The Nation's Highway and Transit Investment Needs through 2015

An Analysis of the U.S. DOT 2006 Report on Conditions and Performance of the Nation's Highways, Bridges and Mass Transit Systems in Preparation for SAFETEA-LU Reauthorization

American Road and Transportation Builders Association

Executive Summary

Highway Investment Needs. The U.S. Department of Transportation (U.S. DOT) released its 2006 *Report to Congress on the Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance* on March 15, 2007. The information in this valuable biennial report can and should be used by the Congress to determine annual funding levels for the next surface transportation authorization bill and beyond. But the report contains some serious shortcomings that must be rectified before the information can serve that purpose:

- The report emphasizes a definition of the cost to maintain current highway and bridge conditions that ARTBA believes is the wrong policy objective for the federal highway program. The cost-to-maintain scenario in the report, at an annual investment by all levels of government of $78.8 billion in 2004 dollars, would maintain physical conditions but congestion would worsen, according to the report, because it would finance too little new highway capacity. ARTBA holds that the policy objective for SAFETEA-LU reauthorization should be a federal highway program that at minimum would not let highway congestion and delays increase. The U.S. DOT report calculates an annual investment of $89.7 billion in 2004 dollars would be required to achieve this policy goal. Most of the additional $11 billion investment each year would be for new capacity.

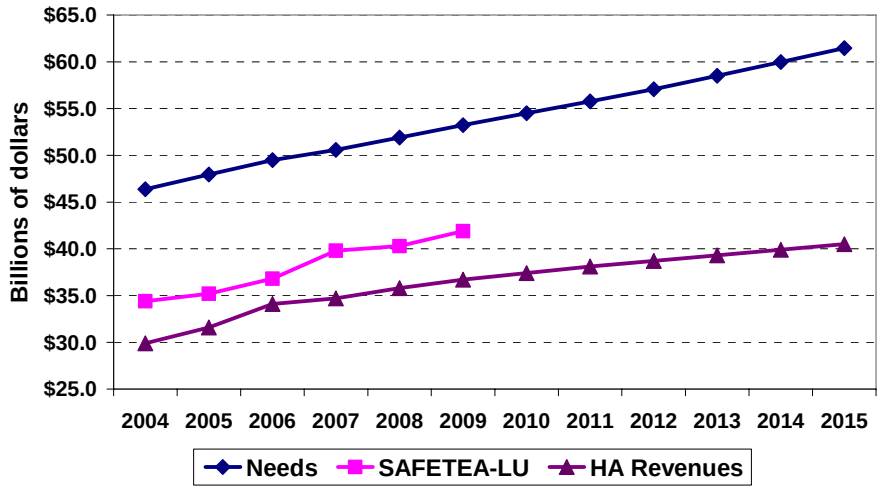
- The report presents all amounts in "constant 2004 dollars." This assumes the dollar will maintain the same purchasing power every year in the future as in 2004. But construction wages and materials prices go up each year, which means the investment figures in the report must be adjusted to reflect rising construction costs. There is no comprehensive official measure of highway construction costs, so ARTBA uses the Consumer Price Index to translate the investment requirements presented in 2004 dollars into actual dollars.

- Despite being a *Report to Congress*, the U.S. DOT report does not calculate the level of federal highway funding needed to meet highway investment goals, but instead focuses only on the total investment required by all levels of government. Congress, however, needs this information for SAFETEA-LU reauthorization. In recent years,

the federal share of highway capital outlays has averaged 43 percent and this analysis assumes it will remain at that level. To this must be added a margin for administration, research, transfers and the typical spendout to compute annual funding levels for SAFETEA-LU reauthorization.

After applying these adjustments, ARTBA calculates that federal highway funding in the next surface transportation bill would have to start at $54.5 billion in FY 2010 and grow to $61.5 billion by 2015 to provide the federal share of the annual highway investment needed to maintain both physical conditions and operating performance.

Fig. 1 - Highway Investment Needs Exceed SAFETEA-LU Funding and Highway Account Revenues



By comparison, federal highway funding under SAFETEA-LU peaks at $41.9 billion in FY 2009 while projected revenues into the Highway Account of the Highway Trust Fund range from $37.4 billion to $40.5 billion between FY 2010 and 2015, an annual funding gap averaging $19 billion. This comparison is shown in Figure 1.

The report explicitly states that an annual investment of $89.7 billion in 2004 dollars is required to maintain congestion at its current level.

The report calculates that the maximum annual highway investment that can be justified by comparing benefits and costs of potential improvements is $131.7 billion in 2004 dollars. After adjusting these figures to incorporate projected inflation and applying the current federal share of highway investment, federal highway spending would have to be $72.7 billion in FY 2010 and grow to $82 billion by FY 2015 to hit this target. This is almost double the current level of federal highway investment.

It should be noted that all investment figures in the needs report assume that the funds will be spent on the optimal set of potential highway improvements, based on the ratio of economic benefits to costs. But Congress and state/local DOTs factor other considerations into highway investment decisions, such as distributing highway funds equitably around the state or country and earmarking funds for projects desired by constituents. Neither approach guarantees selection of the ideal set of highway improvements as identified by the model based on economic benefits. As a result, the real-world funding needed to maintain conditions will be above the levels shown in Figure 1.

The report also suggests that investment requirements could be significantly reduced through a universal congestion pricing program, where highway users are charged higher prices to use roads at peak travel times. The report calculates that universal congestion pricing could reduce the cost of the highway investment required to maintain current conditions by $21 billion per year. To achieve this $21 billion savings, the report calculates that highway users would pay tolls of $34 billion per year, or $13 billion more per year for exactly the same result. The costs of the technology to track each vehicle, to calculate and bill congestion tolls, and to evaluate congestion conditions on each road would also be enormous. The report's analysis of universal congestion pricing should not distract from the need for the federal government to meet the investment responsibilities shown in Figure 1.

Public Transportation Investment Needs. The report calculates that an annual investment by all levels of government of $15.8 billion in 2004 dollars would be needed to maintain current physical conditions and operating performance on the nation's mass transit systems.

After incorporating projected inflation and applying the current federal share of transit investment, federal transit funding in the next surface transportation bill would need to be $9.3 billion in FY 2010, rising to $10.5 billion by FY 2015. By comparison, guaranteed funding for the transit program in SAFETEA-LU is $10.34 billion in FY 2009, or slightly more than would be needed just to maintain current conditions.

It should be noted, however, that some of the SAFETEA-LU transit funds are for new transit systems, which are not included in the needs report.

Moreover, the federal share of transit needs for FY 2010-2015 exceed projects revenues into the Mass Transit Account of the Highway Trust Fund, which means additional revenues would still be required.

The Nation's Highway and Transit Investment Needs through 2015

An Analysis of the U.S. DOT 2006 Report on Conditions and Performance of the Nation's Highways, Bridges and Mass Transit Systems in Preparation for SAFETEA-LU Reauthorization

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Introduction

On March 15, 2007, the U.S. Department of Transportation (U.S. DOT) released the 2006 edition of its biennial *Report to Congress on the Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance*[1].

This report, also known as the Needs Report, provides information on the current physical and performance conditions of the U.S. surface transportation system as well as on the annual investment required to maintain and improve our highways, bridges and transit systems. The report is required by law under Section 5201 of the Safe, Accountable, Flexible and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU), the current law authorizing the federal highway and public transportation programs, and continues a series of similar reports that began almost 40 years ago.

The U.S. DOT report contains critical information that Members of Congress can, and should, take into account when setting annual funding levels for the federal highway and mass transit programs. The information in the report, however, is technical and presented in ways that are difficult to apply to policy issues. Yet, without the information in the report, Congress has few other objective foundations for developing federal transportation investment policy. This is particularly important now, as the Congress begins to consider reauthorization of SAFETEA-LU, which expires September 30, 2009.

The American Road and Transportation Builders Association's (ARTBA) analysis of the 2006 Needs Report attempts to clarify and interpret the information in the report in ways that can make it useful for setting federal highway and transit investment policy. The analysis focuses on the following issues:

- What should be the nation's highway and transit investment objective?
- How much money must be invested each year to achieve the objective?

[1] Also known as the "Conditions and Performance Report" and the "Needs Report."

- What is the appropriate federal share of this investment?
- What annual federal highway and transit program funding is needed to achieve the desired investment?

Highway Investment Requirements

The 2006 *Conditions and Performance Report* focuses on two alternative targets for investment in the nation's highways and bridges. One is the annual investment that would be required to maintain current highway and bridge conditions, and the other is the maximum amount of highway investment that could be economically justified—the "cost to maintain" scenario, and the "cost to improve" or "maximum investment" scenario.

"Cost to maintain" is the term used in the report to describe the annual investment by all levels of government that would be required to maintain highway conditions at the 2004 level over the 20-year period 2005–2024.

"Cost to improve," or the equivalent "maximum investment scenario," is the term used for the maximum annual highway investment by all levels of government that could be justified by the economic criteria that project benefits exceed costs.

Cost to Maintain Conditions

The report calculates that to maintain highway and bridge conditions at their 2004 level would require an annual investment of $78.8 billion in 2004 dollars for each of the 20 years 2005-2024 covered by the report. This is the total investment required by all levels of government (including any private sector investment), not just the federal government.

By comparison, federal, state and local governments invested a total of $70.3 billion in highway and bridge improvements in 2004, $8.5 billion less than needed just to maintain current conditions as defined by the 2006 Needs Report.

But the $78.8 billion investment target in the report seriously understates the annual investment that would be needed to maintain current highway conditions, as most people would define "current conditions."

The Needs Report, and most highway users, look at two measures of highway conditions. One is the physical condition of highways and bridges—how smooth are the roadways, how many bridges are structurally deficient or functionally obsolete. The other is the operational performance of the highway system—how well the system accommodates the transportation needs of businesses and travelers.

While both measures are important, the primary concern of highway users today is congestion. There is simply not enough highway capacity in many parts of the country to accommodate the volume of highway travel and, as a consequence, many highway users spend a significant portion of their travel time on congested roads, idling in slow-moving traffic and

wasting time and money. According to the 2006 report, 31.6 percent of all traffic on urban freeways and expressways in 2004 occurred under congested conditions and the typical duration of congested conditions lasted about 6.6 hours per day.

The U.S. DOT's definition of the "cost to maintain" conditions, however, does not address this issue. The $78.8 billion annual investment requirement in the 2006 Needs Report is instead based on maintaining "highway user costs."

Highway user costs represent a blend of the costs borne by highway users, including vehicle repair costs, the direct costs of driving such as gasoline and depreciation, crash costs, and emissions costs, as well as the costs of congestion and delay.

If Congress were to use the highway user cost measure as the basis for setting federal highway funding for SAFETEA-LU reauthorization, would the American people be satisfied with the results?

The $78.8 billion annual investment emphasized in the 2006 Needs Report provides enough investment to improve the physical condition of highways and bridges, according to the report, but not enough new capacity to prevent a continued deterioration of highway congestion. At this investment level, the percent of travel under congested conditions would continue to rise, average travel speeds would continue to fall and the cost of delays would continue to rise.

This is not a scenario that, by common understanding, preserves current highway conditions.

A more relevant target would be to invest at least enough each year to keep congestion from worsening. The 2006 report calculates that an annual investment of $89.7 billion in 2004 dollars would be needed to achieve this goal, or about $11 billion more than the annual investment required to maintain user costs. Most of the additional funds would be used to add highway capacity.

At this higher investment level, the report calculates that the average speed of travel on the nation's highways would be kept at 43.0 miles per hour and the amount of delay per vehicle mile traveled would remain at its 2004 level.

Given the current frustration of highway users with congestion and the persistent deterioration of the performance of our nation's highway system, the maintain user cost investment target highlighted in the U.S. DOT's report, which promises even more congestion in the years ahead, makes no public policy sense.

ARTBA believes that the goal of the nation's highway investment strategy should be, at the very least, to maintain current highway performance by not letting congestion worsen or travel conditions deteriorate. The investment level required to do this would be $89.7 billion per year in 2004 dollars.

Cost to Improve Conditions

The 2006 report estimates that the maximum annual investment that could be justified by economic criteria in highways and bridges would be $131.7 billion in 2004 dollars. This figure represents all highway and bridge improvements where the benefits of the investment would exceed the project costs—i.e., where the benefit/cost ratio of the investment would exceed 1. Like the cost to maintain figure, this amount represents investment by all levels of government, not just the federal government.

Any investment level higher than $89.7 billion, up to a maximum of $131.7 billion annually in 2004 dollars, would improve both physical conditions and operational performance on the nation's highways and bridges. The $131.7 billion maximum annual investment is the level that would finance all highway and bridge projects where economic benefits exceed costs.

Fig. 1 - Annual Investment in 2004 Dollars by All Levels of Government to Achieve Each Goal

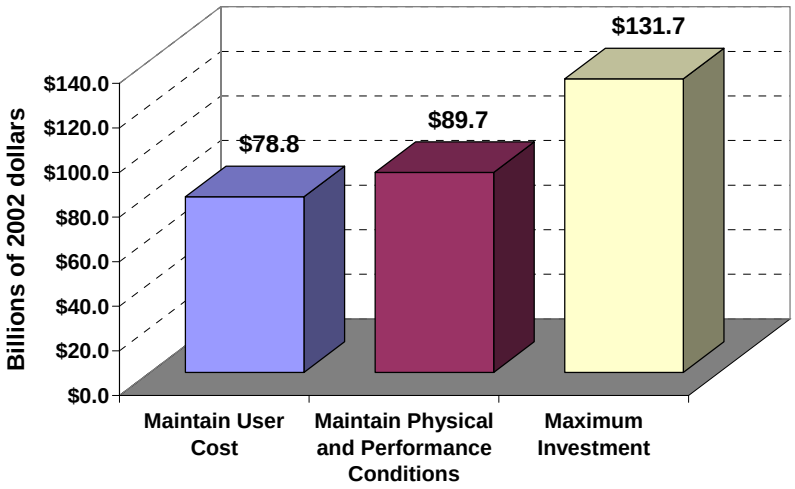


Figure 1 shows the annual outlays required by all levels of government in 2004 dollars over the period from 2005 – 2024 to achieve each of the three highway investment targets discussed above.

It should be noted that even if governments invested a total of $79.8 billion per year in highway and bridge improvements, that may still not be enough to maintain conditions. The state and local highway departments that develop and schedule highway and bridge construction projects might not choose to make the same improvements as the U.S. DOT model. The DOT model selects projects strictly on the basis of economic benefits versus project costs. State and local highway agencies have other criteria to consider. These include citizen demands for highway improvements, the political need to spread projects equitably around the state and earmarks by federal and state legislators.

The investment level from the U.S. DOT model thus should be viewed as the absolute minimum that would achieve the investment target.

Impact of Rising Construction Costs on Investment Requirements

The 2006 Needs Report estimates of the investment required each year to maintain (or improve) current highway conditions and performance are expressed in constant 2004 dollars—

i.e., the amount that would have to be invested each year if the dollar were to maintain the same purchasing power every year in the future as in 2004.

But, if history is any teacher, the dollar is not going to maintain its 2004 purchasing power. Each year, the cost of building highways and bridges goes up—the result of rising materials costs, higher wages and salaries for employees, and higher prices for services like electricity, phone and insurance—so the highway construction dollar buys less. As a result, governments have to spend more dollars each year to finance the same amount of actual construction work.

For this reason, the investment targets in 2004 dollars in the Needs Report are not useful to Members of Congress for setting federal highway policy. To be useful, especially for SAFETEA-LU reauthorization, the investment targets must be adjusted to incorporate projected highway construction cost increases.

There is, unfortunately, no official government measure of highway and bridge construction costs. There is an index—the Producer Price Index for Highway and Street Construction—that measures prices of construction materials. But it does not include labor costs or the cost of "overhead" inputs like office rent, phone bills, insurance or machinery use, so it is only a partial measure at best. Furthermore, there is no official forecast for this index for future years.

Instead, we use the best available measure of price increases, the Consumer Price Index (CPI), to adjust the highway investment measures in the 2006 Needs Report. In the past, the CPI and the PPI for Highways and Streets have generally followed the same trend which suggests that forecasts of the CPI can serve as a reasonable substitute for future increases in highway construction costs. In addition, the annual budget of the U.S. government includes official estimates of CPI inflation that are widely accepted.

Table 1 shows the annual investment needed to maintain physical conditions and operational performance on the nation's highways and bridges at their 2004 level. The top line shows the annual investment in constant 2004 dollars while the bottom line incorporates the projected annual increase in highway construction costs each year, based on official government projections of the CPI. For 2005-2012, the CPI projections come from the President's Budget for Fiscal Year 2008. After 2012, we assume costs will rise 2.5 percent annually, which is in line with the budget forecast.

Table 1 - Annual Investment Required to Maintain Physical and Performance Conditions on Highways

(Billions of dollars)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
In 2004 Dollars	$89.7	$89.7	$89.7	$89.7	$89.7	$89.7	$89.7	$89.7	$89.7	$89.7	$89.7	$89.7
Annual Inflation		3.4%	3.2%	2.2%	2.6%	2.6%	2.4%	2.3%	2.3%	2.5%	2.5%	2.5%
Cumulative Inflation		3.4%	6.7%	9.1%	11.9%	14.8%	17.5%	20.3%	23.1%	26.2%	29.3%	32.5%
Investment Required	$89.7	$92.7	$95.7	$97.8	$100.4	$102.9	$105.4	$107.9	$110.4	$113.2	$116.0	$118.9

Using the CPI to forecast highway construction costs for future years provides a conservative estimate of highway investment needs. In 2005 and 2006, highway construction costs actually rose substantially more than consumer prices because of rapidly-rising prices for core high-

way construction materials like asphalt, aggregates, ready-mix concrete and diesel fuel. Strong growth of construction on new homes and apartments, office buildings, schools, even factories, as well as highways, raised demand for construction materials above the amounts producers could supply. The rising cost of oil—the source of asphalt and diesel fuel to power construction equipment—also contributed.

ARTBA estimates that material, labor and overhead costs for highway construction actually rose 7.7 percent in 2005 and 6.5 percent in 2006, or about twice the increase for the CPI. These, however, are not official cost figures and are not incorporated into this analysis. Had we applied these cost increases, the annual investment figures in Table 1 would be $3-$4 billion higher.

Federal Share of Highway Capital Investments

The 2006 Needs Report provides data on the total amount of investment required to highway maintain physical conditions and operational performance at 2004 levels, but does not divide the potential responsibility among the levels of government in the U.S.

As the report states:

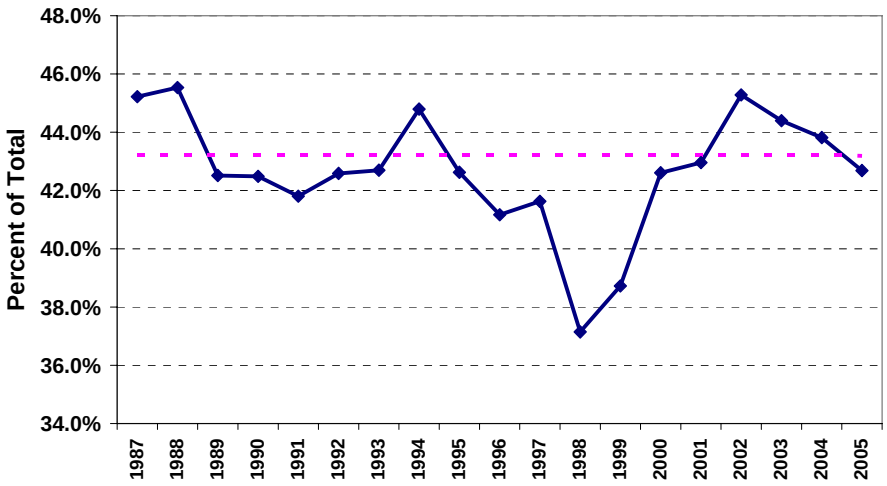
> The investment scenario estimates reflect the total capital investment required from **all sources**—Federal, State, local, and private—to achieve certain levels of performance. They do not directly address which revenue sources might be used to finance additional investment, nor do they suggest how much might be contributed by each level of government. **This report makes no recommendations concerning future levels of Federal investment[2].** (Emphasis in original).

State and local governments are ultimately responsible for administering virtually all public highways in the United States. The federal government is directly responsible only for roads on federal property, such as military bases, national parks and Indian reservations. The federal government, however, does share the cost of capital investments in those public roads which are of significance to the national economy and national defense. These, by law, include all roads and bridges except those classified as local roads or rural minor collectors. Of the 3.9 million miles of road in the U.S., just over 900,000 miles are eligible for federal highway aid while the remaining 3.0 million miles in general are not.

In recent years, the federal highway program has paid about 40-45 percent of total annual highway investment, while state and local governments have paid the rest, as shown in Figure 2. While the annual federal share varies from year to year, the average for the past 20 years has been just about 43 percent.

[2] 2006 *Conditions and Performance Report*, page ES-12.

Fig. 2 - Federal Share of Capital Outlays for Highways



To project the federal share of investment required to maintain physical and performance conditions on the nation's highways, we assume that the federal highway program will continue to cover 43 percent of highway and bridge investments.

In addition, about 10 percent of federal highway funds are used for non-capital spending, such as FHWA administration, research, transfers to the Federal Transit Administration, etc.

To accommodate the non-capital spending, we add 4 percentage points to the 43 percent federal share and thus calculate the target federal outlays as 47 percent of annual highway investment requirements. These data are shown in Table 2.

Table 2 - Federal Highway Program Outlays Required to Maintain Physical and Performance Conditions on Highways

(Billions of dollars)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total Investment to Maintain Conditions	$89.7	$92.7	$95.7	$97.8	$100.4	$102.9	$105.4	$107.9	$110.4	$113.2	$116.0	$118.9
Federal Share of Capital Outlays	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%
Non-Capital Federal	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Federal Outlays to Maintain Conditions	$42.2	$43.6	$45.0	$46.0	$47.2	$48.4	$49.5	$50.7	$51.9	$53.2	$54.5	$55.9

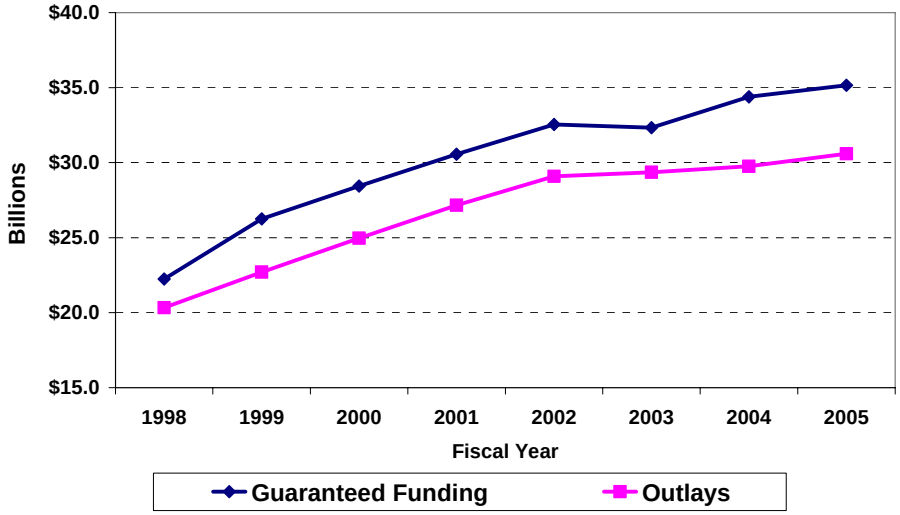
Annual Federal Highway Funding to Maintain Conditions

The annual amounts shown in Table 2 represent the federal outlays required each year to maintain physical and performance conditions on the nation's highways and bridges.

The question of this section is how much guaranteed funding or obligation authority should be provided each year under the federal highway program to generate the outlays shown in Table 2?

Funds authorized under the federal highway program spend out over a number of years because highway projects take a long time to plan, design and build. The Office of Management and Budget and the Congressional Budget Office calculate that the funds authorized each fiscal year actually "spend out" or generate outlays over a minimum of 7 years.

Fig. 3 - Guaranteed Highway Funding Compared to Outlays



As a result, outlays each year are usually below the level of guaranteed funding, sometimes by a substantial amount. The relationship in recent years is shown in Figure 3. For these years, outlays averaged just about 89 percent of guaranteed funding. The difference in a year can be more than $4 billion and has averaged $2.5 billion since 1998. Preliminary data for FY 2006 suggest the gap is growing, not shrinking.

To hit the annual outlay targets in Table 2, annual guaranteed funding would thus need to be about 10 percent above the outlay target.

The guaranteed funding needed just to maintain highway conditions each year is shown in Table 3.

Table 3 - Guaranteed Federal Highway Funding Required to Maintain Physical and Performance Conditions on Highways

(Billions of dollars)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Federal Outlays to Maintain Conditions	$42.2	$43.6	$45.0	$46.0	$47.2	$48.4	$49.5	$50.7	$51.9	$53.2	$54.5	$55.9
Guaranteed Funding to Achieve Target Outlays	$46.4	$47.9	$49.5	$50.6	$51.9	$53.2	$54.5	$55.8	$57.1	$58.5	$60.0	$61.5

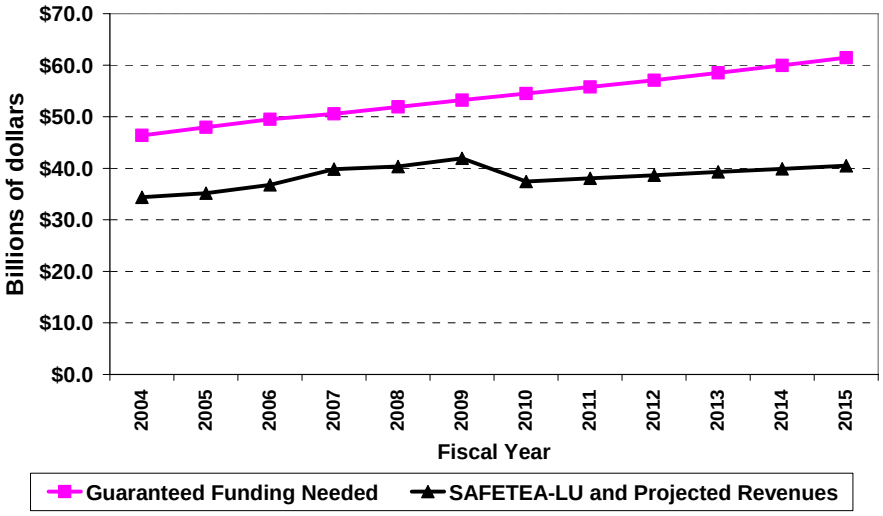
For reauthorization of SAFETEA-LU, guaranteed funding for the federal highway program would have to start at $54.5 billion in FY 2010 and grow to $61.5 billion by FY 2015 just to provide the federal share of the cost to maintain current physical conditions and operating performance on the nation's highways and bridges.

Federal Highway Funding Compared to Needs

Anyone familiar with the federal highway program will recognize that the federal funding requirements shown in Table 3 are far higher than actual highway funding under SAFETEA-LU or revenues that will be available in the Highway Account of the Highway Trust Fund to finance the next six-year authorization.

Figure 4 shows the annual federal highway funding needed to maintain physical and performance conditions on highways and bridges—from Table 3—compared to the funding authorized by SAFETEA-LU for FY 2004-2009, plus a projection of the maximum funding that could be supported by current Treasury Department projections of highway trust fund revenues.

Fig. 4 - Federal Highway Funding is Below Amount Required to Maintain Highways



The chart shows that the federal highway program has not been funded under SAFETEA-LU at the level needed to maintain conditions. Between FY 2004 and FY 2009, the shortfall averages more than $10 billion annually and hits $11 billion in FY 2009. After FY 2009, the shortfall will balloon to $19 billion annually unless Congress increases Highway Trust Fund revenues.

The year-by-year data for Figure 4 are shown in Table 4.

Table 4 - Actual and Projected Highway Funding and Funding Required to Maintain Physical and Performance Conditions
(Billions of dollars)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Highway Funding Needed to Achieve Target Outlays	$46.4	$47.9	$49.5	$50.6	$51.9	$53.2	$54.5	$55.8	$57.1	$58.5	$60.0	$61.5
SAFETEA-LU Funding and Projected HA Revenues	$34.4	$35.2	$36.8	$39.8	$40.3	$41.9	$37.4	$38.1	$38.7	$39.3	$39.9	$40.5
Annual Shortfall	$12.0	$12.8	$12.7	$10.7	$11.6	$11.3	$17.1	$17.7	$18.4	$19.2	$20.1	$21.0

Federal Reauthorization Funding Targets are Conservative

The annual federal highway investments to maintain highway and bridge conditions, as shown in Figure 4 and Table 4, are actually quite conservative and are more likely to understate than overstate the minimum federal funding required to meet this goal.

Inflation adjustment. As discussed earlier, ARTBA used the Consumer Price Index to translate 2004 dollar amounts into actual dollar amounts for the period from 2004 through 2015. In 2005 and 2006, however, highway construction costs rose substantially more than consumer prices. ARTBA estimates that material, labor and overhead costs for highway construction

actually rose 7.7 percent in 2005 and 6.5 percent in 2006, or about twice the increase for the CPI. This means the investment targets for 2005 and 2006 in the above tables fall short of the amounts actually required to maintain conditions. In the past, however, highway construction costs over the long run have generally risen in line with consumer prices. So using the CPI to project highway construction costs in the future is probably a reasonable approximation.

New highway corridors. The investment requirements identified in the needs report focus on the existing highway and bridge system. The FHWA model can identify needed improvements and capacity additions to current corridors, but can't identify the need for new "greenfield" roads. The need for new roads in new places as the economy grows would add to the investment requirements in the report.

Inadequate SAFETEA-LU funding. As Figure 4 and Table 4 show, guaranteed federal highway funding under SAFETEA-LU was less than required to maintain 2004 highway conditions. The annual shortfall averaged $12 billion per year. As a result, highway conditions probably deteriorated between 2004 and 2009. Even if Congress were to begin funding the federal highway program in FY 2010 at the level indicated in Table 4, the amount would not be enough both to make up the investment lost between SY 2004 and 2009 plus maintain conditions. To make up for lost time would require additional investment.

Ideal versus Real-World Project Selection. In computing the cost-to-maintain and maximum investment requirements in its biennial *Conditions and Performance Reports*, the U.S. DOT starts with a database of about 120,000 highway segments across the U.S., then identifies and evaluates all of the potential improvements on each segment, and then computes the value of the benefits and the cost of each potential project. This results in a benefit/cost ratio for each potential highway investment. Projects with benefits that exceed costs will have a benefit/cost ratio of 1 or greater. Projects whose costs exceed benefits will have a ratio of less than 1. The higher the ratio of benefits to costs, the higher the priority of the project.

Once all potential projects have been evaluated and ranked, the model assumes those with the highest benefit/cost ratio will be implemented first, followed by additional projects in descending order. The report then asks how many of the projects on the list must be implemented to achieve a particular goal, such as maintaining highway user costs for the next 20 years.

Based on this process, the 2006 report calculates that projects costing an average of $78.8 billion (in 2004 dollars) would have to be implemented annually in order to maintain user costs while $89.7 billion of projects (in 2004 dollars) would have to be implemented each year to maintain physical conditions and operating performance. To implement all projects with a benefit/cost ratio of 1 or greater would cost $131.7 billion annually. The model assumes no project with a benefit/cost ratio of less than 1 would be implemented.

By implication, these estimates all assume state and local DOTs will select the ideal mix of highway improvements based on economic benefit/cost ratios.

But state and local departments of transportation use a complex set of criteria for selecting highway improvements, not all of which reflect economic benefits and costs. For example, in many states, some highway funds are distributed geographically or among jurisdictions by formula. Similarly, most federal highway funds are distributed among the states by formula. This assures that the benefits of highway investment are widely spread, but not necessarily maximized. In addition, some state legislatures, as well as the U.S. Congress, designate at least some highway funds for specific highway projects, which may be selected on the basis of non-economic criteria. Thus, it is unlikely that the highway improvements made by state and local DOTs will all be those with the highest economic benefit/cost ratios.

As a result, the annual investment needs calculated by the U.S. DOT model may not be sufficient, in the real world, to achieve the goals of maintaining highway user costs ($78.8 billion annually in 2004 dollars) or maintaining physical conditions and operating performance ($89.7 billion annually in 2004 dollars).

The investment targets for the federal program shown in Table 3 thus probably understate the amounts needed between FY 2010 and 2015 to maintain highway physical conditions and operating performance at the 2004 level.

Congestion Pricing

The *2006 Conditions and Performance Report* estimates that immediate implementation of universal congestion pricing applied to travel on all roads would reduce the cost to maintain average user costs to $57.2 billion annually (in 2004 dollars), or $21.6 billion less than without congestion pricing. The savings comes from the assumption that congestion pricing will reduce traffic and thus wear and tear on roads, while less traffic at peak travel times means less new capacity would be required. To maintain both physical conditions and operating performance would, presumably, also require about $21 billion less per year, or an annual investment by all levels of government of $69 billion (in 2004 dollars). Both figures are less than the current level of highway investment, which totaled $70.3 billion in 2004.

This, on the surface, looks like a way to maintain the performance of the U.S. highway system without having to raise taxes or take other politically unpalatable measures to increase funds for federal, state and local highway investment.

But the analysis involves a number of critical issues that are not immediately obvious.

Cost versus benefit to highway users. According to the report, universal congestion pricing would cost highway users $34 billion annually in terms of tolls paid to use the nation's highways and bridges at peak travel times. This $34 billion of additional costs to highway users would reduce the annual investment required to maintain conditions by $21 billion per year, for a net cost to highway users of $13 billion. For this extra $13 billion, highway users would receive no net benefit since both scenarios maintain current conditions. Furthermore, this comparison does not include the cost to implement universal congestion pricing, discussed below.

Technology. There are a handful of roads using congestion pricing at the moment, but all are limited access roads where the fee is paid physically at a toll plaza or electronically through a transponder in the vehicle. Technology is simple and enforcement costs are minimal. But this is a far cry from the congestion pricing model in the report, which envisions immediate implementation of a system to track all highway traffic on all roads at all times and charge each highway user the proper fee. This would require fitting out more than 230 million existing vehicles with tracking mechanisms plus about 20 million new vehicles each year, along with the infrastructure to track each vehicle and accurately bill the owner. In theory, we have the technology to do this. In reality, it would be an enormous project to carry out both financially and logistically.

Enforcement. Currently, only a few hundred wholesale distributors of gasoline and motor fuels pay the federal motor fuels tax, which is then passed on to gasoline purchasers are the pump. While there is some fuel tax evasion, enforcement requires monitoring only a few taxpayers, work that can be done by only a handful of people at the IRS. There is no way an individual can evade the federal gas tax at the pump, so there is no need for enforcement at the individual level. Enforcement of a scheme that charges every individual highway user a fee each time he or she accesses the highway system, however, would be a major problem, since every highway user would have a financial incentive to evade the fee. Implementation of a congestion fee as envisioned in the report would have to include some way of monitoring and enforcing compliance for each individual highway user. This would be a massively expensive and intrusive undertaking.

Cost of Implementation. The investment savings in the report are due partly to the fact that the costs of implementing the proposal are not included. The startup costs to implement the required technology would be in the tens of billions of dollars, including the technology to track each vehicle, to calculate and bill congestion tolls, and to evaluate congestion conditions on each road. Annual costs would also be substantial. Enforcing and collecting congestion fees would require a substantial addition to the federal bureaucracy.

Privacy. Monitoring all highway use, as the congestion pricing scheme in the report would require, raises sensitive privacy issues. These issues do not arise on roads where congestion pricing is currently used, since users access the roads voluntarily. But they would arise in a universal mandatory program.

Safety. To the extent that congestion pricing shifts traffic from top-level roads like the Interstate Highways onto local roads, highway crashes and fatalities would likely increase by a substantial amount. The safest roads in the U.S. are the Interstates, even at high speeds, because of their divided lanes, wide lanes, long sight lines, and wide shoulders. Fatality rates are significantly less than on lower-level roads. Reducing congestion, particularly in urban areas, means removing traffic from Interstate and similar highways onto other roads. Congestion costs may go down but safety-related highway costs will inevitably rise.

Thus, while the report finds that aggressive congestion pricing would reduce the annual investment required to maintain conditions on the nation's highways and bridges, the analysis

overlooks the cost of implementing such a program as well as the political and technological obstacles.

This analysis should not distract from meeting the federal government's highway investment responsibilities.

Public Transportation Investment Requirements

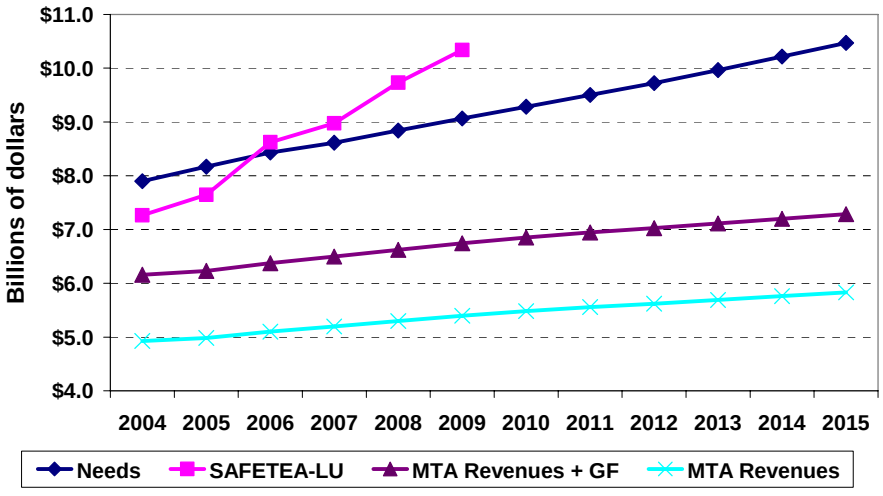
The 2006 *Conditions and Performance Report* also estimates the annual investment required both to maintain and improve conditions and performance on the nation's public transportation systems.

The report calculates that an annual investment by all levels of government of $15.8 billion in 2004 dollars would be needed each of the next 20 years to maintain current physical conditions and operating performance on the nation's mass transit systems. At this investment level, transit assets could be replaced and rehabilitated over the 20 year period such that average conditions at the end of the period are the same as at the start, while new vehicles and infrastructure would be added so that vehicle utilization rates are the same at the end as at the start, given projected ridership growth.

Because the transit investment figures are in constant 2004 dollars, they must be adjusted to incorporate projected cost increases, just as the highway investment amounts were adjusted. Since there is no price index for transit capital investments, the Consumer Price Index is used as a proxy.

The federal share of transit capital spending averaged 46 percent between 1995 and 2004, according to the 2006 *Conditions and Performance Report*. This is just slightly higher than the 43 percent federal share of highway capital spending. After applying a small margin for administration and research costs as well as to recognize the extended spendout of federal transit program funds, this analysis assumes annual federal funding for the public transportation program would equal 50 percent of the future annual total investment required to maintain transit conditions and performance.

Fig. 5 - SAFETEA-LU Met Transit Needs but MTA Revenues Are Inadequate for the Future



After incorporating these two calculations, federal transit funding in the next surface transportation bill would need to be $9.3 billion in FY 2010. This would rise to $10.5 billion in FY 2015, as shown in Figure 5. By comparison, guaranteed funding for the transit program in SAFETEA-LU is $10.34 billion in FY 2009, or slightly more than would be needed just to maintain current conditions.

It should be noted, however, that some of the SAFETEA-LU transit funds are for new transit systems which, as explained above in the highway section, are generally not included in the needs report. Total needs, including new systems, probably do exceed current federal transit program funding.

As Figure 5 shows, the federal share of transit needs for FY 2010-2015 exceed projected revenues into the Mass Transit Account of the Highway Trust Fund. The needs also exceed available revenues even if Congress were to continue funding 20 percent of transit program costs from the General Fund. Additional revenues for the Mass Transit Account would thus be required to meet transit needs in the next reauthorization cycle.