TRANSPORTATION INVEST IN OUR FUTURE






FUTURE NEEDS OF THE U.S. SURFACE TRANSPORTATION SYSTEM

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS

FEBRUARY 2007

AT A GLANCE

The Nation's Transportation System

- **Highway Investment.** In 2005, highway capital investment was $75 billion, $33 billion or 45 percent of the total in Federal assistance, and $42 billion from the state and local level.
- **Transit Investment.** In 2004, transit capital investment was $13.2 billion, $5.2 billion or 40 percent of the total in Federal assistance, and $8 billion from the state and local level.
- **Construction Costs.** Between 1993 and 2015 highway and transit construction costs will have increased 70 percent.
- **Restore Purchasing Power.** To restore the program's purchasing power, Federal highway assistance will have to increase from $43 billion in 2009 to $73 billion in 2015, and transit assistance will have to increase from $10.3 billion to $17.3 billion.
- **U.S. DOT 2004 Conditions and Performance Report (C&P).** Based on 2002 data, Highways "Cost to Improve" estimate is $118.9 billion, Transit "Cost to Improve" estimate is $24 billion.
- **C&P Report Estimates Adjusted for Inflation.** Adjusting U.S. DOT's 2004 "constant dollar" projections to "years of expenditure" dollars yields the following estimates for 2007:
  - **Highways.** The "cost to improve" highways and bridges in the United States to the levels needed in 2007 is estimated at $155.5 billion.
  - **Transit.** The "cost to improve" transit in the United States to the levels needed in 2007 is estimated at $31.4 billion.
  - **Freight Rail.** The "cost to maintain freight rail's current market share," in 2007 is estimated at $12 billion—$2.75 billion annually in public support and $9.25 billion annually in railroad private capital investment.
  - **Intercity Passenger Rail.** The "cost to bring 21 intercity passenger rail corridors to a good state of repair," is $3.3 billion in annual rail capital investment.
- **Population.** Between 1955 and 2005, the U.S. population grew by 130 million to 295 million. Over the next 50 years, it is expected to grow by 140 million to 435 million.

- **Vehicles.** In 1955, our highways carried 65 million cars and trucks. They carry 246 million today, and that number is expected to reach nearly 400 million by 2055.
- **Travel.** Highway travel in the United States measured in "vehicle miles traveled," increased from 600 billion in 1955 to 3 trillion in 2006. FHWA forecasts that it will grow by 2.07 percent per year through 2022. Travel may exceed 7 trillion vehicle miles by 2055.
- **Truck Freight.** Truck tonnage is expected to increase 114 percent between 2004 and 2035. Trucks are expected to carry 79 percent of total tonnage.
- **Rail Freight.** Rail tonnage is expected to grow by 63 percent by 2035. Rail is expected to carry 13 percent of total tonnage in 2035, down from 14 percent in 2004.
- **Truck Traffic.** Today's Interstates carry an average of 10,500 trucks per day per mile. By 2035, this figure will increase to 22,700 trucks per day, per mile. Today only 30 miles on the Interstate carry more than 50,000 trucks per day per mile. By 2035, that number may reach 2,500 miles.
- **Trade.** Trade as a percentage of Gross Domestic Product (GDP) increased from 13 percent in 1990 to 26 percent in 2000, and is expected to reach 35 percent by 2020.
- **Container Cargo.** U.S. container traffic increased from 8 million units in 1980, to 42 million in 2005. By 2020, container volume is expected to hit 110 million units.
- **Interstate Highways.** The 47,000-mile Interstate Highway System contains only 1 percent of total U.S. highway miles, but carries 24 percent of all traffic and 41 percent of large truck traffic. Interstate vehicle miles traveled are expected to double from 690 billion in 2002 to 1.3 trillion 20 years from now.
- **Tolls.** In 2005, tolls generated $7.75 billion in receipts which represented 5 percent of highway revenues. There are 4,630 miles of toll roads in the United States in 25 states.
- **Global Competition.** China is building a 53,000-mile National Expressway System which, when complete in 2020, will rival the 47,000-mile U.S. Interstate System. India is building a 10,000-mile national expressway system. Europe with a population of 450 million is spending hundreds of billions of euros on a network of highways, bridges, tunnels, ports, and rail lines.

PREFACE






Between 2005 and 2006, AASHTO combined resources from the Transportation Research Board's National Cooperative Highway Research Program, the Transit Cooperative Research Program, and state pooled funds to conduct policy research in four areas. These included *The Future of the Interstate Highway System, AASHTO's Bottom Line Report for Highways and Transit, Future Financing Options to Meet Highway and Transit Needs,* and *AASHTO's Freight Bottom Line Report.* The results of these studies have enabled AASHTO to provide information and policy recommendations to the National Surface Transportation Policy and Revenue Study Commission to assist them in their deliberations. A listing of the contractors who prepared these reports follows. Copies of the various research reports will be made available to the Commission as soon as they are complete. We are grateful to TRB and to our member states for making this research possible.

Future Options for the National System of Interstate and Defense Highways, NCHRP 20-24 (52): PB Consult (Prime) with Cambridge Systematics; Kevin Heanue and Alan Pisarski

Surface Transportation Safety and Investment Update on Progress Since 2000, NCHRP 20-24(54) A: Timothy Neuman, P.E., CH2M HILL

Right-of-Way and Environmental Mitigation Costs—Investment Needs Assessment, NCHRP 20-24(54) B: Nathan M. Macek, AICP, AECOM Consult, Inc.

System Operations Investment Needs Measurement and Analysis, NCHRP 20-24(54) C: Richard Margiotta, Ph.D.,Cambridge Systematics, Inc.

Inflation Effects on National Investment Requirements: NCHRP 20-24(54) E: Arlee T. Reno Cambridge Systematics, Inc.

Future Financing Options to Meet Highway and Transit Needs, NCHRP 20-24 (40): Cambridge Systematics, Mercator Advisors and Trans Tech Management.

State and National Transit Investment Analysis: Cambridge Systematics, Inc. in association with KFH Group, Inc.

AASHTO's Freight Bottom Line Report: Cambridge Systematics, Inc.; Boston Logistics Group; Global Insight, Inc.; Wilbur Smith Associates; TransSystems Corporation; PB Consult

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Governments at All Levels Must Fund Their Share of Transportation Investment

"Transportation investment in highways and transit needs to increase significantly to meet national needs. To achieve this, governments at all levels—Federal, state, and local—must continue to fund their share.

AASHTO supports giving all states all the options possible to use tolling, public–private partnerships, and innovative financing tools. It is the hope that the Commission will be supportive of tolls and public–private ventures as a way to supplement traditional sources of transportation revenues. In most cases, however, the contribution from tolling and public–private ventures will be limited.

In 2005, $7.7 billion was generated through tolls which represented 5 percent of highway revenues nationally. Over the next 10 years supportive Federal and state policies could make it possible to increase that percentage to 9 percent of the total.

Federal highway assistance, which provides nearly half of capital spending, could be in crisis as early as 2008. Unless a solution is found, the program may have to be cut as much as $11 billion in FY2009. Toll funding cannot offset such a cut. It will take the equivalent of a 3 cent Federal fuel tax increase to sustain the Federal program at the levels approved by SAFETEA-LU.

Meanwhile, because of rapidly escalating construction costs, the purchasing power of the Federal program will have been cut by over one half since the fuel tax rate was last adjusted in 1993. Restoring the purchasing power of this important program will also require a fuel tax increase or its equivalent.

We hope:
The Commission will analyze the importance of the Federal government continuing to fund its share of the highway and transit programs and how this can be funded.

Second, that you will analyze the challenges and successes of state and local governments in increasing their transportation revenues.

And third, that you will take a hard look at to what degree, toll-based funding and public–private ventures can help state and local governments fund their share of the increase in investment needed."

Testimony of Victor Mendez
AASHTO President and Director of the Arizona Department of Transportation
National Surface Transportation Policy and Revenue Study Commission Forum
Portland, Oregon
October 27, 2006

The Commission: Great Opportunity for New Policy Direction

Congress created the National Surface Transportation Policy and Revenue Study Commission to examine "future surface transportation system needs, expected demographic and economic changes that will shape traffic demand, the future of the Interstate System, and the potential for expansion, upgrades, and other changes to the surface transportation system to meet the nation's needs."

The Commission was directed to consult with representatives of State departments of transportation. This report is the first of six that AASHTO plans to provide to assist the Commission. It contains a comprehensive assessment of transportation needs today and in the future, and the demographic and economic changes that will shape that future. The other five reports will address: *AASHTO's Surface Transportation Policy Recommendations; America's Freight Challenge; Revenue Sources to Fund the Needs of the U. S. Surface Transportation System; A Conceptual Plan to Ensure That the Surface Transportation System Will Continue to Serve the Needs of the United States;* and *A Performance-Based, Results-Driven National Surface Transportation Program.*

AASHTO is pleased that the Congress created this Commission to conduct a top-to-bottom review of the surface transportation challenges facing America and how best to meet them. This is the first opportunity in over 25 years for a National Commission to undertake a mission with this broad a scope. We are impressed by the quality of the individuals appointed by the President and the Congress and by their commitment to use this opportunity to deliver a report to Congress which covers the full range of issues they were asked to address.

We are also pleased that Congress asked the Commission specifically to consult with representatives of State departments of transportation to ensure that their views are considered. The Commission has welcomed testimony from State DOTs in many of its forums and hearings, and it is in response to their request for information that this report is being provided.

It is instructive to review what came out of the last National Transportation Policy Study Commission which issued its report June 25, 1979. That Commission saw two major problems: aviation, trucking, and rail systems choking on over-regulation, and inadequate levels of investment. What they recommended was sweeping deregulation of aviation, trucking, and railroads, and a significant increase in transportation investment. Both were enacted, and both brought about significant advancements in the transportation system from 1980 to the present.

There is tremendous potential for the recommendations of this Commission to have as great an impact. We look forward to working with you and stand ready to assist you in every way possible.

John Horsley, AASHTO Executive Director
Testimony Before the National Surface Transportation Policy
and Revenue Study Commission Forum
Portland, Oregon
October 27, 2006

KEY FINDINGS FOR AMERICA'S FUTURE






To support their economic development, nearly all the major players on the world stage are investing aggressively in their transportation infrastructure. The two questions this raises for the United States are: First, does not the United States also need to invest to compete? And second, if so, how much?

- **Investing to Meet Increasing Global Competition—**China, with a population of 1.3 billion, is building a 53,000-mile National Expressway System which, when complete in 2020, will rival the 47,000-mile U.S. Interstate System. India, with a population of one billion, is building a 10,000-mile national expressway system. Europe, with a population of 450 million, is spending hundreds of billions of euros on a network of highways, bridges, tunnels, ports, and rail lines.

- **Increased Costs of Construction—**Between 1993 and 2015, construction costs will have increased more than 70 percent. To restore the purchasing power of the highway and transit programs, funding will have to be increased to levels which match the increase in costs. For highways, that would mean increasing the Federal program from $43 billion in 2009 to $73 billion in 2015. For transit, it would mean increasing the Federal program from $10.3 billion in 2009 to $17.3 billion in 2015.

- **Restoring Purchasing Power—**Because of the rising costs of construction, the value of the 18.3 cents Federal gas tax rate will decline 55 percent or to 8.3 cents between 1998 and the end of 2015 if corrective action is not taken to preserve Federal capital investment. To restore the purchasing power of the program to 1998 levels and sustain it into the future would require the gas tax rate to rise from 18.3 at the close of fiscal year 2009 to 28.3 cents by fiscal year 2015. The rate will have to be increased by 3 cents or its equivalent in 2009 to sustain the program at the level guaranteed in SAFETEA-LU. Between 2010 and 2015 it would have to be increased by another 7 cents to restore the program's purchasing power.

- **Phasing-In Transportation Investment—**The program needs to be increased over many years and several phases. In the first phase, from 2008 to 2010, the objective

should be to *assure sufficient revenues to sustain the highway and transit programs at the levels* promised in SAFETEA-LU. In the second phase from 2010 to 2015, the objective should be to *restore the purchasing power of the highway and transit programs* to 1993, the last time the Federal gas tax was increased. In the third phase, from 2015 and beyond, the objective should be to *close the gap* between current spending and the "cost to improve" goals.

- **Time for Phase II of the Interstate—**AASHTO Vice President Pete Rahn, Director, Missouri DOT has stated, "If the Interstate System planned in the first half of the 20th Century and built in the second half is considered Phase I, it is time to modernize the system in place and build the additional capacity needed for the 21st Century in Phase II."

- **A Strategy for a 21st Century Interstate System—**AASHTO believes the Interstate Highway System for the 21st Century can be brought about through four strategic actions: preserve the current system, enhance its performance, expand capacity to meet future needs, and reduce growth in highway demand by expanding the capacity of transit and rail.

- **Expanding Capacity to Meet Future Needs—**To remain competitive in the global economy and meet America's 21st Century mobility needs, we will need to add nearly as much capacity to the Interstate System in Phase II, as we did over the past 50 years in Phase I. Studies show there is a need to add as many as 10,000 miles of new routes on new corridors, 20,000 miles of upgrades to National Highway System routes to Interstate standards, and 20,000 new lane-miles on existing Interstate routes. These could include exclusive truck lanes and value-priced lanes. System improvement would also include correcting bottlenecks, upgrading interchanges, and improving intermodal connections.

- **Doubling Transit Ridership—**To reduce congestion and meet the demand of those dependent on public transportation, we believe the United States will have to build enough transit capacity to double ridership by 2030. Substantial freight rail capacity will be needed to handle the 63 percent increase in demand expected by 2035. Additional capacity will be needed as well to make expansion of intercity passenger rail service possible.

- **Interstate Highway System Needs Assessments—**Congress should call upon the State DOTs and the FHWA to undertake two comprehensive Interstate needs assessments during the period from 2010 to 2013. The first should study the costs of rebuilding or replacing the 55,000 bridges on the system, the 15,000 interchanges and the pavement foundations for the system's 210,000 lane-miles. The second should study long-term system-wide expansion needs of the network, taking into account the global economy, population and economic growth, safety, national defense, and homeland security needs. Initial analysis shows the need to nearly double the lane-miles on the existing Interstate System.

- **Reducing Highway Demand—**FHWA forecasts that highway travel will increase at 2.07 percent per year through 2022. If this rate of increase holds for the next 50 years, highway vehicle miles traveled will more than double from 3 trillion today to nearly 7 trillion by 2055. That is more traffic than the system can accommodate. In order to reduce highway demand, a policy objective should be set to double transit ridership over the next 20 years. With supportive land use and transit-oriented development, many trips which would otherwise take place by car, can be shifted to transit.

- **Need for a New National Rail Transportation Policy—**A new National Rail Transportation Policy must be established to increase freight rail capacity and intercity passenger rail services. Federal incentives, such as investment tax credits, should be provided to make it feasible for rail companies to invest in capacity improvements for the future. Federal funds outside the Highway Trust Fund should be provided to states who participate in "public-benefit freight rail projects. AASHTO recommends that the National Commission develop and recommend a National Rail Policy, in consultation with U.S. DOT, State DOTs, railroads, and shippers.

EXECUTIVE SUMMARY






Congress created the National Surface Transportation Policy and Revenue Study Commission to examine "future surface transportation system needs, expected demographic and economic changes that will shape traffic demand, the future of the Interstate System, and the potential for expansion, upgrades, and other changes to the surface transportation system to meet the nation's needs."

To support their economic development, nearly all the major players on the world stage are investing aggressively in their transportation infrastructure. The two questions this raises for the United States are: First, does not the United States also need to invest to compete? And second, if so, how much?

The Commission was directed to consult with representatives of State departments of transportation. This report is the first of six that AASHTO plans to provide to assist the Commission. It contains a comprehensive assessment of transportation needs today and in the future, and the demographic and economic changes that will shape that future.

On October 30, 2006, AASHTO's Board of Directors approved a series of policy recommendations for the Commission which included a "Call for Action." In part it read,

"Our generation inherited the world's best transportation system made possible by the commitment of the past two generations to invest in the country's future. We have spent that inheritance."

"The 21st Century is an increasingly competitive world where countries like China and India have set their sights on overtaking America as the preeminent economic power. Our prosperity and way of life are at stake. America must respond."

Today the country is faced with increasing global competition. China, with a population of 1.3 billion, is building a 53,000-mile National Expressway System which, when complete in 2020, will rival the 47,000-mile U.S. Interstate System. India, with a population of one billion, is building a 10,000-mile national expressway system. Europe, with a population of 450 million, is spending hundreds of billions of euros on a network of highways, bridges, tunnels, ports, and rail lines.

To support their economic development, nearly all the major players on the world stage are investing aggressively in their transportation infrastructure. The two questions this raises for the United States are: First, does not the United States also need to invest to compete? And second, if so, how much?

Future Surface Transportation Needs

The future needs of the U.S. surface transportation system are great and the costs to provide them are increasing:

- **Preservation.** The current system of highways, transit, and railroads is growing old and will need to be rebuilt or replaced.
- **Capacity.** Travel on the current system has increased well beyond what it was designed to carry. Over the next 50 years, nearly as much highway arterial capacity as was built over the past 50 years will need to be added. Over the next 20 years, we should double transit ridership.
- **Increased Costs of Construction.** Between 1993 and 2015, construction costs will have increased nearly 70 percent. To restore the purchasing power of the highway and transit programs, revenues will have to be increased to levels which match the increase in costs. For highways, that would mean increasing the Federal program from $43 billion, in 2009 to $73 billion in 2015. For transit, it would mean increasing the Federal program from $10.3 billion in 2009 to $17.3 billion in 2015.
- **Global Trade.** International trade and the volume of freight needed to be carried by truck and rail is increasing rapidly. This will require substantial additional capacity and in many cases dedicated truck lanes.

Determining Long-Term Estimates

In March 2006, U.S. DOT published its 2004 *Conditions and Performance Report* which estimated that the "cost to improve" highways nationally to the levels needed would require an annual investment of $118.9 billion and that the "cost to improve" transit nationally to the levels needed would require $24 billion. AASHTO has confidence in the modeling methodology used to prepare this report and believes it should be used as the starting point for estimating future needs.

However, two adjustments are needed to bring estimates up to current and future needs. First, the 2004 report is based on 2002 data. Between 2002 and 2006, there has been a significant increase in commodity prices in petroleum, concrete, asphalt, steel,

and construction machinery. The starting point for a long-term estimate of needs must take this cost increase into account.

Second, U.S. DOT's *C&P Report* expresses its estimate as a constant dollar amount to be invested each year for 20 years. The Commission was directed to study "revenue sources to fund the needs of the surface transportation system over at least (a) 30-year period…" In order to correlate the C&P Report's "constant dollar" estimates with a future "30-year" revenue stream, costs need to be converted to "year of expenditure" dollars.

For the period from 2004 to 2006, actual producer price index data was used to reflect increases in construction costs. For the period 2007 and beyond, the Consumer Price Index was used to adjust the Conditions and Performance Report estimates from "constant" dollars to "year of expenditure" dollars so these can be correlated with revenue projections over time.

Highways and Transit

The 2007 "cost to improve" highways and bridges in the United States is estimated at $155.5 billion and the "cost to improve" transit is estimated at $31.4 billion.

Freight Rail

The "cost to maintain freight rail's current market share," in 2007 is estimated at $12 billion—$2.75 billion annually in public support and $9.25 billion annually in railroad private capital investment.

Intercity Passenger Rail

The "cost to bring 21 intercity passenger rail corridors to a good state of repair" is $3.3 billion in annual rail capital investment.

Are these investments achievable?

Is it is even worthwhile to consider investments of these magnitudes? Yes, for three reasons. First, the needs are based on the estimate made by U.S. DOT in 2006, updated using a credible index which accounts for the increases in construction costs which have occurred in the recent past and are expected in the future.

Second, when put into historic perspective they look more realistic. Actual highway capital spending nationally increased from $19.7 billion in 1981, to $75 billion in 2005, an increase of 280 percent over 24 years. Between 1981 and 2004, transit capital investment increased by 290 percent. If both the Federal and state governments continue to fund their shares of the increases needed over time, significant growth in both programs can be achieved.

The third reason to consider investments of this magnitude is that while they are huge, they do not have to be achieved all at once. The program needs to be increased over many years and several phases. In the first phase, from 2008 to 2010, the objective should be to assure sufficient revenues to sustain the highway and transit programs at the levels promised in SAFETEA-LU. In the second phase, from 2010 to 2015, the objective should be to restore the purchasing power of the highway and transit programs to 1993, the last time the Federal gas tax was increased. In the third phase, from 2015 and beyond, the objective should be to close the gap between current spending and the "cost to improve" goals.

Demographic Trends Affecting Transportation

Population

Between 1955 and 2005, the U.S. population grew by 130 million to 295 million. Over the next 50 years it is expected to grow by 140 million to 435 million. Over the next 30 years, 88 percent of that growth will occur in the south and west. By 2030, the population of people over 65 will have grown from 35 million to 70 million. More than 70 percent of the nation's population growth and 80 percent of its economic growth are expected to take place in metropolitan areas. At the same time, rural states will face the enormous cost of preserving the network of roads they have built over the past 80 years.

Vehicles

In 1955, U.S. highways carried 65 million cars and trucks. They carry 246 million today, and that number is expected to reach nearly 400 million by 2055.

Travel

Highway travel, measured in "vehicle miles traveled," increased from 600 billion in 1955 to three trillion in 2006. FHWA forecasts that it will grow by 2.07 percent through 2022. Travel may exceed seven trillion vehicle miles by 2055.

Truck Freight

Truck tonnage is expected to increase 114 percent between 2004 and 2035. Trucks are expected to carry 79 percent of total tonnage. Today's Interstates carry an average of 10,500 trucks per day per mile. By 2035, this figure will increase to 22,700 trucks per day per mile.

Rail Freight

Rail tonnage is expected to grow by 63 percent by 2035. Rail is expected to carry 13 percent of total tonnage in 2035, down from 14 percent in 2004.

Trade

Trade as a percentage of Gross Domestic Product (GDP) increased from 13 percent in 1990 to 26 percent in 2000, and is expected to reach 35 percent in 2020. Container traffic increased from 8 million units in 1980, to 42 million in 2005. By 2020, container volume is expected to hit 110 million units.

Economic Forecast

U.S. economic growth is anticipated to remain healthy, with real GDP projected to expand by 2.8 percent annually. Oil prices are expected to drop from the record-setting levels of $70 a barrel and above in early 2006 and hover around the $50 per barrel range. Thereafter, the forecast shows oil prices climbing steadily to 2030 and beyond.

The Future of the Interstate Highway System

To make recommendations for the future of the Interstate Highway System the Commission should study the history of the Interstate System to see what can be learned, compare that with the challenges ahead, and consider AASHTO's recommendations on what will be needed.

Historical Perspective

The System was designed in the pre-World War II period from the experience of a very different era. As Interstate construction began in the late 1950s, there were 65 million vehicles creating 600 billion vehicle miles of travel. Vehicle ownership had just begun to take off and long-distance trucking was still in its infancy. Fifty years later, there are over 240 million vehicles creating 3 trillion vehicle miles of travel on a highway system that grew by only 15 percent in the 50 years.

Major changes have taken place in the transportation environment for the Interstate. Some of these include transformations:

- From basic interstate commerce (farm to market, urban rural) to national/global commerce connections;
- From "old geography" (pre-sunbelt) to new geography of dispersed regional growth;
- From limited truck use to just-in-time logistics with large combination vehicles;
- From transcontinental troop and material movement to rapid "fort-to-port" mobilization;
- From uncongested new capacity to the need for congestion management; and
- From civil engineering standards to intelligent transportation systems and solutions.

Forecasts of the Challenges Ahead

Forecasts show that Interstate highway travel demand measured through vehicle miles traveled (VMT) will increase from 690 billion in 2002 to 1.3 trillion by 2026. Truck-borne freight is expected to double by 2035. Whatever redundancy and extra capacity that had been created when the system was originally built is being used up. As has been noted by FHWA, by 2020, 90 percent of urban Interstates will be at or exceeding capacity.

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AASHTO's Recommendations on the Future Interstate System

1. **Preserve the Current System.** The first priority will be to preserve the 47,000-mile system which has been built over the past 50 years so that it lasts for at least the next 50 years.

2. **Enhance System Performance.** Advanced ITS technologies and better system management techniques need to be utilized to reduce congestion, improve throughput, and increase system reliability.

3. **Expand Capacity to Meet Future Needs.** It is vital that we are competitive in the global economy and meet America's 21st Century mobility needs. We will need to add nearly as much capacity to the Interstate System in Phase II, as we did over the past 50 years in Phase I. Studies show there is a need to add as many as 10,000 miles of new routes on new corridors, 20,000 miles of upgrades to National Highway System routes to Interstate standards, and 20,000 new lane-miles on existing Interstate routes. These could include exclusive truck lanes and value-priced lanes. System improvement would also include correcting bottlenecks, upgrading interchanges, and improving intermodal connections.

4. **Reduce Growth in Highway Demand by Expanding the Capacity of Transit and Rail.** The United States can neither afford for congestion to get as bad as forecasted, nor for traffic to increase as much as is estimated. In part, what is needed is a reduction in demand. Expanding the capacity of transit can help shift some local and regional trips off the Interstate and onto transit. Expanding the capacity of intercity passenger rail can help shift some long-distance trips off the Interstate and onto rail. Railroads must add to the capacity needed to at least continue to carry their current market share of freight so it does not shift to trucking and increases rather than decreases highway demand.

Potential for Expansion, Upgrades, and Other Changes to Meet Surface Transportation Needs

Expansion and upgrades are exactly what will be required to meet future needs. To do so will require a multi-modal approach, meaning that expansion of highways, highway interchanges, transit, and rail will all be needed, as well as policy innovations such as pricing. Ten successful projects have been highlighted to illustrate what is needed. What they have in common are substantial cost, value, and results. They also illustrate innovation in policy, design, contracting, finance, construction, and materials.

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1. **Expansion of a Major Interstate Bridge**
   The $2.4 billion Woodrow Wilson Bridge project south of Washington, DC, on Interstate 95, will expand its capacity from the 75,000 vehicles per day it was designed to carry 50 years ago, to 300,000 vehicles per day in the future.

2. **Joint Expansion of an Interstate Route and Construction of a Light Rail Line**
   Denver's $1.7 billion T-REX project widened and improved 17 miles of Interstate 25 and Interstate 225 from Denver's downtown to its rapidly growing suburbs, and added 19 miles of brand new light rail transit for service.

3. **Modernization of a Major Interstate Exchange**
   Replacement of the Marquette Interchange in Milwaukee, is being accomplished without hurting the city's economy or disrupting life in the surrounding University community.

4. **Adding Capacity in the Heart of a City**
   Nebraska's Department of Roads came up with an innovative solution for Omaha's busiest intersection—building two mile-long elevated expressway bridges 40 feet above grade.

5. **Rebuilding a Major Interstate Bridge to Survive Earthquakes**
   Caltrans, the Bay Area Toll Authority and the California Transportation Commission are using tolls to fund reconstruction to make the 70-year-old San Francisco to Oakland Bay Bridge—damaged in a 1989 earthquake—seismically safe for users.

6. **Using a Design-Build Contract to Expand a Major Suspension Bridge**
   The Washington State DOT is slated to open a new $849 million Tacoma Narrows Bridge, built under the state's first design-build contract.

7. **Solving Chicago's Freight-Rail Congestion Through a Public–Private Partnership**
   Federal, state, and local governments together with several private railroads have agreed to supply $330 million to initiate a $1.5 billion program to reduce freight rail congestion in Chicago.

8. **Spurring Economic Growth Through a Transit New Start**
   The Hudson–Bergen light rail system is a vital link among the growing cities of New Jersey's Hudson River waterfront and it currently serves an average of 38,000 customers a day and is expected to expand to 70,000 daily riders when the project is completed.

9. **Pricing to Relieve Truck Congestion at the Nation's Largest Port Complex**
   PierPass is a program created by marine terminal operators at the Los Angeles and Long Beach ports to reduce congestion by imposing charges during peak daytime hours to encourage trucks to work nights and Saturdays.

10. **Enhancing Tourism Through the National Scenic Byways Program**
    States have leveraged Federal resources to preserve scenic highways, expand their visitor appeal, and generate travel and tourism dollars for local economies.

Conclusion

Simply put, AASHTO believes the mission of the U.S. Surface Transportation Program is to keep the U.S. competitive in the global economy and meet America's 21st Century mobility needs. Part of what it will take to sustain our prosperity in the context of the global economy is a modern, efficient transportation system which enables the U.S. to increase productivity growth, create jobs, and compete head-to-head with all comers.

As was outlined in AASHTO's Call for Action, we believe the time has come to increase investment in our Surface Transportation System to the levels needed. This will require marshalling the political will necessary at the federal, state and local levels to generate the additional revenues required to make this quantum increase in investment possible. It will also require a strategy which goes well beyond just "more of the same."

Meeting America's surface transportation needs for the future will require a multi-modal approach, which preserves what has been built to date, improves system performance, and adds substantial capacity in highways, transit, freight rail, and intercity passenger rail, and better connections to ports, airports and border crossings. It will also require solutions which go beyond transportation improvements and include policies addressing land use, energy, global climate change, the environment, and community quality of life.

"Our generation inherited the world's best transportation system made possible by the commitment of the past two generations to invest in the country's future. We have spent that inheritance."

CHAPTER I

For Our Grandchildren's Future, Global Competition, Not Revenue, Is the Real Challenge






"The 21st Century is an increasingly competitive world where countries like China and India have set their sights on overtaking America as the preeminent economic power. Our prosperity and way of life are at stake. America must respond."

AASHTO's recommendations for the National Surface Transportation Policy and Revenue Study Commission, approved by the Board of Directors on October 30, 2006, includes this "Call for Action."

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"The 21st Century is an increasingly competitive world where countries like China and India have set their sights on overtaking America as the preeminent economic power. Our prosperity and way of life are at stake. America must respond."

Assessing the Competition Worldwide

Today the nation is facing increasing global competition. China, with a population of 1.3 billion, is building a 53,000-mile National Expressway System which, when complete in 2020, will rival the 47,000-mile U.S. Interstate System. India, with a population of one billion, is building a 10,000-mile national expressway system. Europe, with a population of 450 million, is spending hundreds of billions of euros on a network of highways, bridges, tunnels, ports, and rail lines.

To support their economic development, nearly all the major players on the world stage are investing aggressively in their transportation infrastructure. The two questions this raises

for the United States are: First, does not the United States also need to invest to compete? And second, if so, how much?

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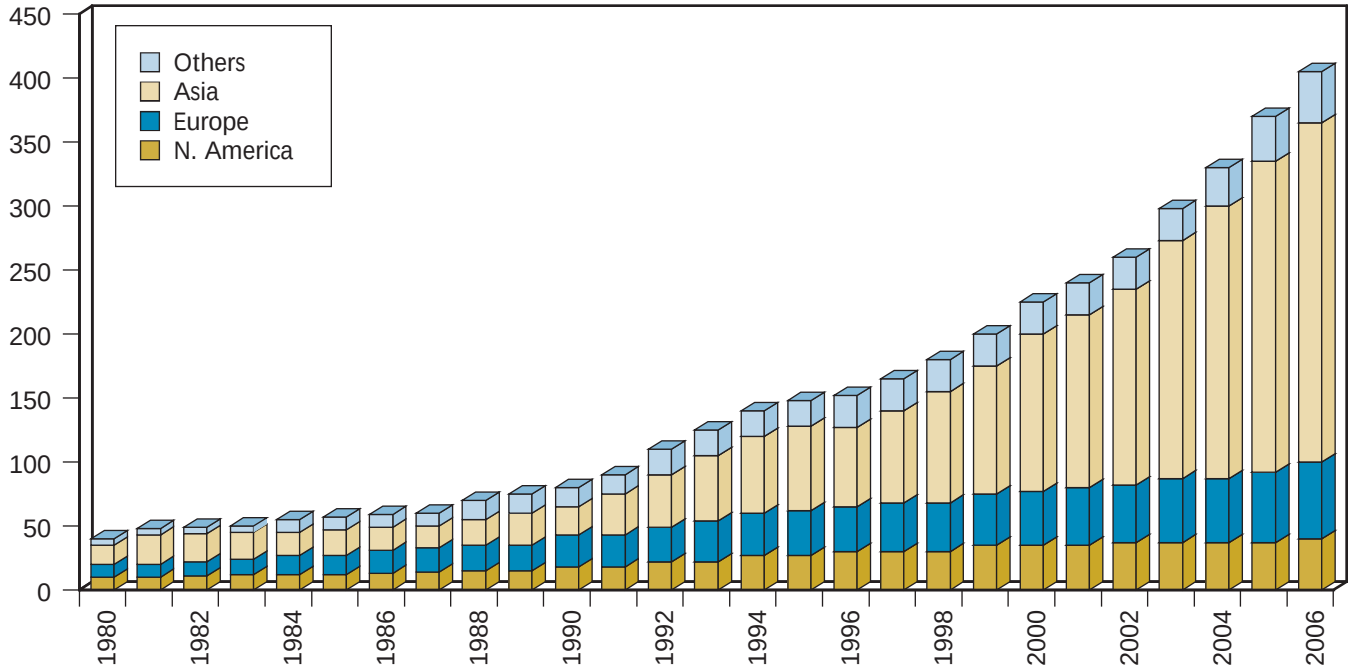
The China Challenge

For the past decade China, with a population of 1.3 billion, has generated economic growth of between 8 and10 percent annually. To support its economic expansion, the government of China has devoted extraordinary resources to the development of its transportation system including its trunk highway system, regional and local highways, ports, freight railroads, intercity passenger rail, subways, and public transportation. As is shown in the chart below there has been modest growth in container cargo volumes from Europe, North America and elsewhere over the last 25 years. The most dramatic growth has come from Asia, with China accounting for the vast majority of the increase. (Figure 1.)

In 2005, a delegation of transportation leaders from the United States, including then Federal Highway Administrator Mary Peters and AASHTO Executive Director John Horsley visited China to assess the development of its Trunk Highway System. Under the leader-

Figure 1. Asia Dominates Growth in Container Cargo Worldwide, 1980–2006



Source: Clarkson Research Studies.

ship of the Ministry of Communications (MOC), which is responsible for highways, China completed 41,000 kilometers of their National Expressway System in 14 years, 7 years earlier than planned. Investment in highways has increased from $12.6 billion in 1996 to $53 billion in 2004.

MOC briefed the U.S. delegation on China's master plan for a National Expressway Network that includes a total of 85,000 kilometers that will connect all large and medium-sized cities by 2020. The U.S. group was impressed by the scale and pace of the system under development. The quality of the expressways and bridges were world-class. When complete, the Chinese National Expressway System at 53,000 miles will be larger that the current 47,000-mile U.S. Interstate Highway System. At the end of one briefing the Chinese asked, "What are the United States' plans for the future of your Interstate System?" This question must be addressed.

The pace of development in China poses two challenges for America's transportation system. First, the rate of increase in the volume of containers being shipped from China through U.S. ports threatens to overwhelm the capacity of our system. Second, China's appetite for materials such as steel and concrete to fuel its massive construction program, has put considerable upward pressure on the cost of construction here in the United States.

The impacts on our transportation system reflect the even larger impacts on the nation's future economic standing in the world. Economic analysts suggest that China, armed with excellent transportation, a low-cost and enormous labor pool, and an aggressive policy for economic growth will supersede the United States as the dominant trading nation perhaps as early as 2020. Such a change will have serious impacts on the ability of the United States to sustain the current standard of living, afford good-paying jobs to its workforce, and maintain world markets for its goods.

As the U.S. economy becomes both more integrated and globalized, there is an ever-increasing economic premium placed on rapid, reliable transportation for goods and passengers. Our ability to compete will require a well-connected, nationwide, high-capacity system capable of high speeds and reliability. The competitiveness of U.S. industries like agriculture already depends on a low-cost, efficient transportation system to give it an edge. In the future, increasing our productivity and retaining manufacturers like Dell, which assembles its computers here in the United States, will depend on a reliable, efficiently running system as well.

India Makes Massive Investments

India is enjoying annual growth rates of 7 to 8 percent. With a population in excess of one billion and such dynamic growth rates some observers expect India's economy to become the third largest in the world, after those of the United States and China. India now recognizes that its projected economic expansion cannot be sustained without massive investments in and operational reforms of its transportation system, in particular, in the highway sector.

India has embarked on a 12-year plan at the estimated cost of $15 billion, to develop a 10,000-mile national highway system connecting its four principal metropolitan areas of Delhi, Mumbai, Chennai, and Kolkata, and two cross-country expressways connecting the country North–South and East–West. India's development plans will also put upward

pressure on the costs of construction in the United States due to increased demand for materials.

Europe Connects a Common Economy

T.R. Reid in a book titled, *The United States of Europe,* writes "Twenty-five nations have joined together—with a dozen or so on the waiting list—to build a common economy, government, and culture…Europe has more people, more wealth, and more trade than the United States." He goes on to report that the European Union, with a population of over 450 million, has invested hundreds of billions of euros in an ambitious network of highways, bridges, tunnels, ports, and rail lines.

Reid concludes that while this historic transformation of Europe has been taking place, "Americans have been asleep." Some of the transportation improvements built recently in Europe are the following: the $50 billion Chunnel between the United Kingdom and France; a $4 billion bridge from Denmark to Sweden; new tunnels to carry truck and train traffic under the Alps and across the Pyrenees; 100 billion euros are being poured into the reconstruction of a route connecting Italy and Greece with the Baltic States; Rotterdam has become the world's largest freighter port; and finally, Europe from the TGV in France to the Eurostar in Italy has an extensive network of high-speed rail lines which connect the entire continent.

Neighbors Prepare for Trade Goods

Over the past 25 years, a tsunami of container-borne cargo has hit U.S. ports. Container volume, most of it from Asia, increased from 8 million twenty-foot equivalent units (TEUs) to 40 million in that period, and if current trends continue, it will exceed 100 million TEUs by 2020, overwhelming current North American port capacity.

Recently, John Vickerman of TransSystems, recognized as one of the pre-eminent port planners in the United States, asked, "What is it about this huge growth in trade that is about to hit the West Coast that the Canadians get, and the Mexicans get, that Americans don't get?"

To respond to this huge increase in trade, the Canadians plan to tap a $233 million gateway fund to develop a major deep-water port at Prince Rupert, north of Vancouver and transship containers south by rail to the Canadian National's mainline and then east to Chicago. Hutchison Port Holdings, the world's largest independent port operator, plans to pump $200 million into expanding containership capacity at Lazaro Cardenas, Mexico's deepest port, which is just north of Acapulco, and transship cargo via the Kansas City Southern de Mexico rail line to Texas and destinations north. The voters of Panama have approved the plan to invest $5 billion to deepen and widen the Panama Canal so that the huge "PostPanamax" container cargo ships of the future can use the Canal to access American ports in the South and East.

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CHAPTER II

Future Surface Transportation System Needs






The future needs of the U.S. surface transportation system are great and the costs to provide them are increasing. The discussion below describes why the needs are as great as they are, gives examples of what four states are doing to meet those needs, and then outlines the costs the United States will have to address in order to provide the future system needed.

Preservation Is Job One!

The system of highways, bridges, public transportation, and railroads on which the nation depends have largely been built over the past 60 years. Much of the system is getting older and needs to be rebuilt or replaced. For example, the 47,000-mile Interstate Highway System, which represents about 1 percent of total U.S. road miles, has almost 15,000 interchanges, many of which are wearing out or do not meet current operational standards.

A good example of this is the Marquette Interchange in Milwaukee, Wisconsin. Built in 1968, for $33 million, it was designed to carry 150,000 vehicles per day, but is currently forced to carry 300,000 vehicles per day. The overworked structure has aged quickly and needs to be replaced. A new interchange with the capacity and modern design needed for the future is under construction and will replace the old Marquette Interchange next year at the cost of $810 million.

Similar anecdotes prevail for the 210,000 Interstate lane-miles whose pavement foundations may have to be rebuilt, the 55,000 bridges on the Interstate in need of reconstruction or replacement, or the 540,000 bridges elsewhere in the system. The point is, the numbers are huge.

Capacity Increases Are Needed in All Modes

Travel on the U.S. highway system has increased five-fold over the past 50 years, from 600 billion vehicle miles traveled (VMT) in 1956 to 3 trillion VMT in 2006. The amount of highway mileage built during that period was substantial, but the increase in travel has

been so great that most of the capacity and redundancy planned when the system was built have been used up. A good example of this is the Woodrow Wilson Bridge on Interstate 95 just south of Washington, DC. By the year 2000, the 45-year-old bridge had become a notorious bottleneck, carrying more than 200,000 vehicles a day, when it was only built to accommodate 75,000 vehicles a day. By 2008, an investment of $2.4 billion will expand the bridge from 6 to 12 lanes, two of which will be reserved for use by transit. Its new capacity of 300,000 vehicles a day will hopefully be adequate for many years to come.

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Over the next 50 years in Phase II of the Interstate System, nearly as much capacity will need to be added to the Interstate System as the lane-miles built over the past 50 years in Phase I. To reduce congestion and meet the demand of those dependent on public transportation, the United States will have to build enough transit capacity to double ridership by 2030. Substantial freight rail capacity will be needed to handle the 63 percent increase in demand expected by 2035. Additional capacity will be needed as well to make expansion of intercity passenger rail service possible.

Courtesy of the Woodrow Wilson Bridge Project.

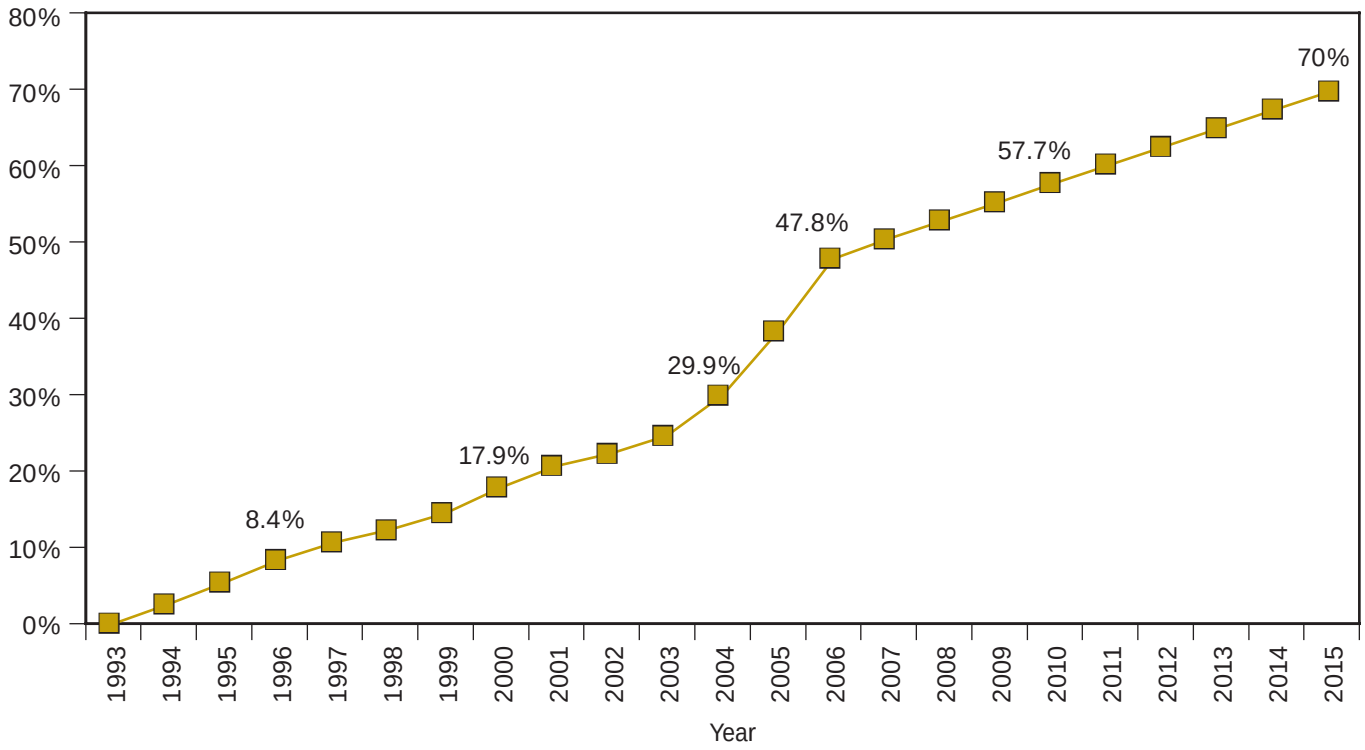
Traffic moves freely on the new Woodrow Wilson Bridge.

Increased Costs of Construction Erode Purchasing Power

In the period from 1993 to 2004, highway construction costs increased at approximately the rate of the consumer price index—around 2.5 percent annually. But from 2004 through 2006, there was a spike in the prices of petroleum, steel, concrete, asphalt, and construction equipment which increased construction costs, overall, by close to 30 percent. At the Commission hearing in Memphis, on November 16, 2006, Scott Bennett of the Arkansas DOT gave an example of what this has meant to the highway program in his state. "In 1977, with a $100 million widening program, the Department could have funded 143 miles of major widening improvements. In 2006, for the same $100 million, the Department could construct only 17 miles."

There are two ways to describe what needs to be done to restore the purchasing power of Federal transportation programs to adjust for increasing construction costs. One is to describe how much the program needs to be increased to restore the program's purchasing power to a level equivalent to what it could have purchased previously. The other is to calculate how much Federal fuel taxes would have to be adjusted to produce the revenues needed to fund the program at the restored levels.

Figure 2. Percentage Increases in Construction Costs 1993–2015



Note: Projected change from 2007 to 2015 based on the Consumer Price Index.
Data for 2004 to 2006 based on the Producer Price Index for highway construction.

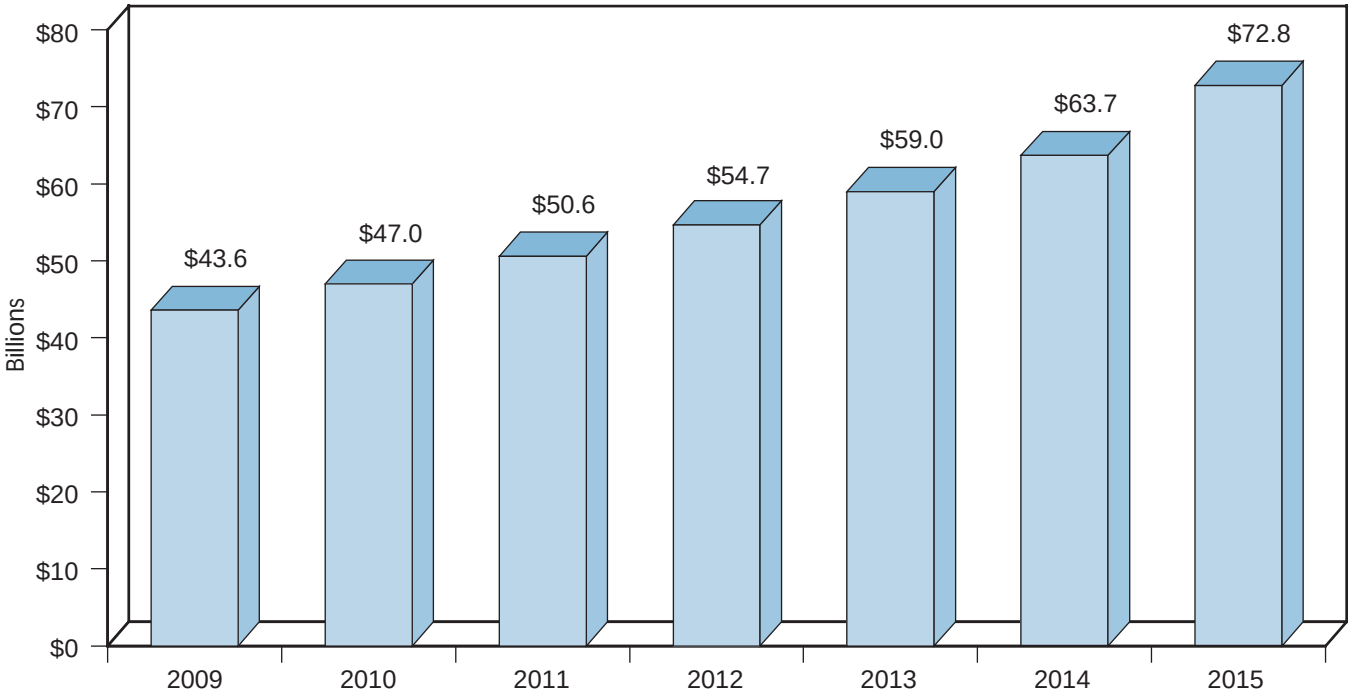
Restoring the Purchasing Power of Federal Assistance

AASHTO estimates that between 1993, the year in which Federal fuel taxes were last adjusted, and the end of 2015, construction costs will have increased nearly 70 percent. (Figure 2.) To restore the purchasing power of the program, annual Federal funding will have to be increased from $43 billion in 2009 to $73 billion by 2015. (Figure 3.) Over the past

15 years, the Federal share of highway capital spending has been 45 percent, and the state and local share 55 percent. To sustain their share at 55 percent of the total in 2015, state and local governments would have to increase their investment to $89 billion.

To put into perspective whether such an increase is possible, consider the history of the past two decades. In 1981, highway capital investment was $19.7 billion, $11.5 billion Federal and $8.2 billion state and local. By 2005, it had increased to $75 billion, up 280 percent; $33 billion Federal, up 187 percent; and $42 billion state and local, up 412 percent. If state and local investment increases at the same annual rate for the 10 years between 2005 and 2015 as it did for the 24 years between 1981 and 2005, it will increase to $89 billion. To restore the system's purchasing power overall, the Federal government will also have to fund its share of the increase needed.

Figure 3. Federal Highway Program Funding Needed to Restore Program Purchasing Power

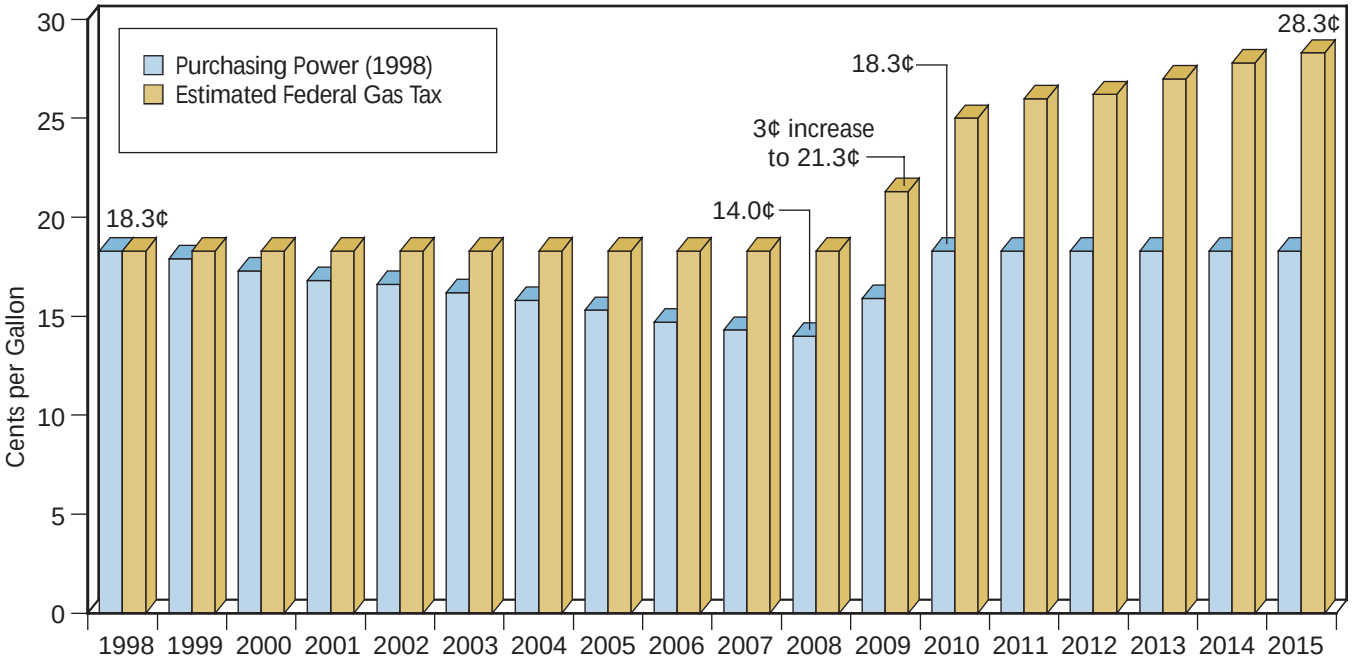


To restore the purchasing power of the transit program, Federal funding will have to be increased from $10.3 billion in 2009 to $17.3 billion in 2015. To sustain their share at 55 percent of total spending in 2015, state and local governments would have to increase their investment to $21.1 billion.

Adjusting Federal Fuel Tax Rates to Restore Program Purchasing Power

The Federal gas tax rates have remained static since 1993 when the rate was increased to 18.3 cents with 4.3 cents dedicated to the General Fund. The Highway Trust Fund did not receive any investment benefit until 1998. Our estimate of what it would take to restore the program's purchasing power is calculated to coincide with the recapture of the 4.3 cents revenue in 1998 under TEA-21. Inflation has and will continue to dramatically decrease the purchasing power of current revenues due to a lack of rate adjustments.

Figure 4. Federal Fuel Tax Rate Adjustments to Restore Purchasing Power



Note: The inflation effects are based on the Consumer Price Index actual rates from 1998 through 2006 and estimated from 2007 through 2015.

Because of the rising costs of construction, the value of the 18.3 cents Federal gas tax rate will decline 55 percent or to 8.3 cents between 1998 and the end of 2015, unless corrective action is taken to preserve Federal capital investment. The rate will have to increase by 3 cents or its equivalent in 2009 to sustain the program at the level guaranteed in SAFETEA-LU. Between 2010 and 2015, it would have to increase by another 7 cents to restore the programs' purchasing power. (Figure 4.)

Global Trade Will Multiply Truck Freight Traffic

When construction of the Interstate Highway System began in the 1950s the economy of the United States was largely self-contained. That is changing. The percentage of U.S. GDP represented by foreign trade increased from 13 percent in 1990, to 26 percent in 2000, and is expected to hit 35 percent by 2020. The number of containers moving through U.S. ports increased from 8 million units in 1980 to over 40 million in 2006, and is expected to hit 110 million by 2020. To carry those containers as well as growing domestic traffic, truck freight on our highways is expected to increase over 100 percent by 2035.

Just saying that the number of combination freight trucks will increase 100 percent or double over the next 20 years does not convey the challenge. Alternatively, on today's Interstates the most heavily used portions are seeing upwards of 50,000 combination trucks per day, per mile. Today, only 30 miles on the entire Interstate System carry more than 50,000 trucks per day. Forecasts show that by 2035 that number will reach 2,500 miles. Loads of this magnitude will almost certainly force State DOTs to handle this traffic through dedicated truck lanes.

The hours of peak congestion on the Interstate System in metropolitan areas are expected to increase from 29 percent in 2000 to 46 percent by 2020. And this comes at a time when U.S.

retailers and manufacturers are almost totally dependent on "just-in-time" truck delivery. Store shelves and manufacturing assembly lines have to be resupplied, sometimes within a 15-minute window. Reliability is a must. So the entire freight system of shippers, carriers, highways, railroads, ports, retailers, manufacturers, and customers face major challenges.

Today, only 30 miles on the entire Interstate System carry more than 50,000 trucks per day. Forecasts show that by 2035 that number will reach 2,500 miles.

The railroads face the challenge of restoring capacity fast enough to keep pace with the increase in intermodal freight which has been growing at over four percent annually. Over the past several decades, to improve productivity the railroads reduced track mileage from 380,000 miles to around 175,000 miles. If they are unable to raise the capital required to add the capacity needed, long-haul traffic, which many believe could be more efficiently carried by rail, may, by default, have to be carried by truck, further complicating highway congestion.

Strategies of Four State Departments of Transportation to Meet Future Needs

Pennsylvania Calls for Funding Reforms

In 2005, Governor Edward G. Rendell created a nine-member Transportation Funding and Reform Commission to conduct a review of the state's transit, highway, and bridge systems. The Commission, which was chaired by Secretary of Transportation Allen Biehler, and included three key legislative leaders, delivered their recommendations in November 2006.

They found that Pennsylvania's highways and bridges have reached the point where significant rehabilitation is required and that the time to make these repairs is now. Delay will result in more costly repairs later. They found that the state's dedicated funding sources are simply not keeping pace with inflation—in the past several years costs have skyrocketed. They recommended that funding should be coupled to reform to assure taxpayers of value for their investment and a lasting funding solution.

They recommended reforms which could annually generate $120 million in savings, and revenue measures to support highways which could generate an additional $900 million annually: $750 million by increasing the equivalent of a gas tax by 11.5 cents per gallon, and $150 million by raising various motor vehicle registration fees.

The Commission believed $60 million annually could be generated through transit reforms. They saw a need for $760 million annually in new investment to stabilize transit funding and bring the system to a good state of repair. They recommended that $576 million be generated at the state level through a realty transfer tax and that local governments should be allowed to generate an additional $184 million.

Said Commission Chairman Biehler, "Not only is the Commission proposing a solution to ensure Pennsylvanians have a better transportation system, it is also recommending management practices to make sure investments are made wisely and service is improved."

If the Commission's recommendations are adopted, the average driver would pay $7 more per month to fund highways and bridges. The new funds from the realty transfer tax for transit would add $5 a month to a 30-year $150,000 mortgage.

Iowa Analyzing Options to Meet Future Needs

Recently the Iowa Legislature asked the State DOT to prepare an assessment of the needs of the state's highway program. In brief, here is what was found.

Each year vehicles in Iowa travel over 31 billion miles on Iowa's roadway system. Nearly $390 billion worth of freight is hauled. Iowa manufacturers rely more and more on just-in-time delivery and agriculture relies on reliable, low-cost transportation solutions to get goods to market. This requires a road system that is in good condition, has adequate capacity and is well-maintained, even in inclement weather. Finally, the citizens of Iowa count on transportation to support their quality of life. Roads provide the primary means to access recreation, education, and health care. Companies want good roads not only for business purposes, but to attract and support a stable workforce.

Even though Iowa's population is not growing all that rapidly, travel demand has been. Over the past 15 years traffic in general has increased 36 percent, and large truck travel increased 51 percent, with over 60 percent of this growth on Iowa's 9,000 miles of primary roads, including their Interstates and other key arterials. By 2020, large truck traffic is expected to grow by another 50 percent.

Because of lagging revenues and rapidly escalating construction costs, Iowa is falling behind in maintaining its roadway system. Pavement conditions are deteriorating and the number of structurally deficient bridges has increased. To maintain and improve Iowa's roads to the levels required will require an investment over the next 20 years of $67 billion. From current sources, only $39.5 billion in revenues are expected to be available, so Iowa faces a 20-year revenue shortfall of approximately $27 billion.

The conclusion of the State DOT study is that the most critical needs on Iowa's roads can be met with an additional $4 billion in revenue over the next 20 years. This will require an annual revenue increase of $200 million. Several options have been outlined for the legislature to consider in order to generate this amount, including increases in current road fund taxes and fees. They explored new sources of revenue such as a sales tax on fuel purchases, a severance tax on exported ethanol, and a per mile tax. They also analyzed the feasibility of tolls, bonding, and privatization. Once the report has been submitted, it will then be up to the legislature to decide what to do to meet the state's future needs.

Utah Focusing on Financing Tools and Improved Project Delivery

As the fifth fastest growing state in the union, Utah continues to experience rapidly growing transportation needs. With a population of 2.5 million people, 88 percent live in urban areas, with most of that population along the Wasatch Front—a narrow 125-mile corridor comprising the metropolitan areas of Salt Lake City, Ogden, and Provo. Utah will add another one million people along the Wasatch Front alone by the year 2030. Consequently, while Utah faces challenges associated with an aging and deteriorating infrastructure, the greatest challenge is addressing growth and increasing congestion.

Utah continues to pursue new strategies to address growing transportation needs, including new state financing tools and improved project delivery.

In the past, Utah's primary source of transportation funding was limited to highway user fees. Since 1997, the state has also contributed significant state general funds to help meet highway capacity needs through the $3 billion Centennial Highway Program. Starting in 2005, the state began contributing even greater amounts of general funds to highway needs

through the Transportation Investment Fund by directing auto-related sales tax to transportation. Additionally, the state recently passed legislation allowing counties to impose an added vehicle registration fee for corridor preservation purposes, and a new local option sales tax for counties to build regionally significant highway, transit, or airport congestion mitigation projects.

Other strategies pursued by the state include adoption of comprehensive authority for public–private partnerships for tollways. The state is also considering Mountain View Corridor as a toll facility in order to help finance and deliver the project years sooner than it could be built otherwise. Additionally, the state recently converted 38 miles of HOV lanes on I-15 to High Occupancy Toll (HOT) lanes to help manage congestion through the heaviest-traveled sections of I-15.

Project Delivery

- The $1.6 billion project to rebuild Interstate 15 through downtown Salt Lake City would have normally taken 10 years but was completed in just 4.5 years and $32 million under budget, all while maintaining traffic flow throughout the valley. Utah rebuilt 17 miles of Interstate 15 using a design-build contract with Wasatch Contractors, a team led by Kiewit Pacific, Granite Construction, and Washington Construction. They expanded I-15 from 6 to 12 lanes and rebuilt 142 bridges.
- The initial segment of Utah Transit Authority's TRAX light rail was constructed to move additional people through Salt Lake Valley's congested I-15 corridor, providing new travel choices and helping to relieve peak-hour congestion. The project was completed 13 months ahead of schedule and $20 million under budget. Additional light rail lines are under development throughout the Salt Lake City metropolitan area.
- In addition to expanding existing roadways, new limited access facilities will be added to the system. The Legacy Parkway project north of Salt Lake City will be completed by fall 2008, providing 14 miles of new roadway to relieve congestion and provide an alternate to I-15. An Environmental Impact Study is currently underway on the Mountain View Corridor, which would provide 38 miles of new roadway in the rapidly growing western portion of Salt Lake and Utah Counties. Additionally, a Record of Decision has been issued for the Southern Parkway near St. George City. The new 26-mile roadway will help address growth in the southwest portion of Utah.

California Voters Approve Transportation Funding

California is the largest state in the country with a population of 36 million which is expected to increase by 15 million over the next 30 years. It contains two of the largest metropolitan areas in the country, the Los Angeles region with over 16 million and the San Francisco region with close to nine million. Forty percent of the nation's international container traffic moves through the ports of Los Angeles and Long Beach. Because of increased trade with China and other booming Asian economies, that container volume is expected to quadruple over the next 20 years.

When the technology crash hit in 2001, it hit the California economy hard, and state revenues dropped dramatically. To balance the state's budget, resources were shifted from transportation to the general fund. By 2004, the state had recovered and transportation

funding began to be increased once more. Between 2004 and 2006, Caltrans increased its highway construction program from $7.9 billion to $9.6 billion.

The November 2006 elections produced two important transportation successes. First, the voters approved $19.9 billion in transportation improvement bonds. Second, five self-help counties succeeded in securing voter approval for a one-half cent sales tax increase dedicated to transportation. Remarkably, in each case the measures received at least the two-thirds majority support required for the referendum to pass. For these five counties, these measures will generate nearly $17 billion in transportation revenues over the next 30 years.

The 30-year value for all of the counties that have succeeded in passing such one half-cent referenda by two-thirds majority is $50 billion.

Now that the voters have approved $19.9 billion in state-wide transportation bonds, Caltrans is hard at work together with the State's MPOs and the California Transportation Commission to systematically program the investments to be made. Some of the highlights so far show plans for investing $4.5 billion in highway projects to reduce congestion on key corridors; $3.1 billion for port infrastructure; $4 billion for transit rail, bus and ferry improvements; $1 billion for transit safety and security; and $2 billion for local streets and roads.

Future Cost Estimates for Highway, Transit, and Rail

In March 2006, U.S. DOT published its *2004 Conditions and Performance Report* which estimated that the "cost to improve" highways nationally to the levels needed would require an annual investment of $118.9 billion and that the "cost to improve" transit nationally to the levels needed would require $24 billion. AASHTO has confidence in the modeling methodology used to prepare this report and believes it should be used as the starting point for estimating future needs.

However, two adjustments are needed to bring estimates up to current and future needs. First, the 2004 report is based on 2002 data. Between 2002 and 2006, there has been a significant increase in commodity prices in petroleum, concrete, asphalt, steel, and construction machinery. We believe the starting point for a long-term estimate of need must take this cost increase into account.

Second, U.S. DOT's *C&P Report* expresses its estimate as a constant dollar amount to be invested each year for 20 years. The Commission was directed to study "revenue sources to fund the needs of the surface transportation system over at least (a) 30-year period…" In order to correlate the *C&P Report's* "constant dollar" estimates with a future "30-year" revenue stream, costs need to be converted to "year of expenditure" dollars.

The most widely respected adjustment factor for inflation over time is the "consumer price index (CPI)." The CPI has been used to adjust the *Conditions and Performance Report* estimates from "constant" dollars to "year of expenditure" dollars so these can be correlated with revenue projections over time.

For purposes of this report, AASHTO has adjusted the U.S. DOT's 2004 estimates of $118.9 billion as the "Cost to Improve" for highways and $24 billion as the "Cost to Improve" for transit to incorporate increased construction costs. That was done by ap-

plying the Producer Price Index for highways for years 2004, 2005 and 2006, to supplement the Consumer Price Index adjustment. For years 2007 and beyond, the projected "cost to improve" is estimated by applying the Consumer Price Index. (See Figures 5 and 7.)

Highways Are the Keystone of Passenger, Freight, and Travel

Over the past century, funded by Federal, state, and local governments, the United States has built a highway system of nearly 4 million miles—the largest and best system in the world. This includes a 47,000-mile Interstate System, which together with 115,000 miles of additional arterials constitute the 162,000-mile National Highway System. Other arterials and collectors make up an additional 810,000 miles that are eligible for Federal aid. What remains are three million miles of roads that are not eligible. Nineteen percent of U.S. highways are owned by states, 45 percent by counties, 33 percent by cities and townships, and 3 percent by the Federal government, either on military reservations or public lands.

America is a vast nation which has overcome the tyranny of distance through investments in a highway system that has tied communities together and linked them to the world. The highway network provides American businesses and consumers with unparalleled mobility and choice. Automobiles allow people to travel where they want, when they want, and with whom they want. Today nearly 90 percent of U.S. trips to work and 86 percent of all trips are made by automobile. Highways are the keystone of the U.S. freight transportation system carrying nearly 80 percent of domestic tonnage and 94 percent of domestic value. Trucks provide direct service for both long-distance and local shipments, and provide the pickup and delivery for long-distance shipments made by rail or overnight airfreight.

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AASHTO's 2007 Highway "Cost to Improve" Estimate: $155.5 Billion

AASHTO has calculated the level of investments needed through 2030 to bring the highway system to a condition that produces positive net benefits to the American public in terms of both condition and performance—referred to as the "Cost to Improve." When the U.S. DOT's 2002 estimate of $118.9 billion is adjusted for inflation and increased construction costs, AASHTO estimates that the "Cost to Improve" is actually $155.5 billion in 2007, increasing to some $273.8 billion by 2030. (Figure 5.)

Are These Investments Achievable?

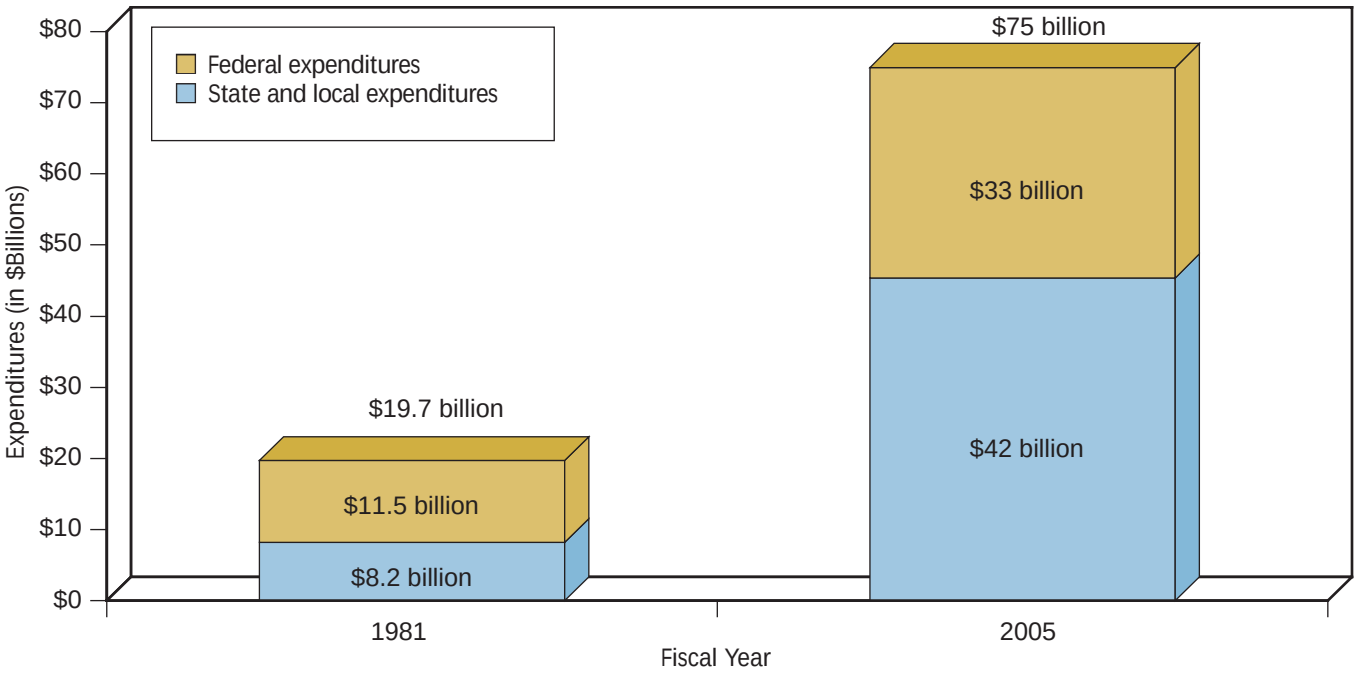
Is it even worthwhile to consider investments of this magnitude? Yes, for three reasons. First the investment needs are based on the estimate made by U.S. DOT in 2006, updated using a credible index which accounts for the increases in construction costs which have occurred in the recent past and are expected in the future.

Second, put into historic perspective they look more realistic. Actual highway capital spending nationally increased from $19.7 billion in 1981, to $75 billion in 2005, an increase of 280 percent over 24 years. (Figure 6.) Increasing highway capital investment between 2005 and 2029 by the same percentage would yield approximately $210 billion.

Figure 5. Highway Needs Increased by the Consumer Price Index* 2007 Through 2030

* The 2002 estimate of $118.9 billion as the "Cost to Improve" highways is taken from the U.S. DOT's *2004 Conditions and Performance Report.*
** The 2007 estimate of $155.5 billion is based on increases using a combination of the Consumer Price Index and the Producer Price Index for increased construction costs in years 2004 through 2006.
*** For the remaining years through 2030, "Cost to Improve" estimates are estimated using the Consumer Price Index.

Figure 6. Highway Capital Expenditures Increased 280% in 24 Years



Over the past 15 years the historical share of highway capital investment has been 45 percent. Federal highway assistance will have increased from $32 billion in 2004 to $39 billion in 2007.

In this period, states have increased their capital programs as well. Washington State which has increased its gas tax by 14.5 cents over the past four years, will increase its capital spending from $725 million in 2004 to $1.1 billion in 2007. Georgia will increase its highway capital spending from $911 million to $2 billion, Alabama from $580 million to $800 million, Texas from $3.8 billion to $5 billion, and California from $7.9 billion to $9.6 billion. Other states have not been able to grow their programs by these rates. But if both Federal and state governments continue to increase their highway investments by similar rates, considerable progress can be expected.

The third reason it is reasonable to consider investments of this magnitude, is that while they are huge, it is not necessary for them to be achieved all at once. The program needs to be increased over many years and several reauthorization cycles. It should be approached in three phases. In the first phase, from 2008 to 2010, the objective should be to assure sufficient revenues to sustain the $43 billion highway program promised in SAFETEA-LU. In the second phase from 2010 to 2015, the objective should be to restore the purchasing power of the highway program to 1993, the last time the Federal gas tax was increased. In the third phase from 2015 and beyond, the objective should be to close the gap between current spending and the "cost to improve" goal.

FHWA indicates that highway capital spending in 2005 was $75 billion, of which Federal assistance represented $33 billion. (Figure 6.) Between 1993, when Federal fuel tax rates were last adjusted and 2015, it is estimated that highway construction costs will have increased nearly 70 percent. To restore the purchasing power of the Federal highway program it will need to be increased from $43 billion in 2009 to $73 billion by 2015. State and local highway capital investment in that year would be expected to increase to $89 billion.

The program needs to be increased over many years and several reauthorization cycles. It should be approached in three phases. In the first phase, from 2008 to 2010, the objective should be to assure sufficient revenues to sustain the $43 billion highway program promised in SAFETEA-LU. In the second phase from 2010 to 2015, the objective should be to restore the purchasing power of the highway program to 1993, the last time the Federal gas tax was increased. In the third phase from 2015 and beyond, the objective should be to close the gap between current spending and the "cost to improve" goal.

Highway Investment Needs Are Understated

As good as U.S. DOT's *Conditions and Performance Report* is as a basis for estimating national needs, there is one area in which AASHTO believes it understates future costs long-term.

Long-Term Interstate Highway System Costs Are Substantial

Today's biennial conditions and performance reports do not adequately estimate several future Interstate Highway System needs.

- **Bridges.** The Interstate System has more than 55,000 bridges, many of which are reaching 40 to 50 years of age. Bridges and other structures of this age usually require substantial rehabilitation, and in another 20 to 30 years, they will require replacement.
- **Pavement.** The Interstates have approximately 210,000 lane-miles of pavement. As these pavement structures reach 40 to 50 years of life, major portions will need to have their foundations completely reconstructed.
- **Interchanges.** The Interstate System has almost 15,000 interchanges, many of which do not meet current operational standards and create bottlenecks or safety problems. Some of the most significant congestion on the system is at major interchanges that were not designed to carry the volumes of traffic that currently use them. Higher projected future traffic volumes will exacerbate these problems.

AASHTO recommends that the National Commission call on Congress to direct U.S. DOT and State DOTs to jointly undertake two comprehensive Interstate Highway System needs assessments during the period from 2010 to 2013. The first should study the costs of rebuilding or replacing the 55,000 bridges on the system, the 15,000 interchanges, and the pavement foundations for the system's 210,000 lane-miles. The second should study long-term, system-wide expansion needs of the network, taking into account the global economy, population, and economic growth, safety, national defense, and homeland security needs. Initial analysis shows the need to nearly double the lane-miles on the existing Interstate System.

Transit Demand Growing

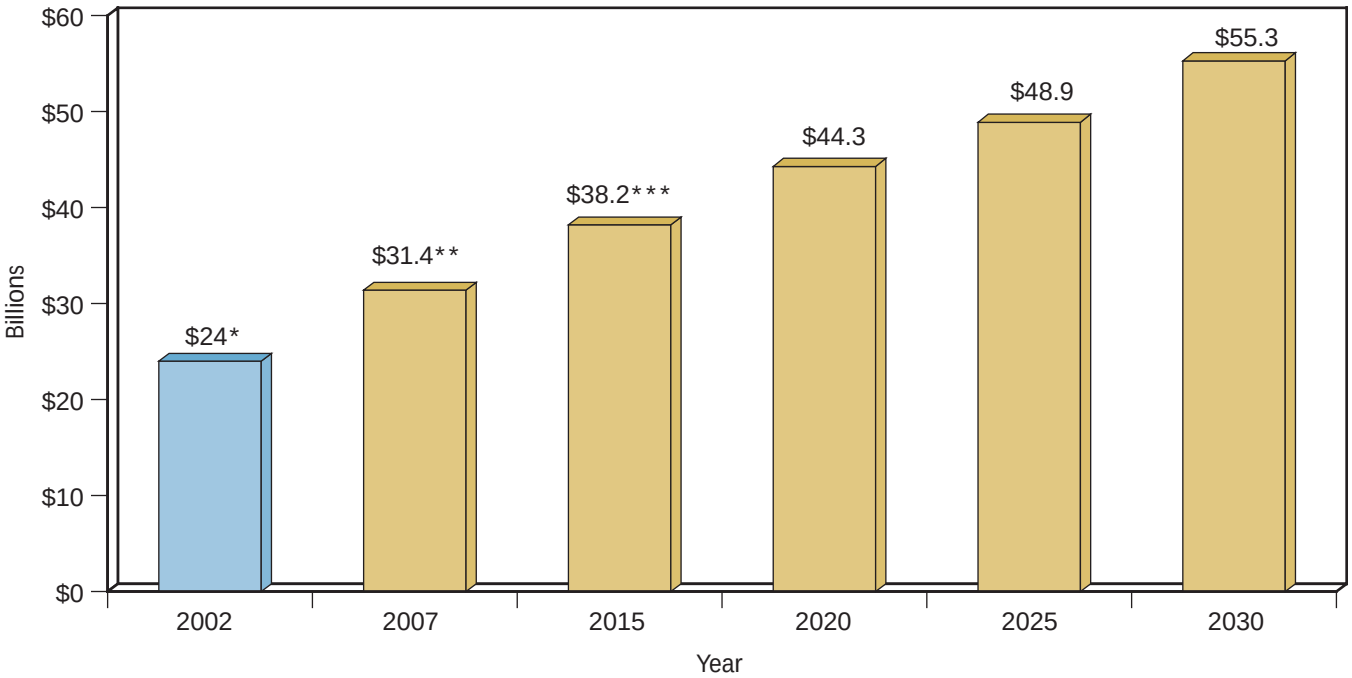
The nation's public transportation network provides access to jobs, mobility for the young, elderly, and disabled, and helps reduce congestion, conserve fuel, enhance the efficiency of highway transportation, reduce air pollution, and support security and emergency preparedness activities. An efficient and safe public transportation system is essential to moving people in both rural and urban areas and to the health of the national economy.

Today there are approximately 610 transit operators serving urban areas, operating 115,000 vehicles. Rail systems comprise 10,700 miles of track and 2,900 stations. There are around 770 bus and rail maintenance facilities. Over 19,000 transit vehicles operate in rural areas. Passengers now make close to 10 billion trips by public transportation each year. In the 1990s, transit carried approximately 5 percent of commuter traffic nationally. In major metropolitan centers such as New York, Los Angeles, Chicago, Philadelphia, Washington, DC, and Boston, the percentage of commuters carried is much higher. Transit ridership is growing and communities all over the country are struggling to fund capacity expansion at a pace that keeps up with demand.

AASHTO's 2007 Transit "Cost to Improve" Estimate: $31.4 Billion

AASHTO has calculated the level of investments needed through 2030 to bring the transit system to a condition that produces positive net benefits to the American public in terms

Figure 7. Transit Needs Adjusted by the Consumer Price Index* 2007 Through 2030



* The 2002 estimate of $24 billion as the "Cost to Improve" highways is taken from the U.S. DOT's *2004 Conditions and Performance Report.*
** The 2007 estimate of $31.4 billion is based on increases using a combination of the Consumer Price Index and the Producer Price Index for increased construction costs in years 2004 through 2006.
*** For the remaining years through 2030, "Cost to Improve" estimates are estimated using the Consumer Price Index.

of both condition and performance—referred to as the "Cost to Improve." When the U.S. DOT's 2002 estimate of $24 billion is adjusted for inflation and increased construction costs, AASHTO estimates that the "Cost to Improve" is actually $31.4 billion in 2007, increasing to some $55.3 billion by 2030. (Figure 7.)

If in 2004 annual transit capital spending was $13.2 billion, a not unreasonable question is how can it be expected to increase to $31 billion in the near future, not to mention to $44 billion by 2020. The good news is that over the 23-year period from 1981 to 2004, transit spending overall increased from $6.4 billion to $42.9 billion, and transit capital spending increased from $3.4 billion annually to $13.2 billion. It obviously will not be easy to increase transit investment to the levels needed, but it is instructive that over the past two decades transit agencies, with major assistance from the Federal government, were able to increase capital investment nearly 290 percent. According to U.S. DOT's latest *Condition and Performance Report,* the Federal share of transit capital investment from 1997 to 2002 averaged 45.8 percent.

FHWA forecasts that highway travel will increase at 2.07 percent per year through 2022. If this rate of increase holds for the next 50 years, highway vehicle miles traveled will more than double from 3 trillion today to nearly 7 trillion by 2055. That is more traffic than the system can accommodate. In order to reduce highway demand, a policy objective should be set to double transit ridership over the next 20 years. With supportive land use and transit-oriented development, many trips which would otherwise take place by car, can be shifted to transit. One recent study showed that by 2030, about half of the buildings in which Americans live, work, and shop will have been built after 2000. In other words, if about half of what will be the built environment in 2030 does not yet exist, there is an opportunity through land use and other policies to shape what is built, and how this affects transportation choices.

AASHTO and APTA recently conducted a joint analysis of future alternatives funded through the Transit Cooperative Research Program. That analysis showed that if transit capacity were to double over 20 years, ridership would have to increase by 3.5 percent annually. The capital cost of expanding urban and rural capacity to make this ridership possible would be to increase the "cost to improve" estimate from the $24 billion level set in U.S. DOT's 2004 *C&P Report* to approximately $45 billion (expressed in "constant" dollars).

There are indicators that there is a potential demand for far more capacity than the system is currently providing. Between 1996 and 2006, more than 460 miles of fixed guideway transit service were added in 26 cities. The current New Starts program includes 36 projects that have moved beyond the initial stages of study. Total funding needed for this part of the New Starts program is $35 billion. More than 200 additional projects are in earlier stages of study and do not yet have cost estimates available. Other communities are considering expanding service through bus rapid transit.

In rural areas, there are also indications of unmet demand. The Greater Minnesota Transit Improvement Plan identified the need for an 81 percent increase in total rural fleet size. North Carolina recommended a 124 percent increase in its rural public transportation system. Vermont estimated a 100 percent increase in its rural fleet size. And Montana saw the requirement for a 242 percent increase in annual capital expenditures. Our study showed that satisfying this demand would require annual capital investment in rural transit to increase from $700 million to $1.2 billion.

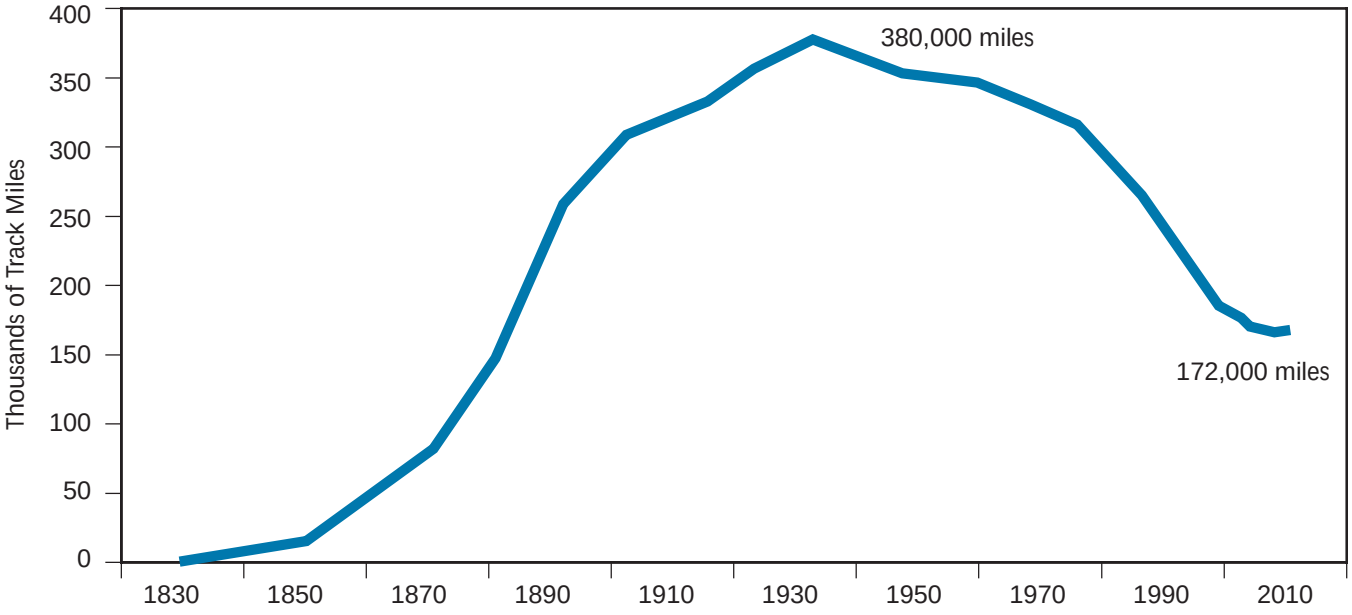
Freight Rail Faces Capacity Shortage

America's freight rail system carries 14 percent of the nation's freight by tonnage, 29 percent of ton miles, and 5 percent of value. Freight rail provides shippers with cost-effective transportation, especially for heavy and bulky commodities. It is vital to the movement of coal which fuels a large percentage of the nation's electric power generation. Freight rail, in partnership with the trucking industry, provides intermodal transportation connecting U.S. seaports with inland producers and consumers. Truck lines use rail to carry trailers long distances, as one solution to the shortage of truck drivers. Rail is a preferred mode for hazardous materials shipments. It is also vital to military mobilization.

In 1980, the freight rail industry was losing money and faced financial crisis. That year it was deregulated by the Federal Government. Since then the railroads have increased their productivity by cutting track mileage from 380,000 miles to 172,000 miles, cutting back on rolling stock and employees, and consolidating ownership into seven Class I Railroads, and 551 Shortlines. (Figure 8.) The seven Class I railroads provide the long-haul, interstate service throughout the United States, along with connections to Canadian and Mexican railroads for international traffic. The Class I railroads account for 70 percent of system mileage and 93 percent of freight revenue.

In 2003, AASHTO's *Freight Rail Bottom Line Report* found that the rail industry today is stable, productive and competitive, earning enough profit to operate, but not enough to replenish infrastructure quickly or fund modernization. After years of downsizing, the railroads face a capacity shortage because the growth in rail freight demand has now outstripped what they can carry. This is especially true for rail intermodal freight which has been growing at 4.6 percent per year, and is forecast to grow 213 percent by 2035. This

Figure 8. Rail Network Today



growth, of course, is contingent on the ability of the railroads to finance adequate additional track capacity. Another challenge is removing height clearance obstructions that prevent double-stack service, such as along the I-95 Corridor.

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The 2007 "Cost to Maintain Freight Rail's Current Market Share" is $12 billion annually, $9.25 billion in private capital and $2.75 billion in public support. AASHTO's 2003 *Freight Rail Bottom Line Report* estimated that the level of investment in rail infrastructure required for freight rail to maintain its current market share and handle its "fair share" of growth was approximately $195 billion over 20 years. It anticipated that the railroads should be able to provide around 75 percent of the funding required, estimated at $142 billion, but the remainder (up to $53 billion, or $2.65 billion annually) would have to come from public sources, in the form of direct assistance, low-interest loans, tax credits, and other forms of public-sector participation. The estimate has been adjusted to 2007 dollars using the same factors as used for highways and transit.

Compared to a scenario in which no public support was provided, the base case scenario, in which $2.75 billion in annual public support was provided, would avoid seeing 450 million tons of freight shift from rail to trucks, avoid 15 billion in additional truck VMT, save shippers $162 billion, and save $10 billion in highway costs over a 20-year period.

AASHTO is in the process of updating its 2003 freight rail analysis. Preliminary results show that the freight rail system is not keeping up with demand and is having to shed some of its traffic to trucking. It is encouraging that private rail investment has been increasing. The Association of American Railroads estimated that major freight railroads will invest $8.3 billion in infrastructure improvements in 2006, nearly double the level from 10 years ago. Even so, the railroads continue to be unable to finance enough expansion from private sources to add the capacity needed.

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In part, rail market share is shrinking because of structural changes in the economy. The economy is producing and shipping more value-added products and less heavy manufactured goods. Our freight shipments are lighter, less bulky, and higher in value, making them better suited to truck than rail. The other reason railroads are shedding traffic to trucking

is their shortage in capacity. Our analysts have observed that some railroads are getting rid of less profitable traffic. Railroads are using pricing to turn aside lower-profit carload and short-haul freight in favor of longer distance intermodal and bulk traffic, which can be handled cost-effectively and profitably in unit trains.

The freight rail industry is operating under the same economic principals as any successful U.S. business—to maximize return on investment and grow shareholder equity. These principals unfortunately sometimes come into conflict with the public's interest and expectation that the railroads will continue to carry their market share of freight and mitigate roadway congestion by reducing the number of trucks on the Interstates and going into our cities.

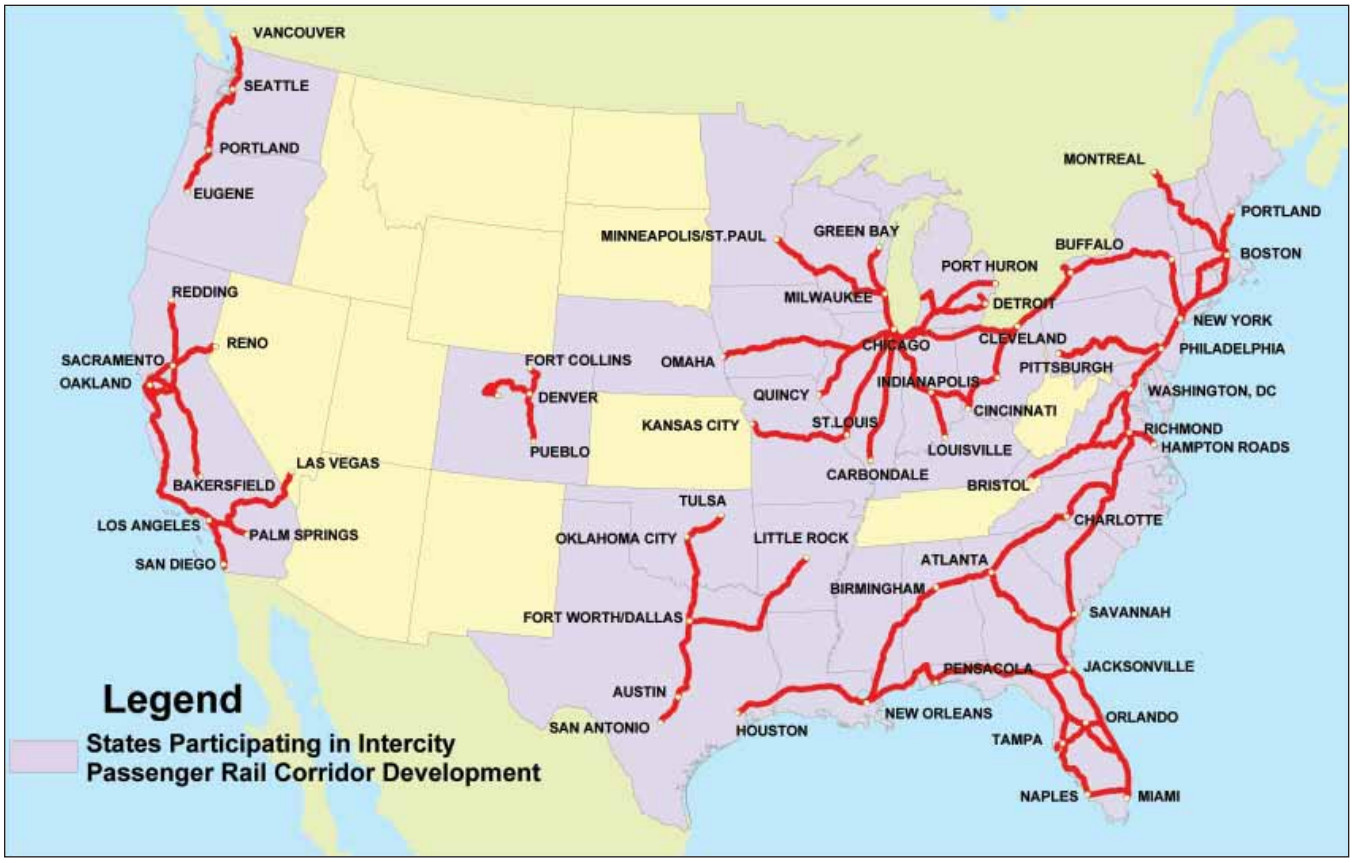
As Tennessee DOT Commissioner Gerald Nicely testified at the Commission hearing in Memphis on November 16, 2006, AASHTO has recently adopted a policy that says a new National Rail Transportation Policy must be established to increase freight rail capacity and intercity passenger rail services. Federal incentives, such as investment tax credits, should be provided to make it feasible for rail companies to invest in capacity improvements for the future. Federal funds outside the Highway Trust Fund should be provided to states who participate in "public-benefit freight rail projects. AASHTO recommends that the National Commission develop and recommend a National Rail Policy, in consultation with U.S. DOT, state DOTs, railroads, and shippers.

Intercity Passenger Rail: A Viable Alternative

Nearly all intercity passenger rail service is currently provided by Amtrak, which serves 23 million passengers annually, generating annual ticket revenues of about $1.1 billion. Services are provided over a network of approximately 23,000 miles of rail over which about 270 trains operate per day, serving 500 communities in 47 states. Over the past 10 years Federal assistance for Amtrak has averaged about $1 billion annually.

Congestion in highway and aviation systems has caused many states to look for ways to augment service. A number of states have invested in intercity passenger rail service. (Figure 9.) Many of these investments have yielded striking successes in the past decade and the experience has demonstrated that passenger rail can be a viable alternative. The Northwest Corridor connecting Eugene, Oregon through Portland, to Seattle, Washington and Vancouver, British Columbia has seen its ridership grow from 92,000 in 1993 to 564,000 by 2001. Planned investment may increase this to over 1.5 million customers. Investment in the Chicago–Milwaukee–Minneapolis corridor, as part of the Midwest Regional Rail Initiative may increase ridership from 321,000 in 1996 to 3.2 million in the future. Planned investment in California's three state-supported corridors will support ridership of 11.6 million in the future, compared with 2.6 million in 1996. For the Northeast Corridor, planned investments will maintain and expand the current annual ridership of 14 million.

Figure 9. Intercity Passenger Rail Corridor Development Plans



Source: Intercity Passenger Rail Transportation Report.

Table 1. Intercity Passenger Rail Corridors and Cost Estimates for Improvement

Corridors	Next 6 Years	7–20 Years	Total
Northeast Corridor (Washington–New York–Boston)	$6,590,000,000	$6,510,000,000	$13,100,000,000
Keystone Corridor (Philadelphia–Harrisburg)	$170,000,000	$140,000,000	$310,000,000
Keystone Corridor Extension (to Pittsburgh)	—	$850,000,000	$850,000,000
Empire Corridor (New York–Albany–Buffalo)	$340,000,000	$1,560,000,000	$1,900,000,000
Midwest Regional Rail Initiative (MWRRI) System–Chicago–Detroit segment	$538,000,000	—	$538,000,000
Midwest Regional Rail Initiative (MWRRI) System–Chicago–St. Louis segment	$500,000,000	—	$500,000,000
Midwest Regional Rail Initiative (MWRRI) System–Chicago–Milwaukee–Minneapolis segments	$681,500,000	$760,400,000	$1,441,900,000
Midwest Regional Rail Initiative (MWRRI) System–other Chicago Hub corridors/extensions	—	$2,339,200,000	$2,339,200,000
Southeast High-Speed Rail (SEHSR) System (Washington–Richmond/Hampton Roads–Raleigh–Charlotte)	$479,400,000	$4,300,000,000	$4,779,400,000
SEHSR Extensions (to Atlanta/Macon and Jacksonville)	$352,000,000	$975,000,000	$1,327,000,000
Florida Corridor (statewide initiative)	$2,000,000,000	$6,000,000,000	$8,000,000,000
Capitol Corridor (San Jose–Oakland–Sacramento)	$380,000,000	$1,030,000,000	$1,410,000,000
Pacific Surfliner Corridor (San Luis Obispo–Los Angeles–San Diego)	$1,490,000,000	$2,560,000,000	$4,050,000,000
San Joaquin Corridor (Oakland/Sacramento–Bakersfield)	$820,000,000	$950,000,000	$1,770,000,000
California Coast Corridor (San Francisco–Los Angeles)	$590,000,000	$320,000,000	$910,000,000
Extensions to California Corridors (Reno, Redding, Palm Springs, and Las Vegas)	$155,000,000	117,600,000	$272,600,000
Pacific Northwest Corridor (Vancouver–Seattle–Portland–Eugene)	$620,000,000	$2,070,000,000	$2,690,000,000
Gulf Coast Corridor (Houston–New Orleans–Mobile and New Orleans–Atlanta)	—	$4,640,000,000	$4,640,000,000
Northern New England (Boston–Portland, Boston–Vermont–Montreal)	—	$2,500,000,000	$2,500,000,000
South Central Corridor (San Antonio–Dallas/Fort Worth–Tulsa, Dallas/Fort Worth–Little Rock)	$1,273,000,000	$1,287,000,000	$2,560,000,000
Colorado Corridor (Front Range and I-70 West)	—	$4,049,784,000	$4,049,784,000
Total	**$16,978,900,000**	**$42,958,984,000**	**$59,937,884,000**

Notes: Estimates for the Gulf Coast, and Northern New England corridors obtained from Amtrak.
Capital estimates for the *Keystone* Extension are based on the midpoint of a range of project estimates.
Capital estimates for the South Central Corridor are based on Amtrak's estimate of $2.56 billion total for the entire corridor.
Capital estimates for MWRRI are updates from the last published report obtained from the states.
Distribution between next six year and 7–20 year investment periods is estimated for the California Corridor Extensions.
Capital investments for Florida Corridor are based on midpoint of range for non-electric technology estimates.

Despite important changes under new Amtrak leadership, uncertainty continues to surround its future. Critical rail infrastructure repairs and improvements remain unaddressed. Recent efforts to recalculate Northeast Corridor access fees for commuter lines have deflected those involved from the broader, long-term task. The uncertainty of annual Federal support for Amtrak and the access fee controversy have called into question the Federal commitment to the investment necessary to bring the Northeast Corridor up to a state of good repair.

To assess investment needs in this field, AASHTO produced in 2002 a report entitled *Intercity Passenger Rail Transportation*. In the report, AASHTO estimated the investment needs for intercity passenger rail corridors including those owned by Amtrak to be $60 billion over the next 20 years. (Table 1.) That would translate into an annual investment of $3 billion. Adjusting for rising construction costs would produce an estimate of $3.3 billion for 2007.

Intercity Passenger Bus: Essential in Rural Areas

The intercity bus industry provides more than 774 million passenger trips annually. Motorcoaches serve over 4,200 communities in regular services which range from routed service, charters, tours, airport shuttles, and sightseeing. For much of rural America, intercity bus service is their only alternative to long-distance travel by private automobile. Federal funding for intercity bus was first introduced with ISTEA in 1991. Today states can use FTA Section 5311(f) funds to underwrite service and facilities in rural areas. In 2006, approximately $35 million was provided through this program. In 2005, when Greyhound announced that it would be forced to reduce service to rural communities in several sections of the country, States joined forces to use their resources to sustain some service.

CHAPTER III

Demographic Trends Affecting Transportation






The surface transportation system for the future must address the economic and demographic changes that have taken place over the past 50 years, and deal effectively with the changes expected for the next 50 years.

Population Growth 2005 to 2055: 140 Million

Over the next 50 years our population is forecast to grow from 295 million to 435 million. An equivalent of another Canada will be added to our ranks each decade. This is in contrast to Europe and Japan whose populations are expected to decline.

Over the next 30 years, 88 percent of the nation's population growth will occur in the South and West. (Figure 11.) Florida, California, and Texas are each expected to grow by 15 million people. Arizona is projected to add 5.6 million and North Carolina 4.2 million. The top five fastest-growing states are expected to be Nevada (114 percent), Arizona (109 percent), Florida (80 percent), Texas (60 percent), and Utah (56 percent). Even though not expected to grow as fast, the population of the Northeast and the Midwest are still expected to increase—the Northeast by 4.1 million and the Midwest by 6.1 million.

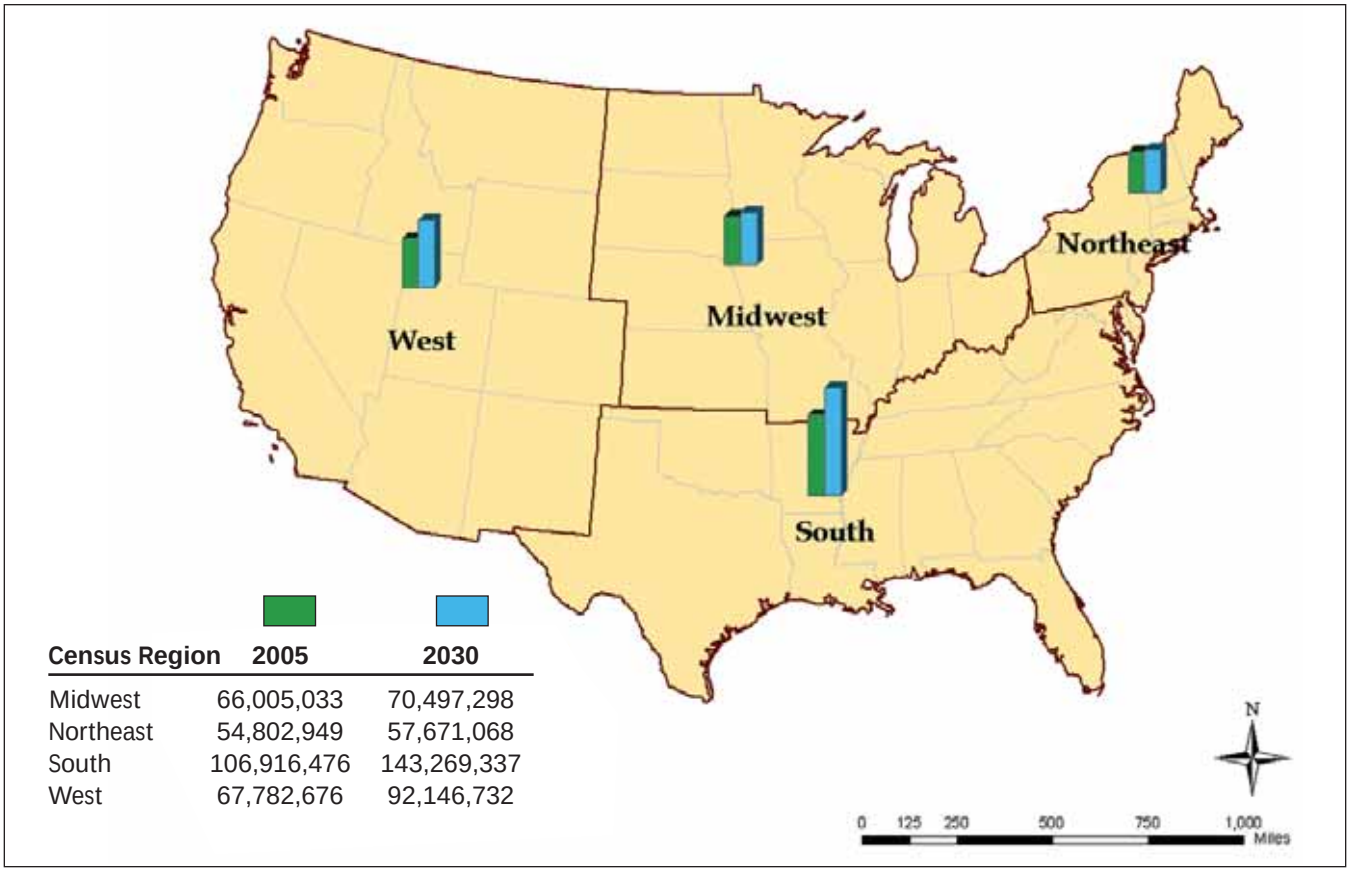
Figure 10. South and West to Grow Most Over Next 30 Years

U.S. Population Growth

U.S. Census

1955–2005	2005–2055
165 million to 295 million	295 million to 435 million
Growth	**Growth**
130 million	140 million

Figure 11. Census Region Population Forecast, 2005–2030



Census Region	2005	2030
Midwest	66,005,033	70,497,298
Northeast	54,802,949	57,671,068
South	106,916,476	143,269,337
West	67,782,676	92,146,732

As the oldest baby boomers become senior citizens in 2011, the population aged 65 and older is projected to grow significantly. By 2030, the number of older people will have grown from 35 million to 70 million.

Growing 65+ Population

As the oldest baby boomers become senior citizens in 2011, the population aged 65 and older is projected to grow significantly. By 2030, the number of older people will have grown from 35 million to 70 million. One in eight of those over 65 will also be over 85. Most of those over 65 are expected to want to drive their own cars. Those living in low-density places will face serious mobility and access problems when they can no longer drive. To meet the needs of this growing elderly population, expansion of public transportation services will be required in both urban and rural areas.

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Growth Centralizes in Exurbs, Suburbs, and Mega-Regions

Since 1950, the number of people living in metropolitan areas in this country increased from 85 million to 226 million. Over the same period the rural population has declined from 65 million to 55 million. Seventy-five percent of the growth in the past 50 years has concentrated in the suburbs, with the remainder going to central cities. (Figure 12.)

As of June 2005, there were 12 "mega-metropolitan" areas of 5 million in population and above. These include New York, Los Angeles, Chicago, Washington, DC, San Francisco, Philadelphia, Boston, Detroit, Dallas, Miami, Houston, and Atlanta. There are also 53 metropolitan areas of one million and above. According to a 2004 study by the University of Pennsylvania School of Design, between 2000 and 2050 more than 70 percent of the nation's population growth and 80 percent of its economic growth are expected to take place in metropolitan areas.

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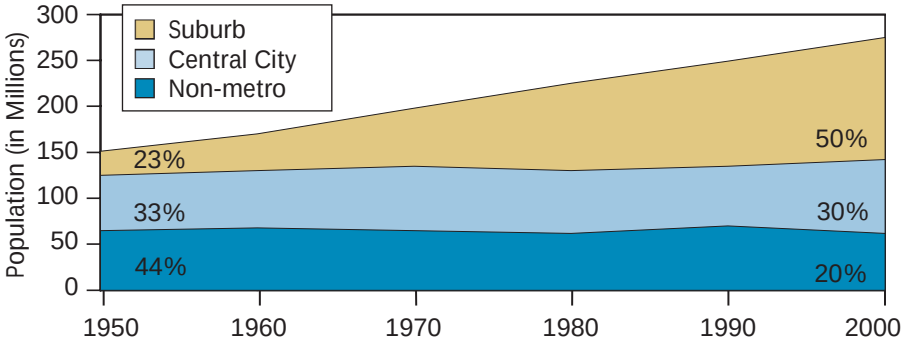
Rural Challenges

Even though a state may be rural that does not mean that it does not face population pressures and growth in travel demand. Out of the 20 states expected to grow the fastest over the next 30 years, several are rural including Nevada, New Mexico, Idaho, Utah, Wyoming, Alaska, and Montana. What these states have in common is large geographic size, and as a consequence highway systems which have to span great distances. The volume of long-haul trucking in the United States moving trade to and from the Coasts across rural America is expected to at least double by 2035. Agriculture also continues to be a major part of the economies of many states. Agriculture depends on efficient, low-cost rail, truck, and water transportation to keep U.S. production competitive in the global economy. All rural states will face the enormous cost of preserving for future generations the network of roads they have built over the past 80 years. It will be important for them to succeed, not only to meet the needs of their own citizens, but also to maintain their part of the national network the U.S. economy depends on.

Figure 12. Long-Term Trends by Major Geographic Areas: Suburbs, Central Cities, and Non-Metropolitan, 1950–2000



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Travel, Tourism, and Recreation Depend on Transportation

One of the least understood and appreciated industries in the United States is travel, tourism, and recreation. Together they rank as the most important industry in three states, and rank either second, third, or fourth, in the rest. As the role of extractive industries such as mining and timber has been declining in parts of rural America, the role of travel, tourism, and recreation has increased. This industry is directly dependent on a good transportation system.

Travel and tourism are expected to generate over $700 billion in revenues in 2007, over $100 billion of that from international visitors. Leisure trips represent 80 percent of domestic travel. Over 200 million Americans visit U.S. Forest campgrounds each year. The use of forest service roads has increased 15-fold over the past 20 years. The number of visitors to National Parks is approaching 300 million.

Families in this country value outdoor recreational activities like skiing, camping, fishing, golfing, and many more. Congress has recognized the importance of these activities to the American people and has included resources in the highway program to support them. The Federal lands program is a major source of support for travel on public lands such as National Parks and U.S. Forests. Congress created a program to recognize and preserve roads that have outstanding scenic, historical, cultural, natural, recreational, or archeological value. As of 2005, the National Scenic Byways Program had designated 27 All-American Roads and 99 National Scenic Byways. Sustaining viable transportation access to outdoor recreation is vital to consumers, vital to the communities whose economies depend on it, and vital to the outdoor recreation industry.

Healthy Economic Growth Forecast

U.S. economic growth is anticipated to remain healthy, with real GDP projected to expand by 2.8 percent annually. Strong growth in GDP can lead to increased travel. With healthy GDP growth and a globally competitive U.S. economy, total freight tonnage is projected to double by 2035. The economies of Europe and Japan are expected to grow by 2 percent over the next 30 years, down from 2.6 percent over the past 30 years. The economies of countries like China and India are expected to continue to grow at 7 to 9 percent annually. According to Global Insight's Energy Service, oil prices are expected to drop from current levels and hover around the $50 per barrel range through 2020 or so. Thereafter, the forecast shows oil prices climbing steadily to 2030 and beyond.

Travel Growth to Continue

Travel in the United States measured in vehicle miles traveled (VMT) increased from 600 billion per year in 1955 to 2.75 trillion in 2000 and is about to hit 3 trillion. The VMT growth rate between 1993 and 2002 was 2.5 percent per year. U.S. DOT's 2004 *Conditions*

and Performance Report estimates that it will grow by 2.07 percent through 2022. At this rate by 2055, VMT is expected to exceed 7 trillion. (Figure 13.)

The number of licensed drivers grew from 78 million 50 years ago to 205 million today and is expected to reach over 380 million 50 years out. Our highways carried 65 million vehicles in 1956, they carry 246 million today. Vehicles on the road are expected to reach nearly 400 million by 2055.

Commuting Patterns Shift to Suburbs

According to *Commuting in America III*, published by TRB in October 2006, since 1980 the percentage of commuters driving alone has increased from 64 to 76 percent; the percentage carpooling has decreased from 20 to 12 percent; transit riders have declined in percentage from 6 to 5 percent; those walking declined from 6 to 3 percent; and those who work at home have increased from 2 to 3 percent. Transit use is more prevalent in densely populated areas such as downtowns and along well-served transit corridors in the 12 mega-metropolitan areas such as New York, Boston, and Chicago.

From 1990 to 2000, 64 percent of the growth in metropolitan commuting was in flows from suburb to suburb, now representing 46 percent of commuting trips. The next largest growth area was the "reverse commute" from central city to suburb, now representing 9 percent. The "traditional commute" from suburb to central city dropped in share to 19 percent.

Figure 13. Projected Vehicle Miles of Travel, 2004–2055

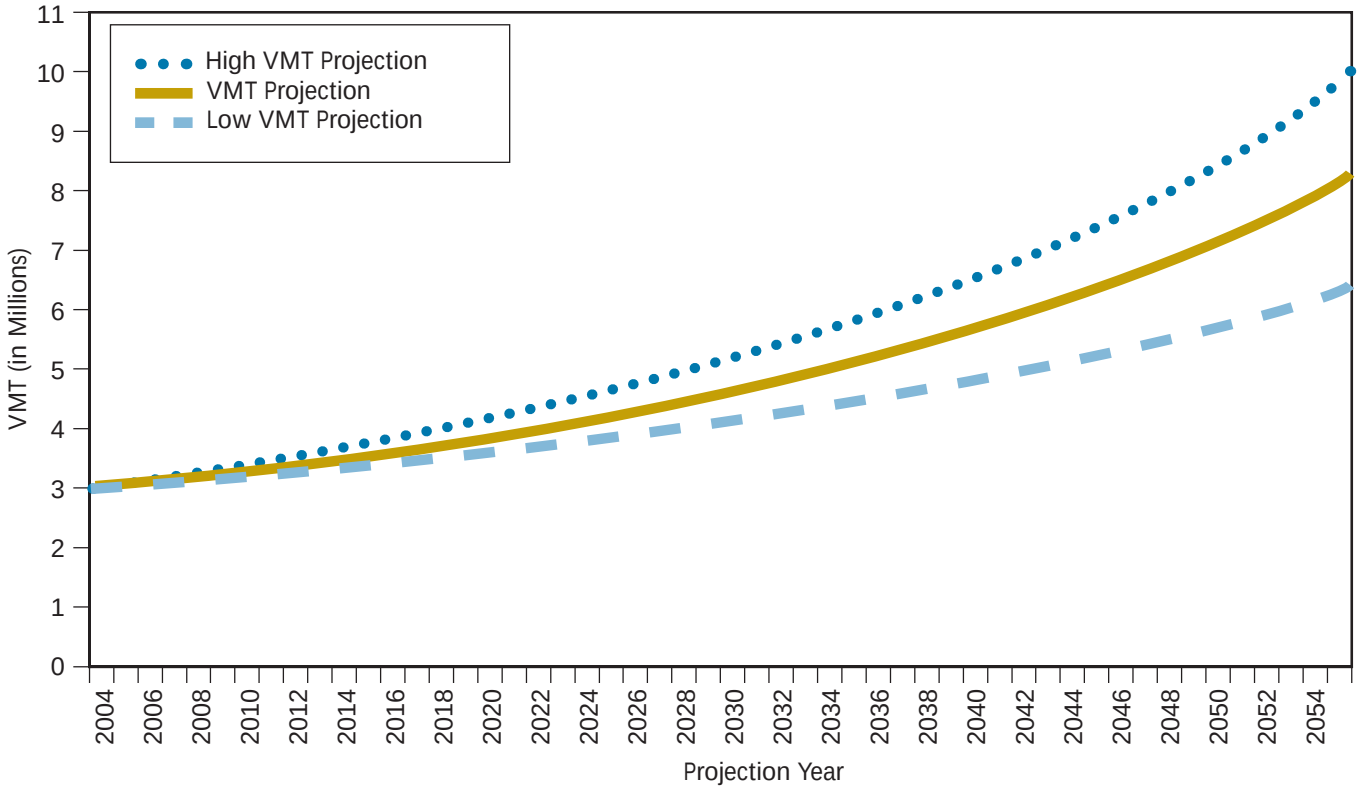
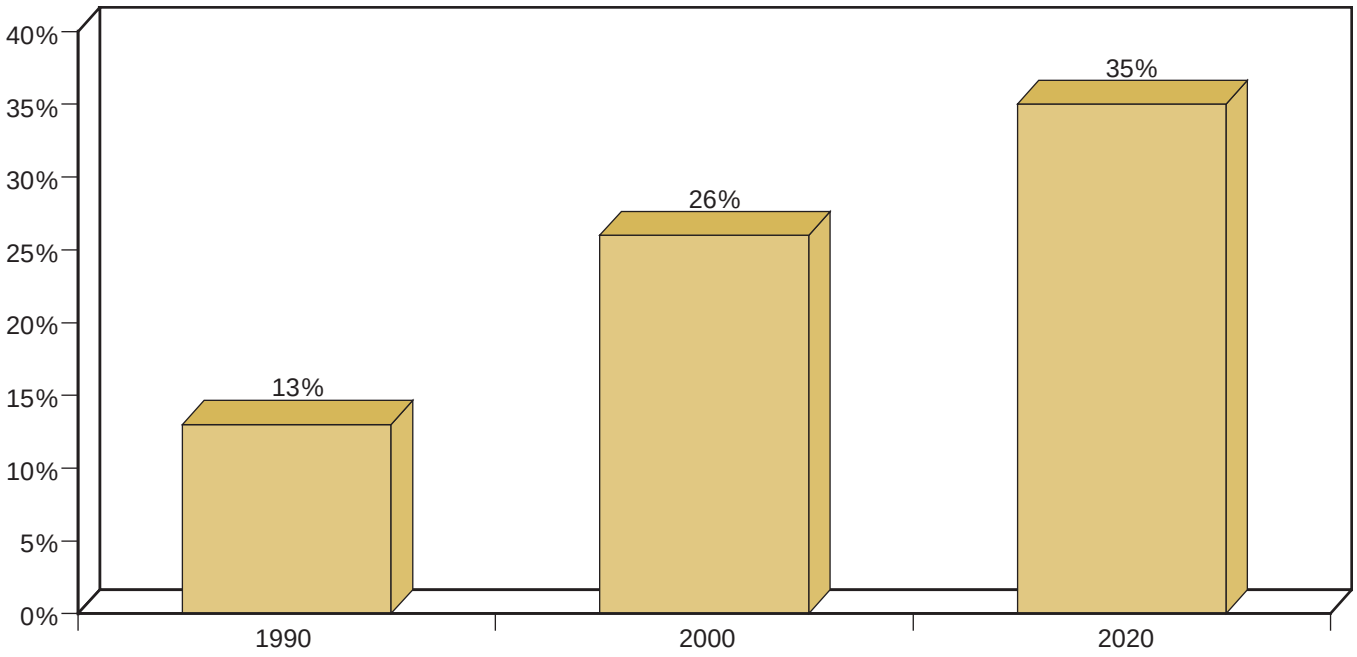


Figure 14. Growth in Trade as a Percentage of U.S. Gross Domestic Product



Freight Trends Present Major Challenges

Freight movement will be one of the major challenges for the years ahead.

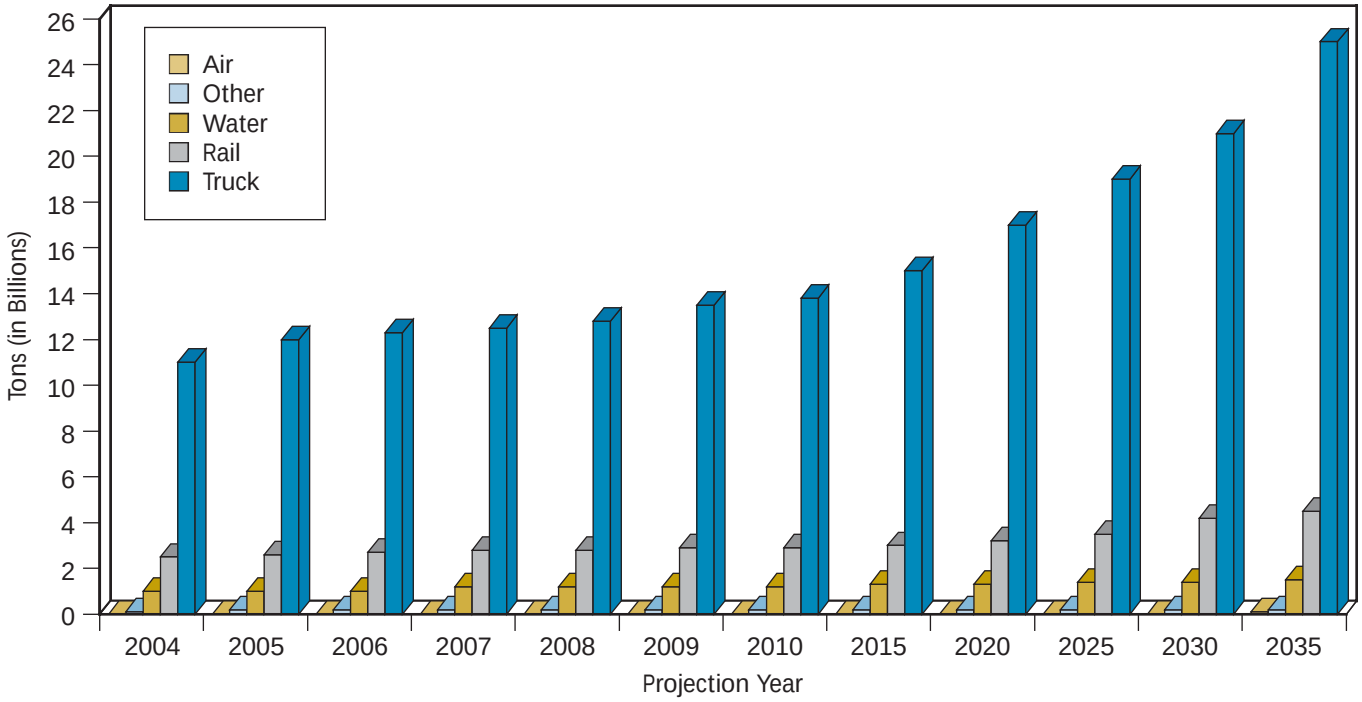
The real change of note is what is taking place with regard to the degree to which our economy is dependent on foreign trade. Trade as a percentage of GDP increased from 13 percent in 1990 to 26 percent in 2000, and is expected to reach 35 percent by 2020. We are indeed moving into a global economy. (Figure 14.)

Trade as a percentage of GDP increased from 13 percent in 1990 to 26 percent in 2000, and is expected to reach 35 percent by 2020. We are indeed moving into a global economy.

Trucking tonnage is projected to more than double between 2004 and 2035, to 24 billion tons, a 114 percent increase. Rail tonnage is projected to grow by 63 percent to over 4 billion tons. (Figure 15.) By 2035, it is anticipated that trucks will carry 79 percent of total tonnage. The share of tons carried by truck will slightly increase by 2035, while the modal share carried by rail is expected to decline from 14 to 13 percent.

The increase in freight demand and truck travel means that where today we have an average of 10,500 trucks per day per mile on the Interstate highways system, tomorrow there will be an average of 22,700 trucks per day per mile, with the most heavily used portions of the system seeing upwards of 50,000 trucks per day per mile. Only 30 miles on the In-

Figure 15. Projected Freight Ton Growth by Mode, 2004–2035



Much of the congestion on the Interstate System is occurring at bottlenecks—specific locations that routinely experience traffic backups because traffic volumes exceed highway capacity.

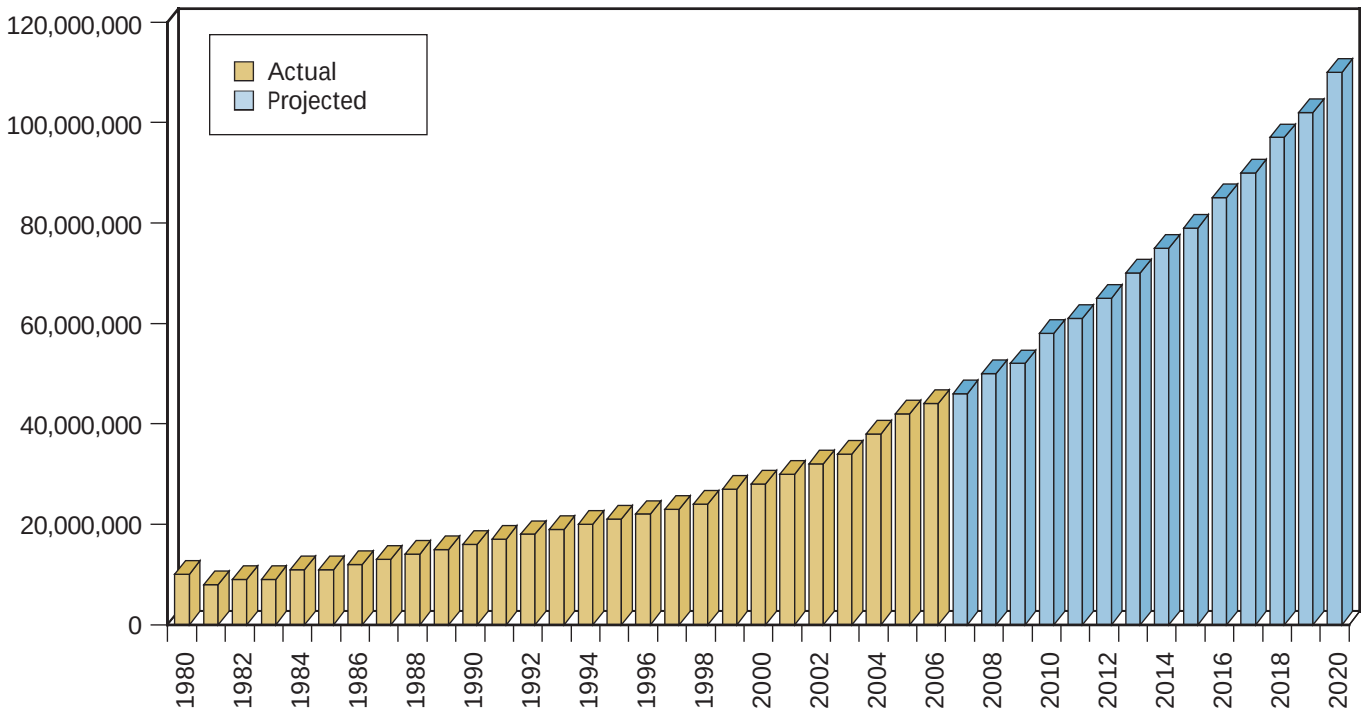
terstate carry more than 50,000 trucks today; by 2035 that number will reach 2,500 miles. To accommodate this growth there will have to be significant increases in capacity. What these volumes of truck traffic may require are dedicated truck lanes.

Much of the congestion on the Interstate System is occurring at bottlenecks—specific locations that routinely experience traffic backups because traffic volumes exceed highway capacity. These bottlenecks, including interchanges, steep-grades, signalized intersections, and lane drops, accounted for the most truck-hours of delay, estimated at about 124 million hours annually in 2004. State programs that target relieving these bottlenecks may be needed.

As NAFTA trade with Canada and Mexico has increased, so too has truck traffic. Since 1994 when NAFTA went into effect, there are 30,000 additional truck crossings per day in the four Southwestern states of Arizona, California, New Mexico, and Texas. In 2004, there were 11.4 million trucks that crossed the Canadian and Mexican border into the United States.

Over the next 20 years, while truck freight is expected to double, international containers are expected to quadruple. (Figure 16.) A great deal of this increase in container volume is coming from Asia, and especially China. These volumes are growing rapidly especially on the West Coast. (Figure 17.)

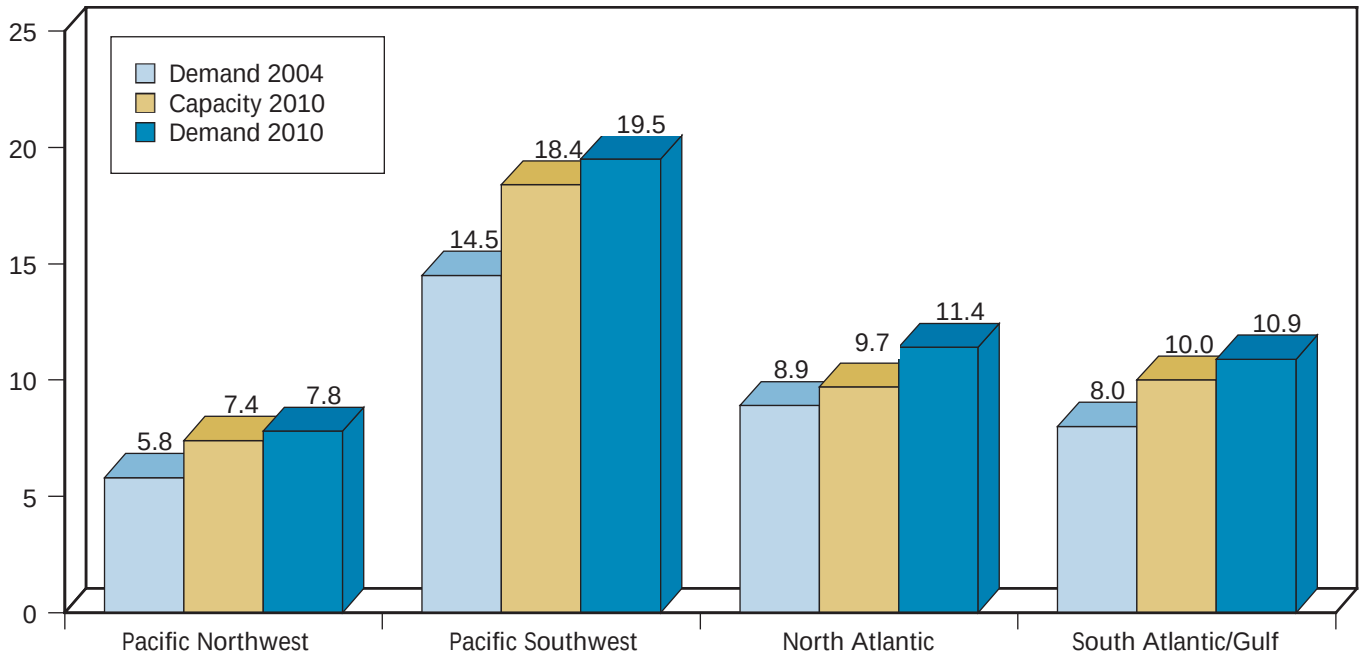
Figure 16. Historic and Projected U.S. Container Traffic (TEUs)



Source: Cambridge Systematics.

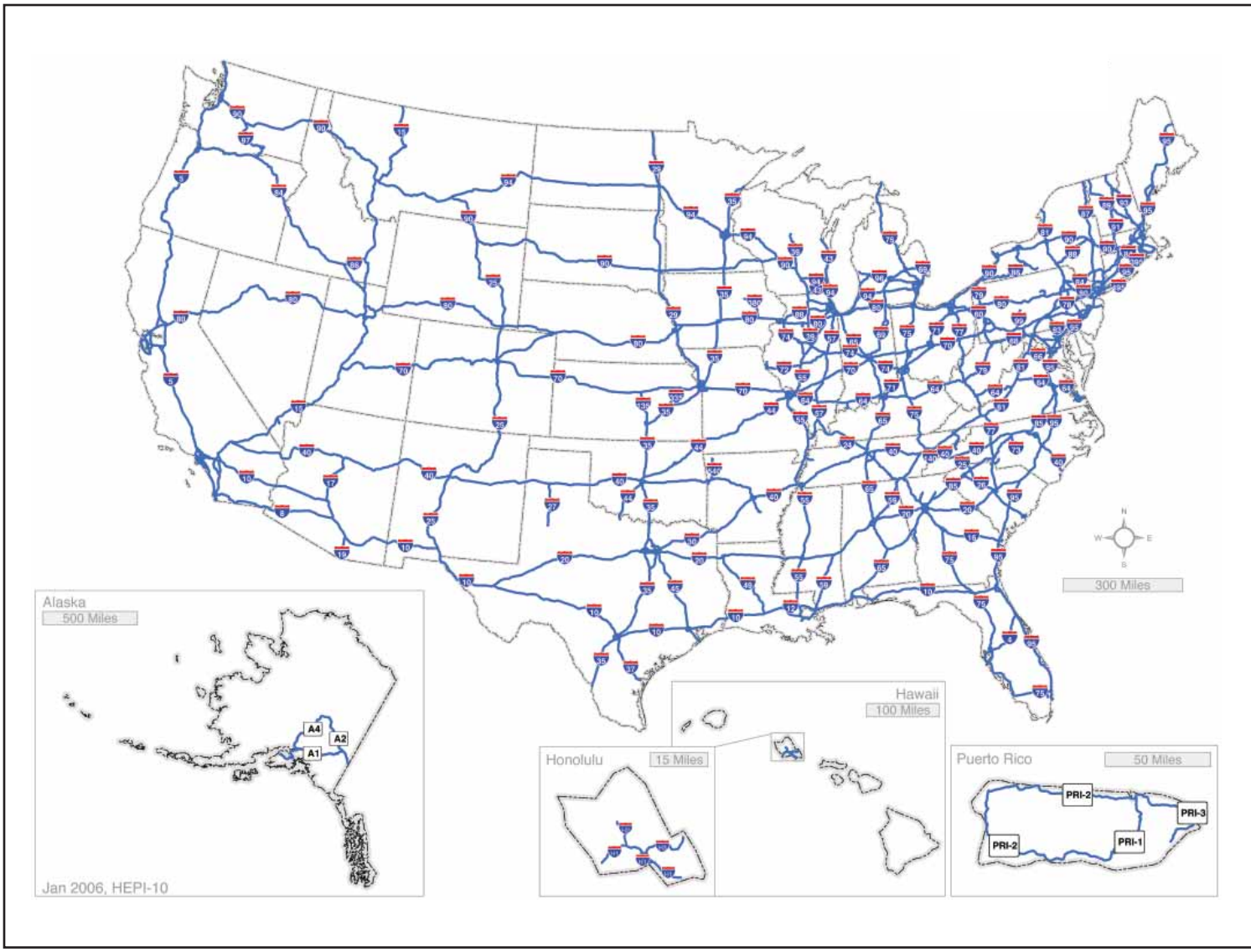
Ports on both coasts are expecting growth, but by 2010 trade is expected to outstrip port capacity in every region of the country. (Figure 17.) Meanwhile, truck volumes are increasing rapidly as well. Peak-hour congestion on the Interstate System in metropolitan areas is expected to increase from 29 percent in 2000 to 46 percent by 2020. And this comes at a time when U.S. retailers and manufacturers are almost totally dependent on "just-in-time" delivery. Store shelves and manufacturing assembly lines have to be resupplied, sometimes within a 15-minute window. Reliability is a must. So the entire freight system of shippers, carriers, highways, railroads, ports, retailers, manufacturers, and customers face some major challenges.

Figure 17. Port and Terminal—Forecast Capacity/Demand
(Millions of Twenty-Foot Equivalent Container Units)



Source: Modern Terminals Limited.

Figure 18. Interstate Highway System



CHAPTER IV

The Future of the Interstate Highway System






"If the Interstate System planned in the first half of the 20th Century and built in the second half is considered Phase I, it's time to modernize the system in place and build the additional capacity needed for the 21st Century in Phase II."

AASHTO Vice President Pete Rahn, Director, Missouri DOT

The last time America had a national vision for transportation was when the Interstate Highway System was launched in 1956. What the country's national leadership asked for was a national system of direct, high-speed highways that would link principal metropolitan areas, agriculture and industrial centers; serve national defense; and connect with Canada and Mexico. The system was designed to include routes that would reach all sections of the country and form a complete network that would attract and serve greater traffic volume than any previous system. What it got was a system that did that and more.

Although the Interstate at 47,000 miles represents only 1 percent of total system mileage, it carries 24 percent of all traffic and 41 percent of combination-vehicle truck traffic. It is a strategic system of arterials which performs well. But it has meant far more to our economy and way of life than its designers could have imagined.

The Interstate Highway System was a technological breakthrough which increased productivity and transformed the country in ways not anticipated. A safer, 65 mile-per-hour system was overlaid onto a less safe, less well-maintained 20 to 40 miles per hour system which previously existed in urban and rural areas. National, multi-state, regional, and local economies were all empowered to reorganize to take advantage of new capabilities. The quantum change it brought about has been compared with the railroads of the 19th Century which also more than doubled speeds and capacities of connections between places, and the jet aviation system of the 20th Century which tied together the nation and the world for business and leisure travel.

Regions that were not part of the nation's economy became integrated through new opportunities to have longer distance links to goods movement and for personal travel. Look what has happened to the south and west over the past 50 years. Urban areas were able to expand and grow, enabling more agglomerations of industries and skills with much larger urban boundaries. Metropolitan areas now generate over 80 percent of jobs, growth, and development.

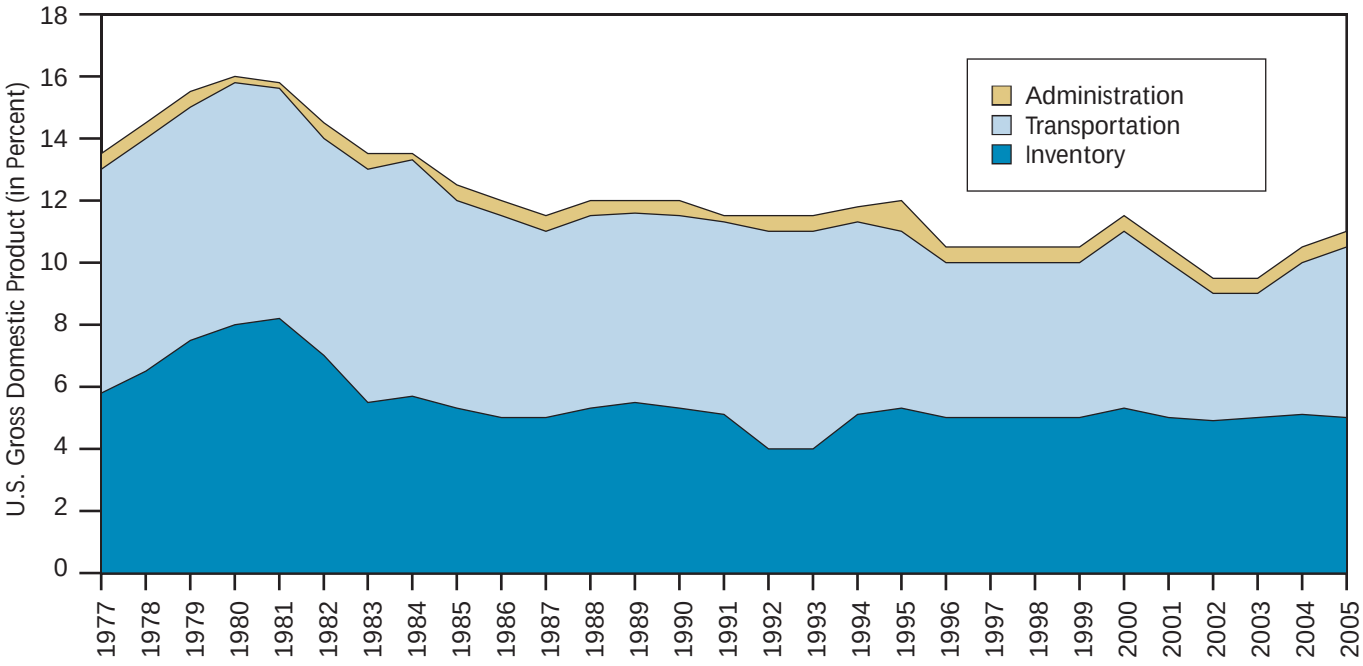
The Interstate Highway System has made significant contributions to U.S. productivity growth. During the 1950s, the contribution of highway network investments to annual productivity growth was 31 percent. It averaged 25 percent in the 1960s, and by the 1980s the net social rate of return on highway capital was 10 percent, about equal to rates of return on private capital.

The Interstate System enabled the U.S. economy in the last half of the 20th century to develop within a much larger envelope of potential size and productivity. However, as the capacity and the performance of the current Interstate Highway System are used up, this will reduce the Interstate's ability to support the increased productivity the United States will need to compete in the global economy.

Greater supply chain productivity and lower logistics costs have been critical to U.S. economic growth. From 1980 to 2003, the cost of transportation was cut in half because of infrastructure improvements making U.S. goods globally competitive. (Figure 19.)

The central question is what needs to be done so that the Interstate System of the future can continue to play its role as a strategic national highway network with the ability to move 24 percent of all traffic and 40 percent of truck freight traffic with acceptable speed and reliability.

Figure 19. Reducing Transportation Costs by Half Has Kept the United States Globally Competitive



Source: Rosalyn A. Wilson, State of Logistics Report, Council of Logistics Management, 2006.

Congress has asked the Commission to make recommendations for the future of the Interstate System for 15, 30, and 50 years into the future. To do this, we believe the Commission should study the history of the Interstate System to see what can be learned, compare that with forecasts of the challenges ahead, and consider the recommendations of AASHTO and other organizations regarding what will be required for the Interstate System of the future.

History Provides Lessons for the Future

The story of the Interstate often begins in 1937 when President Franklin Roosevelt called the Chief of the highway agency to the White House, mapped out his ideas for a cross-country, high-level road system, and asked for an evaluation. Soon after, Congress also requested an assessment of such a system to be funded through tolls. The response was the 1939 report, *Toll Roads and Free Roads* which supported the concept of a national system, but indicated that funding it through tolls was unfeasible. During World War II, studies evaluated system alternatives based on population, vehicles, agricultural output, manufacturing output, military needs, and existing travel. Finally, in December 1944 the Federal-Aid Highway Act authorized a 40,000-mile system of Interstate roads:

"…to connect principal metropolitan areas, cities, and industrial centers, serve national defense, and connect with Canada and Mexico."

The Bureau of Public Roads, the American Association of State Highway Officials (AASHO), and the states began a joint effort to designate the now legislated system, and in 1947 a report was issued showing the general location of an Interstate System of 37,700 miles including 2,900 miles in urban areas with the remaining miles reserved for additional urban routes.

"…to connect principal metropolitan areas, cities, and industrial centers, serve national defense, and connect with Canada and Mexico."

The Funding Mechanism

The Interstate System called for by Congress in 1944 and identified in 1947 made little progress until a dramatic series of studies and Commissions created by President Eisenhower stimulated action. In late 1955, Congress rejected the concept proposed by Eisenhower's Clay Committee that Interstate Highways be financed through bonds. However, between Eisenhower's persistence and visionary members of Congress who developed a way to fund it, the proposal came up for action the next year.

Part of the coming together included decisions on where the final urban Interstate mileage would be allocated. The Bureau of Public Roads and the State Highway Departments, in cooperation with cities and counties, had been working on this and a series of "yellow books" which showed the location of the remaining urban mileage that had been held in reserve in 1947. It all came together in 1956 when the financial piece: new taxes, "pay-as-you-go" funding, a 90–10 Federal/state match, cost-to-complete funding, and the Highway Trust Fund, were re-enacted by Congress.

Lessons to Be Learned from 1956

- Connecting the nation with long-distance expressways was the imperative at the time. For the future, we may need to expand this concept to connect to the global economy.
- Many of today's challenges were faced then: funding gaps, Federal/state relations, metropolitan and rural challenges, allocation formula issues, donor–donee issues, etc.
- The concept of a Federally defined, built, and owned system was rejected in favor of the historical Federal–state partnership that had evolved and strengthened over 40 years.
- The real story is about state–Federal cooperation and co-equal development of the plans and ideas that eventually evolved.
- Vision is crucial and a positive spirit toward what is achievable is critical. The great "can do" generation was immensely important.
- There is a tendency in hindsight to see the creation of the system as inevitable. Anything so fundamental to our way of life had to exist. It did not! The system had to be sold. People had to be convinced.

Current State of the System

Route Miles: Interstate route miles have now grown to nearly 47,000 miles.

Lane-Miles: There are 210,000 Interstate lane-miles.

Travel: In 2002, Americans traveled approximately 280 billion vehicle miles on rural Interstates, 23 billion vehicle miles on small urban Interstates, and 390 billion vehicle miles on urban Interstates. Interstate VMT grew at an average annual rate of approximately 3.1 percent between 1993 and 2002, and FHWA estimates that it will grow at 3 percent through 2022. At that rate Interstate VMT should double from 690 billion to 1.3 trillion 20 years from now.

Highway Conditions: As of 2002, 98 percent of rural Interstates met the standard for "Acceptable" ride quality. Ninety-two percent of the urbanized Interstate miles met the criteria for "Acceptable" or better ride quality.

Bridge Conditions: Bridge conditions have improved. The number of deficient rural Interstate bridges declined from 18.5 percent in 1994 to15.8 percent by 2002. Deficient urban Interstate bridges declined from 30.6 percent to 26.3 percent in the same period.

Increasing Demand: The Daily Vehicle Miles Traveled (DVMT) per lane-mile statistics show the increasing demands that are being placed on the Interstate System. From 1993 to 2002, DVMT per lane-mile increased from 4,300 to 5,700 on rural Interstate highways, and from 13,200 to 15,700 on Interstate highways in urbanized areas.

Current Funding: All levels of government spent $17 billion for capital improvements on Interstate highways and bridges in 2002, which constituted 25 percent of the $68 billion of highway capital spending. System preservation expenditures constituted 53 percent of total capital spending on Interstates, system expansion 38 percent, and system enhancements 9 percent.

Forecasts of the Challenges Ahead

Forecasts indicate that the U.S. population will grow from 300 million today to 435 million by 2055. The economy is expected to grow by 2.8 percent annually. FHWA estimates that highway travel demand measured through VMT will increase from 3 trillion today to 7 trillion by 2055. Truck-borne freight is expected to double by 2035. To sustain a strong economy the Nation will need to find ways to meet those demands. As the legendary Bureau of Public Roads Chief Thomas MacDonald once said, "We do not have roads because we are affluent. We are affluent because we have roads."

Changing Context

The Interstate System was designed in the pre-World War II period from the experience of a very different era. As Interstate construction began in the late 1950s there were 65 million vehicles creating 600 billion vehicle miles of travel. Vehicle ownership had just begun to take off and long-distance trucking was still in its infancy. Fifty years later there are over 240 million vehicles creating 3 trillion vehicle miles of travel on a highway system that grew by only 15 percent in the 50 years.

Fifty years later there are over 240 million vehicles creating 3 trillion vehicle miles of travel on a highway system that grew by only 15 percent in the 50 years.

Major changes have taken place in the transportation environment for the Interstate. Some of these transformations include:

- From basic interstate commerce (farm to market, urban to rural) to national/global commerce connections;
- From "old geography" (pre-sunbelt) to new geography of dispersed regional growth;
- From limited truck use to just-in-time logistics with large combination vehicles;
- From transcontinental troop and material movement to rapid "fort-to-port" mobilization;

Peak-hour congestion in urban areas is expected to increase from 29 percent of the system in 2000 to 46 percent by 2020.

- From uncongested new capacity to the need for congestion management; and
- From civil engineering standards to intelligent transportation systems and solutions.

In urban areas, the Interstate often acts as the regional "main street." In rural areas it is the principal connector. Between population centers it provides the backbone for

long-distance movement—for tourists and trucks alike. However, because demand has increased far faster than the 15 percent of expansion that has taken place, it is no surprise that the Interstate, while efficient and safe, is increasingly congested. Peak-hour congestion in urban areas is expected to increase from 29 percent of the system in 2000 to 46 percent by 2020.

Not Your Grandfather's Interstate

As the U.S. economy becomes both more integrated and globalized, there is an ever-increasing economic premium placed on rapid, reliable transportation for goods and passengers. The nation's ability to compete will require a well-connected, nationwide, high-

The nation's ability to compete will require a well-connected, nationwide, high-capacity system capable of high speeds and reliability. But the needed future Interstate is not simply "more of the same."

Members of the "Singing Angels" choral group at Akron, Ohio at an Interstate 50th Anniversary Celebration hosted by Bridgestone Firestone North American Tire. June 2006

capacity system capable of high speeds and reliability. But the needed future Interstate is not simply "more of the same."

The Interstate System of the 21st Century must apply innovative practices and technologies, including:

- Effective asset management practices;
- Advanced construction and maintenance techniques to get the job done faster, cheaper, and safer;
- Longer-lasting materials to extend periods between major pavement and bridge maintenance and replacement work;
- Aggressive traffic management practices utilizing intelligent transportation systems to minimize traffic delay, improve flow, and safety;
- Design practices that maintain high standards of quality while enabling flexible solutions responsive to environmental and community priorities; and
- Premium services where needed for priority customers, such as emergency service providers, public transport vehicles, freight operators, and High Occupancy Toll (HOT) Lane-paying customers.

But producing such a system is neither ordained nor inevitable. It will require vision and leadership—and the forging of relationships with a wider range of stakeholders.

AASHTO's Recommendations for the Interstate System of the Future

The Interstate Highway System for the 21st Century can be brought about through four strategic actions: preserve the current system, enhance its performance, expand capacity to meet future needs, and reduce growth in highway demand by expanding the capacity of transit and rail.

1. Preserve the Current System

The first priority will be to preserve the 47,000-mile system which has been built over the past 50 years so that it lasts for at least the next 50 years.

The Interstate System currently has approximately 210,000 lane-miles of pavement. As these pavement structures reach 40 to 50 years of life, the traditional approach of rehabilitation and resurfacing will no longer be sufficient and major portions of the Interstate System will need to have their pavements and foundations completely reconstructed. The Interstate System also has more than 55,000 bridges and tens of thousands of other significant structural elements, many of which are reaching 40 to 50 years of age. Bridges and other structures of this age usually require substantial rehabilitation, and, as we look out another 20 to 30 years, they will require complete replacement.

Though proper maintenance is essential to protect the massive national investments in the Interstate, public officials are often unaware of the magnitude of this responsibility. Capital investment in system preservation for both highways and bridges for the Interstate totaled $9.1 billion in 2002. It is important to ask, what level of investment will it take to preserve the Interstate System for the future? U.S. DOT's 2004 *Conditions and Performance Report* estimated a "cost to improve" annual "constant dollar" investment for the next 20 years of $6.4 billion for rural and $24.9 billion for urban Interstates. Stated in "year of expenditure dollars" these numbers would be even higher.

As this reconstruction work goes forward, DOTs will have to minimize disruption to the traveling public. Work zone delays are estimated to cause 24 percent of non-recurring congestion. As the infrastructure ages and more rehabilitation is needed, we are going to have find better techniques to get the job done. Examples of these techniques include using components prefabricated off-site, longer-lasting materials, work at night, short-term shutdowns to allow intensive work, and incentives to get contractors to finish work faster.

2. Enhance System Performance

Advanced ITS technologies and better system management techniques need to be utilized to reduce congestion, improve throughput, and increase system reliability.

Capacity addition alone will not eliminate congestion or reliability problems. Traffic disruptions—crashes, breakdowns, construction work, weather, and special events—cause about 50 percent of delay. These disruptions can be addressed through aggressive system operations applications such as incident clearance, snow and ice control, and construction work zone management. Advanced technologies can be used to collect real-time

information on road and travel conditions; improve travelers' information; and use of ramp metering and lane management to improve traffic flow.

The decade-long effort to develop, demonstrate, and deploy ITS tools, architecture, and standards is starting to pay dividends. Electronic toll systems have reduced back-ups at toll booths, and truck electronic pre-clearance systems allow many trucks to bypass inspection stations altogether. 511 travelers' information systems now serve 50 percent of the U.S. market.

Automobile manufacturers, technology suppliers, and government are collaborating on vehicle-to-vehicle and vehicle-to-system management communications technologies which will save lives and improve performance. An important part of the effort to improve system performance will be to build Interstate Systems of the future that work better because they have smarter technologies embedded in them.

The Interstate System is vulnerable to disruption from natural disasters and security-related incidents. The importance of the Interstate System in providing effective emergency response to such disruptions was dramatically illustrated in Gulf hurricane response over the past several years, and the response to 9/11 in Washington, DC, and New York.

There are several things which need to be done in the future to enable the Interstates to do an even better job. Funding assistance from the Department of Homeland Security is needed to protect critical infrastructure from terrorists attack and to improve surveillance and detection. Inter-agency communications capabilities need to be improved. And a joint program involving police, fire, and transportation agencies at the local and state level and justice, homeland security and transportation agencies at the Federal level needs to be developed to improve emergency response capabilities.

3. Expand Capacity to Meet Future Needs

To remain competitive in the global economy and meet America's 21st Century mobility needs, we will need to add nearly as much capacity to the Interstate System in Phase II, as we did over the past 50 years in Phase I.

Since the 1950s, highway travel has increased from 600 billion VMT to 3 trillion, a five-fold increase. At the rates of growth projected by FHWA, VMT on U.S. highways will reach 7 trillion by 2055.The Interstate System carries 24 percent of all highway travel and 41 percent of truck freight travel, but it is getting harder to do so. During the past 50 years, mileage on the Interstate System has increased only 15 percent. Whatever redundancy and extra capacity that had been created when the system was originally built is being depleted. As has been noted by FHWA, by 2020, 90 percent of urban Interstates will be at or exceeding capacity.

Since the 1950s, highway travel has increased from 600 billion VMT to 3 trillion, a five-fold increase.

Congestion on many segments of the Interstate System is bad and getting worse. Substantial capacity will have to be added to enable the Interstate System of the future to continue to play its role as a strategic national highway network with the ability to move traffic with acceptable speed and reliability.

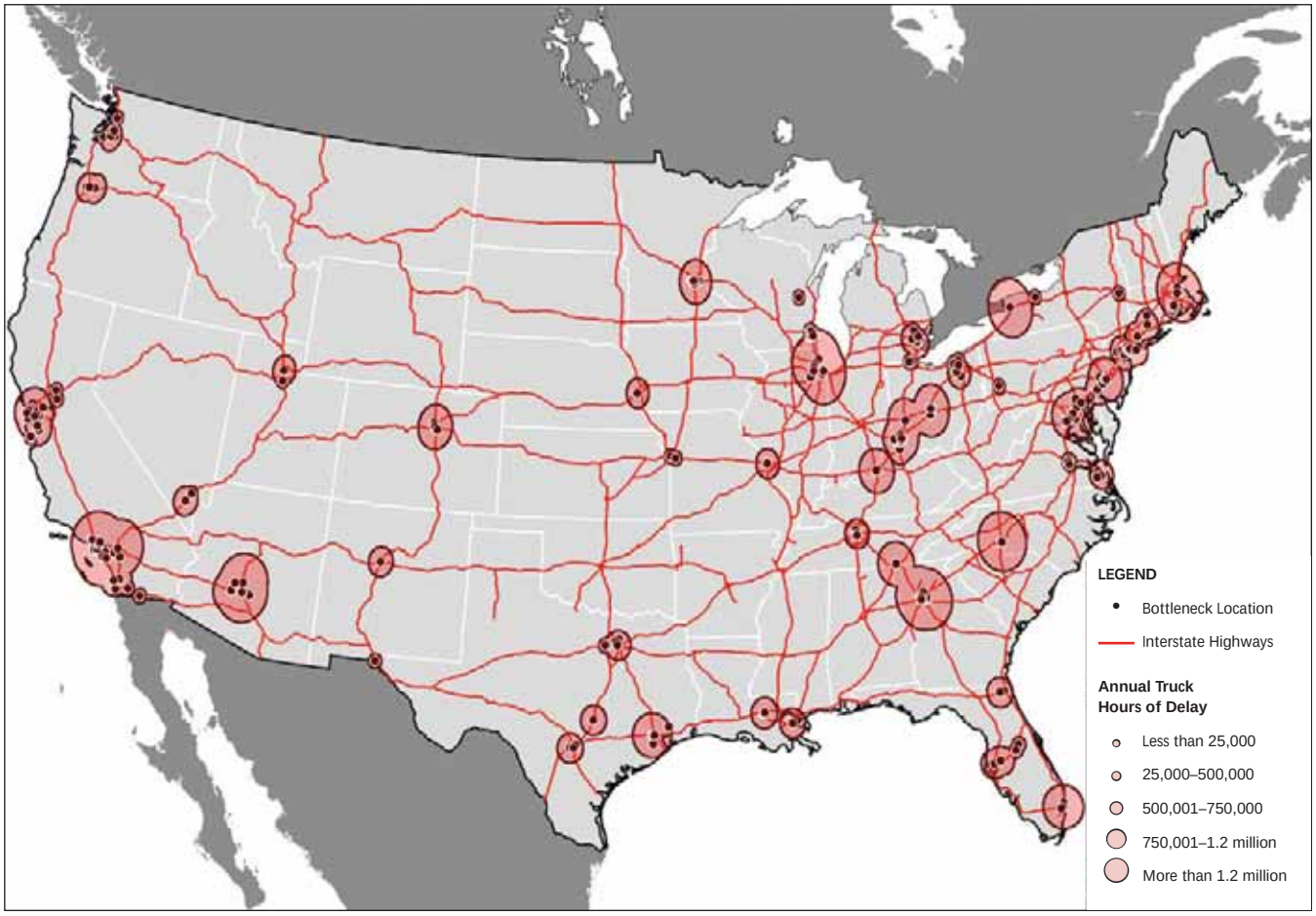
During the past 50 years, mileage on the Interstate System has increased only 15 percent. Whatever redundancy and extra capacity that had been created when the system was originally built is being depleted.

As Neil Pedersen, Administrator of the Maryland State Highway Administration testified at the Commission's November 16, 2006, hearing in New York, "AASHTO recommends that we initiate the next phase of development of the Interstate System which will add as much capacity in the future as we have built in the past."

While state-by-state, in-depth analysis is needed to determine the future capacity needed, recent studies show that, if adequate funding were available, there is a need to add as many as 10,000 miles of new routes on new corridors, 20,000 miles of upgrades to National Highway System routes to Interstate standards, and 20,000 new lane-miles on existing Interstate routes. These could include exclusive truck lanes and value-priced lanes. System improvement would also include correcting bottlenecks, upgrading interchanges, improving intermodal connections, and the use of ITS technologies and advanced system management techniques to improve performance and safety.

Severe bottlenecks in metropolitan areas, many of which are located on the Interstate Highway System, impede the flow of commerce and contribute to significant delay for users of the system. (Figure 20.) At the same time, longer distance interstate and interregional

Figure 20. Interstate Bottlenecks



traffic is often impeded by traffic congestion in metropolitan areas resulting from intra-regional trips overwhelming available capacity. The Interstate System has almost 15,000 interchanges, many of which do not meet current operational and design standards and create significant traffic bottlenecks or safety problems. Some of the most significant congestion on the system is at major interchanges that were not designed to carry the volumes of traffic that currently use them. Higher projected future traffic volumes will exacerbate these problems.

Expansion of the Interstate System should be accomplished in conjunction with upgrades to connecting and local networks. Capacity improvements to National Highway System arterials which connect with the Interstate and other local arterials and collector routes will be needed for the network to function as efficiently as it needs to handle the future demand expected.

One of the key missions of the Interstate System when it was created in 1956 was to support national defense needs. With the end of the Cold War much of the military, which was forward-deployed in places like Germany and Korea, has been repositioned back here in the United States. However, the rapid response requirements of the military today are greater than ever before.

AASHTO recommends that the Commission call for a joint review by the Department of Defense, U.S. DOT and the states of what the Department of Defense requires in terms of support from highways, trucking, railroads, ports, and airports to meet its deployment and mobility needs and what changes and costs this will entail for the future.

4. Reduce Growth in Highway Demand by Expanding the Capacity of Transit and Rail

Current trends show that peak-hour Interstate congestion in urban areas will increase from 29 percent of the system in 2000, to 46 percent by 2020, and that Interstate VMT will nearly double from 690 billion in 2006 to 1.3 trillion 20 years from now. We cannot afford either for congestion to get that bad or traffic to increase that much.

What is needed is a reduction in demand. Expanding the capacity of transit can help shift some local and regional trips off the Interstate and onto transit. Railroads must add capacity so they can continue to carry at least their current market share of freight, rather than shedding some of their share to trucking. Expanding the capacity of intercity passenger rail can help shift some long-distance trips off the Interstate and onto rail.

Commuting in America III, published by TRB in October 2006, shows that the share of commuters carried by transit decreased from 6.2 percent of the total in 1980, to 4.6 percent in 2000. This trend needs to be reversed and that transit ridership, which has grown to nearly 10 billion trips per year, should be doubled. To help make this possible, AASHTO supports policies that will assure that Federal funding for transit will increase at the same rate as Federal assistance for highways in the years ahead.

According to AASHTO's 2003 *Freight Rail Bottom Line Report,* if sufficient public financial support was combined with private railroad investment, then the freight railroads would be able to hold on to their current market share of growing freight demand. This would avoid shedding freight from rail to trucks and reduce truck VMT by 15 billion over a 20-year period. Since 40 percent of truck VMT is carried on the Interstates this could be expected to reduce Interstate truck VMT by six billion.

AASHTO produced a report in 2002 entitled, *Intercity Passenger Rail Transportation.* That report found that, "Corridors with average speeds that are faster than driving can provide an effective alternative to both automobile and air service in markets between 100 and 500 miles." Shifting demand from the Interstate to rail could help reduce highway congestion and more effectively use some airports if some short flights could be replaced with high-speed rail corridor service. A study of 21 corridors produced an estimate of $60 billion to make the short-term and long-term investments needed to make this intercity passenger rail service possible. That translated into an annual investment in 2002 dollars of $3 billion. Adjusting that figure to 2007 dollars would increase it to $3.3 billion annually.

Past Route Selection Process a Good Model for the Future

If the Commission, and later Congress, concur that today's 47,000-mile Interstate System needs to expand significantly to meet future needs, the process by which the routes for the original Interstate System were selected as well as the process by which the routes for the National Highway System (NHS) were selected in the 1990s should be reviewed. They appear to be a model for how we should proceed in the future.

In December 1944, Congress passed the Federal-Aid Highway Act which authorized a 40,000-mile system of Interstate roads. The Bureau of Public Roads, the American Association of State Highway Officials (AASHO), and the states then began a joint effort to determine the specific routes for the new system. In 1947, a report was issued showing the general location of an Interstate System of 37,700 miles including 2,900 miles in urban areas with the remaining miles reserved for additional urban routes. The Bureau of Public Roads and the State Highway Departments, in cooperation with cities and counties, worked on this and in late 1955 developed a series of "yellow books" which showed the location of the remaining urban mileage that had been held in reserve in 1947.

When the Bureau of Public Roads shared these "yellow books" which indicated Congressional District by District where the urban mileage would go, this helped build the final support needed to pass the Interstate program in 1956.

The 40,000-mile system, later expanded to 47,000 miles, came about not as something designated at the Federal level, but designed through an extended process of Federal–state cooperation and consultation at the grass-roots level with counties, cities, state legislators, and community interest groups all of whose views had to be taken into consideration in deciding on specific alignments.

The process for designation of the routes on the National Highway System approved by Congress in 1995 was also instructive. During the 1980s, FHWA and the states through AASHTO explored the concept of creating a National Highway System. In 1989, FHWA and AASHTO agreed to undertake a joint effort to define and map a national highway system that would be a major element in a post-Interstate highway system. They later agreed with the Office of Management and Budget to test three mileage levels ranging from 120,000 miles to greater than 150,000 miles. Passage of ISTEA in 1991 required FHWA to formally work with the states to define an NHS of 155,000 miles plus or minus 15 percent and submit this to Congress by December 1993, for formal Congressional approval.

FHWA and the states were joined by the MPOs in the designation of routes in metropolitan areas. A series of maps recommending NHS routes in metropolitan areas were transmitted to Congress in 1994. The National Highway System Designation Act was passed and signed by the President in November 1995.

In both the case of the Interstate System and the NHS, Congress established a mileage target for the system and policies outlining the characteristics of the system desired. The specific route alignments were determined at the state and local level and then coordinated at the multi-state level and finalized through a joint effort of the Federal highway agency, AASHTO, and the states.

CHAPTER V

Potential for Expansion, Upgrades, and Other Changes to Meet Surface Transportation Needs






10 successful projects discussed below will illustrate the expansion and upgrades needed for the future. What they have in common are substantial cost, value, and results. They illustrate innovation in policy, design, contracting, finance, construction, and materials.

System expansion and upgrades are exactly what will be required to meet future needs. To do so will require a multi-modal approach, meaning that expansion of highways, highway interchanges, transit, and rail will all be needed, as well as policy innovations such as pricing. Addressing highway needs will require preservation and expansion, not only of the Interstate System, but expansion as well for the National Highway System and other arterials and collector highways needed for the network to function efficiently.

Rather than speak in abstractions, 10 successful projects discussed below will illustrate the expansion and upgrades needed for the future. What they have in common are substantial cost, value, and results. They illustrate innovation in policy, design, contracting, finance, construction, and materials. In most cases projects were completed on budget and ahead of schedule.

1. Expansion of a Major Interstate Bridge

A decade ago, it did not take an expert to determine that the only Federally-owned bridge on the Interstate Highway System, the Woodrow Wilson Bridge over the Potomac River south of Washington, DC, needed replacement. Any of the tens of thousands of commuters chronically stuck in traffic jams on or around it could confirm that.

Located at about the halfway point of the Eastern Seaboard's Interstate 95, the 45-year-old bridge had become a notorious bottleneck, carrying more than 200,000 vehicles a day, when it was only built to accommodate 75,000 vehicles a day. In May 2006, Federal, state,

Photo courtesy of Trevor Wrayton, Virginia Department of Transportation.

The old Wilson Bridge was detonated on August 29, 2006, to make way for the new span that will be completed in mid-2008.

Photo courtesy of Woodrow Wilson Bridge Project.

Vessel passes through draw span of new Woodrow Wilson Bridge.

and local officials dedicated the first span of the new bridge before a crowd of 1,400 people, who were thrilled by its attractive architecture and equally impressed by the project's on-time, on-budget status. The second span is slated to be opened to traffic in 2008.

The $2.4 billion project will expand the bridge from 6 to 12 lanes, two of which will be reserved for use by transit. Approaches and interchanges north in Maryland and south of the crossing at Alexandria, Virginia will improve connections and traffic flow. The project was made feasible by $1.5 billion in Federal assistance.

As Neil Pedersen, Administrator of the Maryland State Highway Administration testified at the Commission's November 16, 2006, Hearing in New York, "Maryland and Virginia had been watching the bridge deteriorate and congestion build. The estimated cost of replacing the bridge and the approaches was several times the annual statewide capital budgets of either state. It took a Congressional earmark and exceptional political support to be able to get construction started."

2. Joint Expansion of an Interstate Route and Construction of a Light Rail Line

Ten years ago Denver civic leaders knew two major transportation projects were needed to improve traffic—widening and improving 17 miles of Interstate 25 and Interstate 225, and adding 19 miles to the Regional Transportation District's (RTD) light rail system. Separately neither had the public support to proceed. However, Colorado DOT and the RTD determined that if these facilities were built as a joint project, both would have the public support needed.

Courtesy of Regional Transportation District.

Southeast Light Rail Interchange opened as part of T-REX in Denver.

Photo courtesy of Regional Transportation District.

A large crowd attended the opening of Denver's expanded RTD light rail system.

In August 2006 the highway portion of Colorado's Transportation Expansion Project, or "T-REX" as it came to be known, was opened to the public. This $1.7 billion Colorado Department of Transportation project widened Interstate 25 from Denver's downtown to its rapidly growing suburbs, and improved a key interchange where I-25 met I-225, one of the region's worst bottlenecks. November 17, 2006, the RTD opened 19 miles of brand new light rail transit for service along the T-REX corridor.

Both projects were placed into service more than a year in advance of their proposed completion dates. Colorado DOT achieved this through a "design-build" contract with Southeast Corridor Constructors. The contract enabled this group to begin construction while also completing the project's design. As CDOT Director Tom Norton observed, "As the nation's largest multi-modal transportation project, I am very proud of the fact that we have managed to stay within budget and complete the project ahead of schedule. The innovation and partnership approach demonstrated by T-REX is a model for future transportation projects."

3. Modernization of a Major Interstate Interchange

Near the end of the 1990's, the Wisconsin Department of Transportation was faced with the enormous challenge of rebuilding an outdated interchange in the heart of Milwaukee. They had to accomplish that in just four years with a budget of $810 million while maintaining traffic in and out of downtown the entire time.

Built in 1968 at the convergence of I-94, I-794, and I-43, the Marquette Interchange provides access to over a third of the state's jobs and population in southeastern Wisconsin. The Marquette Interchange was completed at a cost of $33 million. By the end of the cen-

tury, the Interchange, which was designed to carry 150,000 vehicles per day, was forced to handle 300,000 vehicles per day.

Designed to be one of two major downtown interchanges to serve the growing metropolitan area, the Marquette Interchange was forced into double duty when the second planned interchange was stopped in the 1970s.

The overworked structures also aged quickly. Without reconstruction, the interchange would have been put out of use for truck traffic within the first decade of the new millenium.

Intense traffic mitigation research and public outreach efforts produced a traffic mitigation plan that would keep Milwaukee open for business and recreation during the four-year project.

"I'm proud of what my people have been able to achieve in partnership with Marquette University and the surrounding communities," said Wisconsin DOT Secretary Frank Busalacchi. "We've reached out to them and actively engaged them in helping us figure out how to make this project work for all involved. Our people have listened and revised our plans to be responsive to what folks asked for."

So far, the plan seems to be working. During the first two years of construction, the Milwaukee Bucks, Admirals, Wave, Brewers, and the Milwaukee Symphony Orchestra actually reported increased attendance.

Construction of the Marquette Interchange underway in Milwaukee, WI.

Now taking shape in the skyline of Wisconsin's largest city, the Marquette Interchange is blossoming into the inviting gateway that planners envisioned over 50 years ago and that generations to come will enjoy until the next millennium.

4. Adding Capacity in a Downtown on a National Highway System Route

On July 28, 2006, the Governor of Nebraska cut the ribbon on an innovative $100 million project which will ease access to Interstate 680, and take 70 percent of the traffic off local roads. With daily traffic at Omaha's busiest intersection expected to increase by 50 percent in the next two years, Nebraska's Department of Roads came up with building two elevated expressway bridges, both 40 feet above grade and a mile long, and worked with contractors Hawkins Construction Company and HDR Engineering to deliver the project a year ahead of schedule. The West Dodge Expressway will relieve congestion at an intersection that sees more than 105,000 vehicles a day. The expressway bridges will carry three lanes of traffic in both directions, with local traffic using the existing at-grade West Dodge Road.

AASHTO's Executive Director John Horsley said, "I like to point to this project as a demonstration that you can, in fact, 'build your way out of congestion.' By going up, rather than out they found a way to add capacity without having to acquire new right-of-way."

Courtesy of Nebraska Department of Roads.

West Dodge Elevated Expressway.

5. Reconstructing a Major Interstate Bridge to Survive Earthquakes

In January 2002, the California Department of Transportation (Caltrans) began reconstructing the 11,500-foot East Span of the San Francisco–Oakland Bay Bridge to make the 70-year-old bridge—damaged in a 1989 earthquake—seismically safe for users. A decision was made to replace the bridge with one specially engineered to withstand an earthquake on either the Hayward or San Andreas faults.

"It's absolutely critical to the safety of Bay-area residents and for the health of the Bay-area economy that this bridge is in place as soon as possible," said Will Kempton, Director of Caltrans.

In mid-2005, Governor Arnold Schwarzenegger and legislative leaders struck a bi-partisan agreement to finance the work on the bridge and other state projects. The agreement increases the toll on several bridges by $1 effective January 2007, and provides $630 million in state funds toward the multi-bridge and seismic retrofit program. Construction of the bridges will be overseen by Caltrans, the Bay Area Toll Authority and the California Transportation Commission. Caltrans manages and maintains the bridges, and the Bay Area Toll Authority is responsible for managing toll revenue.

The bridge has been designed with several features to enable it to survive an earthquake. The design of the single-tower on the self-anchored suspension span increases the like-

Courtesy of the California Department of Transportation.

Rendering of the Oakland Bay Bridge.

lihood the bridge will remain intact following a quake. The bridge's suspension cable differs from that of a traditional suspension bridge, which would have two large cables anchored to the earth, with smaller cables to hold up the bridge deck. The self-anchored approach uses a single cable anchored to the bridge deck.

The bridge, which at $1.3 billion, came in under the engineer's cost estimate of $1.45 billion, will use the world's largest precast concrete segments for its skyway deck. Its builders are using some of the largest cranes and hydraulic hammers in the world.

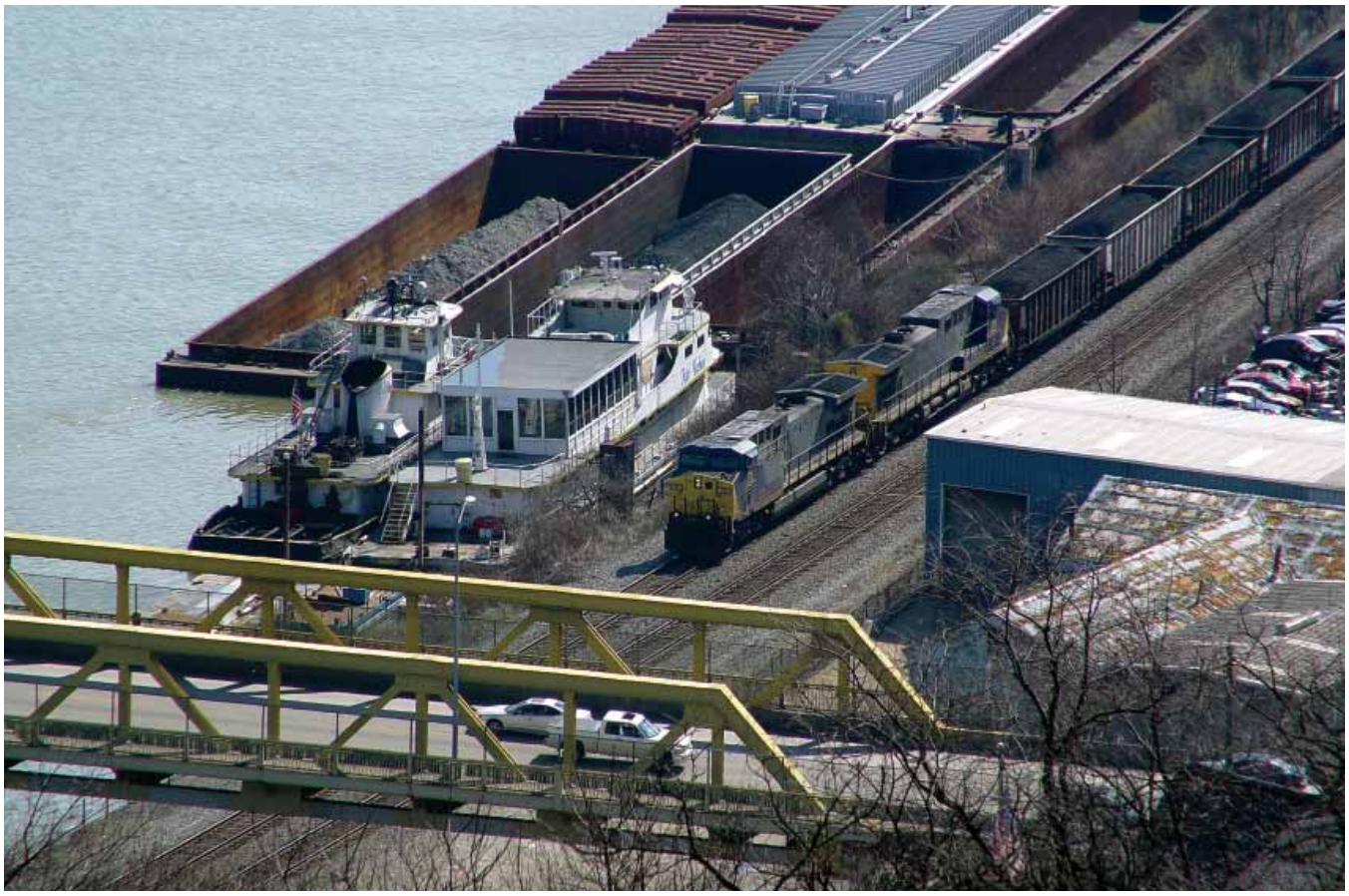
6. Using a Design-Build Contract to Expand a National Highway System Suspension Bridge

An experience nearly every freshman civil engineering student shares is to watch the 1950 film of "Galloping Gertie," a mile-long suspension bridge west of Tacoma, Washington. They see it twist and turn in a heavy wind and finally collapse, victim to a concept called "harmonics" and too much lateral wind resistance. That bridge was replaced 10 years later and has served that crossing at the Tacoma Narrows well for half-a-century. Its problem today is overcrowding. It is carrying twice the traffic it was designed for. By 2020, traffic is forecast to increase even further from 90,000 vehicles a day to over 120,000.

Washington State DOT secured voter support through a regional referendum, then contracted with Tacoma Narrows Constructors to build a new suspension bridge parallel to and south of the existing bridge.

Photo courtesy of Connie Rus, Washington Department of Transportation.

Tacoma Narrows Bridge construction at SR 16 near I-5.



Experts expect a near doubling of freight rail traffic in Chicago over 20 years.

The new bridge will have two general-purpose lanes, an HOV lane for eastbound traffic, and a separated path for pedestrians and bicyclists. The project includes upgrading and retrofitting the existing bridge which will carry three lanes of westbound traffic. The project is the first design-build contract of its kind in the state. To help recoup the cost for the entire project, estimated at $849 million, a toll will be added. The bridge is slated to open in 2007.

7. Solving Chicago's Freight-Rail Congestion Through a Public–Private Partnership

The poet Carl Sandburg called Chicago "the Nation's Freight Handler," and that still is true decades later. It is the busiest rail gateway in the United States moving one-third of the nation's freight traffic. Each day, more than 500 trains pass through. But demand has exceeded supply, leading to substantial freight-rail congestion. It takes about three days for containers from Los Angeles to get to Chicago on the rail systems serving the west, and often three more days just to get across Chicago to connect with the rail systems serving the East. Experts predict near-doubling of demand for freight-rail service in Chicago over the next 20 years.

To address this congestion and get ahead of future demand, a public–private plan, dubbed CREATE, is putting major funding to work on a priority list of rail infrastructure improvements and grade-crossing eliminations. Ultimately the work is projected to cost $1.5 bil-

Photo courtesy of Michael Rosenthal, New Jersey Transit.

Some 27,000 passengers commute daily on the New Jersey Transit, Hudson–Bergen Light Rail.

lion. In September 2006, Federal, state, and local officials announced an agreement to supply $330 million of that sum over three years.

The agreement includes $100 million in SAFETEA-LU funds, $100 million from the railroads, $100 million from the State of Illinois and $30 million from the City of Chicago. Slated improvements include 25 new overpasses to separate motor vehicles from train tracks, six new overpasses to separate freight-rail trains from passenger-rail trains, and extensive upgrades to tracks, switches, and signals.

Said Illinois DOT Secretary Tim Martin, "We have a 21st Century economy running on a 19th Century rail system. If we are to maintain our competitiveness in a global economy where time is money, something must be done, and it must be done now."

8. Spurring Economic Growth Through a Transit New Start

The Hudson–Bergen light rail line has provided a vital link among the growing cities of New Jersey's Hudson River waterfront and has been a catalyst for economic growth. The project also was a pioneer in the areas of public–private finance and project delivery. The 21-mile/30-station light rail system has been opening in segments, with the initial 7.5-mile stretch between Bayonne and Jersey City opening in April 2000. Eight segments have opened over the past six years.

The Hudson–Bergen light rail line (named for the two counties it runs through) currently serves an average of 38,000 customers per day, and is expected to expand to 70,000 daily riders when

the project is completed. The project was conceived 20 years ago, when New Jersey government officials concluded that a light rail system would do wonders for refurbishing the waterfront commercial district just across the Hudson River from Manhattan.

Today, the light rail has proven to be a catalyst for both residential and commercial development along the route. The line running along Essex Street in downtown Jersey City has spawned 3,000 residential units in five years. An 86-acre tract of land bordering Liberty State Park is being redeveloped into a transit-oriented development known as Liberty Harbor North, which will add 6,000 residential units and millions of square feet of commercial space.

The Hudson–Bergen light rail project was also designed to maximize private sector participation. The design-build-operate-maintain (DBOM) approach, which New Jersey Transit officials adopted, helped assure quality construction by making the builder be the operator of the system as well. The private sector has shared the risks and has helped accelerate the construction and financing phases of the project.

The Hudson–Bergen light rail project has put an accent on the linkage between transit investments and economic development. The billions of dollars being invested along the alignment by private developers is helping reshape the future of New Jersey's Hudson River waterfront.

9. Pricing to Relieve Truck Congestion at the Nation's Largest Port Complex

PierPASS is a program created by marine terminal operators at the Los Angeles and Long Beach ports to reduce truck traffic during peak daytime hours, alleviate overall port congestion, and lessen the industry's environmental impacts on neighborhoods and air quality. By imposing charges during peak daytime hours through an electronic toll system, trucks have been encouraged to operate at night and on Saturdays.

In July 2006, PierPASS announced that 2.5 million truck trips have been diverted from peak daytime traffic during the first full year since the "offpeak" program was launched in 2005. Offpeak is taking up to 60,000 truck trips per week out of daytime freeway traffic patterns, producing a notable reduction in daytime congestion on roads near the ports.

Since the start of the program, between 30 and 35 percent of container cargo at the ports has moved during the new offpeak shifts on a typical day. Importers, exporters, terminals, and truck drivers have all made significant changes in the way they operate and the results have been impressive. All 12 international marine terminals at the two ports have offered night and weekend gate openings. A traffic mitigation fee has been imposed electronically on most peak daytime traffic. This provides the incentive to use the offpeak gates at night. Geraldine Knatz, executive director of the Port of Los Angeles reports that PierPASS has had several benefits, "But the foremost has been the expansion of our capacity to handle more cargo."

The number of containers handled at the Los Angeles/Long Beach port complex is forecast to increase by 10.2 percent in 2006. The combined ports ranked as the fifth largest in the world in 2005, handling more than 40 percent of all containerized goods imported into the United States.

Another successful example of pricing is the eight-mile Interstate 15 High Occupancy Toll (HOT) Lane project in San Diego, California. This project has proven so successful, that the San Diego Association of Governments has plans to expand it to build and finance a 100-mile variably-priced network of new HOT lanes elsewhere in the County.

Ports are using techniques such as peak pricing to move growing freight loads.

What has not generated interest to date is the option to toll or "price" existing free lanes on the Interstate. This option has been available for the past three six-year reauthorization cycles, but not one state has taken advantage of it. It has generally been the perception that it would be highly unpopular politically to attempt to impose tolls on existing lanes which the public perceives have already been paid for. The exception to this has been when it has proven necessary to impose tolls to pay for expensive bridges which could otherwise not be replaced.

10. Enhancing Tourism Through the National Scenic Byways Program

States have leveraged Federal resources to preserve scenic highways, expand their visitor appeal, and generate travel and tourism dollars for local economies. Program innovations in resource protection, marketing, and interpretation—from the simplest approaches to the most sophisticated—offer a roadmap for the future.

For example, Kansas DOT invested a modest $123,000 in a Traveler Information Radio System (TIRS) to tell the story of the Flint Hills Scenic National Byway and provide visitor information. The information system uses three low-watt radio systems—information technology normally used at airports and large-scale tourist attractions. The communities along the Flint Hills Byway are using this information system to enhance the visitor experience with information about the byway and events in communities along the way. The system, which is operated by the local chambers of commerce, is integral to sustaining tourism economic development in the rural communities served by the Byway.

In Colorado, a modest investment of $37,000 including $6,800 from the National Scenic Byways Program provided for the development of a comprehensive historic preservation plan. The plan led to the implementation of a multi-million dollar project—using private funds—to preserve 13 highly visible historic sites and to protect thousands of acres of historic landscapes along the 236-mile San Juan Skyway. Preservation of historic structures along the Skyway, which is recognized as one of the most scenic drives in America, has resulted in a substantial increase in tourism and has generated additional revenue generation opportunities for the surrounding communities.

Photo courtesy of Ken Francis, leader of the San Juan Skyway Byway.

Redburn Ranch, a Conservation Easement.

Conclusion

Simply put, AASHTO believes the mission of the U.S. Surface Transportation Program is to keep the U.S. competitive in the global economy and meet America's 21st Century mobility needs. Part of what it will take to sustain our prosperity in the context of the global economy is a modern, efficient transportation system which enables the U.S. to increase productivity growth, create jobs, and compete head-to-head with all comers.

As was outlined in AASHTO's Call for Action, we believe the time has come to increase investment in our Surface Transportation System to the levels needed. This will require marshalling the political will necessary at the federal, state and local levels to generate the additional revenues required to make this quantum increase in investment possible. It will also require a strategy which goes well beyond just "more of the same."

Meeting America's surface transportation needs for the future will require a multi-modal approach, which preserves what has been built to date, improves system performance, and adds substantial capacity in highways, transit, freight rail, and intercity passenger rail, and better connections to ports, airports and border crossings. It will also require solutions which go beyond transportation improvements and include policies addressing land use, energy, global climate change, the environment, and community quality of life.

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