



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

**Rethinking the Highway Trust Fund**  
**Robert W. Poole, Jr.**  
**Director of Transportation Studies, Reason Foundation**  
[Bob.Poole@reason.org](mailto:Bob.Poole@reason.org)  
**954-587-9426**

**ABSTRACT**

Federal surface transportation policy is at a fateful crossroads. Since the completion of the Interstate system, the federal program has lost its focus and its sense of purpose. And the user-pays funding mechanism used to build that system have gradually been transformed into a public works tax for Congress to spend on its own-- rather than highway users' -- priorities. Most calls to reformulate the federal program would further break faith with highway customers. While appearing to advocate simplification and program consolidation, they would add costly new non-highway programs, increasing highway use taxes but spending much of the proceeds on new kinds of non-highway programs, from passenger trains to energy subsidies to federalized land-use planning. Yet it is thanks to these very trends that American taxpayers no longer have trust in the Highway Trust Fund. Instead of welcoming an expanded federal program, most oppose increases in fuel taxes as unlikely to improve their own transportation situations.

This study argues that the federal program needs to be rethought. Every serious study in recent years has concluded that America is under-investing in highway infrastructure; indeed, we are not even investing enough to maintain its current mediocre performance and condition, let alone enough to produce major improvements. But rather than simply putting larger sums of money into a seriously flawed process, the better course is to rethink and refocus the federal role, in order to spend more on core federal purposes and less on peripheral concerns.

While the federal government may have an *interest* in a wide range of transportation issues and concerns, direct federal involvement is both unwise and inappropriate in many of these areas. The facilitation of interstate travel and commerce and international trade are clearly federal responsibilities, so a larger emphasis on inter-state and international transportation should be at the core of a rethought federal role. The Interstate highway system was laid out more than 60 years ago, and begun 50 years ago. Increasing portions are reaching the end of their design life and need complete reconstruction. Most urban Interstates need major additions to eliminate bottlenecks and reduce congestion; and as the lifeblood of goods movement, many inter-city Interstates need more lanes to handle projected growth in truck traffic.

A major federal effort to rebuild and modernize the Interstate system for the 21<sup>st</sup> century is the kind of purpose that could give new focus to the federal highway program. And it offers us the opportunity to restore the original user-fee nature of highway user taxes. Ever since the ISTEA legislation of 1991, each federal reauthorization has expanded the eligible uses of federal highway user taxes to an ever-larger array of non-highway programs. Indeed, this diversion ultimately goes back to the 1970 PL 91-605, which

permitted Highway Trust Fund monies to be used for bus facilities and park-and-ride lots, undercutting the user-pays/user-benefits principle. Subsequent reauthorizations steadily increased non-highway uses, such that today urban transit, bikeways, scenic trails, “enhancements,” and numerous other programs consume one-third or more of current federal highway user tax revenues.

Congress could dramatically increase funding to reduce the very large backlog of cost-effective highway projects via two changes: (1) shifting non-highway programs either to general revenues or to the states, and (2) narrowing the Trust Fund’s focus to rebuilding and modernizing the Interstate system, both urban and inter-city. This would restore the kind of trust in the Highway Trust Fund that was present during the creation of the Interstate system. Making this change is also probably the best hope we have for gaining political support—not for all-purpose transportation tax increases but for an increase in the “utility bills” that highway users pay to significantly improve the performance of the nation’s most critically important highway infrastructure.

## INTRODUCTION: THE CASE FOR HIGHWAY USER FEES

How should we pay for highways in America? Relatively unique among developed countries, the United States from the beginning has employed the user-pays principle. In the 19<sup>th</sup> century, prior to motorized transportation, most inter-city roads were toll roads, usually developed and operated by private companies under state charters.(Klein) When the automobile led to a demand for paved roads in the early 20<sup>th</sup> century, Oregon legislators enacted a tax on motor fuel in 1919.(Corning) In the following decade, the remaining 48 states and the District of Columbia all enacted motor fuel taxes. In order to ensure that the revenue would be used solely to benefit those paying these taxes, states created dedicated highway funds, many of which were given constitutional status and often called “trust funds.” Toll roads and bridges proliferated in the first half of the 20<sup>th</sup> century, generally in cases where the large size of the investment needed made toll finance the best way to fund such large “lumpy” investments. Toward the end of the 20<sup>th</sup> century and the first decade of the 21<sup>st</sup>, a new generation of toll roads and toll lanes has been emerging.

There are many advantages to the users-pay/users-benefit principle. Among them are the following:

- **Fairness:** Those who pay the user fees are the ones who receive the benefits, and those who benefit are the ones who pay. This is the same general principle America employs with respect to other network utilities, such as electricity, water, gas, and telecommunications.
- **Proportionality:** Those who use more highway services pay more, while those who use less pay less (and those who use none pay nothing).
- **Self-limiting:** A user tax whose proceeds may only be used for the specified purpose imposes a de-facto limit on how high the tax can be: only enough to fund an agreed-upon need for investment. In contrast, Europe’s motor fuel taxes are a general revenue source, and hence tend to be three to five times as high as those in the United States (though highway investment in Europe is the same or less than in this country).
- **Investment signal:** The user-pays mechanism provides a way to answer the question of how much infrastructure to build, assuming that the customers have some degree of say. With respect to toll roads, the value of the facility can be judged by how many choose to use it and what level of tolls they are willing to pay. This mechanism is less direct with fuel taxes, though there does appear to be a connection between motorist/taxpayer confidence in a government’s highway program and their willingness to support increases in fuel taxes. Prof. Eric Patashnik, in his book on federal trust funds, notes that “Taxpayers will only demand an increase in services if they perceive the benefits of the service increment to exceed the cost.”(Patashnik)

These points about the advantages of user fees hold true regardless of the details of the user-fee mechanism. In highways, America has used tolls, fuel taxes, excise taxes on tires, weight-distance taxes (for trucks), and several other minor sources, and is considering a shift from fuel taxes to a charge or tax per vehicle mile traveled. In

deciding whether any such mechanism is essentially a user fee or essentially a tax, the critical question is the use of the revenues. If the proceeds can be spent on beneficiaries *other* than those who generated the funds by making use of the infrastructure, then the mechanism is a tax. In the case of utility bills, the charge that is based on services the customer has used is a fee, paid to the infrastructure provider to cover the costs of building, operating, and maintaining the infrastructure. (This is true regardless of whether that infrastructure is provided by a public-sector or private-sector utility.) If government seeks to make those utility customers fund other beneficiaries, it may impose a tax for that purpose on utility bills (e.g., the tax that is used to fund rural telephone services).

Historically, therefore, highway advocates were correct in calling motor fuel taxes highway *user fees*, since most state fuel taxes were dedicated to the state highway system and the federal fuel tax, when the Interstate highway program was launched in 1956, was dedicated to building that nationwide system, via the newly created federal Highway Trust Fund. Whether that characterization is still true today will be explored below.

## **HISTORY OF THE HIGHWAY TRUST FUND**

Early proposals for funding creation of the Interstate highway system included the issuance of long-term bonds, based in some version on toll revenues (modeled after mid-century superhighways such as the Pennsylvania Turnpike and the New York Thruway) and in others on federal taxes. There was strong opposition in Congress both to bonding and to the large federal tax increases that were estimated to be necessary to fund the system. Neither alternative prevailed in 1955.

Hence, the following year, “The object . . . was to find a way to finance the system that more stakeholders thought was fair, and to reassure stakeholders and legislators that the receipts of the increased taxes would be dedicated towards highways.”(Davis) The proposed solution was a set of federal highway user taxes (largely on motor fuel) whose proceeds would be deposited into a new Highway Trust Fund. The Republican members of the House committee that recommended this approach wrote that “The existence of this fund will insure that receipts from the taxes levied to finance this program will not be diverted to other purposes.”(House Report) The final bill embodying these provisions was passed by both houses of Congress and signed by President Eisenhower in June 1956.

The pure users-pay/users-benefit principle was not breached until 1970, when PL 91-605 allowed federal highway monies to be used for bus lanes, bus facilities, and park-and-ride lots. Many urban and transit advocates wanted to open up the Highway Trust Fund much further, being dissatisfied with the extent of funding available from the Urban Mass Transportation Administration (UMTA), created by 1964 legislation. (The previous federal transit assistance program had been located within the Department of Housing & Urban Development--HUD). Several years later, in 1973, Congress enacted PL 93-87, which (1) allowed Highway Trust Fund monies to be used for capital expenditures for buses and fixed rail facilities and (2) permitted a state to petition the U.S. DOT for permission to withdraw a planned urban Interstate project and build a public transit

system instead, using federal general fund monies up to the amount that the Interstate segment would have cost.

President Carter proposed consolidation of the highway and transit programs, merging the Federal Highway Administration (FHWA) and UMTA, as part of the 1978 highway bill. But that bill ended up making only minor program changes. And that status quo prevailed until the early years of the Reagan administration. DOT Secretary Drew Lewis accepted the need for increased federal highway investment, but had difficulty persuading President Reagan to support the corresponding federal fuel tax increase. To build transit groups' support for the measure, "He promised to create a mass transit account in the Highway Trust Fund that would receive 20 percent of the revenue from a five cent per gallon tax hike (the 'transit penny'). This convinced many big city Democrats and liberals to support the measure, despite their concern over the effects of the tax on the poor." (Dunn) After first promising to veto the bill, after the 1982 elections Reagan changed his mind, and signed the bill after it finally passed, in January 1983.

That bill, the Surface Transportation Assistance Act of 1982 (PL 97-424), established the Mass Transit Account within the Highway Trust Fund, to receive "one-ninth of the amounts appropriated to the Highway Trust Fund" from all federal motor fuels taxes. As Jeff Davis's history of the Trust Fund notes, the changes from 1973 through 1982 "represented a shift away from the 'benefit taxation' model . . . whereby user fees are levied on system users in proportions that are as close as feasible to the direct benefit that the users get out of the system." He adds that, "although the votes brought to the table by the transit lobby were the key to getting the biggest-ever increase in the 'user fee' on drivers and truckers, the addition of mass transit to the Trust Fund made the gas and diesel taxes resemble true 'user fees' much less." (Davis)

Since the 1982 legislation, every subsequent reauthorization of the federal program has led to further departure from the users-pay/users-benefit principle. The most sweeping change occurred with enactment of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991. It created two new programs within the Highway Trust Fund, both of which were to be "flexible" in that states and metro areas could switch funds from highway to non-highway uses. The Surface Transportation Program (STP, funded at \$23.9 billion over six years) allowed highway funds to be spent not merely on transit projects but on bike paths, sidewalks, recreational trails, landscaping, and historic preservation—all under the rubric of "transportation enhancements." The Congestion Mitigation and Air Quality Program (CMAQ, funded at \$6 billion) funded a wide variety of projects intended in some manner to reduce emissions and/or reduce congestion.

ISTEA also imposed extensive new transportation requirements on Metropolitan Planning Organizations (MPOs). As political scientist James Dunn notes, "The increased complexity of planning infrastructure investments reflects so many goals (air quality, promoting public transit, historic preservation, wetlands protection, environmental justice) that moving cars can get lost in the shuffle." (Dunn)

Subsequent reauthorization measures—TEA-21 in 1998 and SAFETEA-LU in 2005—have expanded the extent of “flexibility,” and increased both the number of specific transportation programs and the complexity of transportation planning requirements.

As of this writing, the only draft reauthorization bill—the House’s Surface Transportation Authorization Act—would complete the transformation of what used to be called the highway program into an overall transportation program, and convert the former highway user taxes into general transportation taxes. The Congressional Research Service’s impartial analysis notes that the bill “reflect[s] policies that favor alternatives to the automobile, such as transit, bicycles, and walking.”(Fischer) The CRS analysis notes that “STAA would allow for a major expansion of funding transferability between highway and transit programs and a broadening of direct project funding eligibilities to allow an increase in direct highway funding of transit projects or direct transit funding of highway projects.” Although as of December 2009, STAA still has no funding provisions, CRS interprets the wording of the bill to imply that STP “could be substantially expanded by STAA in dollar terms.” Moreover, it would shift several of the non-highway programs (including Safe Routes to Schools, Transportation Enhancements, Recreational Trails, Scenic Byways, and the U.S. Bicycle Route System) into a new FHWA Office of Livability. It would also “specifically require that ten percent of STP funds must be obligated for Transportation Enhancement activities.”

Even this is not enough for some opponents of highways and automobiles. The Smart Growth Partnership is promoting a measure called the Complete Streets Act, which would require state DOTs and MPOs to adopt new traffic-calming street designs with full sidewalks and bikeways, if necessary at the expense of traffic lanes.(National Complete Streets Coalition) The two before-and-after photos on the Complete Streets website both show four-lane urban streets reduced to two lanes to permit the addition of raised medians, bike lanes, and traffic-calming bulb-outs. The “Policy Elements” discussion on the coalition website says the bill would apply to “all agencies and all roads,” though it would allow for exceptions such as Interstate highways. And it would apply to all new roads and road-improvement projects.

Measures like STAA and the Complete Streets Act represent the repudiation of the model set forth in the 1956 legislation that expanded the federal government’s role in order to create the Interstate system. Implementation of these kinds of measures would, in effect, abolish the user-pays/user-benefits principle. It would also eliminate any meaningful distinction between what is properly a federal, state, and local/regional responsibility in transportation.

## **THE NEED FOR INCREASED HIGHWAY INVESTMENT**

Some of those supporting expanded diversion or highway user revenues, or even the termination of the user-pays/user-benefit principle, argue that since the Interstate system is long-since completed, the federal government should shift its focus to other priorities, such as promoting intermodal transportation, reducing Americans’ “dependence” on automobiles, and shifting as much freight as possible from truck to rail. They see the

current reauthorization effort, coming as it does at a time of concern over greenhouse gases and dependence on petroleum imports, as a historic opportunity to make such a shift.

But the age of highways, automobiles, and trucks is not over. Trucks haul 66% by value of all goods moved in America—and FHWA projections show that this volume will increase 2.5-fold by 2035.(Office of Freight Management and Operations) All responsible projections, based on continued growth in both population and GDP, show continued growth in driving, as measured by vehicle miles of travel (VMT), in coming decades—even though the rate of increase in VMT has been slowing down.(Polzin) Consequently, the need for highway investment will continue.

There are four fundamental reasons why America must continue large-scale capital investments in its highway system.

- First, highways and bridges wear out over time, yet limited federal and state investment in recent decades has allowed the accumulation of huge backlogs of deferred maintenance and rehabilitation, leading to faster deterioration.
- Second, when highways and bridges do wear out they must be replaced; much of the Interstate system will be in this situation in the next two decades.
- Third, the places where Americans live and work have changed dramatically since the Interstate system was planned in the 1940s; hence, some new highways are needed to connect places that scarcely existed 70 years ago (e.g., the missing Interstate link between Phoenix and Las Vegas).
- Fourth, given the enormous growth in both population and affluence since the 1950s, significant portions of our major highways are under-sized for current, let alone future, travel demand. Improved performance (e.g., reduced congestion) therefore requires additional capacity.

A number of organizations have made serious estimates of highway capital investment needs in recent years. They include the American Association of State Highway and Transportation Officials (AASHTO), the Surface Transportation Policy and Revenue Study Commission, the National Surface Transportation Infrastructure Financing Commission, and the Federal Highway Administration. All four use the same underlying database, but make somewhat different assumptions for their analysis.

Congress requires the FHWA to make estimates, every two years, of the capital costs needed to “maintain” and “improve” the existing highway and transit infrastructure of the United States, accounting for federal, state, and local funding sources. Their biennial report is called the Conditions and Performance (C&P) Report. Unfortunately, FHWA has fallen behind in producing this report, so the most recent one as of this writing is the 2006 edition, released in 2007 and based on 2004 data.(Federal Highway Administration)

A National Cooperative Highway Research Program project produced updated estimates taking into account recent construction-cost inflation.(Transportation Research Board, Sept. 2006) For highways, these adjusted numbers estimate that annual capital spending by all levels of government from 2008 to 2035 will average \$65 billion. To maintain



current performance (i.e., pavement condition getting no worse but also not better, and congestion getting no worse but also no better) would require \$112 billion per year—leaving a gap of \$47 billion per year. The “improve” scenario, which includes implementing all proposed highway projects with a benefit/cost ratio of 1.0 or greater, would require \$158 billion per year—leaving a gap of \$93 billion per year. In other words, to significantly improve the performance of America’s highway system would require far more than a 100% increase in the currently expected annual capital investment. And just preventing things from getting worse would require a 72% increase.

It’s important to note two caveats to the above estimates. First, because they are the sum of federal, state, and local capital spending on highways, these totals imply no specific shortfall amount at the federal level. Most recent reports (such as those from AASHTO and the two national commissions) assumed that the federal government should cover its “historic” share of 45% of the total. But what share should come out of *federal* funding depends critically on how the federal role is defined, which is one of the subjects of this paper. So at this point, we will deal only with the national totals.

Secondly, most of these totals implicitly assume that all of the highway projects involved would be un-priced, such that they appear “free” at the point of use. But economists understand that pricing can significantly affect how much of a good or service will be used. Hence, alternative scenarios that involve various degrees of pricing would produce lower total capital investment needs. In its most recent C&P report, FHWA did include an alternative scenario, based on large-scale use of congestion pricing; this scenario reduced the annual capital investment need by 27.5%. (Federal Highway Administration, March 2006) Likewise, the Policy & Revenue Commission’s Scenario 2 combined an aggressive operations-strategy approach with road pricing to produce the lowest-cost of its six scenarios. (National Surface Transportation Infrastructure Policy and Revenue Study Commission)

The Financing Commission, whose report came out in 2009, developed its own updated estimates: of highway revenues, from projections of current sources, and of investment needs to “maintain” and “improve,” using definitions similar to those of the C&P report. However, in its “improve” scenario, the Financing Commission imposed a more stringent benefit/cost ratio of 1.2, which reduced the investment amount by about 10% compared with using a 1.0 threshold. (National Surface Transportation Infrastructure Financing Commission) Their figures estimate annual highway revenues at \$76 billion per year and investment needs of \$131 billion per year for the “maintain” scenario—leaving an annual gap of \$55 billion. For the “improve” scenario, the investment need averages \$165 billion per year, leaving an annual gap of \$89 billion. Because these are the most recent projections, and also use a more conservative benefit/cost ratio, we will use these numbers henceforth in this report. (Note also that the Financing Commission’s tables include transit capital investment needs, which we are excluding here; hence, the “surface transportation” gap numbers in the Financing Commission’s reports are higher.)

How well do the investment needs projections of these four expert bodies capture the four factors creating the need for increased highway investment? One of those factors—the

need to replace worn-out highways and bridges—is a matter of some uncertainty. A recent NCHRP study included a Task 14, which concluded that current Interstate reconstruction needs are not adequately reflected in the C&P and related reports. (Transportation Research Board, July 2007) The most recent AASHTO Bottom Line report summarizes this finding:

“Today large parts of the Interstate system are reaching the age where major reconstruction will be required. This work has already begun around the country and reconstruction costs have been dramatic. It is not possible at this time to estimate the costs involved in a complete reconstruction of the system. A special analysis conducted to assess how to obtain reconstruction cost estimates recommends that the states conduct a complete systematic nationwide inventory of the Interstate system to determine the future investment requirements.” (American Association of State Highway and Transportation Officials)

Regardless of the exact size of the investment gap, every responsible analysis clearly establishes the case for large-scale increases in highway investment in America. The current reauthorization will be a failure if it does not address this critically important need.

### **WHAT IS THE APPROPRIATE FEDERAL ROLE?**

Why do we have a federal government? Most historians and political scientists would say that it exists to do things that the state governments cannot do—and potentially to keep the states from doing harmful things. One of the reasons for replacing the Articles of Confederation with the Constitution was that under the former, the original 13 states were erecting barriers to interstate commerce. To the framers of the Constitution, fixing this problem was so important that it led them to include in that document of the interstate commerce clause. Yet despite the widely accepted view of the appropriateness of the federal government ensuring the free flow of interstate commerce, the idea of the federal government, rather than the states, building and operating highways was controversial right up until the creation of the Interstate highway system.

To be sure, in the first half of the 20<sup>th</sup> century there was a well-marked system of U.S. highways, ranging from U.S. 1 on the east coast to U.S. 101 on the west coast. But it was well-established that these highways were owned, operated, and maintained by the states, though they took advantage of modest federal aid that was provided, based on a two-cent federal fuel tax. (Prior to the creation of the Highway Trust Fund in 1956, however, the federal gas tax was considered general federal revenue, and federal highway aid was appropriated each year from general revenues.)

From time to time, experts on federalism have questioned the current division of responsibilities between the federal, state, and local governments. In her 1992 book for the Brookings Institution, Alice Rivlin recommended that “The federal government should eliminate most of its programs in education, housing, highways, social services,

economic development, and job training,” so that it could focus its resources on more truly national priorities.(Rivlin)

In 2004, Tom Downs, a former senior official with a number of federal, state, and local transportation agencies, gave the Turner Lecture at the annual American Society of Civil Engineers conference. His assessment was that the federal transportation program had evolved into little more than a revenue block grant to the states, with no clear national objectives. After further cataloguing the program’s shortcomings, he suggested that “It is time to seriously consider an option that has been rejected out of hand in the past, namely a reversion of the . . . federal gas tax to the states.”(Orski)

Still more recently, the Government Accountability Office, in a whole series of reports, has cited many of the same shortcomings of the federal programs as have other critics. It recommended “identifying issues in which there is a strong federal interest and determining what federal goals should be related to those interests. . . . For issues in which there is a strong federal interest, ongoing federal financial support and direct federal involvement could help meet federal goals. But for issues in which there is little or no federal interest, programs and activities may best be devolved to other levels of government.”(Government Accountability Office, March 2008)

If we could start with a clean sheet of paper in the highway sector, it would seem obvious that the federal government would be responsible for major highways supporting interstate trade and commerce, state governments would be responsible for connecting cities within their state, and local/regional governments would be responsible for roadways and other forms of urban transportation.

The current federal surface transportation program, as noted in Part 2, bears little resemblance to this model. Congress has gradually expanded the “federal” program—originally concerned almost exclusively with the Interstate highway system—into an all-purpose highway, streets, sidewalks, bikeway, and transit program, with many additional frills and flourishes (“enhancements”). There is no rationale for this enormous expansion of scope other than (1) it enables members of Congress to provide desired projects to organized interest groups, and (2) those paying the federal “highway user taxes” have failed to protest effectively at the diversion of their “highway utility bill” payments to these ever-expanding purposes.

A refocused federal highway program should focus on three uniquely federal roles and responsibilities. Those are:

- Interstate commerce
- Safety
- Research

The first of these would account for the lion’s share of budgetary resources. It would focus on rebuilding and modernizing the Interstate highway system, as the nation’s truly national circulation system for interstate travel and commerce. Given the huge investment gap discussed in Part 3 and the large (but not yet quantified) fraction of this accounted for by Interstate facilities (both urban and inter-city), properly and thoroughly doing this job

over the next several decades should be the program's principal focus. This includes elevating goods-movement to a much higher priority in the federal highway program than it has ever explicitly enjoyed.

Safety regulation, in a major nation involved in the global economy, needs to be uniform and national in scope, so it is highly appropriate that the National Highway & Transportation Safety Administration and the National Motor Carrier Safety Administration be part of the U.S. Department of Transportation and federally funded.

Transportation research, like much other research, is something of a public good, and is appropriately funded and carried out at the federal level via such bodies as the Transportation Research Board and the various cooperative research programs such as the National Cooperative Highway Research Program, an effort jointly funded by the federal and state departments of transportation.

## **REFOCUSING THE FEDERAL ROLE AND PROGRAM**

What would it mean to refocus the federal program along the lines set forth in the previous section? One key provision would be to redefine federal highway user taxes as user fees for high-priority federal highway purposes only. The second key provision would be a credible commitment to rebuild and modernize the Interstate system to (1) facilitate interstate commerce and travel, and (2) reduce congestion on urban Interstates. The only other uses of federal highway user-tax monies would be to:

- Operate the refocused Federal Highway Administration
- Fund highway safety programs
- Fund highway transportation research.

Based on that prescription, this section seeks to estimate the amount of annual spending that would be shifted from non-highway to highway purposes under this new approach. To do this, we must identify all the non-highway activities currently being funded out of the Highway Trust Fund. Our starting point is a 2009 Government Accountability Office report analyzing highway and non-highway expenditures from the Highway Trust Fund during the five-year period 2004-2008. (Government Accountability Office, June 2009) The task is to go through the various categories identified in this report, separating them into those that relate directly to the refocused FHWA and those that do not.

### **Enhancements and Miscellaneous**

GAO's Table 2 identifies \$3.75 billion worth of "transportation enhancement" projects funded by highway users during the five-year period. Just over \$2 billion of this is for pedestrian and bicycle projects, with other monies going for scenic beautification, historic preservation, transportation museums, rehabilitation of historic transportation buildings and facilities, etc. None of these activities fit the refocused federal highway program definition. In addition, GAO's Table 3 identifies a mixture of highway-related (though not strictly construction or maintenance) and non-highway-related projects, totaling \$24.2 billion over five years. To avoid confusion over how these items are

treated, we reproduce here all the categories of Table 3 and indicate which ones would remain as part of the refocused FHWA:

<u>Category</u>	<u>HTF Amount (\$M)</u>	<u>Retained?</u>
Safety	\$8,111	Yes
Planning	3,089	Yes
Traffic Engineering	1,814	Yes
Utilities (ROW, etc.)	1,586	Yes
Research	1,321	Yes
Debt Service	1,241	Yes
Rail/highway crossings	1,100	Yes
Environmental/highway	449	Yes
Vehicle weight enforcement	107	Yes
Other (trails, etc.)	4,388	No
Administration (trails, etc.)	355	No
Transit	318	No
Training (non-FHWA)	164	No
Ferryboats & facilities	121	No
Youth conservation service	13	No

To summarize, of the \$24.2 billion for these miscellaneous expenditures, FHWA would retain \$9.2 billion for various safety programs, \$8.3 billion for the highway-related project activities, and \$1.3 billion for research.

### **Urban Mass Transit**

During the five-year period analyzed by GAO, the Federal Transit Administration received \$34.6 billion from the HTF's Mass Transit Account. But in addition, highway monies were "flexed" by state DOTs (as permitted by law) under three FHWA programs, as follows(American Public Transportation Association):

Congestion Mitigation and Air Quality (CMAQ)	\$3.20 billion
Surface Transportation Program (STP)	1.83 billion
Other	<u>0.06 billion</u>
5-Year Total:	\$5.09 billion

And another \$0.32 billion was identified as transit spending in GAO's Table 3. Thus, over the five-year period, just over \$40 billion of highway user tax revenue was shifted to transit.

### **Federal Highway Safety Regulation**

In addition to providing funding for a variety of highway safety programs, the HTF was the source of funding for the two federal highway safety agencies, National Highway Traffic Safety Administration and the Federal Motor Carrier Safety Administration, accounting for \$5.6 billion over five years. In general, federal safety agencies are paid for out of general fund monies, not user taxes. This is true of the Consumer Product Safety Commission, the safety regulatory functions of the Federal Aviation Administration, the

Federal Railroad Administration, the Nuclear Regulatory Commission, and most of the budget of the Food and Drug Administration. Consistency argues for shifting NHTSA and FMCSA to general-fund support, as well.

In summary, then, the Highway Trust Fund would no longer fund the following four categories:

<u>Category</u>	<u>5-Year Total</u>	<u>Annual Average</u>
Transit (Mass Transit Account/flexed/other)	\$40.01B	\$8.00B
Safety Regulation (NHTSA, FMCSA)	5.60B	1.12B
Enhancements	3.75B	0.75B
Miscellaneous	<u>5.04B</u>	<u>1.00B</u>
Totals:	\$54.4B	\$10.87B

During the five-year period analyzed by GAO, FHWA spent \$234.7 billion (after subtracting \$8.4 billion of general fund money that covered a portion of the FTA's budget). Thus, the average annual amount drawn from the Highway Trust Fund was \$46.9 billion per year. Consequently, having \$10.9 billion per year more to spend on highways would represent a 30.3% increase, based on present federal fuel tax rates.

However, during the SAFETEA-LU period, Congress directed that FHWA spending rely on both current highway user tax receipts and drawing down the entire unspent balance in the HTF. Since that balance is now gone, during the next five years the only monies available to FHWA are the projected receipts from highway user taxes. In August 2009 both the Congressional Budget Office and the Office of Management and Budget produced forecasts of HTF receipts and potential outlays for fiscal years 2010-2014. (Transportation Weekly) The figures on receipts from both sources were very similar, averaging \$38.3 billion per year over that time period. In this new environment, shifting \$10.9 billion per year from non-highway to highway purposes would mean an increase in federal highway spending from \$27.4 billion (\$38.3 minus \$10.9) to \$38.3 billion, an increase of 39.8%.

Thus, without an increase in current federal highway user tax rates, federal spending on highway investment could be increased by approximately 40% from what it otherwise be in the time period 2010 to 2014. And all of that money would be focused on 21<sup>st</sup> century Interstates.

## **POLITICAL FEASIBILITY**

How politically feasible is the refocusing of the federal highway program outlined in previous sections? Whether such a major shift in focus and funding could come about will depend principally on two considerations. First, would this approach cut the Gordian Knot that has prevented much-needed investment in America's highway infrastructure in a way that could build support from those groups that care the most about that issue? Second, could supporters of transit and other transportation choices be assured of funding

to replace what they now receive from the Highway Trust Fund? This section addresses both issues.

### **Restoring Trust in the Highway Trust Fund**

Since enactment of the federal ISTEA reauthorization in 1991 (which increased the federal fuel tax rate by 5 cents/gallon), there have been no further increases in the federal tax rate. And despite increased efforts on the part of public officials, only 21 of the 50 states have enacted any increases in state fuel taxes in that nearly two-decade period. (Federal Highway Administration, 2009) Taxpayer groups at both federal and state levels increasingly point to fuel taxes as “just another tax,” and this message appears to resonate with taxpayers.

This point is borne out by a growing volume of public opinion survey data. A 2006 survey of California voters, by researchers from Portland State University and San Jose State University, offered voters 13 options (various tax and toll possibilities) to raise money for new transportation facilities in that state. (Weinstein) The top-ranked choices, with support in the 50-60% range, were all toll options. Only 40% favored increasing the gas tax, and just 27% supported indexing it. And although transportation-only sales taxes are widely used in California’s urban counties, only 40% favored increased use of that option. Also in 2006, the American Automobile Association did a national survey of transportation funding options. Only 21% favored increasing the gas tax, while 52% favored tolling for new capacity. (American Automobile Association) In 2008, the National Cooperative Highway Research Program released a national synthesis report on voter/taxpayer response to tolling and road pricing. The study analyzed and summarized the results of numerous public opinion polls on aspects of this topic—a survey of surveys. (Zmud, A) One of the study findings was that “the public favors tolls if the alternative is taxes.” (Zmud, B)

One likely explanation for all of these results is as follows. The typical voter, who is a motorist, knows that if she supports a tax increase (fuel tax, sales tax, etc.) dedicated to transportation, she will definitely pay more—but she doubts that her own transportation problems will be eased. On the other hand, by supporting toll funding, she has reasonable confidence that she will only pay more if a toll project built in her region is both convenient for her to use and a good value for the amount of toll charged. It is plausible that voters could likewise support an increase in the federal gas tax if they could be assured that all of the proceeds went toward modernizing the Interstate system, both inter-city and urban, that they use and benefit from.

Members of the traditional highway community continue to advocate fuel tax increases as if they were what they used to be. For example, here is the editor of *Better Roads* magazine in a recent editorial: “The fuel tax is a user fee. You pay for what you get, and you get what you pay for. And if we don’t start paying more for our roads, we are going to get a lot less.” (Landers) Editor Kirk Landers is talking about the fuel taxes of the 1950s and ‘60s, not the general-public-works taxes of today that voters have lost faith in.

The two national commissions, in 2008 and in 2009, ably documented the huge highway investment shortfall and the need to do something about it. But the Policy and Revenue Commission, instead of proposing a narrower focus for the federal program, proposed greatly expanding its scope to encompass much greater federal transit assistance, new high-speed rail initiatives, waterways improvements, freight-rail projects as well as new energy and environmental programs—all to be funded out of greatly increased federal and state gasoline taxes. Not only was their call for potentially tripling the federal gas tax dead on arrival, but their proposal would also have obliterated any remaining vestiges of the user-pays/user-benefits principle. It would have completed the job of converting what once was a true user fee into a general-purpose transportation/energy/environment tax, but with the burden falling solely on motorists and truckers.

The members of the traditional highway coalition—including the American Highway Users Alliance, the American Automobile Association, the American Trucking Association, and the American Road & Transportation Builders Association—all continue to use and support the “fuel tax = highway user fee” language. But historically, to varying degrees these groups have been willing to support diversions of fuel taxes to other purposes in exchange for a larger total program (and hence more total highway funding). But while that approach succeeded in ISTEA and subsequent reauthorizations, what is currently on the table in the House reauthorization bill—STAA—would change that trade-off. As currently written, it would dramatically expand the ability of states to “flex” what used to be highway funding, to the point where at least one analyst has estimated that out of the proposed (but unfunded) six-year \$450 billion total, “only \$100 billion of this is dedicated to highways.”(O’Toole) That is the combined total of the to-be-consolidated Interstate Maintenance and National Highway System programs. Most of the rest of the nominal highway spending is flexible, and the program also elevates and expands programs for sidewalks, bike paths, and trails to higher level by creating an Office of Livability within the FHWA to institutionalize and oversee them.

By contrast, the proposed refocusing called for in this report would actually provide for a 40% increase in much-needed federal highway investment, focused on the truly federal priority of modernizing and rebuilding the Interstate system. No reliable cost estimate has been made on what it would take to rebuild and modernize the Interstates over the next, say, 20 years. One national study estimated the cost of rebuilding the 24 most seriously congested interchanges, in urban areas, at \$[to come]billion.(Cambridge Systematics) A 2005 study estimated that adding networks of HOT lanes for congestion relief to the urban freeway systems (most of which are Interstates) of the 19 most congested metro areas would cost \$98 billion.(Poole and Balaker) As noted previously, AASHTO has called for a study of what it would cost to reconstruct major Interstates as they reach the end of their original design life.

Even if the bulk of federal highway user taxes were devoted to Interstate modernization, the amount of funding produced from current fuel tax rates could well be inadequate to the task. But in the context of a national commitment to rebuild and modernize the Interstates as the focus of a reconfigured federal program, motorists (and taxpayer groups) might be persuaded that a true user fee, to be used for a clearly important



highway purpose, would be worthy of increasing the user tax. It is reliably estimated that each one cent per gallon produces about \$1.8 billion per year in federal fuel tax revenue. Thus, a five-cent increase would produce \$9 billion more in annual revenue, a 10-cent increase \$18 billion more. Since toll funding would be applicable to at least portions of the Interstate modernization (in particular, the HOT lane networks), it is not clear how much of a fuel tax increase would be necessary. At any rate, that question is premature until (1) a comprehensive cost estimate of the entire Interstate modernization program is developed and (2) the federal fuel tax and highway program is refocused as proposed in this report.

The question for highway supporters is whether to (a) continue supporting a federal program that is abandoning the user-pays/user-benefits principle, in hopes of eking out a net increase in highway funding, or (b) support the restoration of user-pays/user-benefits in a refocused program that has a reasonable chance of winning motorist and taxpayer support for increased highway investment.

### **Funding Non-Highway Transportation**

Would advocates of transit and “livability” support the proposed refocusing of the federal highway program? The default assumption must be “no,” simply because the transit community fought for years to get federal support at all, and fought many more years to gain access to a portion of highway user tax revenue. Why give up an assured status quo for a speculative future? Nevertheless, a strong case exists that transit and related programs for non-motorized urban transportation can continue to be well-funded, even without access to a portion of federal highway user tax revenue.

The context in which the reauthorization debate is taking place is one in which there is considerable political and popular support for measures that will reduce petroleum use and greenhouse gas emissions. That means Congress will be motivated to fund federal programs such as increased urban transit and other “livability” measures. Highway user taxes, however, are not the only possible sources of federal funding. General fund dollars and cap-and-trade revenues are other plausible funding sources.

General Fund Monies. During the 2008-2009 recession, Congress has twice (thus far) used general-fund monies to bail out the Trust Fund, supporting both its highway and transit components. The first bailout was \$8 billion in September 2008, followed by \$7 billion in July 2009. Congress authorized an additional \$48 billion in general fund monies for surface transportation in the stimulus measure (American Recovery & Investment Act) in February 2009. A second stimulus measure, of comparable size, may be enacted in early 2010. And all \$13 billion currently planned for federal high-speed rail support is general fund money. In effect, Congress has been expressing considerable willingness to spend general fund money on transportation infrastructure since 2008, and in a climate of popular support for reducing petroleum use and reducing greenhouse gases, that support seems likely to continue.

From a public policy standpoint, it makes sense to use general fund monies for programs that are in the nature of public goods—programs that provide general benefits to the public but for which it is not feasible to charge anything like what it costs to build, operate, and maintain them. That is the case for such “social infrastructure” as trolleys, light rail, buses, sidewalks, bikeways, recreational trails, etc. Highways, on the other hand, can and should be self-supporting from user charges (which can be a combination of true user taxes and tolls). To ask highway users to support social infrastructure which they do not use because that social infrastructure produces general public benefits is unfair. Programs that produce broad public benefits should be paid for by general taxpayers; that’s the principle under which general taxpayers pay for national defense, safety regulation, courts, and welfare programs.

Cap and Trade Revenues Some will argue that at a time of record federal budget deficits, it is not appropriate to add to the number of programs funded by general federal revenues. A recent article in *The New Republic* made this point explicitly about transportation, criticizing the recent uses of general fund monies to bail out the Trust Fund.(Tomer) An alternative to using general fund monies is to use a portion of the revenues generated by a possible cap and trade measure. At least two such measures include such support. The Kerry-Boxer Senate bill would devote a fixed portion (not yet specified) to “green” transportation, presumably mostly mass transit. And the Carper-Specter CLEAN-TEA bill would allocate 10% of the revenues from any cap and trade measure to non-highway transportation projects such as urban transit and inter-city rail.

Noted transportation budget expert Jeff Davis has laid out a rationale for shifting transit funding from fuel taxes to cap and trade revenue.(Davis, October 2009) Here is the argument, condensed and paraphrased:

- A. All the taxes that flow into the Highway Trust Fund (including its Mass Transit Account) are paid for by motorists, truck owners, and bus operators.
- B. Those who don’t drive, such as regular transit users, don’t pay any fuel taxes.
- C. The intent of increased federal transit spending is to shift trips from cars to transit, thereby reducing the amount of fuel sold and used.
- D. Thus, increased transit spending from the Trust Fund uses Trust Fund dollars in order to reduce the revenues going into the Trust Fund.
- E. Every serious transportation person agrees that there aren’t enough fuel tax revenues flowing into the Trust Fund to sustain current federal funding commitments.
- F. If inadequate Trust Fund revenues are the big problem, *“then in what universe can it possibly be a good idea to spend a greater percentage of the Trust Fund’s inadequate revenues on expanding transit systems in order to get more people to stop paying the taxes that support the Trust Fund, thus driving revenues down even further?”*

Davis goes on from there to support using cap and trade revenues to fund transit, freeing up gas-tax dollars to more adequately support the Highway Trust Fund’s original purposes.

Federal vs. State and Local Support for Transit It is also worth considering the same kinds of federalism issues addressed previously when it comes to transit and non-motorized transportation. Are these truly federal concerns? If federal funding were reduced or eliminated, would metro areas be out of luck? How much of a difference does federal support make? The author and a colleague did an analysis of funding sources for all transit agencies listed in the National Transit Database for 2002, in connection with the author's membership on a special committee of the Transportation Research Board. (Transportation Research Board, 2006) For those transit agencies with 2002 budgets of \$10 million or more, the largest group received between 5 and 10% of their funding from the federal fuel tax; the next largest group received 10 to 15%. A small number received less than 5% (with some getting none at all), but some received upwards of 25%, with two outliers receiving 34.3% and 59.1%, respectively. (Balaker and Poole)

More recently, a National Cooperative Highway Research Program report analyzed trends and patterns in federal and state government support for urban transit systems. (ICF International) Using 2004 data, they identified seven states as having very large transit systems (CA, IL, MA, MD, NJ, NY, and PA). Of the total in that year of \$9.3 billion in state government support for transit, \$7.6 billion was provided by those seven states, with all others accounting for the remaining \$1.7 billion of state transit assistance. Of \$7 billion in federal transit assistance that year, \$4 billion went to the seven largest states and the remaining \$3 billion went to all the others.

From these two sources, we can conclude that most transit agencies do not rely on the federal government for more than 20% of their total budgets, with many getting far less than that. In fact, the data from the 2004 National Transit Database show that most of the very large transit agencies in the seven largest states receive only 5 to 15% of their budgets from the federal government.

Transit is well-supported by state governments in states where there is large demand for transit in the urban centers. While federal assistance is highly likely to continue in any case, concern about transit agencies' funding should be based on an accurate understanding of the fact that most of the dollars supporting transit in the United States today are, appropriately, state and local, not federal.

## **CONCLUSION**

This paper has suggested an alternative to most of the recent prescriptions for reshaping the federal surface transportation program. Most of the policy reports from think tanks, like that of the Policy and Revenue Study Commission, would greatly expand the size and scope of the federal program. They would require a large increase in existing federal fuel taxes. And due to the combination of these two factors, they would essentially eliminate the original user-pays/user-benefits rationale that was the basis for creating the federal Highway Trust Fund in 1956, as the key means to pay for creating the Interstate highway system.

This paper accepts the case for large-scale increases in highway investment, both to eliminate the large backlog of cost-effective highway and bridge repair and modernization projects and to rebuild the aging Interstate system as it begins reaching the end of its original design life. But it argues that large-scale increases in existing federal highway taxes are highly unlikely to be possible without a major change in focus. To recreate public support for a revised federal program, that program must offer direct improvements in service to those asked to pay the bills. Rebuilding and modernizing the federal Interstate system, both urban and rural, it is argued, is the kind of program that could gain the support of motorists and truckers, since they would directly benefit from the reduced congestion and improved service quality that would result.

On the other hand, asking highway users to pay substantially more in order to fund expanded programs for sidewalks, bikeways, recreational trails, and more transit is unlikely to succeed, since the large majority of highway users do not use, and would not benefit from, these mostly localized urban projects. Principles of federalism suggest that these kinds of projects are more appropriately funded at state or local levels of government. But if Congress sees fit to continue them at the federal level, they should be supported by all taxpayers, as the kind of social infrastructure funded by federal agencies concerned with urban amenities (HUD) and outdoor recreation (Interior).

The urgent need to rebuild and modernize vital interstate highway infrastructure is bogged down by the unpopularity of increasing what has become a general-purpose public works tax, rather than a highway user fee. Refocusing the federal program on Interstate highways, and correspondingly restoring the true user fee nature of the federal fuel tax, offers a way to cut the Gordian knot.

## REFERENCES

American Association of State Highway and Transportation Officials, *Transportation: Are We There Yet? The Bottom Line Report—2009*, NCHRP Project 20-24(54)G, Washington, DC, 2009.

American Public Transportation Association, “APTA Primer on Transit Funding, FY 2004 Through FY 2009,” Table 37, August 2009.  
([www.apta.com/gap/policyresearch/Documents/Primer\\_SAFETEA\\_LU\\_August\\_2009\\_Update.pdf](http://www.apta.com/gap/policyresearch/Documents/Primer_SAFETEA_LU_August_2009_Update.pdf))

American Automobile Association, [citation to come]

Balaker, Ted, and Robert Poole, analysis of data in the 2004 National Transit Database, author email to Joseph Morris of TRB, June 2005.

Cambridge Systematics, *Unclogging America's Arteries*, American Highway Users Alliance, February 2004.

Corning, Howard M., *Dictionary of Oregon History*, Binfords & Mort Publishing, 1956.

Davis, Jeff, “The History of Transportation Trust Funds, Part 2, *Transportation Weekly*, Vol. 10, Issue 36, Sept. 2, 2009.

Davis, Jeff, "Editorial: Cap-and-Trade Revenue Makes Sense for Transit Funding," *Transportation Weekly*, Vol. 10, Issue 42, Oct. 14, 2009.

Dunn, James A., Jr., *Driving Forces: The Automobile, Its Enemies, and the Politics of Mobility*, The Brookings Institution, 1998, p. 38.

Federal Highway Administration, *Status of the Nation's Highways, Bridges, and Transit: 2004 Conditions and Performance*, U.S. Department of Transportation, March 2006.

Federal Highway Administration, State Motor Fuel Tax Rates, 1992-2006 (downloaded Dec. 29, 2009). ([www.fhwa.dot.gov/policy/ohim/hs06/pdf/mf205.pdf](http://www.fhwa.dot.gov/policy/ohim/hs06/pdf/mf205.pdf))

Fischer, John W., et al., "Surface Transportation Reauthorization Legislation in the 111<sup>th</sup> Congress: Summary of Major Selected Provisions," Congressional Research Service, 7-5700, R40780, Aug. 26, 2009, p. 10.

Government Accountability Office, "Surface Transportation: Restructured Federal Approach Needed for More Focused, Performance-Based and Sustainable Program," GAO-08-400, Washington, DC, March 2008.

Government Accountability Office, "Highway Trust Fund Expenditures on Purposes Other than Construction and Maintenance of Highways and Bridges during Fiscal Years 2004-2008," GAO-09-729R, June 30, 2009.

House Report No. 1899, 84<sup>th</sup> Congress, 2<sup>nd</sup> Session, p. 9 (cited in Davis).

ICF International, "Comparative Review and Analysis of State Transit Funding Programs," NCHRP Report 569, Transportation Research Board, 2006.

Klein, Daniel and John Majewski, "America's Toll Road Heritage: The Achievements of Private Initiative in the 19<sup>th</sup> Century," in Gabriel Roth (ed.), *Street Smarts*, Transaction Publishers, 2006.

Landers, Kirk, "Leadership, Please," *Better Roads*, October 2009, p. 40.

National Complete Streets Coalition, "The Complete Streets Act of 2009 (S.584/HR.1443)," [www.completestreets.org](http://www.completestreets.org) (downloaded Dec. 11, 2009).

National Surface Transportation Infrastructure Financing Commission, *Paying our Way: A New Framework for Transportation Finance*, Washington, DC, February 2009. ([http://financecommission.dot.gov/Documents/NSTIF\\_Commission\\_Final\\_Report\\_Advance%20Copy\\_Feb09.pdf](http://financecommission.dot.gov/Documents/NSTIF_Commission_Final_Report_Advance%20Copy_Feb09.pdf))

National Surface Transportation Policy and Revenue Study Commission, *Transportation for Tomorrow*, Washington, DC, December 2007. ([www.transportationfortomorrow.org/final\\_report](http://www.transportationfortomorrow.org/final_report)).

Office of Freight Management and Operations, *Freight Facts and Figures, 2008*, Table 2-2, Federal Highway Administration, November 2008.

Orski, Kenneth, "Is There a Case for Devolution?" *Innovation Briefs*, Vol. 16, No. 4, July/August 2005.

O'Toole, Randal, "Oberstar's Grand Plan," June 19, 2009 (<http://ti.org/antiplanner/?p=1498>), accessed Dec. 11, 2009.

Patashnik, Eric M., *Putting Trust in the U.S. Budget: Federal Trust Funds and the Politics of Commitment*, Cambridge University Press, 2000.

Polzin, Steve, and Xuehao Chu, "Exploring Long-Range U.S. Travel Demand: A Model for Forecasting State Level Person Miles and Vehicle Miles of Travel for 2035 and 2055," Center for Urban Transportation Research, University of South Florida, June 11, 2007.

Poole, Robert W., Jr. and Ted Balaker, "Design and Evaluation of Nationwide Deployment of Urban Area HOT Networks," prepared for the Science and Technology Policy Institute, Institute for Defense Analysis, Los Angeles: Reason Foundation, March 15, 2005.

Rivlin, Alice, *Reviving the American Dream*, Washington, DC: Brookings Institution, 1992, p. 17.

Tomer, Adie, "Will Looming Debt Issues Penetrate the Federal Transportation Debate?" *The New Republic*, Nov. 25, 2009.

Transportation Research Board, *The Fuel Tax and Alternatives for Transportation Funding*, Special Report 285, Washington, DC, 2006.

Transportation Research Board, *Future Financing Options to Meet Highway and Transit Needs*, NCHRP Project No. 20-24(49), September 2006.

Transportation Research Board, "Developing a Process to Assess Potentially Underestimated Interstate Highway Reconstruction Needs in the U.S. DOT Conditions and Performance and AASHTO's Bottom Line Reports," Task 14, in *Future Options for the National System of Interstate and Defense Highways*, NCHRP Project No. 20-24(52), 2007.

*Transportation Weekly*, "Comparing the Administration and CBO Highway Trust Fund Forecasts," Vol. 10, Issue 36, Sept. 2, 2009.

Weinstein, Asha, et al., "Transportation Financing Options for the State of California," Report 06-01, Mineta Transportation Institute, San Jose State University, 2006.

Zmud, Johanna, "Compilation of Public Opinion Data on Tolls and Road Pricing," National Cooperative Highway Research Program, Synthesis 377, 2008.

Zmud, Johanna, "The Public Supports Pricing If . . . A Synthesis of Public Opinion Studies on Tolling and Road Pricing," *Tollways*, Vol. 5, No. 1, Winter 2008.