢	3.2¢	2.7¢	15.5¢	3.7¢	48.4¢	75.9¢	$ 96.2

a. Estimated LDV and truck VMT charges maintain the current ratio of LDV and truck-related contributions to the HTF (i.e., revenues from federal gasoline and special fuel taxes versus federal diesel taxes plus truck user fees).

b. Equivalent motor fuel tax rates assume current truck-related user fees are maintained (indexed for inflation); motor fuel taxes are based on levels needed to maintain the current ratio of total LDV to truck-related contributions. Equivalent rates also assume and account for the extension of current motor fuel tax refunds and transfers.

c. Average VMT charges are simply total required revenues divided by all LDV and truck miles on the applicable system.

I-7. As a national mileage-based fee system is put in place, Congress should reduce and ultimately eliminate the current fuel and vehicle-related taxes as the primary mechanism for funding the surface transportation system.

A fully implemented national mileage-based system will reduce the need for other federal revenues for the HTF, assuming rates are set at a level sufficient to meet needs. In all likelihood, however, some method may be required to charge specifically for carbon emissions in order to send the right price signals to vehicle owners and users. These charges could occur as a continuation of the current fuel taxes (which would then be acting as a "carbon tax"), under a "cap and trade" type system, or potentially as a vehicle-specific surcharge to the VMT fee. To the extent that such carbon charges are implemented, a portion of those proceeds should be credited to the HTF and dedicated to funding carbon-reducing transportation strategies.

I-8. Congress should give U.S. DOT the authority and mandate to develop standards for VMT pricing technology and require original equipment manufacturers to install that technology by a date certain that will accommodate the desired 2020 comprehensive implementation.

Any technology deployed should be designed to accommodate the full range of potential charge systems because the Commission anticipates that state and even local charges may piggyback on the national system. Further, these systems should allow states, local governments, and private toll road operators to use such a system to charge for travel on their roads. States would not be required to join into the system, but they would likely find it beneficial to do so since all vehicles would be equipped. A single system or national account could be used for all transportation taxes and fees anywhere in the country.

The national VMT fee system should have the following technical characteristics in addition to those listed in the introduction to this section (also see Chapter 6 for additional details):

- The chosen VMT fee system must accommodate multiple forms of payment, including for individuals who choose to pay by cash, credit card, automatic bank debit, and through multiple channels, including via the Internet.

- To the extent possible, the VMT fee systems should be designed to facilitate integration with intelligent transportation systems, such as traveler information systems, and with emerging IT-based safety applications such as vehicle infrastructure integration programs. It should, to the extent possible, also have the ability to integrate with existing in-vehicle GPS systems (such as GM's OnStar system or after-market devices from companies like Garmin or TomTom).

- The VMT fee system must be established so that initially only new vehicles will be equipped with the appropriate technology, and the process of equipping all new vehicles with factory-installed equipment should begin at the earliest feasible time. When a substantial share of vehicles in the fleet (e.g., approximately 90 percent) has factory-installed technology, the remaining vehicles can be addressed through retrofit approaches.

I-9. Congress should require that any state, local, or private system be interoperable with the national VMT standard.

As noted earlier, the Commission anticipates that the national VMT fee system will serve as the backbone for an integrated system of charges by federal, state, and local governments as well as private toll facility operators. To the extent that states, local governments, or private operators implement their own systems, possibly doing so before the national system is in place, Congress should require that these systems be interoperable with the national system and meet all national standards. Should these state and local systems be established prior to the federal system and standards, states and localities should be afforded an appropriate amount of time (e.g., five years) to comply with national standards.

I-10. Congress should facilitate the transition to a VMT charge system by making existing and additional discretionary federal funds available to states for the costs of developing and implementing state-level VMT charge system programs.

To the extent that states choose to transition their systems to a VMT-type charge system, and to encourage them to invest in appropriate RD&D, the costs associated with RD&D for new state systems should be fully eligible for federal funding, under either existing programs or preferably a new targeted discretionary funding category.

I-11. Congress should support and U.S. DOT should initiate extensive public outreach to foster broad understanding of the current funding problem, the proposed solution, and the intended method of implementation.

A change as bold as a shift to a VMT-type charge system will require a great deal of public discussion and learning. A comprehensive outreach approach will be critical to a successful and timely transition. Akin to comprehensive efforts to educate the public on safety issues like drinking and driving and the use of seat belts, the public education required to bring about such fundamental change will require a partnership with state and local governments to launch a broad outreach program. This should include campaigns to circulate information on the costs and consequences of our deteriorating transportation system, how VMT pricing would work in a person's daily life, what the costs and benefits would be for various types of transportation system users, how problems and concerns would be dealt with, and so forth.

II. RECOMMENDATIONS ON FEDERAL POLICY DRIVERS TO FACILITATE NON-FEDERAL INVESTMENT

The nature of the intergovernmental funding partnership for surface transportation in the United States means that restoring the capacity of the federal government to meet needs designated as "federal responsibility" is not enough. As of 2006, state and local governments funded over 55 percent of both transit capital and highway capital through state-level motor fuel taxes, a host of vehicle-related fees and charges, property taxes, sales taxes, general revenues, transit fares, and—to a modest though increasing extent—through tolling, either directly by state and local tolling authorities or in a handful of cases by the private sector.

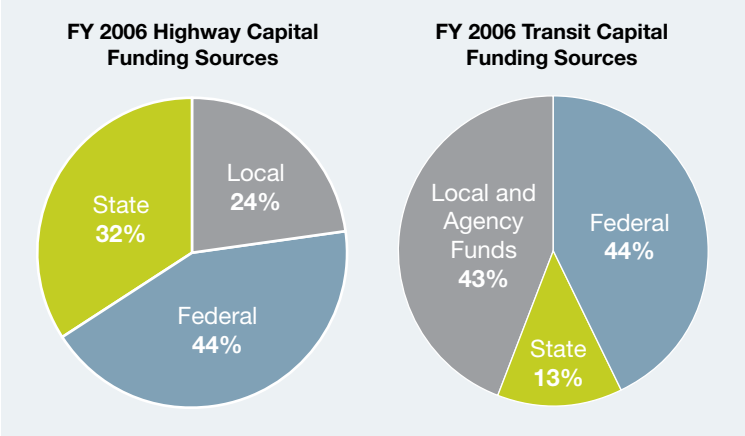
(See Exhibit 8–6.) This does not include additional system operations and maintenance costs borne primarily by state and local jurisdictions. Any national solution therefore must address not only the sustainability of the federal program but also how to enhance the ability of state and local governments to meet their share of the overall funding responsibility.

In determining what the federal government can and should do to facilitate non-federal surface transportation infrastructure investment, the Commission recognizes several important realities:

- Federal policy currently allocates HTF revenues to the states based largely on formula-driven apportionments, without specific adjustment for the quality or efficiency of outcomes.
- State and local officials, not federal officials, play the lead role in deciding what capacity enhancements to build, what role direct user fees (e.g., tolls and transit fares) will play to help fund such capacity, and the allocation of tax revenues to specific projects—subject to federal guidelines, restrictions, and specific discretionary funding programs.
- Making the decision to charge direct user fees for new capacity and managing the financing complexities of converting that future revenue stream into the maximum upfront capital for construction have presented and will continue to present daunting challenges—both politically and practically—for state and local officials.
- Overcoming these challenges need not lead to a restructuring of the model whereby state and local policy makers make the key decisions in project development and finance, but success will require new tools and closer consultation among federal, state, and local officials.

Given these realities, while the previous recommendations focused on areas of direct federal funding responsibility (and considered the possible negative effect on the states of federal funding sources), this section offers recommendations related to federal policies or programs that can increase the options available to states and localities for funding their non-federal share. The recommendations focus, in part, on financial incentives, which historically have been useful tools to help state and local officials overcome inherent obstacles to implementing funding and finance innovations in a range of policy areas, including transportation.

EXHIBIT 8–6: SHARE OF CAPITAL FUNDING, BY LEVEL OF GOVERNMENT



Sources: FHWA Highway Statistics, APTA Factbook

Examples of past successes with federal financial incentives include:

- A variety of funding programs that provided states and localities with incentives to demonstrate the application of pricing in highly urbanized transportation networks
- Federal credit programs such as the Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA) program—which, among other finance-related objectives, provides incentives for states to use new non-federal revenue streams and attract private and other forms of non-federal investment for major projects

- The State Infrastructure Bank (SIB) program, giving states an incentive to create in-house revolving loan programs to aid local and regional projects

The Commission's recommendations related to facilitating state and local investment include, but are not limited to, new financial incentive programs in three broad subcategories:

- Federal policies and programs related to tolling and other direct user fee funding initiatives
- Federal financing assistance programs, financing incentives, and tax policy
- Federal policies and programs related to private-sector financial participation

Federal Policies and Programs Related to Tolling and Other Direct User Fee Initiatives

In this section, the Commission makes recommendations regarding tolling and other direct user fee funding approaches that can play a role in narrowing the funding gap faced by state and local governments in addressing surface transportation needs, which like the federal funding gap is growing. (See Exhibit 8–7.) The Commission believes that targeted tolling at the state and local level is an important strategy, particularly in urban congested areas, at least until a more comprehensive pricing system can be established that state and local governments could rely on for a share of system funding—should they choose to do so.

EXHIBIT 8–7: TOLLING RECOMMENDATIONS SUMMARY

New Interstate Capacity, Metro Areas above 1 Million Population	New Interstate Capacity, Outside Metro Areas above 1 Million Population	Existing Interstate Capacity, Metro Areas above 1 Million Population	Existing Interstate Capacity, Outside Metro Areas above 1 Million Population	Non-Interstate Federal System (or Federal Financial Involvement)	Off the Federal System, No Federal Financial Involvement
Allowed (Subject to Toll Agreement)	Allowed (Subject to Toll Agreement)	Allowed (Subject to Toll Agreement)	Limited to expanded ISRRPP* (Subject to Toll Agreement)	Allowed (Subject to Toll Agreement)	State and Local Control

** Interstate System Reconstruction and Rehabilitation Pilot Program.*

II-1. Congress should allow tolling on the National Interstate System under the following circumstances: in combination with the provision of significant new capacity[2] or on existing Interstate capacity in large metropolitan areas (i.e., over 1 million population) for congestion relief.

The first provision would essentially broaden the SAFETEA-LU section 1604(c) Interstate System Construction Toll Pilot Program (which currently allows up to three new Interstate facilities to be tolled for the purpose of funding construction of new highways) to full program status. The second provision would build on the SAFETEA-LU section 1604(b) Express Lanes Demonstration Program (which currently allows up to 15 demonstration projects involving the collection of tolls on eligible Interstate facilities for the purpose of managing congestion or reducing emissions in nonattainment or maintenance areas) to full program status, as well as expand its potential applications.

In both cases, the permitted uses of toll revenues should conform to the uniform standard described in Recommendation II-3. In addition, to ensure full adherence to the commerce clause of the Constitution, potential adverse impacts on interstate commerce and local

travel should be thoroughly analyzed and appropriately mitigated as a requirement of implementation.

II-2. Congress should continue the Interstate System Reconstruction and Rehabilitation Pilot Program (authorized in TEA-21 section 1216(b)), which allows tolling of existing Interstate System capacity for the purpose of reconstruction and rehabilitation and should expand it from three slots to five.

The Commission supports the general construct of the pilot program and suggests a few modifications. First, applicants must explicitly address the potential impacts of tolling on interstate commerce and travel on the national system in their currently required implementation plan and U.S. DOT should take this element into careful consideration. Second, the program should require robust reporting from program participants, including a retrospective analysis of the tolling experience and resulting impacts on interstate commerce and travel. Third, the permitted uses of toll revenues should conform to the uniform standard described in Recommendation II-3.

II-3. Congress should uniformly require that residual revenues (beyond those necessary for operations and maintenance, debt service, and return on investment) generated by a toll facility under federal jurisdiction (i.e., for federal-aid projects, federal system roadways, or facilities built with federal credit assistance) be used for qualified surface transportation purposes within the state or other relevant jurisdiction. These qualified purposes should include capital investments currently eligible for federal assistance under Title 23 or Chapter 53 of Title 49 of the United States Code.

The avenue for management of this provision would be the Section 129 Toll Agreement (currently required under Section 129(a)(3) when federal highway funds are involved). The Commission recommends applying the Section 129 Toll Agreement provisions uniformly to all toll facilities where there is federal jurisdiction. All toll revenues received from operation of the toll facility must be used for the costs necessary for the proper operation and maintenance of the toll facility (i.e., the facility must be maintained at the appropriate Interstate or other standard), for debt service and to provide a reasonable return on any public or private investment as agreed to in a toll agreement. If the state (or other public authority having jurisdiction) certifies that the toll facility is being properly maintained, then any remaining (residual) toll revenues may be used for qualified surface transportation purposes within the state or other relevant jurisdiction. These qualified purposes should include highway and transit capital investments currently eligible for federal assistance under Title 23 or 49, United States Code.

II-4. Congress should require that all public and private toll facility operators publish price data on each tolled facility in interoperable electronic format so that all users, including truckers and other out-of-state users, can know how much they will pay.

Ideally, private application developers would aggregate these data into easy-to-use formats that travelers could obtain on computers, mobile devices, and in-vehicle traveler navigation devices.

II-5. U.S. DOT should complete tolling standardization rulemaking, which will govern the use of electronic tolling and interoperable systems.

Section 1604(b)(6) of SAFETEA-LU directed U.S. DOT to issue a final rule specifying requirements and standards designed to maximize the interoperability of electronic toll collection (ETC) systems. U.S. DOT issued a Notice of Proposed Rulemaking on this subject on September 20, 2007 (72 FR 53736), and a final rule is expected soon. Currently, four major types of ETC technology are used: the E-ZPass system in the northeastern and midwestern states, the SunPass system in Florida, the Fastrak system in California, and Tolltags in Texas. Clearly, making greater use of direct user charges will benefit from adoption of a single nationwide standard for electronic toll collection. The Commission therefore urges U.S. DOT to complete its rulemaking on this as quickly as possible.[3] The forthcoming U.S. DOT rule should promote interoperability without forcing toll road operators to adopt existing technology that is about to become obsolete, especially as changes are anticipated in the fundamental ETC technology. IEEE (originally the Institute of Electrical and Electronics Engineers, Inc.) needs to complete its standard-setting for the new 5.9 GHz band as quickly as possible so that this new standard can be adopted uniformly.

Federal Financial Assistance Programs, Financing Incentives, and Tax Policy

This section outlines the Commission's recommendations related to direct federal assistance programs, financing incentives, and tax policy. Together, these recommendations are intended to continue and enhance past and current initiatives on the part of the federal government to facilitate non-federal investment in surface transportation infrastructure.

II-6. Congress should reauthorize the TIFIA program with a larger volume of credit capacity, broadened scope, and greater flexibility. In conjunction with additional credit assistance, Congress should authorize incentive grants for pre-construction feasibility assessments and for capital cost gap funding to further support the development and financing of major user-backed projects. The Commission recommends a total of $1 billion per year in budget authority for these purposes as follows: $300 million per year for credit assistance, $100 million per year for pre-construction feasibility assessment grants, and $600 million per year for capital cost gap funding grants (as detailed below).

II-6a. Credit Assistance ($300 million in budget authority per year)

TIFIA has proved to be a successful niche program to facilitate the financing of major projects with dedicated revenues, especially user-backed projects, by providing important credit enhancement. In order to support states wishing to use this supplemental funding for such investments, and based on the recent increased demand for credit assistance (especially in light of current financial market conditions), TIFIA should be reauthorized and its funding level for core credit activities increased. The proposed $300 million in budget authority would be able to fund about $2–3 billion in annual credit assistance.

The Commission further recommends that the TIFIA program be given greater flexibility in committing resources for credit instruments. This is necessary because of the relatively "lumpy" nature of the development pipeline for major user-backed projects that results in uneven utilization of budgetary resources. This might be addressed, in part, by exempting TIFIA from the annual

obligation limitations that apply to most federal highway programs. The TIFIA program would continue to have multi-year budget authority from the HTF that could carry over from one year to the next. Perhaps the annual commitment of program resources could be subject to special credit limits, provided any such limits were set high enough or made flexible to accommodate demand.

II-6b. Pre-Construction Feasibility Assessment Grants ($100 million in budget authority per year)

The Commission recommends that Congress authorize and fund this state incentive grant assistance program to address a key obstacle to advancing user fee–backed projects: the funding of early feasibility assessment costs. The program would provide funding for a portion of the costs that a state or local sponsor must incur to undertake early planning, feasibility studies, environmental clearance, procurement, and other development activities. The selection process for the program would be similar to that of the current TIFIA credit program, with established specific selection criteria. Under this program category, funds provided to selected recipients could be grants. Alternatively, they could be "conditional loans," whereby they would be subject to repayment if the project progresses to implementation and once user-based revenues exceed pre-established targets. Such an early assistance program could create substantial leverage of limited federal funds as a percentage of total construction investment. For example, a $20 million feasibility assessment grant could justify and lay the groundwork for a potential $1 billion highway capacity expansion. To be sure, not all feasibility studies lead to projects, but many likely would. Because pre-construction feasibility assistance grants would assist state and local officials in using direct "user pay" approaches where appropriate, they would help expand the revenue sources available for surface transportation investment.

II-6c. Capital Cost Gap Funding Grants ($600 million in budget authority per year)

The Commission recommends that Congress authorize and fund this state incentive grant assistance program to complement TIFIA credit assistance for major user-backed projects. This new program would help offset the construction costs of TIFIA-eligible projects. It would be designed to provide "gap funding" for projects that are partially but not fully capable of being supported by direct user fee financing. Once a project has achieved environmental clearance and preliminary engineering, this program could provide assistance to help fund a portion of the estimated gap between the amount of capital for construction that can be derived from future user fees and the amount necessary to complete and maintain the facility for its useful life. Capital cost gap funding grants would be allocated to projects through a pre-established selection process like that used for the current TIFIA program. As with the feasibility assessment grant program just described, this program could create substantial leverage of limited federal funds as a percentage of total construction investment. It, too, would help state and local officials use more direct "user pay" approaches and thus expand the revenues available for surface transportation investment and minimize the reliance on tax revenues for, or the continued deferral of, the largest and most expensive capital projects.

II-6d. TIFIA Program Refinements

In addition to the funding enhancements just described, the Commission urges Congress to maintain and enhance the TIFIA program's overall flexibility, which is essential for its successful application to a wide array of important projects around the country. The Commission offers the following suggested TIFIA credit program refinements:

- *To maximize the program's effectiveness given limited resources*, take steps to give priority to the financing of new capacity projects over the refinancing of existing facilities. Congress should consider imposing several requirements for the use of TIFIA assistance to refinance existing debt, including—as part of the acquisition of an existing facility—requiring that significant new capacity be part of the acquired facility or proposed refinancing, limiting TIFIA assistance to 50 percent of the cost of the new capacity (excluding the acquisition cost of an existing facility), and requiring sponsors of refinancing proposals to pay for some or all of their federal budgetary subsidy cost (capital reserve) so that limited federal resources are preserved for new projects.

- *To support viable projects with more constrained capital market access*, allow TIFIA credit support to fund up to 50 percent of eligible project costs (TIFIA currently imposes a credit cap equal to 33 percent of eligible project costs).

- *To increase the value of the financial subsidy provided to projects receiving credit assistance and address a demonstrated friction point in the current program construct*, eliminate the "springing lien," which hinders the ability of senior project debt to obtain investment grade ratings. The "springing lien" refers to the provision in the TIFIA statute that requires the federal government's claim on a project's pledged revenues or other security to not be subordinated to the claims of other creditors in the event of bankruptcy, insolvency, or liquidation. The federal government's financial participation through TIFIA is limited to 33 percent of the project's capital cost by statute (and to not more than 50 percent as recommended in this section). This limitation is designed to leverage a relatively modest federal investment of "patient capital" with a large amount of private or other non-federal capital. This federal financing role can be very cost-effective, but only if the TIFIA investment enhances the ability of the senior debt to gain access to capital markets. When the federal investment is intended to facilitate a significant amount of non-federal financing, the springing lien is inappropriate and counterproductive. Any additional perceived credit risk can and should be reflected in the credit instrument's subsidy cost.

II-7. Congress should continue to allow states to use their federal program funds to further capitalize State Infrastructure Banks. It also should provide additional federal seed capitalization funds for SIBs and/or multi-state revolving loan fund compacts. This recommendation recognizes the value of enabling smaller projects at the state and local level, which otherwise might find market access challenging, to embrace user fees and other dedicated funding sources. The Commission suggests additional capitalization funding of up to $500 million per year for this purpose.

Although states have had the ability to fund their SIBs with a portion of their federal-aid grants, most have not done so to a significant degree because of chronic underfunding to meet capital needs. Providing this level of additional funding to the SIB program could help support a wide range of smaller projects that have the potential to leverage user-backed payments or other new revenue streams but that lack access to the capital markets on a cost-effective basis. The infusion of federal funds may be of particular value in the near term because of recent dislocations in the credit markets—including for even the most "plain vanilla" financings of state and local governments, let alone for more complex project financings.

Following the proposed model for an expanded TIFIA program, states may wish to create their own programs to help fund pre-construction costs and/or capital grants for user-backed projects as part of these expanded SIB programs. Congress may wish to promote such program activities through specially targeted funding or other means. In this manner, smaller projects could benefit from the same types of additional financial assistance afforded to projects of national interest under federal credit programs.

II-8. Congress should continue the highway / intermodal Private Activity Bond (PAB) program and increase the national volume cap from the current $15 billion to $30 billion. Congress should limit the use of the program to projects that directly provide net new capacity; this tax benefit should not be used to subsidize the acquisition financing of existing assets (i.e., "brownfield monetizations").

The Commission believes that the highway / intermodal PAB program, authorized in SAFETEA-LU with a $15 billion national volume limitation, has the potential to be an important and effective tool for states and local governments. (Highway / intermodal PABs are not subject to the annual state volume caps that apply to certain other PAB categories.) As of December 2008, U.S. DOT had approved allocations totaling nearly $5 billion for eight projects. But a year ago there were realistic projections that the currently authorized PAB allocations would be fully subscribed by 2010. The current credit crisis has significantly constrained the tax-exempt capital markets generally and this program specifically.

It is anticipated that as the tax-exempt capital markets gradually recover, state and local demand for PAB allocations also will return. The Commission therefore recommends its reauthorization and expansion. State and local project sponsors increasingly will explore the benefits of advancing major projects through public-private partnerships, and their ability to issue tax-exempt debt will be an important tool to help finance investments with major public benefits. The volume of "ready-to-go" projects is expected to grow more quickly in the years ahead for two reasons:

- More states will enact legislation enabling them to take advantage of private-sector financial participation for the development and operation of transportation facilities.

- The turmoil in the financial markets, which has made obtaining project financing difficult (especially for projects relying on direct user revenues), likely will subside, enabling more projects to come to market.

The Commission acknowledges that increasing the volume cap likely will be assessed a budgetary cost (tax expenditure). However, the potential value that PABs can and will have in the future as a method to help address the investment gap for certain types of transportation improvements is significant. Further, other categories of PABs that can be issued to finance transportation infrastructure with public benefits—such as airports, docks and wharves, and government-owned high-speed intercity rail facilities—are not subject to any volume limitation.

In order to better support the financing of important public transportation projects, especially in light of growing energy security and environmental protection concerns, the Commission also recommends that Congress redefine "mass commuting facilities" to include rolling stock and exclude mass commuting facility PABs from the annual state volume caps (as is the case for other categories of PABs that may be issued for infrastructure improvements that

significantly benefit the public).[4] Finally, the Commission notes that there are certain technical factors that have a limiting effect on the potential use of highway / intermodal PABs; these factors and potential remedies are addressed in Chapter 7.

II-9. The Commission believes that highly targeted tax subsidies (as with incentive grants) can be used to spur state, local, and private investment in the transportation system. In particular, Congress may wish to consider authorizing the issuance of tax credit bonds to subsidize the financing of certain improvements in areas where the public benefits cannot be fully monetized by direct users or other beneficiaries.

Various tax incentive approaches have been proposed over the years, especially for targeted improvements that do not benefit from existing grants or other forms of financial assistance and for which there is a potential argument for some form of federal subsidy. Consistent with its focus on the "user pays principle," the Commission believes that such general subsidies should be limited and be justified by significant public, as opposed to private, benefits. In the context of transportation investment, this means that tax incentives should be structured narrowly to facilitate specific improvements that benefit the public. This recommendation applies to existing incentives, such as private activity bonds, as well as to proposed incentives, including investment tax credits and tax credit bonds. Tax credit bonds, in particular, may be effective in providing federal financial support to major projects that benefit the public. Intercity passenger rail and goods movement projects are specific investments with broad national benefits that may be good candidates for this type of federal subsidy.

II-10. If Congress chooses to create a national infrastructure financing organization (e.g., National Infrastructure Bank or National Infrastructure Reinvestment Corporation) that includes transportation as part of its core mission, such an entity should be structured to address actual funding and credit market gaps. It should target assistance to projects that are essential to the national network that do not have access to sufficient resources through existing programs or other sources. Congress also should ensure that any such entity is properly integrated with or a logical extension of current federal funding and financing programs, most notably TIFIA and other federal credit programs currently housed within U.S. DOT.

Some policy makers and industry participants have proposed creating a national infrastructure bank or investment corporation in order to help address pressing infrastructure investment needs. These proposals are driven by two primary objectives:

- To accelerate investment in critical infrastructure (through debt financing mechanisms and/or General Fund transfers)
- To improve the allocation of limited resources by the federal government to investments that are essential to improving the national transportation system

Although improving project selection and accelerating investment are desirable goals, policy makers differ on how best to accomplish this. The Commission believes that proposals to create a new special-purpose financing entity need to adequately address key questions about how the stated objectives would be achieved and why the proposed mechanism(s) would be the best way to achieve those objectives. These questions deal with:

- **The critical infrastructure improvements being targeted:** which ones are nationally significant and warrant federal assistance from the new entity?

- **The types of financing assistance necessary or helpful in accelerating the investments:** how would any financing assistance provided by the entity be different from that available through existing governmental programs or private sources?

- **The sources of revenue used to fund the investments and repay any financing assistance:** how much of the entity's assistance would be in the form of grants for non-revenue projects, how would such assistance be funded—from the General Fund, the Highway Trust Fund, or other sources—and how much would fund projects that provide a repayment stream back to the entity, paid for by, among other sources, user fees?

- **The control over resource allocation:** how would projects be selected and how would the entity acquire expertise and use methods leading to a superior allocation of resources compared with existing agencies and programs?

- **The federal budgetary impact and other policy issues:** how cost-effective is the proposal compared with existing agencies and programs, and what are the long-term federal liabilities associated with it?

In order to justify the creation of a new special-purpose entity, the Commission believes the case must be made that it would provide necessary financing that is unavailable through government programs or the private markets and that it would be more effective in delivering the financial subsidies than current programs are. Implicit in these proposals is an assumption that a new entity, independent of the U.S. DOT and having a narrower mission focused on certain kinds of infrastructure investment, would be more effective in selecting projects and managing resources. It would be important for any new entity to acquire the expertise necessary to evaluate financing proposals from across modes or even among infrastructure sectors. Congress also must consider how a new entity would coordinate its activities with the U.S. DOT and other existing agencies and programs.

It should be noted that the Commission's finance-related recommendations can be achieved with existing agencies and programs (e.g., the TIFIA credit assistance program) and do not require the creation of a new national-level entity. Either way, the Commission urges that important steps be taken (through fundamental reform of existing programs and/or proper structuring of a new entity) to support the infrastructure investment that provides the highest societal returns while leveraging limited tax dollars with private-sector investment and new sources of revenue—particularly direct user fees. Any existing or new federal financing for targeted investments should offer one or more of the following benefits:

- Lower cost financing and more flexible terms than available from other sources
- Credit enhancement to help projects gain access to private capital markets
- Financial assistance for major projects of national importance that cannot be fully funded with identified revenues

The Commission stresses that the potential role of a new infrastructure financing entity should be examined in the context of long-term funding needs and not just as a short-term measure designed primarily to address the current disruption of the credit markets. If any new entity simply substitutes for capital available in the private markets, it will not significantly address the nation's long-term investment needs. In contrast, if it focuses instead on identified funding gaps and market failures in order to spur greater use of private capital in conjunction with the financing of user-backed projects, it can play a meaningful role in expanding surface transportation infrastructure.

The Commission also emphasizes that the focus on new or enlarged funding programs and financing techniques should not be seen as a substitute for generating revenue by raising taxes, expanding tolling, or developing other sources. The institutional mechanisms being proposed, whatever their merit, will not in and of themselves directly address the core problem of insufficient revenue to support needed investment. Finally, in line with the Commission's general principle that system funding should be paid for by system users, the Commission believes that any new infrastructure entity should not be funded primarily with general tax revenues or General Fund borrowing.

In Chapter 7, the Commission offers further discussion of the potential design of a new national financing entity, including consideration of available capital sources (both debt and equity) and financing techniques as well as potential incentives to help project sponsors move toward a system that relies more heavily on user-based revenue mechanisms.

Private-Sector Financial Participation

This section presents the Commission's recommendations on private-sector financial participation in surface transportation infrastructure investment. The Commission recognizes the potential positive role that private-sector participation can play. But it also cautions that this should not be seen as a panacea for the nation's transportation funding deficit. The ultimate goal of federal policy in this area, therefore, should be to foster a balanced approach that facilitates partnerships with the private sector, subject to appropriate protections.

Specifically, federal policy should:

- Encourage private-sector investment where it can play a valuable role in providing capital, accelerating delivery, and supporting user fee–based funding approaches and tax-based availability payment structures to help meet the country's capacity needs (in particular urban congestion challenges)
- Ensure that appropriate governmental controls are in place to protect the public interest in all respects; federal policy in this area should recognize the respective purviews of federal and state governments and preserve and support the ability of state decision makers to impose appropriate restrictions on these arrangements

The Commission recognizes that although there is a broad range of potential opportunities for private-sector participation in surface transportation project development, financing, and operation, the overall impact on the national funding challenge is limited. It also recognizes that discussions of the appropriate mix of incentives and controls can become quite muddied when all forms are considered as one monolithic approach. The Commission therefore recommends making clear distinctions among applications when considering policy proposals.

In general, there are two distinct categories of private-sector participation (note that this does not reflect the full range of private-sector involvement in delivering and operating transportation assets but instead focuses on the aspect of direct financial investment in facilities):

- Concession arrangements to *develop new transportation assets or significantly expand the capacity of existing assets*, commonly referred to as "greenfield" projects
- Long-term leases of *existing tolled or non-tolled highway facilities, public transportation assets, or other existing surface transportation facilities*, often termed "asset monetizations" or "brownfield" projects (within this category, there may be instances where it is appropriate to consider existing tolled facilities and existing non-tolled facilities as distinct subcategories for the purposes of establishing appropriate controls)

II-11. Congress should adopt a narrow set of carefully targeted parameters for private-sector financial participation in the development of new capacity or the leasing of existing capacity on "federal / national system" facilities (however Congress chooses to define such a system)—regardless of whether or not federal funds are used.

The Commission believes federal regulation of public-private partnerships should be limited in scope, in order to protect essential federal interests, and that primary oversight responsibility should reside with the states. Public-private partnerships generally occur at the state (or local) level, and many state governments already have experience with mitigating the potential concerns in their own states, including dealing with the complex set of state-specific procurement laws. The federal government therefore may wish to focus on specific federal interests and provide the appropriate technical assistance to state and local governments.

To this end, the Commission recommends that federally imposed statutory requirements should maintain or adopt the following narrow set of restrictions on private-sector financial participation:

- Interstate facilities must be designed, constructed, operated, and maintained to ensure Interstate quality performance; for non-Interstate facilities, other federal performance objectives should be met, as appropriate.

- Facilities on the federal system cannot be closed to traffic by the concessionaire except for a narrow set of permissible purposes, including required maintenance, and the state shall be allowed to open tolled facilities for necessary evacuations or other national emergency purposes.

- The following restrictions on the use of proceeds received by the state or local project sponsor should be imposed:

  - *If a material amount of federal funding is involved* in the project either directly or through the provision of credit assistance, use of proceeds received by the state or local project sponsor from long-term concessions or other arrangements should be limited to qualified surface transportation investments (including capital improvements to highways and public transportation).

- *If no material federal funds are involved but the facility is part of the federal system*, state and local concession proceeds should be required to be used for surface transportation infrastructure purposes defined more broadly (including not only highway and public transportation capital improvements but also other surface transportation purposes that serve to enhance the national network).

- *If no material federal funds are involved and the project is not part of the federal system*, the federal government should not impose any limitation on the use of proceeds but rather should leave that decision to the state or local government. In defining what constitutes a "material amount of federal funds," Congress may wish to consider a test such as federal investment (including credit support) of at least 10 percent of the capital cost of any new capacity or reconstruction project and/or at least 20 percent of the capital cost of the original facility if such federal investment occurred within the last 30 years).

II-12. Congress should generally support the states' primary role in overseeing private-sector arrangements and, to this end, should encourage the development of appropriate technical assistance and dissemination of best practices information.

The Commission offers its views regarding the issue of government oversight of private-sector financial participation in Chapter 7, recognizing that the primary responsibility for such oversight is in the purview of state and local governments. This discussion includes consideration of appropriate standards for public disclosure to ensure transparency, "value for money" type analyses to ensure the best value is achieved, potential limitations on the length of individual concession arrangements to protect the public interest, and other key governmental oversight provisions. Recommendation III-3 specifically relates to the federal government's potential role in supporting the development of "best practices" assistance and guidance on the important issues of transparency and reporting.

III. RESEARCH, DEVELOPMENT, AND DEMONSTRATION RECOMMENDATIONS

This section contains research and development-related recommendations, the most critical of which support the transition from the current funding system to a new national mileage-based fee system. Given the extent of institutional, technological, and practical challenges to effecting the envisioned transition in the required timeframe, investment in these recommended research activities, as well as those identified during the implementation process, is critical to a successful and timely transition.

III-1. Congress should immediately (i.e., in the next federal program reauthorization) authorize a comprehensive research and development agenda that includes investment in basic research, technology development, and pilot programs of mileage-based user fees.

A research program should be overseen by a multimodal body within U.S. DOT that combines technology, policy, tax administration, and systems expertise, similar to the agency created on a much smaller scale by the State of Oregon for its road pricing

pilot project. Coordination will be required among several modal administrations (likely to include the National Highway Traffic Safety Administration, the Federal Highway Administration, the Federal Transit Administration, and the Federal Motor Carrier Safety Administration). An example of such a multimodal coordinating body within U.S. DOT can be found in the Intelligent Transportation System (ITS) Joint Program Office for ITS Research.

An interdisciplinary approach is crucial to making a new comprehensive revenue system work. Specifically, Congress should:

- Create an expert independent advisory committee or policy oversight body to help review and advise on funding of R&D and pilot programs; to further explore policy issues; and to make specific recommendations to Congress regarding the best option(s), system design, required technology, and implementation plan. In essence, this body would advise on the federal government's activities to research, develop, and implement the new system, working in conjunction with U.S. DOT and other federal agencies as necessary and appropriate. This body should include representation from organizations focused on privacy and civil liberties to help ensure that protections for these are built into the system and technology from the beginning and not tacked on after the fact.

- Fund more expansive R&D, implementation experiments, and tests of new systems akin to past and current experiments conducted by the State of Oregon, the University of Iowa, and others. The first set of studies should be wide-ranging and experimental, testing various self-selected VMT fee processes. Subsequent tests would be more prescriptive to align with national study needs and facilitate the selection of a single interoperable system. Examples of necessary RD&D efforts, including potential pilot programs, include those related to the following:

    - Necessary protocols and systems to accommodate concerns regarding personal privacy
    - Impact of such a system on rural drivers who have no choice but to drive long distances
    - Options related to the method and point of collection of a national VMT fee
    - Methods to ensure the feasibility of multiple forms of payment, including for those who do not have credit cards or who choose not to pay by credit card or via the Internet
    - The administrative costs associated with such a national program
    - Whether it is more logical to transition all vehicles simultaneously or some vehicle classes first as early adopters
    - How to ensure individuals are not paying both the gas tax and the VMT fee under any phased transition approach and, relatedly, how to address implementation issues related to gas tax collection, which currently occurs on a centralized basis, termed "the Rack"
    - Impacts of a voluntary or mandatory use of the system, recognizing the potential for voluntary programs to result in reduced revenues (at least in the short term) because those who volunteer may do so because they will (or perceive they will) pay less

- Determining whether different systems for different vehicle types will be necessary or appropriate, including pilot programs for automobiles and different classes of trucks
- How to provide the positioning accuracy and positioning availability necessary to support state, local, or private charges based on specific areas or lanes traveled (e.g., to distinguish between tolled and non-tolled lanes on a single facility such as in the context of high occupancy/toll lanes)

III-2. Congress should fund new research that assesses the true transportation cost impacts of various vehicle classes, including the costs of environmental impacts, as well as the behavioral response to cost (i.e., price elasticity) so that Congress can decide to what extent the future funding system should take these full costs into account and facilitate the transition to pricing strategies.

The Commission has emphasized that any funding sources should, when appropriate, promote efficient use of the transportation system and discourage adverse side effects by charging prices that include the costs of those side effects. Promoting efficient use of the transportation system generally requires a good understanding of the costs that different system users impose and whether those costs are wear-and-tear on the infrastructure, congestion imposed on other users, or environmental effects. A research program focused on these issues therefore is important.

At the same time, transitioning to a system that relies more on direct user fees than fuel taxes to fund transportation will be improved by a stronger knowledge base of how users respond to various pricing signals. Although social science research in this area has improved and continues to improve, more research is needed, including research into the response of travelers to different pricing signals and the impacts of pricing on various types of geographies and income groups.

III-3. Congress should require that U.S. DOT, in conjunction with the American Association of State Highway and Transportation Officials (AASHTO) and the American Public Transportation Association (APTA), develop best practices information for public-private partnerships and specifically guidelines that address transparency and accounting for public-private partnerships, including disclosure of facility financial operations by private entities—taking into account the need for proprietary information and individual state laws related to public records.[5]

The issue of transparency is very important to the success of public-private partnerships. The Commission addresses this issue in more detail in Chapter 7.

In addition to this specific recommendation, given the varying levels of sophistication and knowledge across state and local governments, Congress should encourage AASHTO and APTA to develop best practices related to assisting states and local governments in managing public-private partnerships more broadly.

III-4. U.S. DOT should provide technical assistance to support states' efforts to improve revenue forecasting for both federal and state-level revenue sources.

The current methodologies used for forecasting fuel tax and vehicle-related tax revenues are not well understood or documented. Better information about the data and methods used to support forecasts of future revenues from various sources would both improve transparency of federal highway and transit funding and provide state and local governments with better technical information to support forecasts from similar sources at the state and local level.

IV. ADDITIONAL RECOMMENDATIONS RELATED TO FUNDING ALLOCATION

This section presents several recommendations that go beyond the direct issue of how money is raised to include how it is spent. The Commission includes these recommendations in part because sometimes the two issues are inseparable (such as dedicated charges raised from particular user groups for particular purposes) and in part because of the importance of boosting public trust in the system so that users and other beneficiaries are more willing to pay for their demands on the system and also to make the transition to a more sustainable funding approach.

The following resource allocation recommendations have some bearing on the likely effectiveness of the Commission's funding and finance-related recommendations. They do not, however, represent a comprehensive set of recommendations regarding how resources are used. Rather, these recommendations address a few key issues related to the funding and finance recommendations presented in this report. Regardless of the manner in which Congress ultimately chooses to generate funding for the national surface transportation system in both the short term and long term, incorporating these and other principles into decisions about how funds are allocated and spent will help ensure that critical and limited resources are used effectively.

IV-1. Investments should focus on safety as a high priority.

In the past, highway and transit safety performance has improved steadily and significantly over time, but achieving further improvements—the most important of which is reductions in fatality rates—will require additional effort and investment. Assessments of proposed capital investments' impact on safety performance should be part of every evaluation process.

IV-2. Decisions on the allocation of federal dollars to states should be based more directly on performance outcomes.

The current funding allocation construct does not place adequate emphasis on directing funds to improve system performance or on holding funding recipients accountable for real outcomes (e.g., improvements in safety, mobility, system quality, etc.). In turn, these shortcomings may contribute to overall system underfunding because voters do not perceive that good decisions are being made and cannot see clear-cut connections between revenues raised and transportation improvements. While the Commission views greater emphasis on moving to a more performance-

based system as critical, it also believes that the immediate funding demands cannot wait. The investment needs are too great and the funding gap too severe. Key steps to increase federal resources for surface transportation and to move to a more performance-based approach must proceed in tandem in order to prevent further deterioration of the system.

IV-3. As a new federal funding system is implemented, Congress should ensure that funding allocations under the federal program continue to support the investments needed on a national basis to ensure a comprehensive and cohesive surface transportation system.

The purpose of the federal surface transportation program is to ensure that critical investments are made across the country, regardless of how or where revenues are generated. As a result, to ensure a cohesive and comprehensive national system, there will continue to be the need for cross-subsidization between and among states. It is important to note that transitioning the current federal funding mechanism to a VMT-based system will not alleviate the need for such targeted funding. Congress therefore should ensure that the allocation of federal revenues continues to support a cohesive and comprehensive national transportation system that supports mobility for all purposes and citizens of this country.

IV-4. Congress should have a transparent system for making earmarks and explicitly limit such activity to a specified percentage of the federal transportation program (e.g., to less than 3 percent of available authorizations).

This is consistent with the Commission's strong belief that funding decisions need to be based more directly and explicitly on meeting specified performance objectives. The Commission also is concerned about the perceptions that such earmarks create among taxpayers and the resulting impact on the general trust in the funding system. Finally, on more technical grounds, the Commission recognizes that, if not carefully managed, such earmarks can tie up money in projects that are not ready to be implemented or that do not have the rest of their funding in place.

IV-5. Federal policies should be designed to encourage state and local policy makers to further use contracting methods targeted at achieving lifecycle cost efficiencies and optimal asset management—thus addressing the funding gap from both sides of the ledger.

This could potentially include demonstration or incentive grant programs for performance-based contracting as well as technical training and peer exchange programs.

CONCLUSION

The Commission has evaluated the ability of a wide range of options to raise significantly more resources at the federal level and to support state and local governments' ability to do the same—to begin to close what has come to be an unacceptable and unsustainable investment deficit in our nation's surface transportation infrastructure. In offering to Congress the results of this evaluation process, the Commission recognizes that there are no easy solutions and, especially in the short to medium term, no single silver bullet answers. Looking

to the future, the Commission endorses the growing consensus that transitioning to a funding approach based more directly on use of the transportation system, including mileage-based user fees, is the right foundation.

In the twentieth century, surface transportation was largely about steel and concrete: extending and expanding the physical network of roads, bridges, rail systems and the buses, trucks, and cars that operated on it. The goal was to raise the money needed, from whatever sources, to build a robust enough system to meet the nation's mobility needs.

In the twenty-first century, steel and concrete will continue to be the foundation of surface transportation infrastructure. New capacities and capabilities of the system, however, will need to be not just big but also "smart." In our lifetimes, we will be able to take advantage of technological advances not only to improve how people pay for their use of the transportation system but, as important, to deliver real-time information to vehicle drivers to help reduce congestion and improve safety, enhance system monitoring and management, improve the convenience and reliability of public transit, improve the allocation of transportation infrastructure resources, and mitigate transportation's negative impacts on the environment.

The Commission's core recommendations focus on the first attribute of this new intelligent system: improving how the system is funded, specifically in ways that are more sustainable and more efficient. The Commission's many other recommendations play vital roles, focused heavily on ensuring overall funding security and staving off further degradation through immediate action that will afford us the time to re-align the funding framework.

Transitioning from a fuel tax–based system to one based more directly on use of the highway system measured by miles driven undoubtedly will require a great deal of planning and public education. But that is no reason to delay initiating the transition. As one Commissioner warns, "if we don't start, we won't ever get there." And as this process commences, policy makers will need to ensure that all stakeholders are consulted and involved in the decision making for all aspects of the transition.

In closing, if we fail to address the immediate and longer-term funding crisis in our surface transportation system, we will suffer grim consequences: unimaginable levels of congestion, reduced safety, costlier goods and services, an eroded quality of life, and diminished economic competitiveness as a nation. Our alternative future—with increased federal revenue, new funding approaches, and new technology as a foundation—is an integrated national transportation system that is less congested and safer and that promotes increased productivity, stronger national competitiveness, and improved environmental outcomes. That future is waiting for us to embrace it.

Endnotes

1. As users choose more privacy or opt for deletion of personally identifiable information after payment, they sacrifice the degree to which they could challenge charges.

2. This broad Interstate tolling authority is not intended to be used for incidental capacity improvements in connection with the acquisition and/or routine maintenance and refurbishment of an existing facility.

3. All the existing electronic toll collection (ETC) systems use Dedicated Short Range Communications (DSRC) technology in the 902-928 MHz band. U.S. DOT is developing the 5.9 GHz standard through IEEE and testing tolling applications using this standard.

4. Currently, mass commuting bonds are subject to the annual state volume caps and therefore must compete

with other Private Activity Bond purposes (including single and multi-family housing, student loans, manufacturing, etc.) for annual state allocations of issuance authority.

5. Relying on the American Association of State Highway and Transportation Officials and the American Public Transportation Association would be consistent with current industry standard-setting processes that rely on these organizations.

ANNEX: RESPONDING TO THE FINANCING COMMISSION'S STATUTORY MANDATES

This final report of the National Surface Transportation Infrastructure Financing Commission responds to the congressional directives contained in Section 11142 of Public Law 109-59 (the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users). In general, the Commission was tasked with:

- Making a thorough investigation of revenues flowing into the federal Highway Trust Fund (HTF) under current law
- Considering the impact on likely revenues under current law of possible changes in vehicle choice, fuel use, or travel alternatives
- Considering alternative approaches to generating revenues for the HTF
- Considering highway and transit investment needs and determining what additional federal revenues would be required to meet those needs

The analyses and findings contained in the report—particularly those presented in Chapters 2 and 3—address these items in detail. Specific recommendations relating to them appear in Chapter 8.

In addition to these general tasks, the Commission was specifically directed to examine certain other matters:

I. Consider a program that would exempt all or a portion of gasoline or other motor fuels used in a state from the federal excise tax on such fuels if the state elects not to receive all or a portion of its federal surface transportation funding (commonly called an "opt out" program)

II. Determine what levels of revenue are required by the HTF in order for it to meet the investment needs to maintain and improve the condition and performance of the nation's highway and transit systems

III. Determine what levels of revenue are required by the HTF in order to ensure that federal levels of investment in highways and transit do not decline in real terms

IV. Determine the extent, if any, to which the HTF should be augmented by other mechanisms or funds as a federal means of financing highway and transit infrastructure investments

Because of their specificity in the Commission's authorizing statute, these matters are addressed in order below in summary fashion. As with the more general issues, items II–IV are thoroughly discussed elsewhere in the report, especially Chapters 2, 3, and 8.

I. CONSIDERING AN "OPT OUT" PROGRAM FOR THE STATES

Congress asked the Commission to consider the potential viability of a program that effectively would exempt a state from all or part of the federal surface transportation program. It has been contemplated that, under such a program, a state could "opt out" of the federal fuel taxes and the spending programs funded by them—in exchange for increasing its own state-level taxes and committing to maintaining and improving the transportation system within its borders to certain standards. The stated goal of such proposals is to shift much of the funding responsibility to the state so that it can determine its own transportation spending priorities. The underlying premise is that much of the current federal-level spending is misallocated by an inefficient process that dispenses funds according to outdated formulas and wasteful earmarks—and that the states are more flexible, closer to the transportation challenges that need to be met, and more accountable to transportation system users and taxpayers.

While sympathetic to frustrations about some of the federal funding decisions and program requirements associated with the current system, the Commission has serious reservations about any potential opt out program. These concerns stem from consideration of the appropriate federal role, required infrastructure investments, potential program mechanics, and the question of "devolution" of funding responsibility to the state level. The common theme of these interrelated issues, which are discussed in more detail below, is ensuring the integrity of the national highway and transit network.

The purpose of the federal program is to make sure that investments critical to the national network are made across the country, regardless of how or where revenues are generated. Our economic competitiveness as a nation relies on an effective and integrated surface transportation system. Federal involvement helps ensure that sufficient resources are allocated to meet the mobility needs of all citizens. Effective improvements to the national system require a national perspective, national coordination, and national funding.

Attempting to support the national system at the state level would be highly problematic—especially in light of the growing funding gap. Although it is desirable to develop performance standards guiding the operation and maintenance of existing assets by the states, that alone would not guarantee that necessary enhancements are made to the national network. In any given time frame, individual states may or may not have the resources available to make critical investments. And they likely would have conflicting priorities over time for making those enhancements to the network—both for highways and for transit. Furthermore, as summarized in Chapter 2, the levels of investment needed to maintain and improve the conditions and performance of the nation's highways and transit systems are significantly higher than current levels. It is not clear that states, absent federal support and acting on their own, could maintain existing levels of investment, much less close the gap and make necessary improvements to the national system.

The Commission recognizes that the specific definition of the federal role in surface transportation that Congress chooses to maintain or set in the future will drive the level of resources that must be generated at the federal level. But it also emphasizes that reducing the federal role would not mean that investment needs are reduced; the burden of meeting those needs would simply be shifted to individual states. In light of the serious performance

crisis facing the nation's transportation system and the associated investment shortfall, the Commission has concluded that any attempt to implement an opt out program is inadvisable. Moreover, the proposed transition to a mileage-based fee system presents a real opportunity to address many of the concerns that lead to calls for states to opt out of the current program.

Federal Role

Most opt out proposals start with an assumption that the federal role in supporting the surface transportation system should be much smaller. Under this assumption, with virtual completion of the Interstate Highway System and the National Highway System, the federal role can be reduced to promulgating safety and supporting certain research and development efforts. Under this view, supporting interstate commerce can be accomplished (perhaps more efficiently and fairly) by requiring the states to maintain or improve the national system to certain standards rather than collecting and redistributing funds at the national level.

As part of its assessment of funding options and investment needs, the Commission examined the range of potential federal funding roles from minimal ("devolution") to expansive (enhanced beyond the current role). The Commission does not make any recommendation about the future federal role, but it used this exercise to inform its investigations and illustrate some of the analyses contained in this report. Acknowledging a more than minimal federal role means recognizing that there is a national network of some kind that broadly benefits the general public. And the central issue concerning the federal role is the distribution of resources to support that national network. Through its deliberations about surface transportation policies and programs, Congress must address the future federal role in this post-Interstate era. Authorizing any state to opt out of the current federal program would first require addressing the ramifications of such action on the overall national system and therefore is not an advisable course of action.

Investment Needs

Closely tied to perspectives on the federal role are assessments of required investments. As summarized in Chapter 2, the levels of investment needed to maintain and improve the conditions and performance of the nation's highways and transit systems are immense—far larger than current spending levels. Even if policies and programs were significantly reformed to greatly improve the allocation of resources, the Commission has concluded that more revenue is still needed. In light of this fundamental underinvestment problem, any scheme to reduce current federal fuel taxes in exchange for increases in state-level taxes would be problematic. Using the Commission's Baseline Revenue Forecast and Base Case Investment Scenario, the average annual investment shortfall relative to spending needed to maintain and improve the nation's highway and transit systems is $138 billion. Closing that annual gap with fuel taxes alone would require an increase of about 76¢ per gallon (that would be on top of the existing federal and state gas taxes that combined average about 40¢ per gallon today). Thus, according to the most recent assessment, the nation (at all levels of government) is spending only about 35 percent of what is needed to maintain and improve the surface transportation system. Quantifying the funding gap in this manner shows that any opt out program involving federal fuel tax reductions that roughly offset state fuel tax increases would not address the underlying national investment shortfall (even if policy makers agreed with reducing the federal funding role relative to the states).

A related issue concerns the ability of individual states to maintain higher fuel taxes in the face of cross-border competition. If fuel taxes are much higher in one state than another, there is an incentive for some of the residents of that state, particularly those living near the border, to purchase their fuel where the tax is lower. These pressures may work to keep state taxes lower than they would be absent such competition and therefore may result in less overall fuel tax revenue if an opt out program were to be implemented.

Another aspect of investment needs, beyond their aggregate amount, is their relationship to the national network. As mentioned earlier, while it may be possible (indeed desirable) to develop performance standards guiding the operation and maintenance of existing assets, it can be difficult to ensure that necessary enhancements are made to the national network. To the extent direct users are willing to pay for certain improvements (i.e., user fees can be monetized to generate the upfront capital required to undertake the improvements), those signals can be used to guide appropriate investments. But not all critical improvements can be funded this way. A major challenge to supporting the national network is identifying those improvements that generate broad public benefits that cannot be easily monetized directly. Such system improvements require a national perspective, national coordination, and national funding (as opposed to state-by-state determinations).

Program Mechanics

The opt out concept seems straightforward: If a state agreed to increase its own taxes and maintain the "federal system" (however defined), it would benefit from a commensurate decrease in federal fuel taxes. But the collection, attribution, and distribution of current federal fuel taxes complicates this proposition (setting aside the above-noted concerns about the federal role and investment needs). Fuel taxes are not collected directly from the end consumer; rather, they are paid at major distribution points (known as "the Rack") and then become part of the overall price passed down through the supply pipeline to the consumer. The fuel tax collections are attributed to the states based on estimates of fuel consumed in the states. The net receipts are distributed to the states predominantly according to formula apportionments, and less so through discretionary allocations, of the various federal spending programs. Thus, for a state to benefit in the desired manner from increasing its own taxes, it would need to receive some kind of rebate from the federal government—perhaps in the form of a block grant (without the federal requirements or other strings associated with current federal spending programs) calibrated to equal all or a portion of the amount of revenue estimated to result from its tax increase. While it should be possible to devise a rebate method consistent with the intent of various opt out proposals, the Commission strongly discourages Congress and the states from pursuing this action without fully understanding the overall impact on infrastructure investments needed to support an integrated and efficient national surface transportation network.

Path to Devolution

Another aspect of an opt out program would be its tendency to lead to "devolution" of the federal program. Those states at the top of the federal HTF "donor" list (i.e., with the smallest return ratios of distributions from the federal HTF to attributed payments into the federal HTF) would be the most likely to consider opting out. Assuming that opt out rebates were tied to estimated payments into the HTF (consistent with such proposals), then each donor state would find it advantageous, strictly in terms of net proceeds, to opt out of the federal program (where its return is less than 100¢ on the dollar) and increase its own taxes (where its return would by definition equal 100¢ on the dollar). While this

might sound like a fair and rational decision for each donor state to make, it would have significant impacts on the remaining states—essentially forcing them out of their donee status and causing a major reallocation of what essentially would be diminished federal resources. The Commission appreciates the desire of donor states to change their status with respect to the current allocation of HTF resources at the federal level. But without first ascertaining the appropriate federal role and identifying sufficient revenues at all levels of government and from all feasible sources to fund the required investments, trying to implement a voluntary opt out program would be counterproductive to supporting a viable national network.

II. DETERMINING REVENUES REQUIRED TO MEET HIGHWAY AND TRANSIT INVESTMENT NEEDS

The Financing Commission—with valuable input and technical assistance from the Federal Highway Administration—developed its own estimates to respond to its congressional mandate to examine needs for HTF resources (the methodology used to develop these estimates was generally consistent with that used by the U.S. Department of Transportation in developing its biennial *Conditions and Performance* reports as well as that used by the National Surface Transportation Policy and Revenue Study Commission). This effort resulted in the Base Case Investment Scenario, which provides an update to total and federal long-term capital investment needs for highways and transit based on current policies and programs and the historical federal/non-federal spending roles. (The Commission also examined investment needs assuming an alternative strategy, one that assumes aggressive implementation of road pricing and greater use of public transportation, which is described in Chapter 2.)

EXHIBIT A-1: BASE CASE NEEDS FORECAST

(all figures in billions of 2008 dollars)

	Need to Maintain Scenario		
	Total	Federal	State/Local
Highways	$131	$59	$72
Transit	$42	$19	$23
Total	$172	$78	$95
Revenues	$76	$32	$44
Gap	$(96)	$(46)	$(50)

	Need to Improve Scenario		
	Total	Federal	State/Local
Highways	$165	$74	$90
Transit	$49	$22	$27
Total	$214	$96	$118
Revenues	$76	$32	$44
Gap	$(138)	$(64)	$(73)

Note: Sums may vary due to rounding

Exhibit A-1 summarizes the results of this Base Case Investment Scenario. Total annual capital investment (from all sources) needed just to maintain current conditions and performance is estimated to average $131 billion for highways and $42 billion for transit, in 2008 dollars. This translates into annual federal highway and transit spending requirements of $59 billion and $19 billion, respectively, for a total of $78 billion. Using the Commission's Baseline Forecast of average annual HTF revenues of $32 billion (2008 dollars averaged over the 2008–35 period), the resulting annual federal investment gap for highways and transit is $46 billion. In addition, the total average annual spending (for all levels of government) needed to go further and improve the system under the Base Case Investment Scenario is $165 billion for highways and $49 billion for transit. The associated annual federal funding requirement is $96 billion for highways and transit combined, leaving an annual federal revenue shortfall of $64 billion.

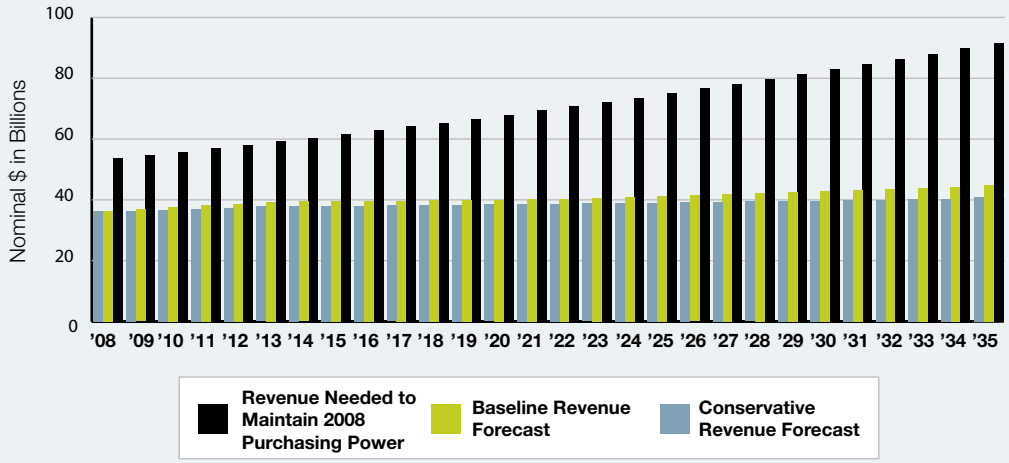
The Baseline Forecast of average annual HTF revenues of $32 billion (2008 dollars) is only 41 percent of the estimated amount of federal spending needed to maintain the nation's highways and transit systems and a mere 33 percent of the estimated annual amount needed to improve conditions and performance (using a benefit-cost ratio threshold of 1.2).

III. DETERMINING REVENUES REQUIRED TO MAINTAIN CURRENT LEVELS OF FEDERAL INVESTMENT IN HIGHWAYS AND TRANSIT

Congress asked the Commission to estimate the level of funding required to "ensure that federal levels of investment in highways and transit do not decline in real terms." The Commission interpreted this to mean the 2008 federal highway and transit program funding (obligation) levels, including the General Fund support for transit. Such an estimate is a projection of future purchasing power and derived from assumptions about long-term inflation. As explained in Chapter 2, the Commission used 2.0 percent for that purpose in this report.

Applying a 2.0 percent long-term average annual inflation rate, the combined federal highway and transit program funding level of $53.6 billion would need to grow to $91.6 billion (in nominal terms) by 2035 for current program purchasing power to be maintained. As illustrated in Exhibit A-2, the HTF revenue forecasts do not come close to achieving this. The Baseline Forecast revenue gap grows from $17.3 billion in 2008 to $45.3 billion by 2035, with a cumulative shortfall of $827 billion over the 28-year period. The Conservative Forecast produces a revenue gap that grows to $55.5 billion by 2035, with a cumulative shortfall of $975 billion. To the extent average annual inflation exceeds the assumed 2.0 percent, the revenue gaps will grow that much larger.

EXHIBIT A-2: ANNUAL FEDERAL REVENUE NEEDED TO MAINTAIN CURRENT HIGHWAY AND TRANSIT PROGRAM PURCHASING POWER, 2008–35



IV. DETERMINING THE EXTENT TO WHICH THE HTF SHOULD BE AUGMENTED

To better demonstrate the magnitude of the results presented above, Exhibit A-3 shows the motor fuel tax increase or, alternatively, the fee level required on a per-mile basis (referred to as a vehicle miles traveled or VMT fee), that would be needed at the federal and state/local levels to close the associated funding gaps. (Note that these estimated tax levels are for illustrative purposes only and are not Commission recommendations.) These conversions to cents per gallon and cents per mile are rough approximations based on the average 2007–08

EXHIBIT A-3: SUMMARY OF LONG-TERM NEEDS AND REVENUES (2008-35 ANNUAL AVERAGE)

(billions of 2008 $ unless otherwise noted)

	Need to Maintain			Need to Improve		
	Total	Federal	State/Local	Total	Federal	State/Local
Investment Needs						
Highways	$131	$59	$72	$165	$74	$ 90
Transit	$42	$19	$23	$49	$22	$27
Total	$172	$78	$95	$214	$96	$118
Baseline Revenue Forecast						
Revenues	$76	$32	$44	$76	$32	$44
Gap	$(96)	$(46)	$(50)	$(138)	$(64)	$(73)
MFT (¢/gal) to Close Gap	53¢	25¢	28¢	76¢	36¢	41¢
VMT Tax (¢/mile) to Close Gap	3.2¢	1.5¢	1.7¢	4.6¢	2.1¢	2.4¢
Conservative Revenue Forecast						
Revenues	$67	$28	$39	$67	$28	$39
Gap	$(105)	$(49)	$(56)	$(147)	$(68)	$(78)
MFT (¢/gal) to Close Gap	58¢	27¢	31¢	81¢	38¢	44¢
VMT Tax (¢/mile) to Close Gap	3.5¢	1.6¢	1.9¢	4.9¢	2.3¢	2.6¢

Note: Sums may vary due to rounding

motor fuel tax yields of about $1.8 billion per penny (all motor fuels) and the 2008 total vehicle miles traveled of about 3 trillion (all roads). (It is estimated that during the 2008–35 period the annual motor fuel tax yield per penny will rise only slightly above the current yield (in nominal terms) to $2.06 billion; total VMT will increase to about 5 trillion, based on estimates supplied by the FHWA.)

The federal tax rate on all motor fuels would need to be increased by 25–27¢ per gallon to address the federal funding shortfall just to maintain the system. Funding the investment needed to improve the system would require a federal fuel tax increase of about 36–38¢ per gallon. Alternatively, a federal VMT fee (charged on all roads in addition to the existing HTF taxes) of about 1.5–1.6¢ per mile would generate the federal share of the funding needed to maintain the system. And a federal VMT fee of 2.1–2.3¢ per mile would be needed to generate the additional federal funding required to improve the system.

In terms of total highway and transit investment needs (from all levels of government), maintaining the system would require a fuel tax increase of about 53–58¢ per gallon or the equivalent of a VMT fee of about 3.2–3.5¢ per mile. Improving the system would require a fuel tax increase of about 76–81¢ per gallon or the equivalent of a VMT fee of about 4.6–4.9¢ per mile.

EXHIBIT A-4: FEDERAL SHORT-TERM NEEDS AND REVENUES

Year-by-Year Federal Revenues and Needs Estimates: 2010-2015 (billions of nominal $)

	2010	2011	2012	2013	2014	2015	Total
Baseline Revenue Forecast	$38	$38	$39	$40	$40	$40	$235
Need to Maintain							
Base Case Scenario	$81	$82	$84	$86	$87	$89	$509
Funding Gap	$(42)	$(44)	$(45)	$(46)	$(47)	$(49)	$(274)
Need to Improve							
Base Case Scenario	$100	$102	$104	$106	$108	$111	$632
Funding Gap	$(62)	$(64)	$(65)	$(67)	$(68)	$ (71)	$(397)

Note: Sums may vary due to rounding

Looking at near-term needs and revenues also creates a strong call for action. As summarized in Exhibit A–4, the federal HTF current-law revenues under the Baseline Forecast total just $235 billion (in nominal dollars) over the 2010–15 period (an average of $39.2 billion per year). The federal share of cumulative needs under the Base Case Investment Scenario, meanwhile, ranges from $509 billion (to maintain the system) to $632 billion (to improve the system). The annual federal funding gap, therefore, ranges from about $43 billion to $71 billion in nominal dollars for the six-year period.

SUPPLEMENTAL STATEMENT OF COMMISSIONER DONALD F. CARMODY

It should be noted at the outset that in large part I support the work of the National Surface Transportation Infrastructure Financing Commission, **with one major exception** that deals with some of the uses of the Highway Trust Fund (HTF)—in particular, the use of these funds for transit.

Throughout the report there is the common theme of "user pays," with which I agree, but it is not consistently applied.

My disagreement comes from the fact that the Commission is proposing to increase user fees paid only by the driving public (the source of funding for the HTF), yet at the same time the HTF and thus the driving public is currently subsidizing Mass Transit. Over the last few years these subsidies have averaged about $5 billion annually and will conceivably increase in the future unless legislation changes this subsidy and puts the cost for transit where I feel it belongs—and that is with the user. Further compounding the issue is the fact that the beneficiaries of Mass Transit do not pay into this fund. People who use bus, light/heavy rail, subways, and commuter rail systems do not pay into the HTF for the trips they take. This is unfair to the millions of Americans that do pay into the HTF for driving. Likewise, millions of Americans do not have access to simple forms of Mass Transit for commuting to work or other types of trips as well as for pleasure.

While I believe in Mass Transit, and support an enhanced rail system across our country for the movement of people and goods, I do not believe this should be at the expense of those who choose not to use it or do not have an alternate choice. *It should be funded by those who use it. Remember the "user pays" concept*.

While we talk in our report about the need for more direct user fees and congestion pricing, which I believe are ideas worth strong consideration by Congress and State legislatures, we completely stay away from making any recommendations that perhaps transit should do the same. As the discussions move forward, perhaps it should be seriously considered that if any monies go to transit at all, then it should be with the same concept as being considered for highways.

During the Commission deliberations we discussed the fact that tolls and transit fees are typically set by the local jurisdictions that own or operate them, as well as federal incentives to those local jurisdictions to encourage them to raise transit fees. I believe such incentives should be short-term in length and should only be offered as a way of moving transit agencies toward greater self-sufficiency and to encourage use of new and improved transit systems. However, I am not in favor of these incentives becoming part of a permanent or long-term package.

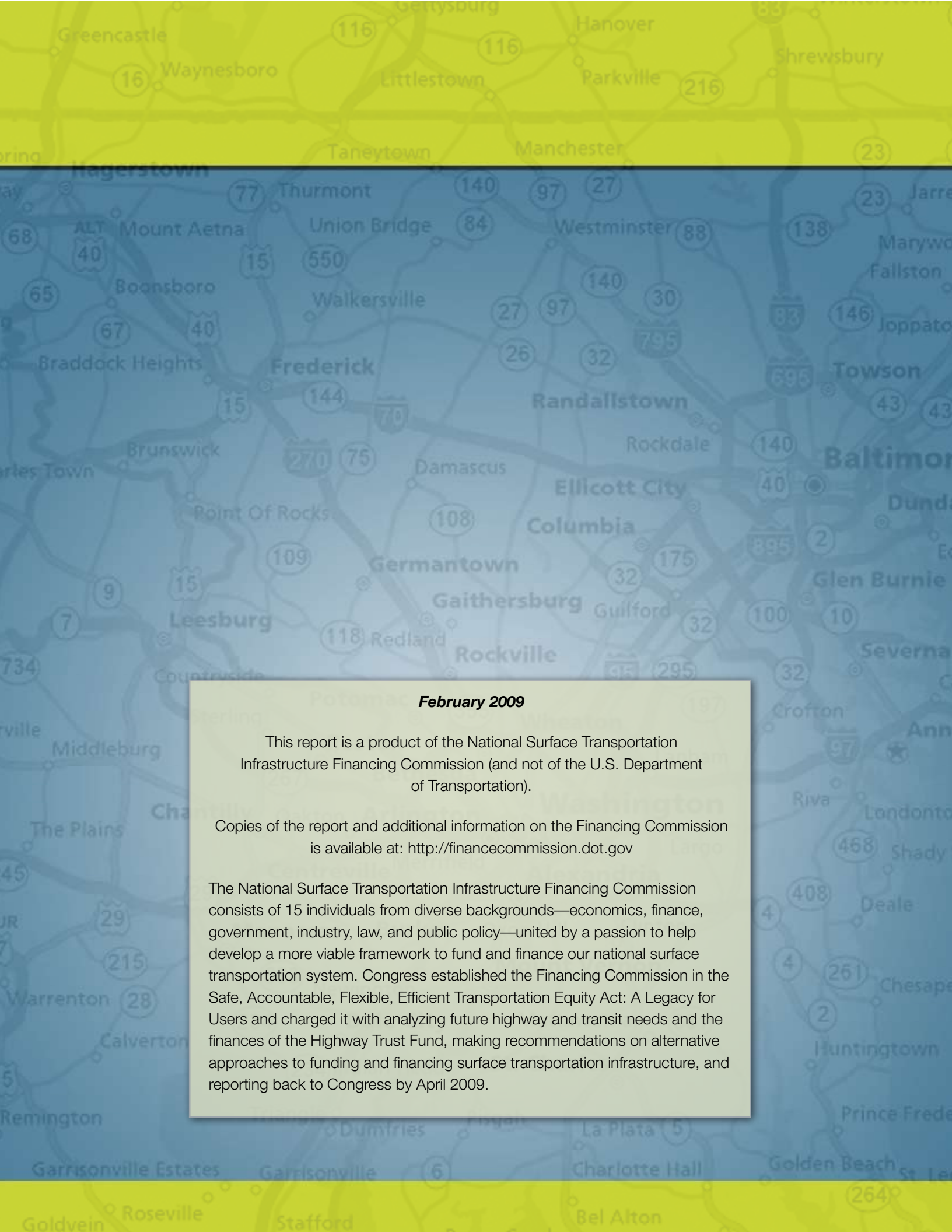
The idea of capping the subsidy at the recent historical level ($5 billion), not an ever-increasing pot of money, was discussed; however, this was not agreeable to some. The HTF was designed to maintain our bridges and highways and to expand them as needed. Given the current state of our highways and the magnitude of our highway investment gap, we cannot allow more funds to move to other non-highway purposes such as transit and continue to ask

the driving public to pay for transit while the highway infrastructure they use on a daily basis is beginning to crumble around them.

I sincerely hope that Congress will entertain this discussion because their constituents cannot and should not be asked to finance special projects such as transit with funds that are intended to support the road system. I strongly urge our elected officials to look at the many and varied reports regarding the conditions of our roads and bridges and whether it is fair to ask the driving public to pay even more dollars to fund the critical repairs that are needed for the highways and bridges they are driving on while still taking money from the HTF for other uses.

Conclusion: I feel that the Commission has accomplished a great deal. My fundamental difference is regarding how transit needs should be funded; I strongly believe the current approach, which dedicates a portion of the federal motor fuels tax to transit, should be reviewed. I do strongly endorse the Commission's primary suggestion, which is that we need to implement a VMT system tax and that we should start sooner rather than later.

I would like to congratulate my fellow commissioners as well as to thank the Administration, Members of Congress, and the Department of Transportation for enabling this discussion and for me being able to participate in it.



February 2009

This report is a product of the National Surface Transportation Infrastructure Financing Commission (and not of the U.S. Department of Transportation).

Copies of the report and additional information on the Financing Commission is available at: http://financecommission.dot.gov

The National Surface Transportation Infrastructure Financing Commission consists of 15 individuals from diverse backgrounds—economics, finance, government, industry, law, and public policy—united by a passion to help develop a more viable framework to fund and finance our national surface transportation system. Congress established the Financing Commission in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users and charged it with analyzing future highway and transit needs and the finances of the Highway Trust Fund, making recommendations on alternative approaches to funding and financing surface transportation infrastructure, and reporting back to Congress by April 2009.