

# Introduction

This is the tenth in a series of combined documents prepared by the U.S. Department of Transportation (DOT) to satisfy requirements for reports to Congress on the condition, performance, and future capital investment needs of the Nation's highway and transit systems. This report incorporates highway, bridge, and transit information required by 23 U.S.C. §503(b)(8), as well as transit system information required by 49 U.S.C. §308(e). Beginning in 1993, the Department combined two separate existing report series that covered highways and transit to form this report series; prior to this, 11 reports had been issued on the condition and performance of the Nation's highway systems, starting in 1968. Five separate reports on the Nation's transit systems' performance and conditions were issued beginning in 1984.

This *2013 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance* report to Congress (C&P report) draws primarily on 2010 data, which reflect funds from the American Recovery and Reinvestment Act of 2009 (Recovery Act) (Pub.L. 111–5). The 2010 C&P Report, transmitted on March 15, 2012, was based primarily on 2008 data.

In assessing recent trends, many of the exhibits presented in this report present statistics for the 10 years from 2000 to 2010. Other charts and tables cover different time periods depending on data availability and years of significance for particular data series. The prospective analyses presented in this report generally cover the 20-year period ending in 2030.

## Report Purpose

This document is intended to provide decision makers with an objective appraisal of the physical conditions, operational performances, and financing mechanisms of highways, bridges, and transit systems based both on the current state of these systems and on their projected future state under a set of alternative future investment scenarios. This report offers a comprehensive, data-driven background context to support the development and evaluation of legislative, program, and budget options at all levels of government. It also serves as a primary source of information for national and international news media, transportation associations, and industry.

This C&P report consolidates conditions, performance, and financial data provided by States, local governments, and public transit operators to provide a national-level summary. Some of the underlying data are available through the U.S. DOT's regular statistical publications. The future investment scenario analyses are developed specifically for this report and provide national-level projections only.

## Report Organization

This report begins with an Executive Summary that highlights key findings of the overall report, which is followed by Chapter Overviews that summarize the key findings in each individual chapter.

The main body of the report is organized into four major sections. The six chapters in Part I, "Description of Current System," contain the core retrospective analyses of the report. Chapters 2 through 6 each include separate highway and transit sections discussing each mode in depth. This structure is intended to accommodate report users who may primarily be interested in only one of the two modes. The Introduction to Part I provides background information on the Recovery Act and performance management.

- **Chapter 1** provides information on household travel and highway freight movement.
- **Chapter 2** describes recent trends in highway, bridge, and transit system characteristics.
- **Chapter 3** depicts the current physical conditions of highways, bridges, and transit systems.
- **Chapter 4** discusses issues relating to the safety of highways and transit.
- **Chapter 5** presents information on various aspects of the current system performance for highways and transit, including sustainability and operational performance.
- **Chapter 6** discusses highway and transit revenue sources and expenditure patterns for all levels of government.

The four chapters in Part II, “Investment/Performance Analysis,” contain the core prospective analyses of the report, including 20-year future capital investment scenarios. The Introduction to Part II provides critical background information and caveats that should be considered while interpreting the findings presented in Chapters 7 through 10.

- **Chapter 7** projects the potential impacts of different levels of future highway, bridge, and transit capital investment on the future performance of various components of the system.
- **Chapter 8** describes selected capital investment scenarios in more detail and relates these scenarios to the current levels of capital investment for highways, bridges, and transit.
- **Chapter 9** provides supplemental analysis relating to the primary investment scenarios, comparing the future investment scenario findings to previous reports and discussing scenario implications.
- **Chapter 10** discusses how the future highway and transit investment scenarios would be affected by changing some of the underlying technical assumptions.

Part III, “Special Topics,” explores some topics related to the primary analyses in the earlier sections of the report.

- **Chapter 11** examines the transportation systems serving Federal and Tribal lands.
- **Chapter 12** describes the FHWA Center for Accelerating Innovation.
- **Chapter 13** discusses FTA’s National Fuel Cell Bus Program.

The report also contains three technical appendices that describe the investment/performance methodologies used in the report for highways, for bridges, and for transit. A fourth appendix describes ongoing research activities and identifies potential areas for improvement in the data and analytical tools used to produce the analyses contained in this report.

## Highway Data Sources

Highway conditions and performance data are derived from the Highway Performance Monitoring System (HPMS), a cooperative data/analytical effort dating from the late 1970s that involves the Federal Highway Administration (FHWA) and State and local governments. The HPMS includes a statistically drawn sample of more than 100,000 highway sections containing data on current physical and operating characteristics, as well as projections of future travel growth on a section-by-section basis. All HPMS data are provided to FHWA through State DOTs from existing State or local government databases or transportation plans and programs, including those of metropolitan planning organizations.

The HPMS data are collected in accordance with the *Highway Performance Monitoring System Field Manual for the Continuing Analytical and Statistical Database*. This document is designed to create a uniform and consistent database by providing standardized collection, coding, and reporting instructions for the various data items. The FHWA reviews the State-reported HPMS data for completeness, consistency, and adherence to reporting guidelines. Where necessary, and with close State cooperation, data may be adjusted to improve

uniformity. The HPMS data also serve as a critical input to other studies that are cited in various parts of this report, such as the Texas Transportation Institute's *2010 Urban Mobility Report*.

State and local finance data are derived from the financial reports provided by the States to FHWA in accordance with *A Guide to Reporting Highway Statistics*. These are the same data used in compiling the annual *Highway Statistics* report. The FHWA adjusts these data to improve completeness, consistency, and uniformity. Highway safety performance data are drawn from the Fatality Analysis Reporting System (FARS).

## Bridge Data Sources

The FHWA collects bridge inventory and inspection data from the States annually and incorporates the data into the National Bridge Inventory (NBI). The NBI contains information from all bridges covered by the National Bridge Inspection Standards (Title 23, Code of Federal Regulations, Part 650) located on public roads throughout the United States and Puerto Rico. Inventory information for each bridge includes descriptive identification data, functional characteristics, structural design types and materials, location, age and service, geometric characteristics, navigation data, and functional classifications; conditions information includes inspectors' evaluations of the primary components of a bridge, such as the deck, superstructure, and substructure. Most bridges are inspected once every 24 months. The archival NBI data sets represent the most comprehensive uniform source of information available on the conditions and performance of bridges located on public roads throughout the United States.

## Transit Data Sources

Transit data are derived from the National Transit Database (NTD) and transit agency asset inventories. The NTD provides comprehensive data on the revenue sources, capital and operating expenses, basic asset holdings, service levels, annual passenger boardings, and safety data of the more than 700 urban and 1,500 rural transit operators that receive annual funding support through the Federal Transit Administration's (FTA's) Section 5307 (Urbanized Area) and Section 5311 (Rural Area) Formula Programs. However, with the exception of fleet vehicle holdings (where NTD provides comprehensive data on the composition and age of transit fleets), NTD does not provide the data required to assess the current physical condition of the Nation's transit infrastructure.

To meet this need, FTA collects transit asset inventory data from a sample of the Nation's largest rail and bus transit operators. In direct contrast to the data in either NTD or HPMS—which local and State funding grantees are required to report to FTA and FHWA, respectively, and which are subject to standardized reporting procedures—the transit asset inventory data used to assess current transit conditions have been provided to FTA in response to direct requests submitted to grantees and have not been subject to any reporting requirements. Although there are no current reporting requirements or reporting standards for asset inventory data, the Moving Ahead for Progress in the 21st Century Act (MAP-21) transportation bill requires that grantees submit this information to NTD. Once rules for collecting this data are formalized in regulation and grantees start submitting it, FTA will have much better data on which to base its forecasts.

In recent practice, data requests have mostly been made to the Nation's 20 to 30 largest transit agencies because these agencies account for roughly 85 percent of the Nation's total transit infrastructure by value. Considering the slow rate of change in transit agency asset holdings over time (excluding fleet vehicles and major expansion projects), FTA has requested these data from any given agency only every 3 to 5 years. The asset inventory data collected through these requests document the age, quantity, and replacement costs of the grantees' asset holdings by asset type. The nonvehicle asset holdings of smaller operators have been estimated using a combination of (1) the fleet-size and facility-count data reported to NTD and (2) the

actual asset age data of a sample of smaller agencies that respond to previous asset inventory requests. This method of obtaining asset data has served FTA well in the past (and the quality of the reported data has improved over time), but the accuracy and comprehensiveness of FTA's estimates of current asset conditions and capital reinvestment needs will benefit from the standardized reporting requirements to be developed as per the requirements of MAP-21.

## Other Data Sources

This report also relies on data from a number of other sources. For example, the National Household Travel Survey (NHTS) collected by the FHWA provides information on the characteristics, volume, and proportion of passenger travel across all modes of transportation. Information on freight activity is collected by the Census Bureau through the Commodity Flow Survey, and then merged with other data in FHWA's Freight Analysis Framework.

## Investment/Performance Analytical Procedures

The earliest versions of the reports in this combined series relied exclusively on engineering-based estimates for future investment/performance analysis, which considered only the costs incurred by transportation agencies. This approach failed to adequately consider another critical dimension of transportation programs, such as the impacts of transportation investments on the costs incurred by the users of the transportation system. Executive Order 12893, *Principles for Federal Infrastructure Investments*, dated January 1994, directs each executive department and agency with infrastructure responsibilities to base investments on “. . . systematic analysis of expected benefits and costs, including both quantitative and qualitative measures . . .” New approaches have been developed to address the deficiencies in earlier versions of this report and to meet this Executive Order. The analytical tools now used in this report have added an economic overlay to the development of future investment scenarios.

The highway investment scenarios presented in this report are developed in part from the Highway Economic Requirements System (HERS), which uses benefit-cost analysis to optimize highway investment. The HERS model quantifies user, agency, and societal costs for various types and combinations of improvements, including travel time and vehicle operating, safety, capital, maintenance, and emissions costs. Bridge investment scenario estimates are developed from the National Bridge Investment Analysis System (NBIAS) model. Unlike earlier bridge models (and similar to HERS), NBIAS incorporates benefit-cost analysis into the bridge investment/performance evaluation.

The transit investment analysis is based on the Transit Economic Requirements Model (TERM). The TERM consolidates older engineering-based evaluation tools and introduces a benefit-cost analysis to ensure that investment benefits exceed investment costs. TERM identifies the investments needed to replace and rehabilitate existing assets, improve operating performance, and expand transit systems to address the growth in travel demand.

The HERS, NBIAS, and TERM models have not yet evolved to the point where direct multimodal analysis is possible. While the three models all utilize benefit-cost analysis, their methods for implementing this analysis are very different. The highway, transit, and bridge models are all based on separate databases that are very different from one another. Each model makes use of the specific data available for its part of the transportation system and addresses issues unique to each mode. For example, HERS assumes that when lanes are added to a highway, this causes highway user costs to fall, resulting in additional highway travel. Under this assumption, some of this increased traffic would be newly generated travel and some could be the result of travel shifting from transit to highways. However, HERS does not distinguish between different sources of additional highway travel. At present, there is no truly accurate method for predicting the impact

that a given level of highway investment would have on the future performance of transit systems. Likewise, TERM's benefit-cost analysis assumes that some travel shifts from automobile to transit as a result of transit investments, but cannot project these investments' impact on highways.

In interpreting the findings of this report, it is important to recognize the limitations of these analytical tools and the potential impacts of different assumptions that have been made as part of the analysis. Appendix D and the Introduction to Part II both contain information critical to contextualizing the future investment scenarios, and these issues are also discussed in Q&A boxes located in Chapters 7 through 10.

## Changes to C&P Report Scenarios from 2010 Edition

The selected capital investment scenarios presented in Chapter 8 are framed somewhat differently from those presented in the 2010 edition of the C&P report. While the transit scenario definitions have remained largely unchanged, the highway and bridge scenarios have been revised.

The 2010 C&P Report presented a single version of each highway and bridge scenario in Chapter 8, based on modeled projections of future vehicle miles of travel (VMT) for individual highway sections provided by the States to the HPMS. This edition includes some scenarios that assume lower future VMT growth based on the historic trend over the past 15 years; these alternative analyses are referred to as "Trend-Based" in this report.

The 2010 C&P Report introduced **Low Growth** and **High Growth** scenarios for transit, which are retained in this edition. The former is based on modeled transit ridership projections developed by Metropolitan Planning Organizations (MPOs), while the latter assumes higher future ridership based on the historic trend over the last 15 years.

The **Maintain Conditions and Performance** scenario for highways and bridges presented in the 2010 C&P Report used average speed and the economic bridge investment backlog as primary indicators. This edition instead targets average pavement roughness, average delay per VMT, and the average bridge sufficiency rating in defining this scenario.

The highway and bridge components of the **Intermediate Improvement** scenario presented in the 2010 C&P Report used the same annual growth in spending, based on HERS analysis. For this edition, the highway and bridge components were derived independently, with the bridge component based on achieving half of the improvement to average bridge sufficiency rating projected by NBIAS for the **Improve Conditions and Performance** scenario.

## 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 deficiencies that may have positive net benefits. Although the models generally assume that projects are prioritized based on their benefit-cost ratios, that assumption deviates somewhat from 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. Because the ultimate decisions concerning highways, bridges, and transit systems are primarily made by their operators at the State and local levels, 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. Improvements are evaluated based on benefit-cost analysis, but not all external costs (such as noise pollution or construction-related loss of wildlife habitat) or external benefits (such as the productivity gains that may result from transportation improvements opening up markets to competition) 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.

## Recovery Act: Overview and Impacts

In February 2009, the American Recovery and Reinvestment Act authorized \$48.1 billion for programs administered by the U.S. Department of Transportation (DOT). The U.S. DOT’s broad recovery goals reflect those of the Recovery Act, primarily (1) creating and preserving jobs and promoting economic recovery and (2) investing in infrastructure that has long-term economic benefits. Supporting the former goal required that Recovery Act funds be spent quickly on projects that would contribute to the Federal government’s larger efforts to promote economic recovery. Supporting the latter goal required that Recovery Act funds be invested in projects that provide long-term benefits for the Nation’s transportation systems. Of most relevance to the transportation modes reflected in the C&P report are the \$27.5 billion appropriated for programs administered by FHWA and \$8.4 billion appropriated for programs administered by FTA. In addition, highway, bridge, and transit projects were eligible to compete for Office of the Secretary of Transportation’s Supplemental Discretionary Grant for a National Surface Transportation System program, later referred to as the TIGER I program.

The short-term goal of the Recovery Act was to support jobs in the economy. The States and transit agencies were required to report the number of labor hours worked on projects supported by Recovery Act expenditures. Reported labor hours were converted to full-time job year equivalents by dividing hours worked by 2080 (40 hours multiplied by 52 weeks). Each job-year could reflect one person working full time for a whole year or two people working 6 months each. The “1201 (c) Report as of January 30, 2011” submitted to Congress in December 2011 indicated that the cumulative total number of jobs-years report for Recovery Act-funded highway and transit projects were 54,686 and 21,368, respectively. In addition to the direct jobs reported, jobs are also supported in industries that supply construction materials, transportation, and other services to the construction sector, referred to as indirect jobs. These were estimated to be 97,557

**Summary of Recovery Act Funding Received by DOT, by Appropriation Title**

<b>Operating Administration</b>	<b>Budget Authority (\$Billions)</b>	<b>Program Name</b>
Federal Highway Administration	27.5	Highway Infrastructure Investment
Federal Transit Administration	6.9	Transit Capital Assistance
	0.75	Capital Investment Grants
	0.75	Fixed Guideway Infrastructure Investment
Office of the Secretary of Transportation	1.5	Supplemental Discretionary Grants for a National Surface transportation System (TIGER)
Federal Aviation Administration	0.2	Facilities and Equipment
	1.1	Grants-in-Aid to Airports
Federal Railroad	1.3	Capital Grants to the National Railroad Passenger Corporation
	8.0	Capital Assistance for High Speed Rail Corridors
Maritime Administration	0.1	Assistance to Small Shipyards
Office of inspector General	0.02	Salaries and Expenses
<b>Transportation Total</b>	<b>48.12</b>	

*Source: U.S. DOT American Recovery and Reinvestment Act of 2009, Pub.L. 111-5*

for highways and 25,368 for transit. The wages earned from these jobs are spent to buy consumer goods and services, inducing jobs in other sectors. The total number of jobs (direct, indirect, induced) were estimated to be 195,325 for highways and 57,467.

The longer-term goal of the Recovery Act, which is more directly relevant to the C&P report, was to invest in infrastructure to produce long-term economic benefits. Through December 31, 2010, the Recovery Act had funded a total of 12,931 highway projects covering 41,840 miles of roadway. This included 7,632 pavement improvement projects (covering 33,340 miles), 421 pavement widening projects (covering 1,076 miles), and 173 new construction projects (covering 429 miles). Also included were 663 bridge replacement projects, 574 bridge improvement projects, and 61 new bridge construction projects. The Recovery Act also supported 970 projects (covering 3,775 miles) focused on safety or traffic management, 1,645 transportation enhancement projects (covering 2,194 miles), and 792 projects (covering 1,027 miles) involving other types of highway improvements. These investments will yield economic benefits through their lifetimes; having addressed these specific needs in the short term will allow a greater share of future investment to be targeted at other system needs.

Consistent with the operation of the regular Federal-aid program funds as a reimbursement program, the Recovery Act funds were obligated to specific projects up front, but the actual transfer of Federal dollars to the grant recipients occurs more gradually over the life of the projects. Through the end of 2010, approximately \$17.3 billion of Recovery Act funding had been expended for highway projects, and approximately \$3.5 billion had been expended for transit projects. Consequently the 2010 conditions and performance data presented in this report do not yet fully reflect the results of the Recovery Act investments. Recovery Act investments will continue to impact future financial data, as well as condition and performance data.

Because the financial statistics presented in the C&P report are cash-based, the Recovery Act funding is accounted for at the time that States and transit agencies are reimbursed, and appears in the revenue figures as support from Federal general funds. During 2010, \$11.9 billion of funding appropriated under the Recovery Act funds were expended for highway purposes and \$2.4 billion were expended for transit capital investments.

### What are the Implications of the Recovery Act for the C&P report?

The Recovery Act significantly affects the financial and other data presented in Part I of the C&P Report and the future investment scenarios in Part II. The Recovery Act impacts are particularly visible in the financial data presented in Chapter 6.

The financial data are presented on a cash basis, so that Recovery Act funding is not reflected in the year it was authorized or obligated, but instead in the year it was expended. Although \$27.5 billion and \$8.4 billion were authorized for highways and transit investments in 2009 and the deadline set for the obligation of these funds was September 30, 2010, only the funds that were actually expended in 2010 will show up in this report.

In 2010, the Recovery Act funded \$11.9 billion of the expenditures for highways and \$2.4 billion of the expenditures for transit. Since Recovery Act funding was not drawn from the user charges that support the Federal Highway Trust Fund, these amounts show up as General Fund revenues, which reduces the national percentage of spending supported by user charges in 2010, relative to most previous years. States and transit agencies were given tight deadlines to obligate Recovery Act funding, and encouraged to select projects that could proceed quickly, in order to produce a short-term impact on employment, particularly in the construction industry. This influenced the types of projects selected and increased the National share of highway capital spending directed toward system rehabilitation spending significantly compared to recent years. Although the long-term effects of this shift are unclear, given a set program of planned and prioritized potential future investments, transportation agencies may shift the focus of their future investment toward other types of investments that did not receive significant amounts of funding from the Recovery Act. While not directly attributable to the Recovery Act, there has been some degree of slowdown in the spending rate from regular Federal highway and transit program funds in recent years compared to some earlier years.

Spending supported by the Recovery Act also impacts the conditions, safety, and performance data presented in Chapters 3, 4, and 5. However, the full effects of the Recovery Act are not yet reflected in the data, since some of the funds have not yet been expended. In addition, while projects are underway, they can have a temporary negative impact on system users (in terms of pavement condition, delays, etc.) until they are completed. Given the number of projects underway in 2010, this could have had an impact on the national-level statistics.

Caution should be taken in evaluating the scenario findings presented in Chapters 7 through 10 of this report given the impact of Recovery Act funding on spending in 2010, which was used as the base year for the 20-year scenarios presented. Sustaining spending at 2010 levels may prove more challenging than would be the case for a more typical base year. To emphasize this point, the scenario identified as “Sustain Current Spending” in previous C&P reports was renamed as “Sustain 2010 Spending” for this report.