Highlights

This edition of the C&P report is based primarily on data through the year 2008; consequently, the system conditions and performance measures presented do not yet fully reflect the effects of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which authorized Federal highway and transit funding for Federal fiscal years 2005 through 2009. These measures also do not reflect the impact of the American Recovery and Reinvestment Act of 2009 (Recovery Act).

Cautionary Notes on Using this Report

In order to correctly interpret the analyses presented in this report, it is important to understand the framework in which they were developed and to recognize their limitations. This document is not a statement of Administration policy, and the future investment scenarios presented are intended to be illustrative only. **The report does not endorse any particular level of future highway, bridge, or transit investment.** It does not address what future Federal surface transportation programs should look like, or what level of future surface transportation funding can or should be provided by the Federal government, State governments, local governments, the private sector, or system users. Making recommendations on policy issues such as these would go beyond the legislative mandate for the report and would violate its objectivity. Outside analysts can and do make use of the statistics presented in the C&P report to draw their own conclusions, but any analysis attempting to use the information presented in this report to determine a target Federal program size would require a whole series of additional policy and technical assumptions that go well beyond what is reflected in the report itself.

The investment scenario estimates presented in this report are estimates of the performance that **could** be achieved with a given level of funding, not necessarily what **would** be achieved with it. The analytical tools used in the development of these estimates combine engineering and economic procedures, determining deficiencies based on engineering standards while applying benefit-cost analysis procedures to identify potential capital improvements to address those deficiencies that may have positive net benefits. While the models generally assume that projects are prioritized based on their benefit-cost ratios, that assumption is not consistent with actual patterns of project selection and funding distribution that occur in the real world. Consequently, the level of investment identified as the amount required to maintain a certain performance level should be viewed as **illustrative only**, and should not be considered a projection or prediction of actual condition and performance outcomes likely to result from a given level of national spending.

As in any modeling process, simplifying assumptions have been made to make analysis practical and to report within the limitations of available data. Since the ultimate decisions concerning highways, bridges, and transit systems are primarily made by their operators at the State and local level, they have a much stronger business case for collecting and retaining detailed data on individual system components. The Federal government collects selected data from States and transit operators to support this report, as well as a number of other Federal activities, but these data are not sufficiently robust to make definitive recommendations concerning specific transportation investments in specific locations. While improvements are evaluated based on benefit-cost analysis, not all external costs (such as noise pollution) or external benefits (such as the impact of transportation investments on productivity) are fully considered. Across a broad program of investment projects, such external effects may cancel each other; but, to the extent that they do not, the true "needs" may be either higher or lower than would be predicted by the models.

Highlights: Highways and Bridges

The Nation's Road Network is Extensive

The Nation's road network includes more than 4 million miles of public roadways and more than 600,000 bridges. In 2008, this network carried almost 3 trillion vehicle miles traveled (VMT).

The term "Federal-aid highways" includes roads that are generally eligible for Federal funding assistance under current law; approximately one-quarter of the Nation's 4 million miles of roadways fall into this category. (Note that certain Federal programs do allow the use of Federal funds on other roadways, under certain circumstances.) These 1 million miles of Federal-aid highways carried over five-sixths of the total VMT in 2008.

The National Highway System (NHS) includes those roads that are most important to interstate travel, economic expansion, and national defense. While the NHS makes up only 4 percent of total mileage, it carries approximately 44 percent of total VMT in the United States.

Highway Spending Has Increased

All levels of government spent a combined $182.1 billion for highway-related purposes in 2008, equivalent to almost $45 thousand per mile of roadway, or just over 6 cents per VMT. Just over half of this spending ($91.1 billion) was for capital improvements to highways and bridges; the remainder included expenditures for physical maintenance, highway and traffic services, administration, highway safety, and debt service.

Total spending on highways increased by 48.4 percent between 2000 and 2008, a 9.1 increase when adjusted for inflation. Highway construction costs generally increased more quickly than consumer prices, increasing sharply between 2004 and 2006. Highway capital expenditures increased by 48.6 percent between 2000 and 2008, equaling a 1.2 percent increase when adjusted for inflation.

Constant Dollar Conversions for Highway Expenditures

This report uses the Federal Highway Administration's (FHWA's) National Highway Construction Cost Index (NHCCI) and its predecessor, the Composite Bid Price Index (BPI), for inflation adjustments to highway capital expenditures and the Consumer Price Index (CPI) for adjustments to other types of highway expenditures.

Prior to the enactment of the Recovery Act, there had been a shift in the types of capital improvements being made by State and local governments. The portion of capital investment going for "system rehabilitation" (which includes resurfacing, rehabilitation, or reconstruction of existing highway lanes and bridges) declined from 52.7 percent in 2000 to 51.1 percent in 2008. The percentage of capital spending directed toward "system expansion" (the construction of new highways and bridges and additional lanes on existing highways) decreased from 37.4 percent to 36.8 percent over this period, while the portion used for "system enhancement" (including safety enhancements, traffic control facilities, and environmental enhancements) increased from 9.9 percent to 12.0 percent.

The portion of total highway capital spending funded by the Federal government declined from 42.6 percent in 2000 to 41.5 percent in 2008, because State and local government funding growth outpaced Federal funding growth over this period. This share is expected to rise in the near future due to the effects of the Recovery Act and various recession-related cuts at the State and local levels. Because the Federal-aid highway program is a multiple-year reimbursement program, the impact of increases in obligation levels on outlay levels phases in gradually over a number of years. (Note the terms "spending", "expenditures" and "outlays" are used interchangeably in this report).

Highway Safety Has Improved

Considerable progress has been made in reducing fatality and injury rates since 2000. Highway fatalities fell by 11.2 percent to 37,261 deaths in 2008. Data for 2009 show a continued drop to 33,808, and fell even more in 2010 to 32,788. The fatality rate per 100 million VMT declined from 1.53 in 2000 to 1.25 in 2008; preliminary 2009 figures show a further drop to 1.13 in 2009, which would be the lowest on record. Similarly, the injury rate per 100 million VMT declined from 116 in 2000 to 80 in 2008.

The 37,261 highway fatalities in 2008 included 5,282 nonmotorists killed by motor vehicle crashes. Overall nonmotorized fatalities decreased by 5.6 percent from 2000 to 2008, as an 8.1 percent decrease in pedestrian fatalities over this period was partially offset by increases in the number of bicyclists and other non-motorists killed. Highway safety remains a top priority within the U.S. Department of Transportation (DOT), and the improvement of the Nation's roadway infrastructure is an important component of the effort to reduce highway fatalities and injuries.

Operational Performance Has Stabilized in Many Areas

Over the period from 2000 to 2008, measures of urbanized area congestion developed for FHWA by the Texas Transportation Institute (TTI) show some overall improvement. The estimated percentage of travel occurring under congested conditions decreased from 27.0 percent in 2000 to 26.3 percent in 2008. The average length of congestion conditions in 2008 matches the 2000 level of 6.2 hours per day. System expansion and operational improvements since 2000 likely played a role in the stabilization of congestion. However, it is worth noting that there were reductions in highway travel in 2008 in conjunction with the recession and it is possible that congestion measures may be impacted when economic growth returns.

While urbanized areas with larger populations generally experience more congestion than smaller urbanized areas, that gap is shrinking. The share of travel occurring under congested conditions for urbanized areas of over 3 million in population decreased from 35.9 percent in 2000 to 35.4 percent in 2008, but rose from 13.4 percent to 13.7 percent over this period for urbanized areas of under 500,000 in population.

Pavement Conditions Have Improved in Many Areas

The percentage of Federal-aid Highway VMT on pavements with "good" ride quality rose from 43 percent in 2000 to 46 percent in 2008, while the share of VMT on pavements with "acceptable" ride quality (a lower standard that includes roads classified as "good") remained relatively stable at 85 percent.

While pavement ride quality has improved in both rural and urban areas over this period, overall pavement conditions in rural areas tend to be better than those in urban areas. In 2008, 62.5 percent of travel on rural Federal-aid highways was on pavements with good ride quality, while only 38.9 percent of travel on urban Federal-aid highways was on pavements meeting that standard.

While the overall pavement ride quality trend for Federal-aid highways has been positive (rising from 43 percent of VMT on "good" quality highways to 46 percent on "good" highways), these gains have occurred primarily on the Interstate System and other principal arterial routes that carry the most traffic. For lower-volume roadways classified as rural major collectors, urban minor arterials, or urban collectors, the percent of VMT on pavements with "good" ride quality declined between 2000 and 2008; the largest decline occurred on urban collectors as the share of VMT meeting this standard fell from 37.9 percent to 31.5 percent over this period.

The percentage of VMT on NHS pavements with "good" ride quality rose from 48 percent in 2000 to 57 percent in 2008. The share of VMT on NHS roads with "acceptable" ride quality increased slightly over this period, from 91 percent to 92 percent. (Note that the pavement statistics presented in this report are based on calendar year data, consistent with the annual *Highway Statistics* publication; in other DOT publications presented on a fiscal year basis, these calendar 2008 statistics appear as Fiscal Year 2009 data).

Bridge Conditions Have Improved, on Average

Bridges are considered structurally deficient if significant load-carrying elements are found to be in poor or worse condition due to deterioration and/or damage, or the adequacy of the waterway opening provided by the bridge is determined to be extremely insufficient to the point of causing intolerable traffic interruptions due to high water. That a bridge is deficient does not imply that it is likely to collapse or that it is unsafe.

Functional obsolescence is a function of the geometrics (i.e., lane width, number of lanes on the bridge, shoulder width, presence of guardrails on the approaches, etc.) of the bridge in relation to the geometrics required by current design standards. As an example, a bridge designed in the 1930s would have shoulder widths in conformance with the design standards of the 1930s, but current design standards are based on different criteria and require wider bridge shoulders to meet current safety standards. The difference between the required, current-day shoulder width and the 1930s-designed shoulder width represents a deficiency. The magnitude of these types of deficiencies determines whether a bridge is classified as functionally obsolete.

Due to the timing of data availability, the bridge statistics presented in this report are for the years 2001 to 2009, rather than for the 2000 to 2008 period presented for most other data. Bridge deficiencies are presented in three ways, relative to the number of bridges, weighted by average daily traffic, and weighted by deck area (the surface area of the bridge deck including the travel lanes, shoulders and pedestrian walkways). Weighting by deck area takes into account the size of bridges, which is significant in terms of the costs associated with replacing or rehabilitating them; weighting by average daily traffic is significant in terms of the number of people affected by bridge deficiencies.

Weighted by deck area, the percentage of NHS bridges classified as deficient declined from 30 percent in 2001 to 29 percent in 2009. About three-quarters of deficiencies on NHS bridges relate to functional obsolescence rather than to structural issues; some NHS bridges are narrower than current design standards would call for given the traffic volumes they currently carry. The percentage of deck area on all bridges (on or off the NHS) classified as deficient declined from 31 percent in 2001 to 29 percent in 2009.

While weighting by bridge deck area is useful in terms of thinking about the costs of addressing deficiencies (which would vary depending on the size of the bridge), in assessing overall bridge conditions it is also useful to consider the actual number of deficient bridges. The percentage of NHS bridges classified as deficient decreased from 23 percent in 2001 to 22 percent in 2009; the percentage of all bridges classified as deficient decreased from 30 percent to 27 percent over this period.

Future Capital Investment Scenarios

In order to provide an estimate of the costs that might be required to maintain or improve system performance, this report includes a series of investment/performance analyses that examine the potential impacts of alternative levels of future combined investment levels by all levels of government on highways and bridges for different subsets of the overall system. These analyses cover the 20-year period from 2008 to 2028 (reflecting the impacts of spending from 2009 through 2028); the funding levels associated with all of these analyses are stated in constant 2008 dollars. Rather than assuming an immediate jump to a higher (or lower) investment level, each of these analyses assume that spending will grow by a uniform annual rate of increase (or decrease) in constant dollar terms using combined highway capital spending by all levels of government in 2008 as the starting point. Drawing upon these investment/performance analyses, a series of illustrative scenarios were selected for further exploration and presentation in more detail. The scenario criteria were applied separately to the Interstate System, the NHS, all Federal-aid highways, and the highway system overall.

The **Sustain Current Spending scenario** assumes that capital spending by all levels of government combined is sustained in constant dollar terms at 2008 levels through the year 2028. The **Maintain Conditions and Performance scenario** assumes that capital investment gradually changes in constant dollar terms over 20 years to the point at which selected measures of future conditions and performance in 2028 are maintained at 2008 levels.

The **Improve Conditions and Performance scenario** assumes that capital investment gradually rises to the point at which all potential highway and bridge investments that are estimated to be cost-beneficial (i.e., those with a benefit-cost ratio of 1.0 or higher) could be funded by 2028. The **State of Good Repair benchmark** represents the subset of this scenario that is directed toward addressing deficiencies of existing highway and bridge assets. The **Intermediate Improvement scenario** assumes that combined spending gradually rises to a point at which potential highway investments with a benefit-cost ratio of 1.5 or higher can be implemented and assumes a comparable rate of growth in bridge spending.

Systemwide Findings

Sustaining combined highway capital spending by all levels of government at its 2008 level of $91.1 billion in constant dollar terms over 20 years is projected to result in a decline in certain measures of condition and performance. Achieving the objectives of the **Maintain Conditions and Performance scenario** would require an annual spending increase of 0.97 percent above the rate of inflation, translating into an average annual investment level of $101.0 billion over 20 years, stated in constant 2008 dollars.

Achieving the objectives of the **Intermediate Conditions and Performance scenario** would require a constant dollar spending increase of 3.51 percent per year, translating into an average annual investment level of $133.5 billion. Implementing all potentially cost-beneficial improvements by 2028 under the **Improve Conditions and Performance scenario** would cost approximately $170.1 billion per year over 20 years, consistent with an annual constant dollar spending increase of 5.62 percent. As part of this scenario, approximately $85.1 billion per year is associated with addressing deficiencies on existing highways and bridges; this figure is described as the **State of Good Repair benchmark**.

Federal-Aid Highway Findings

All levels of government spent a combined $70.6 billion on capital improvements to Federal-aid highways in 2008. The average annual investment level over 20 years for the **Maintain Conditions and Performance scenario** for Federal-aid highways is $80.1 billion, compared with $103.5 billion for the **Intermediate Improvement scenario** and $134.9 billion for the **Improve Conditions and Performance scenario**. The **State of Good Repair benchmark** is estimated to be $67.8 billion per year over 20 years, stated in constant 2008 dollars.

As noted above, the **Improve Conditions and Performance scenario** would address all potential highway and bridge investments with a benefit-cost ratio of 1.00 or higher by 2028, while the **Intermediate Improvement scenario** would address highway investments with a benefit-cost ratio of 1.50 or higher. The other two scenarios also assume that investments will be implemented in order based on their benefit-cost ratios; the funding level associated with the **Maintain Conditions and Performance scenario** is estimated to be sufficient to address all potential highway improvements with a benefit-cost ratio of 2.02 or higher by 2028, while the **Sustain Current Spending scenario** could address improvements with a benefit-cost ratio of 2.42 or higher.

Under the **Sustain Current Spending scenario**, the overall conditions and performance for Federal-aid highways are expected to worsen by 2028: average pavement roughness is projected to increase by 2.8 percent, average delay per VMT is expected to rise by 6.7 percent, and the economic bridge investment backlog is projected to grow by 6.5 percent. Under the **Improve Conditions and Performance scenario**, average pavement roughness is expected to be reduced by 24.3 percent, average delay per VMT would fall by 7.7 percent, and the economic bridge investment backlog would be eliminated by 2028.

NHS and Interstate Findings

All levels of government spent a combined $42.0 billion on capital improvements to the NHS in 2008. The average annual investment level over 20 years for the **Maintain Conditions and Performance scenario** for the NHS is $38.9 billion, compared with $56.9 billion for the **Intermediate Improvement scenario** and $71.8 billion for the **Improve Conditions and Performance scenario**. The **State of Good Repair benchmark** is estimated to be $29.8 billion per year over 20 years, stated in constant 2008 dollars.

Combined Federal, State, and local capital spending on Interstate highways totaled $20.0 billion in 2008. The average annual investment level over 20 years for the **Maintain Conditions and Performance scenario** for Interstate highways is $24.3 billion, compared with $36.2 billion for the **Intermediate Improvement scenario** and $43.0 billion for the **Improve Conditions and Performance scenario**. The **State of Good Repair benchmark** is estimated to be $16.2 billion per year over 20 years, stated in constant 2008 dollars.

Additional Observations

Several supplemental analyses were also conducted with alternative assumptions in the models used to project future capital investment scenarios. For example, if overall VMT, or particularly peak-period VMT, grew more slowly than has been assumed by the State projections reflected in the scenarios, the costs to maintain and improve the system would be lower.

Similarly, improving the livability of existing communities by providing a wider array of transportation options can be an effective means to reduce the strain on existing highway facilities and reduce the need for costly additions of new highway capacity. The widespread adoption of congestion pricing would also be projected to significantly reduce the need for additional highway capacity.

Highlights: Transit

Transit is Almost Everywhere

In 2008, there were 690 agencies in urbanized areas (UZAs) and 1,396 rural transit operators that reported financial and operating data to the National Transit Database (NTD). Not all transit providers throughout the United States are included in these counts since providers that do not receive grant funds from the Federal Transit Administration (FTA) are not required to report to the NTD.

In 2008, transit services provided 10.2 billion unlinked trips and 53.7 billion passenger miles traveled (PMT). Heavy rail and motor bus modes continue to be the largest segments of both measures. Commuter rail accounts for relatively more PMT due to its greater average trip length (23.4 miles compared with 3.9 for bus, 4.8 for heavy rail, and 4.4 for light rail). Though light rail is the fastest-growing rail mode (with PMT growing at 5.7 percent per year from 2000 to 2008), it provided only 3.9 percent of transit PMT in 2008. Vanpool growth during the same period was 11.8 percent per year, substantially outpacing the 1.8 percent growth in motor bus passenger miles. However, while motor buses provided 39.5 percent of all PMT, vanpools accounted for only 1.8 percent.

Every state reported providing rural service. Rural transit operators reported 136.6 million unlinked passenger trips. Included in this total are rural transit services provided by 61 Indian tribes, which reported 417,000 unlinked passenger trips. This service was provided by 1,150 demand response systems, 494 motor bus systems, and 16 vanpool systems. A total of 304 UZA agencies also reported providing rural service at the rate of 24 million unlinked passenger trips in 2008.

Are Transit Systems in Good Repair?

Prior editions of this report included scenarios that considered the level of investment required to either (1) *maintain* the condition of existing transit assets at current levels, or (2) *improve* the condition of those assets to an overall condition of "good" (i.e., 4.0 on TERM's condition scale). For this edition, these "maintain" and "improve" conditions analyses have been replaced by a **State of Good Repair** analysis. This type of analysis better represents idealized asset management practices and, to a somewhat lesser extent, actual practices at most transit agencies.

The FTA uses a numerical rating scale ranging from 1 to 5 (detailed in Chapter 3) to describe the relative condition of transit assets. Assets are considered to be in a state of good repair when the physical condition of that asset is at or above a condition rating of 2.5. For assets below this condition rating, it is cost-effective to replace instead of rehabilitate or repair the asset. A transit system is in a state of good repair when all its assets are rated at or above this 2.5 threshold. State of Good Repair analysis estimates the investment required to replace assets that are past their useful life expectancy (that is, below the 2.5 condition rating).

Additionally, prior report editions only considered a single ridership growth projection whereas this edition assesses transit capital expansion under both low and high ridership growth outcomes. In this report edition, the **Low Growth scenario** (which is comparable to prior editions' single ridership growth projection) assumes UZA-specific rates of PMT growth projected by the Nation's MPOs. Using this projected growth rate, transit operators expect to serve 2.6 billion new riders annually by 2028. Accordingly, these MPO projections (which are financially constrained) have fallen well short of actual growth in recent years. This report adds a new **High Growth scenario** based on UZA-specific historical growth rates for the last decade, which can be extrapolated to project an additional 6.2 billion new riders by 2028.

The transit state of good repair analysis, as presented in this report and in FTA's June 2010, *National State of Good Repair Assessment,* estimates that $77.7 billion (12 percent) of the $663 billion in assets for the entire U.S. transit industry are past their expected period of reliable service. These over-age assets are particularly concentrated in the categories of rail guideway elements and train communications/control systems. Future reports in this series will monitor ongoing changes in the proportion of in-service assets that exceed their useful life and related measures of transit state of good repair.

For purposes of comparison with previous reports in this series, average asset condition estimates are also included in this report. Averages reported here are weighted by the value of the assets. Thus a $2 asset in condition 4.0 and a $1 asset in condition 2.0 have a cost-weighted average condition of 3.3 [($2*4.0+$1*2.0)/($2+$1)] representing the average condition of the investment as opposed to an un-weighted average condition of 3.0 [(4.0+2.0)/2] which would not distinguish between the different replacement values of the two assets. Comparisons with prior year reports suggest that average transit conditions have remained stable or declined slightly over the past decade (though estimated conditions have improved somewhat for vehicle fleets).

Non-vehicle transit rail assets (guideway elements, facilities, systems, and stations) represent the biggest challenge to maintaining a state of good repair. The replacement value of these assets is $143 billion, of which $19 billion is below condition 2.0 (13 percent) and $16 billion is between condition 2.0 and 3.0

(11 percent). The replacement value of train systems (power, communication, and train control equipment) is $92 billion, of which $14 billion is below condition 2.0 (15 percent) and $19 billion is between condition 2.0 and 3.0 (21 percent). Stations have a replacement value of $83 billion with only $1.5 billion below condition 2.0 (2 percent) but with $21 billion between condition 2.0 and 3.0 (21 percent). Facilities, mostly consisting of maintenance and administration buildings, have a replacement value of $32 billion with $1.4 billion below condition 2.0 (4 percent) and $7 billion between condition 2.0 and 3.0 (22 percent). The relatively large proportion of guideway and systems assets that are below condition 2.0, and finding the $36 billion investment required to replace them, represents a long-term challenge to the rail transit industry.

The Ride Hasn't Changed Much

A few of the most important goals shared by all transit operations include minimizing travel times, making efficient use of vehicle capacity, and providing reliable performance. Accordingly, the FTA collects data on average speed, how full the vehicles are (utilization) and how often they break down (mean distance between failures) to determine how well transit service meets these goals.

Average speeds for nonrail service (dominated by the bus mode) have been relatively constant since 2000. Speeds remain around 20 miles per hour (mph) in spite of increases in roadway congestion over this period. Rail service shows a slight decrease in average speed over this period (24.9 to 23.9 mph). This may be due to more crowded conditions in the heavy rail systems that dominate this category (heavy rail passenger loads have increased 7.5% over this period), track maintenance issues associated with the older systems, or both. Average speed is decreased when high passenger volumes force vehicles to exceed scheduled dwell times as they take on and discharge passengers. Bus passenger loads have not increased since 2000.

Utilization of vehicle capacity varies by mode. In 2008 vehicle occupancy as a percentage of the seating capacity was: vanpool, 57.5%; heavy rail, 48.5%; light rail, 38.3%; trolleybus, 30.4%; ferryboat, 29.2%; commuter rail, 28.3%; motor bus, 27.8%; and demand response, 12.3%. Even on crowded routes these percentages seldom exceed 50% as it is difficult to get significant ridership on trips running counter to the flow of commuters who make up the majority of most transit users. The average utilization of vehicle capacity for all modes combined has increased slightly since 2000.

Mean distance between failures has been stable over the last decade at around 7,000 miles. This indicates that the number of unscheduled delays due to mechanical failures of transit vehicles has not changed significantly. Note that the FTA does not currently collect direct measurement data on the number and lengths of passenger delays resulting from non-vehicular mechanical failures, guideway conditions (e.g., roadway congestion or rail slow zones), or related factors.

Transit is Getting Safer

Transit operators report safety information to the NTD for three major categories: incidents, injuries, and fatalities. The number of fatalities (excluding suicides and homicides) has been relatively constant for the last five years with the U.S. transit industry reporting 216 fatalities in 2008. In 2000, there were 245 fatalities reported. Additionally, due to increasing passenger miles traveled over this period, the fatality rate "per 100 million passenger miles" has been trending down. The fatality rate per 100 million passenger miles was 0.56 in 2000 and was 0.42 in 2008.

For injuries and incidents, the NTD has consistent and comparable data back to only 2004 when new definitions were promulgated. The worst year for injuries since then was 2008, with 11 percent more than in the previous year for a total of 26,228 injuries (50.43 per 100 million passenger miles).

Commuter rail reported the highest fatality rate for transit modes in 2008 (1.13 fatalities per 100 million passenger miles). Both light rail (0.77 fatalities per 100 million passenger miles) and demand response (0.83 fatalities per 100 million passenger miles) reported about half the fatalities reported in 2007. A trend toward significantly fewer fatalities may be developing in these two modes. Motor bus and heavy rail also reported relatively low numbers (heavy rail was 0.40 fatalities per 100 million passenger miles and motor bus was 0.38 fatalities per 100 million passenger miles).

Transit Funding is Up

In 2008, $52.5 billion was generated from all sources to finance transit investment and operations, compared with $30.8 billion in 2000. This is a 70 percent absolute increase or 36.3 percent in constant dollars (adjusted for inflation). Of these funds, 73.9 percent ($38.8 billion) came from public sources and 26.1 percent came from passenger fares ($11.4 billion) plus other system-generated revenue sources ($2.3 billion). The Federal share of this was $9.0 billion (23.1 percent of total public funding and 17.1 percent of all funding). The Federal share of total funding from government sources has been fairly constant, between 23 and 25 percent, since 2000 and has rarely been outside that range since 1990. Local jurisdictions provided the bulk of transit funds, $18.5 billion in 2008, or 47.5 percent of total public funds and 35.1 percent of all funding. Dedicated sales taxes were the largest sources of State and local funding; in 2008, they accounted for 30.2 percent of State transit funds and 36.0 percent of total local transit funds. In constant dollars, total public funding for transit increased 47.9 percent and funding from Federal sources increased by 37.0 percent between 2000 and 2008. Funding from State and local sources increased by 52.0 percent in constant dollars during this period.

Constant Dollar Conversions for Transit Expenditures

This report uses the Consumer Price Index (CPI) for inflation adjustments to all types of transit expenditures. (There is currently no industry-specific index for transit capital expenditures comparable to the NHCCI for highway capital expenditures.)

In 2008, $36.4 billion in funding was provided for transit operating expenses (wages, salaries, fuel, spare parts, preventive maintenance, support services, and leases). The Federal share of this has declined from the 2006 high of 8.2 percent to 7.1 percent in 2008. Similarly, the share generated from system revenues has decreased from 40.3 percent in 2006 to 37.6 percent. These decreases have been offset by the State share, which has increased from 22.5 percent in 2006 to 25.8 percent. The local share of operating expenditures has been close to 2008's 29.7 percent for several years.

The average annual increase in operating expenditures per vehicle revenue mile for all modes combined between 2000 and 2008 was 4.1 percent (current dollars) or, after adjusting for inflation, 1.5 percent (constant dollars). Operating expenditures per passenger mile for all transit modes combined increased at an average annual rate of 4.3 percent between 2000 and 2008 (from $0.44 to $0.62) in current dollars (a 1.7 percent increase in constant dollars).

Analysis of NTD reports for the largest 10 transit agencies (by ridership) shows that the growth in operating expenses is led by the cost of fringe benefits (36.0 percent of all operating costs for these agencies), which have been going up at a rate of 3.4 percent per year above inflation (constant dollars) since 2000. By comparison, average salaries and wages at these ten agencies grew at an inflation-adjusted rate of only 0.1 percent per year in that period. FTA does not collect data on the different components of fringe benefits but increases in the cost of medical insurance undoubtedly contributed to the growth in this category.

New Capital Investment Scenarios

The analyses associated with this report assess the impact of broad variations in the total level of transit capital expenditures on future transit asset conditions, the magnitude of the investment backlog, and the overall ability to meet growth in transit travel demand. Furthermore, this report features key transit investment analysis scenarios that assess the consequences of sustaining transit capital spending at current levels as well as the level of investment required to attain specific conditions and performance objectives. As with the highway and bridge analyses, all transit analyses assess investment impacts over a 20-year time period from 2008 to 2028 (reflecting the impacts of spending from 2009 through 2028) and take into account the combined levels of investment from all levels of government.

The **Sustain Current Spending scenario** assumes that spending on the preservation and expansion of transit capital assets by all levels of government is sustained in constant dollar terms at base year 2008 levels from 2009 through 2028. In contrast, the **State of Good Repair benchmark** assesses the level of spending required to bring all of the Nation's existing transit assets—including all vehicles, stations, maintenance facilities, guideway track and structures, and systems—to a state of good repair (with no assessment of investment cost-effectiveness and no consideration of transit expansion requirements). Finally, the **Low Growth** and **High Growth scenarios** consider the level of investment to address both asset state-of-good-repair and service expansion needs subject to two different potential levels of growth (and with all investments now required to pass a benefit-cost analysis). The **Low Growth scenario** assumes transit ridership will grow as projected by the Nation's metropolitan planning organizations (MPOs), while the **High Growth scenario** assumes the average rate of growth (by UZA) as experienced since 1999.

Results for All Transit Systems

All levels of government spent a combined $16.1 billion on capital improvements for the Nation's transit infrastructure and fleets in 2008, including $11.0 billion on reinvestment in existing assets and $5.1 billion on expansions to existing transit capacity. In contrast, the average annual investment level required to attain a state of good repair alone under the **State of Good Repair benchmark** is estimated to be $18.0 billion over the next 20 years (this level of investment does not consider cost effectiveness or address expansion needs). 87% of this amount is associated with the reinvestment needs of urbanized areas with over one million in population. $11.0 billion is associated with rail capital reinvestment nationally.

The level of average annual investment required to attain a state of good repair and address asset expansion to accommodate expected ridership growth is estimated to be between $20.8 billion and $24.5 billion under the **Low Growth** and **High Growth scenarios**, respectively. In addition to the roughly $16.6 billion to $17.2 billion required annually to address *cost-effective* asset preservation needs, these scenarios estimate that an additional $4.2 billion to $7.3 billion are required to support from 2.6 billion to 6.2 billion additional annual transit boardings by 2028 while maintaining current service levels (as measured by the number of riders per peak vehicle). Under both growth scenarios, about 60 percent of these amounts are associated with rail expansion needs, with the remainder devoted to the expansion needs of other transit modes (primarily bus).

Finally, the **Sustain Current Spending scenario** assesses the impact of sustaining national-level transit capital expenditures at the 2008 level (i.e., $16.1 billion) though 2028. Under these circumstances, it is projected that the size of the transit investment backlog will increase from $77.7 billion in 2008 to roughly $116.5 billion by 2028. Similarly, the proportion of assets included in the backlog will increase from about 11.7 percent to about 17.5 percent by 2028, with a related decline in average physical conditions and projected increases in both annual service failures (10 percent) and fleet maintenance costs (4 percent).

Results for Transit Systems in Urbanized Areas Over 1 Million in Population

Transit systems in the 37 Urbanized Areas (UZAs) with over one million in population account for 90.1 percent of the all transit passenger boardings in the Nation. They operate more than 90 percent of the Nation's transit assets (by replacement value), including all but a few rail systems (and these are small).

In 2008, transit agencies operating in these UZAs expended $14.8 billion on capital projects, including $10.2 billion on preservation investments intended to rehabilitate or replace existing assets, and $4.6 billion on expansion investments designed to increase service capacity. The annual investment level for these UZAs to attain a state of good repair under the **State of Good Repair benchmark** is estimated to average $15.6 billion over the next 20 years (excludes expansion needs). The additional level of average annual investment required to address both the asset expansion needs of these larger UZAs is estimated to be between $3.7 billion and $6.6 billion under the **Low Growth** and **High Growth scenarios**, respectively. In 2008 expenditures for expansion were $4.6 billion, a level that is able to meet the low growth projected increases in transit boardings while maintaining current service performance levels (as measured by the number of riders per peak vehicle).

Results for Transit Systems in Areas Under 1 Million in Population

This report includes the results of an analysis that considers the preservation and expansion needs of transit systems in all UZAs with populations of less than a million, as well as those of rural areas with existing transit service. This diverse group covers more than 500 different mid- and small-sized urbanized and rural transit operators offering only bus and/or paratransit services. This group currently accounts for less than 10 percent of all existing transit assets (by replacement value) but tends to have higher average growth in transit ridership as compared with the large UZAs.

The investment level needed for the smaller UZAs and all rural areas to attain a state of good repair under the **State of Good Repair benchmark** is estimated to average $2.4 billion over the next 20 years (excludes expansion needs), primarily for reinvestment in bus and paratransit fleets and the maintenance facilities that service those vehicles. This is significantly larger than the current investment level of $0.8 billion. The level of annual investment required to address the asset expansion needs of this group is estimated to average between $0.5 billion and $0.7 billion under the **Low Growth** and **High Growth scenarios**, respectively. As in the large UZAs, current levels of expansion investment for transit operators in this group meet the needs of the **Low Growth scenario**.