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**National Surface  
Transportation Policy  
and Revenue Study  
Commission**

January 15, 2008

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U.S. Department of Transportation

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*"Create and sustain the  
preeminent surface  
transportation system  
in the world."*

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The Honorable Richard Cheney  
President of the United States Senate  
Washington, DC 20515

The Honorable Nancy Pelosi  
Speaker of the United States House of Representatives  
Washington, DC 20515

Dear Mr. President and Madam Speaker:

We are pleased to transmit to you "*Transportation for Tomorrow: Report of the National Surface Transportation Policy and Revenue Study Commission.*" With the submission of this report, the Commission has met the charge given under Section 1909 of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU).

An identical letter has been sent to the U.S. Senate Committee on Environment and Public Works, the U.S. Senate Committee on Banking, Housing, and Urban Affairs, the U.S. Senate Committee on Commerce, Science and Transportation, and the U.S. House of Representatives Committee on Transportation and Infrastructure.

Sincerely yours,



Mary Peters  
Chair



Jack Schenendorf  
Vice Chair



Report of the  
**National Surface Transportation Policy  
and Revenue Study Commission**

***Transportation for Tomorrow***

December 2007



TRANSPORTATION FOR TOMORROW

National Surface Transportation Policy  
and Revenue Study Commission



# List of Commissioners

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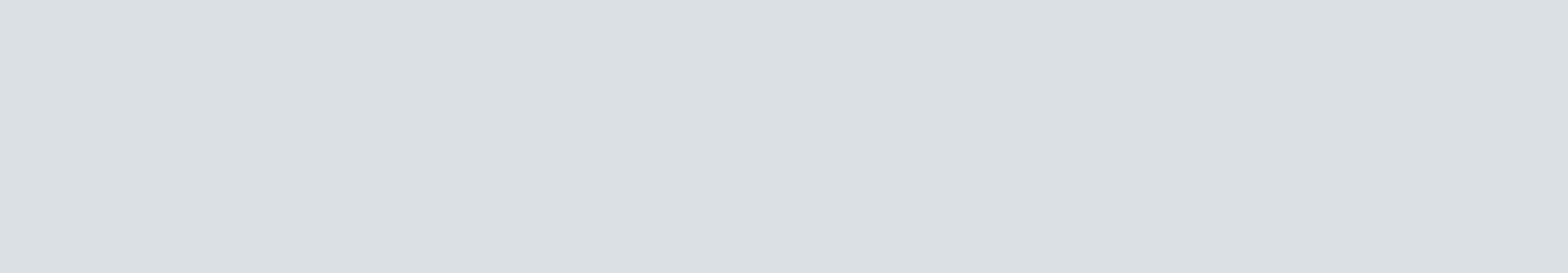
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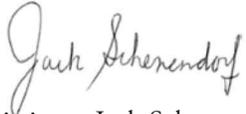
Paul Weyrich  
Chairman and CEO, Free Congress Foundation

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# Approval of the Report of the National Surface Transportation Policy and Revenue Study Commission

On December 20, 2007, the Commission approved the Report by a vote of 9 to 3. The undersigned Commissioners voted in favor of approving the Report:



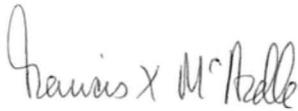
Commissioner Jack Schenendorf  
Commission Vice Chair



Commissioner Frank Busalacchi



Commissioner Steve Heminger



Commissioner Francis X. McArdle

(signature on file)

Commissioner Steve Odland



Commissioner Patrick E. Quinn



Commissioner Matt Rose



Commissioner Tom Skancke



Commissioner Paul Weyrich

The undersigned Commissioners voted against approving the Report:



Secretary of Transportation  
Mary E. Peters, Commission Chair



Commissioner Maria Cino



Commissioner Rick Geddes

To inform the reader, supplemental views and minority views by individual Commissioners have been incorporated into the document at the end of Volume I, as indicated in the table of contents.



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## List of Abbreviations

|        |  |
|--------|--|
| AAR    | Association of American Railroads                                  |
| AASHTO | American Association of State Highway and Transportation Officials |
| APTA   | American Public Transportation Association                         |
| BCA    | Benefit-Cost Analysis  |
| BPI    | Bid Price Index  |
| BRAC   | Base Realignment and Closure Commission                            |
| CEQ    | Council on Environmental Quality                                   |
| CPI-U  | Consumer Price Index for All Urban Consumers                       |
| EIS    | Environmental Impact Statement                                     |
| FAF    | Freight Analysis Framework   |
| FEU    | Forty-Foot Equivalent Unit   |
| FHWA   | Federal Highway Administration                                     |
| FLHP   | Federal Lands Highway Program                                      |
| FRA    | Federal Railroad Administration                                    |
| FTA    | Federal Transit Administration                                     |
| GAO    | Government Accountability Office                                   |
| GDP    | Gross Domestic Product   |
| GPS    | Global Positioning System  |
| GSM    | Global System for Mobile Communications                            |
| HERS   | Highway Economic Requirements System                               |
| HOT    | High-Occupancy Toll  |
| HTF    | Highway Trust Fund   |
| HVUT   | Heavy Vehicle Use Tax  |
| ISTEA  | Intermodal Surface Transportation Efficiency Act                   |
| ITS    | Intelligent Transportation System                                  |
| IWTF   | Inland Waterways Trust Fund  |
| JIT    | Just-in-Time   |

## List of Abbreviations, continued

|            |   |
|------------|---|
| LOS        | Level of Service  |
| MPO        | Metropolitan Planning Organization  |
| NAFTA      | North American Free Trade Agreement   |
| NASTRAC    | National Surface Transportation Commission  |
| NBIAS      | National Bridge Investment Analysis System  |
| NCHRP      | National Cooperative Highway Research Program                                       |
| NEPA       | National Environmental Policy Act   |
| NHS        | National Highway System   |
| O&M        | Operating and Maintenance   |
| PAB        | Private Activity Bond Program   |
| PFC        | Passenger Facility Charge   |
| PMT        | Passenger Mile of Travel  |
| PNRS       | Project of National and Regional Significance                                       |
| PPP        | Public-Private Partnership  |
| PRC        | Postal Regulatory Commission  |
| PRWG       | Passenger Rail Working Group  |
| PUC        | Public Utility Commission   |
| RD&T       | Research, Development, and Technology   |
| RMA        | Regional Mobility Authority   |
| RRIF       | Railroad Rehabilitation and Improvement Financing Program                           |
| SAFETEA-LU | Safe, Accountable, Flexible, Efficient Transportation Equity Act—A Legacy for Users |
| SCAG       | Southern California Association of Governments                                      |
| SOV        | Single Occupant Vehicle   |
| STAA       | Surface Transportation Assistance Act   |
| STTF       | Surface Transportation Trust Fund   |
| STURAA     | Surface Transportation and Uniform Relocation Assistance Act                        |
| TEA-21     | Transportation Equity Act for the 21st Century                                      |

## List of Abbreviations, continued

|       |  |
|-------|--|
| TERM  | Transit Economic Requirements Model                      |
| TEU   | Twenty-Foot Equivalent Unit                              |
| TIFIA | Transportation Infrastructure Finance and Innovation Act |
| TRB   | Transportation Research Board                            |
| USDOT | U.S. Department of Transportation                        |
| VII   | Vehicle Infrastructure Integration                       |
| VMT   | Vehicle Mile of Travel                                   |



# Volume I

## Recommendations

### A Call to Action

The surface transportation system of the United States is at a crossroads. The future of our Nation's well-being, vitality, and global economic leadership is at stake. We must take significant, decisive action now to create and sustain the pre-eminent surface transportation system in the world.

The first half of our Nation's history saw that economic development was directly tied to infrastructure development. The creation of roads for vehicles and the transcontinental railroad led to trade and prosperity across the vast continent. This in turn vaulted the Nation into a position of significance in the world. The second half of our history has been dominated by the move from an agrarian society, through the Industrial Revolution, into a largely urban society and the world's primary economic and military superpower. All of this was facilitated by the foresight of private and public sector leaders who further developed the country's infrastructure including the Interstate highway system, the Nation's freight rail system, and urban mass transit. Now we have outgrown this system and it is time for new leadership to step up with a vision for the next 50 years that will ensure U.S. prosperity and global preeminence for generations to come.

The U.S. now has incredible economic potential and significant transportation needs. We need to invest at least \$225 billion annually from all sources for the next 50 years to upgrade our existing system to a state of good repair and create a more advanced surface transportation

system to sustain and ensure strong economic growth for our families. We are spending less than 40 percent of this amount today.

A significant increase in public funding is needed to keep America competitive. Additional private investment in our system is also needed. We will need to price for the use of our system. More tolling will need to be implemented and new and innovative ways of funding our future system will need to be employed. Maintenance and expansion of our freight system will require a set of policy tools that encourage more private investment and direct public funds toward projects which alleviate capacity constraints and allow for more traffic to flow across an efficient, sustainable, intermodal freight network. Chokepoints at our major gateways and trade corridors don't just represent congestion and environmental hot spots; they are a potential trade barrier as well. Trucks and rail will have to work even more closely in the coming years in order to deliver the commerce the Nation produces, imports, and exports.

Our Nation will need to put more emphasis on transit and intercity passenger rail and make them a priority for our country. A cultural shift will need to take place across America to encourage our citizens to take transit or passenger rail when the option is given. It is also important to increase the market share for freight rail, and to make significant increases in highway investment as part of developing a robust surface transportation network.



In addition to putting more money into the system, we also must create a system where investment is subject to benefit-cost analysis and performance-based outcomes. We need a system that ensures each project is designed, approved, and completed quickly; one that provides a fully integrated mobility system that is the best in the world; one that emphasizes modal balance and mobility options; one that dramatically reduces fatalities and injuries; one that is environmentally sensitive and safe; one that minimizes use of our scarce energy resources; one that erases wasteful delays; one that supports just-in-time delivery; and one that allows economic development and output more significant than ever seen before in history.

The good news is that we can do it. Our people need such a system and they deserve it.

We cannot sit back and wait for the next generation to address these ever-increasing needs. The crisis is now and we have a responsibility and obligation to create a safer, more secure, and ever more productive system. We need to create and sustain the pre-eminent surface transportation system in the world. Now.

## Introduction

President Dwight D. Eisenhower had the foresight to understand how a system of Interstate highways would transform the Nation. If there was ever a time to take a similarly daring look at a broadened surface transportation network, it is now! The Nation faces challenges similar to those of the Eisenhower era. However, the imperative for change due to the global economy is even stronger.

Transportation is a critical engine of the Nation's economy. Investments in the national transportation network over the Nation's history, and especially the Interstate Highway System during the last half-century, have

“Our unity as a nation is sustained by free communication of thought and by easy transportation of people and goods... Together the unifying forces of our communication and transportation systems are dynamic elements in the very name we bear — United States. Without them, we would be a mere alliance of many separate parts.”

*President Dwight D. Eisenhower, 1955*

been instrumental in developing the world's largest economy and most mobile society. Transportation is the thread that knits the country together, providing the mobility that is such an important part of overall quality of life and is so deeply embedded in our culture and history. Highways, transit, rail, and water systems provide unprecedented access to jobs, recreation, education, health care, and the many other activities that sustain and enrich the lives of American families.

Over the next half-century, the U.S. is projected to add 150 million new residents, a 50 percent increase over its current population. This growing society will demand higher levels of goods and services, and will rely on the transportation system to access them. In turn, this will cause travel to grow at an even greater rate than the population. As part of an increasingly integrated global economy, the U.S. will see greater pressures on





its international gateways and domestic freight distribution network to deliver products and materials to where they are needed. The Nation is faced with a massive increase in passenger and freight travel.

The Nation's surface transportation program has reached a crossroads. Will it continue to function as it has since the completion of the Interstate system, pursuing no discernible national interests other than the political imperatives of "donor State" rights and congressional earmarking? Or will it advance concerted actions to confront the transportation challenges facing the Nation that have reached crisis proportions—the deferred maintenance of its basic infrastructure; the burgeoning international trade and its impact on our road and rail networks; the traffic congestion that is crippling metropolitan America; the continued carnage on the Nation's highways; and powering cars and trucks with fossil fuels, much of which is imported from foreign countries?

### ***The Consequences of Inaction***

Applying patches to our surface transportation system is no longer acceptable. The Nation's leaders must make a renewed commitment to serving the American people's need for a system that ensures unparalleled mobility, access, and safety. America must have the pre-eminent transportation system in the world. The demand for more and better transportation resulting from a growing population within an increasingly global economy will continue to strain the U.S. surface transportation



system. We can predict, with some certainty, the consequences of failing to take bold action:

- **The Nation's transportation system assets will further deteriorate.** Too many of the Nation's highways, bridges, and transit systems are already in disrepair. Our transportation system is aging, requiring increasing investment just to maintain its current condition, much less improve it.
- **Automobile casualties will increase, adding to the 3.3 million lives lost to traffic crashes in the last 100 years.** In 2006 alone, almost 43,000 people died on U.S. roads and almost 2.6 million were injured. If safety goals are not pursued more aggressively, far too many Americans will continue to lose their lives, their health, and their family stability in crashes that could be avoided.

*"To save lives, we need funding and flexibility, we need partnerships and persistence, we need Federal, State, and local agencies to commit to the goal and continue their efforts. Anything less will prevent us from moving toward zero deaths." – Kathy Swanson, Director, Office of Traffic Safety, Minnesota Department of Public Safety, at the Commission's Minneapolis field hearing.*





- **Congestion will continue to affect every mode of surface transportation for ever-lengthening periods each day, as a result of the mismatch between demand and supply of limited capacity.** Congestion is not just a big city problem any more. It is disrupting household and business activities from coast to coast, and exacting a large and expanding penalty on business productivity and the quality of life of American families.
- **Underinvestment in all modes will continue.** The Nation is underinvesting in all modes of transportation. Unless the relative market share for other modes—including rail, bus, and water—grows, even significant increases in highway capacity cannot meet the scale of future projected demand.
- **America’s economic leadership in the world will be jeopardized when we cannot reliably and efficiently move our goods.** The declining performance of the surface transportation network—as a result of both inadequate capacity and inefficient management—will choke economic progress, preventing the U.S. economy from growing to its full potential. It is not an overstatement to say that the Nation’s potential for the creation of wealth will depend in great part on the success of its freight efficiency. Without

“Many municipalities have...shipping at night, commuting, having trucks and trailers and containers move up and down the system during non-peak hours. But in many cases...non-peak hours almost don’t exist any more.” – *Jerry Tidwell, Senior Vice President, Supply Operations, Safeway Corporation, at the Commission’s Los Angeles field hearing.*

changes, countries such as China and India, with more dynamic policies for transportation and economic growth, will challenge the U.S. in economic power and world influence.

- **Excessive delays in making investments will continue to waste public and private funds.** Federal funds are currently distributed to State and local transportation agencies along with many “procedural strings” that lead to excessive delays. Particularly for larger projects, the complex process of planning, evaluating environmental impacts, and arranging project funding can take as long as 15 years—an unacceptably long time in the face of immediate and growing transportation problems and in contrast to the ever-shortening cycle of private sector and entrepreneurial decision making. These delays lead to unnecessary cost increases that waste taxpayer funds. The same is true for the construction and expansion of private sector transportation facilities, such as rail lines and intermodal terminals, when such facilities require public approval.
- **Transportation policies will remain in conflict with other national policy goals.** Despite good intentions, the Nation’s government programs don’t always fit together very neatly. Current transportation and land use policies are not well coordinated. This, in turn, undermines national security, energy, and environmental goals by contributing to greater reliance on foreign petroleum, higher greenhouse gas emissions, and adverse public health impacts.
- **Transportation financing will continue to be politicized.** The political process is important in ensuring that the needs of various constituencies are met. In recent years, for example, that process helped to greatly increase the overall Federal investment in highways and transit. Sometimes, however, politics can get in the way of good



The National Surface Transportation Policy and Revenue Study Commission was established

(V) revenues flowing into the Highway Trust Fund under laws in existence on the date of

decision making. Congressional earmarking has increased from 10 projects in 1982 to more than 6,300 projects in SAFETEA-LU (2005). In addition, the lack of transparent analyses of costs and benefits of alternative investments makes achieving the best portfolio of investments unlikely. The American public will have little confidence in infrastructure investment decisions that are the result of highly politicized public and private sector deals.

### ***Future Surface Transportation Investment Requirements***

At the public hearings and in other testimony, perhaps the most common theme the Commission heard was the large investment required in all modes to maintain the condition of the Nation's existing infrastructure, relieve congestion, and improve essential services. Recognizing the uncertainties in how transportation services

might be improved, especially 30 and 50 years in the future, the Commission developed a range of potential investment requirements based on differing assumptions. Among the assumptions were (1) the extent to which operational strategies are deployed; (2) the extent to which State and local agencies use pricing to relieve congestion; (3) the extent to which advanced technologies such as Vehicle Infrastructure Integration (VII) are implemented; (4) the extent of physical capacity expansion pursued; and (5) the level of performance wanted from the system.

The table below summarizes ranges of potential investment levels for different modes for the time periods 2005 to 2020, 2020 to 2035, and 2035 to 2055. See Chapter 4 of Volume II for a complete discussion of these analyses and findings.

The "High Capital Investment" levels shown in the table represent the amount of funding estimated to be adequate to improve key condition and performance measures for each mode in the



**Summary of range of “high” average annual capital investment levels analyzed for all modes**

**Range of “high” capital investment levels analyzed (billions of constant dollars)**

|                                       |             |              |              |              |              |              |              |
|---------------------------------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Highway                               | \$68        | \$207        | \$240        | \$182        | \$250        | \$185        | \$276        |
| Transit                               | \$13        | \$21         | \$32         | \$23         | \$34         | \$26         | \$46         |
| Freight Rail                          | \$4         | \$5          | \$7          | \$5          | \$7          | \$6          | \$8          |
| Passenger Rail                        | \$1         | \$7          | \$7          | \$9          | \$9          | \$8          | \$8          |
| <b>All Modes Combined<sup>2</sup></b> | <b>\$86</b> | <b>\$241</b> | <b>\$286</b> | <b>\$220</b> | <b>\$301</b> | <b>\$225</b> | <b>\$338</b> |

**“Gap” between high capital investment levels and currently sustainable revenue (billions of constant dollars)<sup>3</sup>**

|                           |              |              |              |              |              |              |
|---------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Highway                   | \$139        | \$172        | \$115        | \$182        | \$117        | \$208        |
| Transit                   | \$8          | \$19         | \$10         | \$21         | \$13         | \$33         |
| Freight Rail              | \$1          | \$3          | \$1          | \$3          | \$2          | \$4          |
| Passenger Rail            | \$6          | \$6          | \$8          | \$8          | \$7          | \$7          |
| <b>All Modes Combined</b> | <b>\$155</b> | <b>\$200</b> | <b>\$134</b> | <b>\$215</b> | <b>\$140</b> | <b>\$252</b> |

**Investment “gaps” stated in constant cents per gallon of highway motor fuel<sup>4</sup>**

|                           |               |               |               |               |               |               |
|---------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Highway                   | \$0.71        | \$0.88        | \$0.54        | \$0.85        | \$0.49        | \$0.85        |
| Transit                   | \$0.04        | \$0.10        | \$0.05        | \$0.10        | \$0.06        | \$0.13        |
| Freight Rail              | \$0.01        | \$0.02        | \$0.01        | \$0.01        | \$0.01        | \$0.02        |
| Passenger Rail            | \$0.03        | \$0.03        | \$0.04        | \$0.04        | \$0.03        | \$0.03        |
| <b>All Modes Combined</b> | <b>\$0.79</b> | <b>\$1.02</b> | <b>\$0.63</b> | <b>\$1.00</b> | <b>\$0.59</b> | <b>\$1.03</b> |

<sup>1</sup> The estimated “Currently Sustainable” funding for highways and transit is based on short-term Federal Highway Trust Fund revenue projections and assumes State, local, and private funding remains steady in constant dollar terms (i.e., growth equals inflation), while the estimate for freight rail assumes that private freight rail capital investment keeps pace with revenue growth. The amount shown for intercity passenger rail assumes estimated current capital investment by Amtrak and State governments remains steady in constant dollar terms.

<sup>2</sup> The combined figures do not account for cross-modal impacts.

<sup>3</sup> “Gaps” reflect the difference between the “High” and “Currently Sustainable” capital investment levels.

<sup>4</sup> The implied cents per gallon for the lower and upper ends of the range for each time period are based on the estimated fuel consumption derived from the highway scenario consistent with the highway funding level in each column.

**This table shows the range of potential annual investment levels in highways, transit, freight rail, and passenger rail and the equivalent fuel tax increase that would be required to fill the gap between current sustainable investment levels and the high investment levels shown in the table. Each range represents average annual amounts from the current year through the date shown.**

Source: Commission staff analysis.



future relative to their current levels. Where available data and analytical tools permitted a more refined analysis, investment levels were set at the maximum level for which potentially cost-beneficial investments could be identified. These provisional estimates were developed to support an informed discussion of alternative financing options, but ultimately would be supplanted by the amounts generated by the capital investment plans the Commission is recommending, which would be based on a more rigorous analysis for all components of the transportation system.

For highways and, to a lesser degree, transit, the staff was able to modify existing analytical tools to develop independent estimates of future investment requirements. For other modes such as freight and passenger rail, for which the available data and analytical tools were insufficient to conduct such analyses, the Commission reached out to industry experts to develop estimates.

Expressing investment requirements in terms of cents per gallon of fuel tax should not be construed to mean that the Commission believes the fuel tax should necessarily be the only source for all surface transportation funding. A number of State and local transportation agencies have been using other sources of funds because voters have been unwilling to approve fuel tax increases. Among those other funding sources are tolls, sales taxes, property taxes, and private sector financing.

## A New Beginning

The Commission believes that it is critical to America's future to:

*Create and sustain the preeminent surface transportation system in the world.*

This new transportation vision is fundamental to any significant effort to identify and rectify the shortcomings of the current national surface transportation system. Achieving this vision is within the means of the wealthiest country on Earth assuming leaders at all levels of government and the private sector will take ownership and act on it accordingly and expeditiously. The American people can no longer tolerate more “business as usual” in the surface transportation arena.

The Commission's vision is rooted in an understanding of the longstanding and increasing importance of transportation to the Nation in a global economy. Our families and firms can no longer tolerate excessive transportation constraints that waste our collective resources—time, money, fuel, clean air, and our competitive edge. Concern for the system goes beyond the tangible pieces of infrastructure that can be plotted on a map. Although that engineering perspective was effective in the early days of building our rail, highway, transit, and port systems, it focuses on only the infrastructure side of a complex and sophisticated network essential to moving people and goods reliably and efficiently. By updating our focus to include the performance that this system provides, we can identify current and future failures that will come, for example, with insufficient capacity, inadequate intermodal linkages, and poor system operation.

*The Commission believes the National Interest in quality transportation is best served when:*

- **FACILITIES ARE WELL MAINTAINED.** The infrastructure that serves as the backbone of national surface transportation systems is in at least good condition—Federal-aid highways (including the Eisenhower System of Interstate and Defense Highways and the

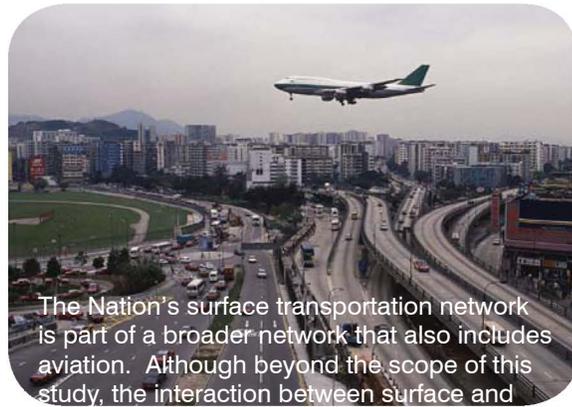
National Highway System), transit assets, intercity passenger and freight rail lines, and network connectors between our modes that complete the overall system.

■ **MOBILITY WITHIN AND BETWEEN METROPOLITAN AREAS IS RELIABLE.**

Chokepoints that consistently impede national and regional movements of people and goods across the current passenger and freight systems are eliminated. Highway, transit, and rail systems are expanded and managed to meet future growth.

■ **TRANSPORTATION SYSTEMS ARE APPROPRIATELY PRICED.** To avoid imbalances between the transportation capacity available at any particular time and the demand for it, pricing can help provide a guide for the most efficient use of scarce investment dollars.

■ **MODES ARE REBALANCED AND TRAVEL OPTIONS ARE PLENTIFUL.** Passengers and shippers should have options to travel within and between regions by road, rail, and water, helping to reduce congestion and accommodating future growth on the highways and in the air. Public transportation and intercity passenger rail will play a significantly larger role in Americans' mobility; Federal, State, and local transportation policies should not only accommodate, but encourage its development. Shares of these modes will grow as part of a robust surface transportation system that includes increased investment in highways, transit, and intercity passenger and freight rail infrastructure capacity.



The Nation's surface transportation network is part of a broader network that also includes aviation. Although beyond the scope of this study, the interaction between surface and

■ **FREIGHT MOVEMENT IS EXPLICITLY VALUED.** Operation of private and public sector freight systems (including rail, trucking, waterways, and ports) that fully serve the needs of the Nation's economy is a priority.

■ **SAFETY IS ASSURED.** Users of our surface transportation systems must not be at risk of death or injury due to unsafe facilities or operations.

■ **TRANSPORTATION DECISIONS AND RESOURCE IMPACTS ARE INTEGRATED.** The Nation's population is expected to swell to 420 million residents by 2050. Given the immensity of this increase, it is essential that the surface transportation system be transitioned away from fossil fuels, and that planners incorporate transportation into thoughtfully planned, efficient, and environmentally sustainable communities.

■ **RATIONAL REGULATORY POLICY PREVAILS.** Ensuring the necessary free flow of capital into the rail industry and other private sector providers of transportation requires that regulatory policies promote efficient operations and encourage investment. National networks require uniform and national regulatory structures to further the Nation's commerce.



***The Commission believes that to meet 21<sup>st</sup> Century transportation needs, it is necessary for Congress to establish a new Federal Compact with the American people.***

The key elements of that “compact” are:

- A strong Federal role in surface transportation that will evolve to meet the national interest;
- Increased expenditures from all levels of government and the private sector to compensate for past investment failures while addressing significant increases in future demand;
- A commitment to make more effective use of taxpayers’ funds for the national interest;

- Federal funding that is performance-based and focused on cost-beneficial outcomes with accountability for the full range of economic, environmental, and social costs and benefits of investments; and
- Far-reaching program reform to eliminate waste and delays in Federally funded program delivery.

## Recommendations to Reform Institutions and Programs

***We propose the new Compact with the American people be fulfilled through a performance-based approach that identifies and establishes priorities, and avoids parochial and wasteful spending.***

The Commission concludes that the current Federal surface transportation programs should not be “re-authorized” in their current form. We must begin anew. This New Beginning is the dawn of the third era in the modern history of the Federal surface transportation program. The first era began 50 years ago with construction of the Interstate highway system, which served as the unifying principle of Federal effort for three decades. While it was an immense undertaking, the basic purpose of the Interstate enterprise was to convert lines on a highway map into miles of concrete, asphalt, and steel. The completed system connected the Nation as President Eisenhower





envisioned, and it still stands as one of the engineering marvels of the world.

The second era was ushered in with the passage of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The “TEA” era has been characterized by the unprecedented flexibility afforded to State and local officials to invest Federal highway dollars in new modes and approaches. Overall, State and local transportation officials invested heavily in their systems, matching Federal funds with State and local funds. However, without easy-to-understand, system-wide performance targets, it is difficult to assure the public that the over \$650 billion in transportation investments improved the national system and thereby met the Federal interest. Ultimately, the TEA era may be viewed as a transition from the Interstate program to a third era of renewed Federal purpose that we seek to inaugurate with this report.

This third era will not be dominated by a single transportation mode, as was the Interstate program. While funding flexibility will continue to have its place, it must be used to meet specific and measurable objectives to improve the Nation’s highway, rail, and public transportation networks. **In brief, the new user-financed Federal surface transportation program the Commission proposes will be performance-driven, outcome-based, generally mode-neutral, and refocused to pursue activities of genuine national interest, as outlined below.**

“It’s our belief that no single mode...can hope to meet the needs of a growing and vital American economy and people...it’s going to be necessary to provide solutions that deal in a multimodal context.”

– Bill Millar, President of American Public Transportation Association, at the Commission’s Dallas field hearing.

## Overview

To make the vision of a New Beginning a reality, Federal leadership and Federal surface transportation investments must be carefully aligned with the “National Interest” as defined above. The Commission believes that several new structural features will be key to the successful program reform necessary to achieve the Commission’s vision.

- Developing a comprehensive, performance-based approach.
- Reforming program and project development processes to reduce the excessive time required to move projects from initiation to completion, improving overall project decisions, reducing project and overall program costs, and realizing project benefits sooner.
- Concentrating Federal surface transportation investment in 10 program areas:
  - Rebuilding America: A National Asset Management Program
  - Freight Transportation: A Program to Enhance U.S. Global Competitiveness
  - Congestion Relief: A Program for Improved Metropolitan Mobility
  - Saving Lives: A National Safe Mobility Program
  - Connecting America: A National Access Program for Smaller Cities and Rural Areas





- Intercity Passenger Rail: A Program to Serve High-Growth Corridors by Rail
- Environmental Stewardship: Transportation Investment Program to Support a Healthy Environment
- Energy Security: A Program to Accelerate the Development of Environmentally-Friendly Replacement Fuels
- Federal Lands: A Program for Providing Public Access
- Research, Development, & Technology: A Coherent Transportation Research Program for the Nation.
- Harnessing the technical strengths of the USDOT and the surface transportation industry, developing a national strategic plan to guide public sector investment in these programs that will serve a growing and vibrant population and economy.
- Based on a Congressional charter, establishing an independent and permanent National Surface Transportation Commission (NASTRAC) that would use the national strategic plan to recommend appropriate authorization and revenue levels to Congress.

The analyses that resulted in the Commission's recommendations are explained in further detail in Chapter 6 of Volume II. In synopsis, the planning process would begin with the USDOT, working collaboratively with its partners and stakeholders, by establishing the appropriate performance standards critical to serve the national interest under the targeted new



program structured described below. National transportation targets would be set for the long run to advance critical national goals for condition of transportation infrastructure, efficiency and mobility, safety, rural accessibility, environmental quality, energy conservation, access to Federal lands, and research.

### ***Speeding Project Delivery***

Efforts to mitigate the environmental impacts of transportation projects through the National Environmental Policy Act often become bogged down in procedures and challenges, crippling the ability of State and local governments to respond promptly to inefficiencies in our surface transportation system. These transportation inefficiencies hurt the economy in many ways, reducing business growth, employment prospects, mobility, and the leisure time of many Americans.

**Simply put, the Commission believes that it takes too long and costs too much to deliver transportation projects, and that waste due to delay in the form of administrative and planning costs, inflation, and lost opportunities for alternative use of the capital hinder us from achieving the very goals our communities set.**

Information compiled by the Federal Highway Administration (FHWA) indicates that major highway projects take approximately 13 years to advance from project initiation to completion. A large part of this time is associated with the environmental review process. In recent years the median time to complete environmental impact statements (EISs) for highway projects has varied from 54 to 80 months. FHWA has set a 2007 target of 36 months to complete EISs.

The rapidly eroding purchasing power of the dollar for transportation construction in recent years has called particular attention to the costs of what many experts consider to be the excessively



**Typical transportation project development process**

Approximate Timeline (in years)

|   | 1                        | 2                    | 3                              | 4                              | 5                | 6                            | 7 | 8                           | 9 | 10 |
|---|--------------------------|----------------------|--------------------------------|--------------------------------|------------------|------------------------------|---|-----------------------------|---|----|
| Determine Existing Conditions             | Purpose and Need         | Traffic Analysis     | Floodplain/ Hydrologic         | Energy                         | Geometric Design | 60% Plans                    |   |                             |   |    |
| Traffic Forecasts                         | Preliminary Alternatives | Public Outreach      | Land Use                       | Economic                       | Typical Sections | 90% Plans                    |   |                             |   |    |
| Analysis Needs                            | Public Outreach          | Technical Studies    | Wetlands                       | Visual Effects                 | Grading          | Specifications and Estimates |   | Right-of-Way Setting        |   |    |
| Conceptual Solutions                      | Air Quality              | Noise Analysis       | Environmental Justice          | Cumulative & Secondary Impacts | Drainage         | Final Plans                  |   | Right-of-Way Engineering    |   |    |
| Preliminary Cost Estimates                | Socio/Economic           | Traffic Analysis     | Cumulative & Secondary Impacts | Cost-Benefit Analysis          | Structural       |                              |   | Appraisals                  |   |    |
| Cost Estimation Validation Process (CEVP) | Cultural Resources       | Biological Resources | Section 4(f) Evaluation        | Refine Alternatives            | Traffic/ITS      |                              |   | Purchase Offers             |   |    |
|   | Hazardous Materials      | Water Quality        | Record of Decision             | Alternative Selection          | Signing/Striping |                              |   | Counter Offers              |   |    |
|   |                          |                      |                                | Section 4(f) Evaluation        | Lighting         |                              |   | Relocation                  |   |    |
|   |                          |                      |                                | Record of Decision             | Utilities        |                              |   | Asbestos Clearing           |   |    |
|   |                          |                      |                                |                                | 30% Plans        |                              |   | Demolition                  |   |    |
|   |                          |                      |                                |                                |                  |                              |   | Condemnation (if necessary) |   |    |
|   |                          |                      |                                |                                |                  |                              |   | Federal Regulations         |   |    |

Source: Nevada DOT.

long time that it takes to bring a transportation project from concept to reality. For some major projects, the time needed to complete planning, environmental, and construction activities can be 14 years or longer. During this period, a project initially estimated to cost one amount can increase sharply in cost, undermining finance plans and construction schedules.

The table at right illustrates the impact of delay and inflation on a transportation project initially estimated to cost \$500 million if construction begins at the start of 2008. The project is estimated to take 4 years to construct. Three cases

**Impacts of project delays on construction costs**

|      |                 |
|------|-----------------|
| 2011 | \$500,000,000   |
| 2014 | \$616,000,000   |
| 2021 | \$1,002,000,000 |

**This table illustrates the potential financial impact of project delays.**

Source: Commission Staff analysis.



are considered: construction begins immediately in 2008 and ends in 2011; construction begins in 2011 and ends in 2014; and construction begins in 2018 and ends in 2021. The rate of inflation in highway construction costs in this illustration is assumed to be 7.2 percent a year (representing the average rate of cost increase for highway projects from 2000 to 2006 as measured by the FHWA's Price Trends for Federal-Aid Highway Construction (or Bid Price Index [BPI])).

As is evident, the high rate of escalation in construction costs would cause the completed cost of the project at the end of 2021 to cost half a billion dollars more than had it been completed 10 years earlier. Allowing for 3 years of planning and environmental review beginning in 2008, the project would cost \$616 million if construction starts in 2011 and completes in 2014. This latter case represents a 23 percent cost increase over the 2011 project completion date, but is still almost \$400 million less than were its completion delayed until the end of 2021.

Project development activities under Federal Transit Administration's (FTA) New Starts program experience similar delays. From 2002 to 2005, the average project development time was more than 10 years, although it fell somewhat in 2006. In light of the rapid increase in construction costs over the past several years, delays in completing projects have become very expensive. Using the average increase in highway and bridge construction costs since 1997, if the average project development time for highway projects could be reduced from 13 years to 6 years, the cost of the project could be reduced by almost 40 percent. This savings could then be applied to other projects, substantially reducing overall funding needed for highway construction programs. The same would be true for other modes as well.

**To reduce overall project delivery times for major transportation projects, the time to complete environmental reviews must be shortened, in conjunction with other measures that address conventional strategies for implementing projects once they clear environmental review.** Many fear that reducing the time devoted to the environmental review process or other aspects of project development will ultimately lead to projects that do not adequately address environmental and other community impacts. Several things can be done to reduce the time required for the environmental review process without adversely affecting the quality of that process. Two sources of delay can and should be addressed in the short term:

- **Redundancies in the National Environmental Policy Act (NEPA) Process.** Draft EISs represent the culmination of several years of planning, public involvement, and coordination and collaboration with resource agencies, some of which could be done prior to formally beginning the NEPA process to ensure it is fully recognized. The current process can create numerous redundancies, including the need to backtrack to revisit alternatives that were previously rejected, or to duplicate environmental analyses that were previously endorsed during planning or scoping but may not have been formally recognized by other agencies when done outside the formal NEPA process. Another frequent byproduct is that repetitive additional analyses and studies must be prepared for issues that already have been adequately addressed prior to the start of the NEPA process.
- **Permit Process Can Add Significant Time.** In addition to the delays associated with NEPA compliance, projects often are held up pending permit approvals from Federal agencies such as the U.S. Fish and Wildlife Service and the Army Corps of Engineers.



Permit applications often languish for months, and it is not uncommon for Federal agencies to disagree with one another in exercising their independent oversight responsibilities.

“Time is money, and our customers deserve the courtesy of us moving forward and making decisions...we consider federal agencies to be our partners.

We want them to be in the roles of interpreting regulations to help us meet our goals with project delivery. But we also want them to interpret the laws to facilitate, to help us and not to hinder.”

– *Susan Martinovich, Director, Nevada Department of Transportation, at the Commission’s Las Vegas field hearing.*

**The Commission recommends that a series of reforms be advanced to address problems with the project development process.** These issues can be addressed through statutory or regulatory approaches. Changes in the current legal and regulatory framework for environmental reviews would be needed before any significant time-savings could be realized. Specifically, the Congress and USDOT should consider changes in the following areas:

- Legislatively provide for a simplified NEPA process that offers the equivalent of a 1040 EZ tax return for projects with few significant impacts.
- Revise Council on Environmental Quality (CEQ) regulations to allow additional factors to narrow the number of alternatives considered as “reasonable alternatives”:
  - Alternatives should be appropriate for project-level (rather than planning-level) decisions
  - Alternatives should reflect community values
  - Alternatives should reflect funding realities
- Revise CEQ regulations for implementing NEPA to allow for a single EIS rather than the current requirement for a draft and final EIS, while preserving adequate opportunities for public comment and review.
- In parallel with revisions to CEQ regulations, FHWA would set minimum conditions for what must occur during a “robust scoping period” before publishing the Notice of Intent and formally beginning NEPA. Some requirements could include:
  - Determination of general project location
  - Determination of modal choice
  - Development of a risk management plan
- Handle impacts identification and mitigation issues early by considering them in an integrated fashion, looking at overall resources rather than in a sequential, project-by-project basis. This might involve addressing these issues at the programmatic level earlier in the planning process.
- Standardize the “risk design” approach under Federal regulations so that project sponsors can proceed with design activities at risk during the EIS process. The USDOT recently issued similar guidance for bridge projects in wake of the Minneapolis bridge collapse.
- Require greater coordination among Federal agencies reviewing transportation project permits, including:
  - Setting time limits for review
  - Using Federal transportation funds to pay for regulatory staff to speed reviews and comply with time limits
  - Establishing a Cabinet-level appeal process where USDOT can seek redress for adverse decisions.



## **Advancing the Federal Interest: 10 Programs**

The 10 programs described below represent the key areas identified by the Commission for Federal participation and funding. Each description explains why a Federal role is appropriate, how performance measures and standards would be set, potential strategies for meeting performance standards, and proposed Federal funding shares for qualifying projects. These 10 new programs are intended to replace the dozens of separate highway and transit funding categories in SAFETEA-LU.

An important element of many programs would be the development of national plans to accomplish key national program goals. These plans would also serve as the basis for apportioning funds to the States on a cost-to-complete basis, much as was done for initial construction of the Interstate System. National plans would be

developed for the Rebuilding America; Freight Transportation; Metropolitan Mobility; Safe Mobility; Connecting America; Intercity Passenger Rail; Federal Lands; and Research, Development, and Technology programs. These plans would then be consolidated into a national strategic plan for Federal investment by the USDOT.

Except for the Federal Lands and Research, Development, and Technology programs, national program plans would be based on individual plans developed by each State and major metropolitan area. The USDOT, in cooperation with State and local governments, multi-State coalitions, transportation system users, and the full range of public and private stakeholders, would develop national performance standards for each applicable program area. Those standards would be closely coordinated with key environmental and energy objectives. The USDOT would then work with each State and major metropolitan area to develop

### **Refocusing the Federal Program structure**

|  |                     |
|--|---------------------|
| Federal Highway Administration                 | 62 Programs         |
| Federal Transit Administration                 | 20 Programs         |
| Federal Railroad Administration                | 6 Programs          |
| National Highway Traffic Safety Administration | 12 Programs         |
| Federal Motor Carrier Safety Administration    | 8 Programs          |
| <b>Total</b>                                   | <b>108 Programs</b> |

1. Rebuilding America: A National Asset Management Program
2. Freight Transportation: A Program to Enhance U.S. Global Competitiveness
3. Congestion Relief: A Program to Improve Metropolitan Mobility
4. Saving Lives: A National Safe Mobility Program
5. Connecting America: A National Access Program for Smaller Cities and Rural Areas
6. Intercity Passenger Rail: A Program to Serve High-Growth Corridors by Rail
7. Environmental Stewardship: A Transportation Investment Program to Support a Healthy Environment
8. Energy Security: A Program to Accelerate the Development of Environmentally-Friendly Replacement Fuels
9. Federal Lands: A Program for Providing Public Access
10. Research, Development, and Technology: A Coherent Transportation Research Program for the Nation

performance standards for their programs. The time frames for meeting national standards could vary for individual areas depending on local circumstances, but eventually each State and metropolitan area would be expected to meet national standards.

State and local performance standards would form the basis for State and metropolitan plans. These plans would replace the long-range and short-range plans that currently are required, but would be expected to include many of the same elements. Major differences between current plans and the plans under the new program are that major projects under the new plans would have to be shown to be cost-beneficial and plans would have to be developed to meet specific performance standards. Progress toward meeting performance standards would be measured.

The Federal government should be a full partner with the State and local governments and the private sector in meeting the significant investment requirements of this new approach. Since the plans would be the basis for apportioning funds among the States, a high degree of uniformity would be required. Only projects in the plans would be eligible for Federal funds, so plans would have to be comprehensive, especially for the near term. Since transportation needs are dynamic, plans would have to be updated, especially prior to each surface transportation reauthorization. Also, because there are overlaps among programs, plans



developed for one program must be consistent with plans developed for other programs.

**(1) REBUILDING AMERICA: A National Asset Management Program.** Our economic and social wellbeing depends on the multi-trillion dollar investment we have made over the course of the Nation's history on transportation infrastructure and services. All levels of government and the private sector have contributed to this inheritance. Accordingly, it is clearly in the interest of all parties, starting with the Federal government and its own immense investment in this system, that we not squander this legacy through underinvestment in its preservation and maintenance. **Therefore, the first of the 10 programs proposed by the Commission would**



Louisiana Hurricane Katrina U.S. 90 Ocean Springs



Texas I-20 West of Pecos



**put and keep the Nation's infrastructure in a state of good repair in the most efficient and cost-effective manner possible.** More specifically, this program would address the portions of the surface transportation network in which there is a strong Federal interest: Federal-aid Highways, including the Eisenhower System of Interstate and Defense Highways and the National Highway System, major transit assets, intercity passenger and freight rail lines, and network connectors between our modes that complete the overall system.

This program underlies all of the other recommended programs, and would need to be closely coordinated with them. The USDOT would define appropriate performance standards for each facility type, in conjunction with States and stakeholders. The full range of stakeholders (including system owners, operators, and users) would be convened by each State Department of Transportation and public transit operator. This group would use its participants' plans based on information that inventories shortcomings in the physical infrastructure in order to develop estimates of the cost to restore these facilities, putting into place best practices of capital budgeting with full consideration of life-cycle costs. These estimates would include the costs of technological and safety upgrades to be made in conjunction with these rebuilding and preservation projects, to improve the operational and safety performance of existing facilities. States would be able to use Transportation Asset Management methods and tools (such as pavement management systems) to establish that the projects contained in their plans are the most cost-effective actions.

**To assure the maximum effectiveness of Federal capital investment support, States, local governments, and other entities accepting Federal capital support must develop, fund, and implement a program of asset maintenance and support over the useful life of the asset**



**that conforms to nationally accepted standards and that is independently audited.** The Federal contribution to funding each of the eligible projects would be established at 80 percent of the project costs.

## **(2) FREIGHT TRANSPORTATION: A Program to Enhance U.S. Global**

**Competitiveness.** Interstate commerce is the historic cornerstone defining the Federal role in transportation. The Federal interest in promoting efficient interstate and international flows of goods and services has motivated the Federal government to support road, canal, and railroad building since the early days of the Nation. Over the last several decades, however, the investment has not kept pace with the demands of modern, trade-driven supply chains that stretch from the United States to virtually everywhere in the world. Growing volumes of freight that now move along our roads, rails, and waterways are increasingly choked by a lack of adequate capacity. These chokepoints at major gateways and trade corridors are a potential trade barrier as threatening as tariffs, and often represent environmental hot spots. Economic forecasts indicate that by 2020, freight volumes will be 70 percent greater than they were in 1998. Without improvements to the surface transportation network (especially key freight transportation corridors), freight transportation will become less efficient and reliable, hampering the ability of American businesses to compete in the global marketplace.

*“We don't need hurricanes and national disasters to show us that freight transportation is important.” – Larry L. (Butch) Brown, Sr., Executive Director, Mississippi Department of Transportation, at the Commission's Atlanta field hearing.*



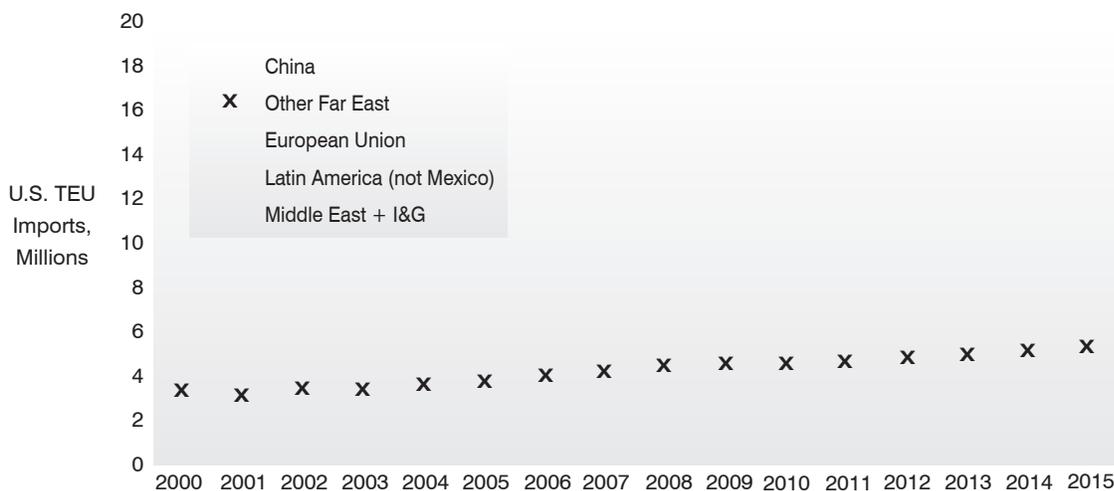
**The Commission believes that the Federal government must return to its historic role of ensuring that the transportation needs of interstate commerce are met. The Commission supports the creation and funding of a national freight transportation program that would, in conjunction with States and metropolitan areas and consistent with a National Freight Transportation Plan, implement highway, rail, and other improvements that eliminate chokepoints and increase throughput.**

The program would provide public investment in crucial, high-cost transportation infrastructure. This would include projects to increase capacity on the Federal-aid highway system (predominantly the Interstate System and portions of the National Highway System) significantly impacted by national and regional freight movements. It would also include public-private projects that have potential national and regional benefits, including facilitating international trade and

relieving congestion. Such projects would include intermodal connectors—roads that link intermodal facilities with an interstate highway—and key sections of interstate highways, such as those near port facilities, where congestion increases air pollution from mobile sources and adds time and costs to the supply chain. Eligible projects could also include assistance for strategic national rail bridges where cost of construction exceeds return on private invested capital, implementation of train control technology, and assistance in corridor development. In addition, eligibility would include development of “green” intermodal facilities and operations, and on/near dock facilities. These projects can reduce vehicular congestion, emissions, and noise—and can improve safety.

The USDOT would take a strong role in formulating the National Freight Transportation Plan by establishing a set of performance standards related to efficient management of

**Projected growth in container imports to the U.S. merchandise trade by export region, 2000–2015**



**This chart shows that containerized imports have grown dramatically in recent years, particularly from China. The growing dominance of China in the containerized trade is expected to continue in the future.**

Sources: Global Insight World Trade Service



One of the earliest examples of one type of

increasing freight volumes. The development and accomplishment of the State plans would in most cases require multi-State cooperation. Multi-State and State freight planning groups would use stakeholder-provided information to develop a consensus on future investments in major highways, freight rail facilities, waterways, ports, and intermodal facilities. States would be required to evaluate the projects in their plans using benefit-cost analysis from the point of view of the public benefit, looking at the full range of potential solutions to freight chokepoints to find the best value for society. Project funding should be merit-based and grantees should be accountable for meeting freight mobility performance standards, and consistent with national environmental and energy goals.

It will be important to standardize public benefit methodology for evaluating and negotiating partnerships between private entities (such as railroads), States, and local and Federal interests. This will ensure that private entities are not subsidized and, concomitantly, that they are not required to pay for public benefits. Government support for infrastructure projects could actually result in a net reduction of overall needed capacity expansion if private investment is diverted to projects with primarily public benefits. Similarly, publicly funded projects should not require non-economic private investment or service, or supplant or diminish private investment.

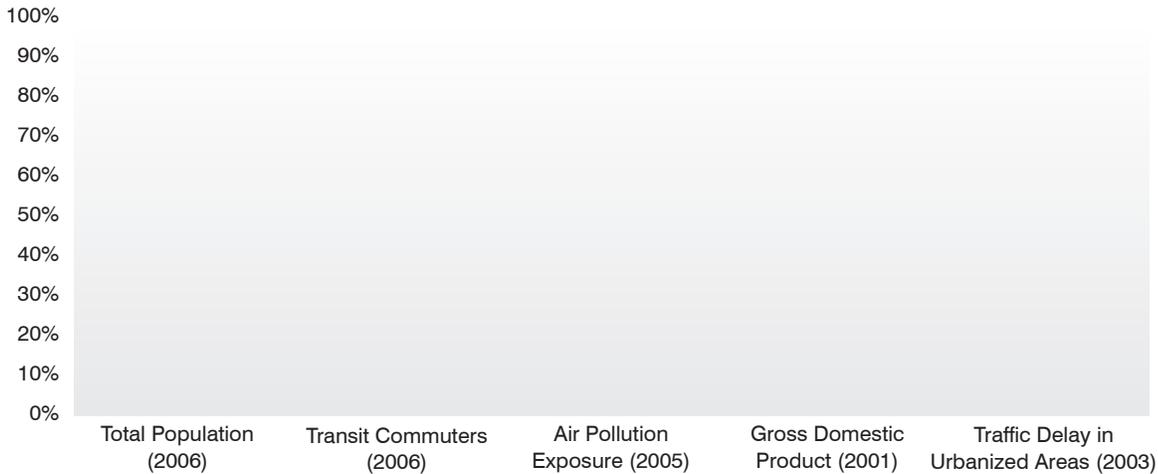
Federal participation in individual projects would be 80 percent, with higher participation levels justified based on their national benefits, particularly when benefits fall primarily outside of the region. Apart from demonstrating that proposed projects under this plan are cost-effective and justified, additional Federal requirements would be kept to a minimum.

**(3) CONGESTION RELIEF: A Program for Improved Metropolitan Mobility.** The Nation's urban areas generate 60 percent of the value of U.S. goods and services. The efficient movement of citizens and goods within these areas is critical to their productivity, and by extension, to the economic productivity of the Nation itself. Clearly, the Nation has a vital interest in guaranteeing efficient metropolitan mobility. **Therefore, the Commission recommends that a distinct program be established to fund projects that reduce congestion in our largest metropolitan areas (of 1 million or more in population).**





**Metropolitan areas over 1 million in population share of U.S. totals for selected characteristics**



**Large metropolitan areas account for a large share of the total population, economic output, transit commuters, air pollution exposure to people, and traffic delay in the United States.**

Source: Metropolitan Transportation Commission

Analyses conducted by the Commission indicate that a 20 percent reduction in per-vehicle delay on major urban highways is possible by 2025. The analyses show, however, that this goal cannot be met without a comprehensive set of strategies to manage demand, improve operations, significantly increase transit capacity and ridership, and significantly expand highway capacity. Many of these strategies, especially expanded transit systems and additional highway capacity, will involve substantial capital investment.

Meeting this goal will require broad coordination among agencies at multiple levels of government. The USDOT would set mobility goals for large metropolitan areas by first establishing standardized measures of mobility (e.g., hours of delay per 1000 vehicle miles traveled [VMT]). It would then specify national mobility standards for metropolitan areas. The full range of public and private stakeholders (including system owners, operators, and users) involved in the planning, construction, and operation of regional

transportation in such metropolitan areas would be convened to assure consideration of the urban interests in defining national standards. This would help integrate transportation planning into other urban planning activities.

The Commission expects that the Metropolitan Mobility plans in most metropolitan areas will include an increasing emphasis on public

*“Our revenue expenditure system is focused on road construction, which is a process, as opposed to reducing congestion, improving air quality, or transferring the movement of hazardous materials away from our urban centers.”*

*– Rich Williamson, Chairman of the Texas Transportation Commission, at the Commission’s Dallas field hearing.*



transportation, especially electrified railways. Federal transportation policy must more effectively support and encourage the use of public transportation as part of a balanced approach to metropolitan mobility. Traditional bus and rail transit and, where appropriate, intercity passenger rail must be an increasingly important component of metropolitan mobility strategies due to their ability to move large volumes of people into and out of areas that cannot handle more automobiles. Not only is transit an important element of congestion relief strategies, it supports policies to reduce transportation energy consumption, greenhouse gas emissions, and air pollution if sufficient use is demonstrated. The Commission believes that public transportation is essential to meeting our future mobility needs in metropolitan areas. But even with transit playing a much bigger role in the future, the Commission believes that many of the plans will also include significant increases in highway capacity as part of a robust nationwide surface transportation system.

**U.S. carbon emissions from fossil energy consumption by end-use sector in 2005**



**The chart shows that the transportation sector is the largest contributor of greenhouse gas emissions in the United States.**

Source: Energy Information Administration

The Commission recognizes that road pricing has great potential to reduce congestion and improve system efficiency because of its ability to better utilize the Nation's existing infrastructure. Congestion pricing provides an incentive for personal travelers to drive during off-peak hours, or to change their mode of transportation for time-sensitive journeys. Such fees are higher in times or places with heavy traffic, and lower in other times and places with light traffic. They are already used at a variety of highways, bridges, and tunnels throughout the U.S. Such fees promote the efficient use of existing infrastructure. To the extent that some drivers choose other modes or routes or to travel at less congested times of day rather than pay the fee, congestion is reduced. Congestion fees have a further critical benefit in that they send price signals about the need to add capacity, thus promoting the efficient use of investment dollars in the long run. Mobility goals also should reflect the fact that high traffic urban highways can generate significant revenues from congestion pricing, requiring less tax-based funding. Metropolitan areas of 1 million or more in population would use these performance standards and national goals to develop their own performance standards, developing Metropolitan Mobility plans to meet these standards in a cost-beneficial manner. The Commission also expects that the major metropolitan areas will be guided



by these standards in their accommodation of new economic and population growth.

Funds authorized under the Metropolitan Mobility program would be reserved for urban areas of 1 million or more in population. Although these major metropolitan areas comprise about 60 percent of total U.S. population, they capture over 85 percent of national market share for three critical transportation indicators: traffic congestion, transit ridership, and population exposure to auto-related air pollution.

Planning and project selection authority in the Metropolitan Mobility program would be vested in a transportation agency designated by the Governor and leading local elected officials from the metropolitan area. This could be the Metropolitan Planning Organization (MPO), another regional transportation agency, or the State department of transportation. In multi-State metropolitan areas, authority could be vested in a consortium of agencies through interstate compact. The Federal funding share of Metropolitan Mobility projects would be 80 percent of project cost.

*“And if America is to compete internationally it has to make...dramatic investments in its metropolitan infrastructure systems to keep pace.”*  
– *Bob Yaro, President of the Regional Plan Association, at the Commission’s New York field hearing.*

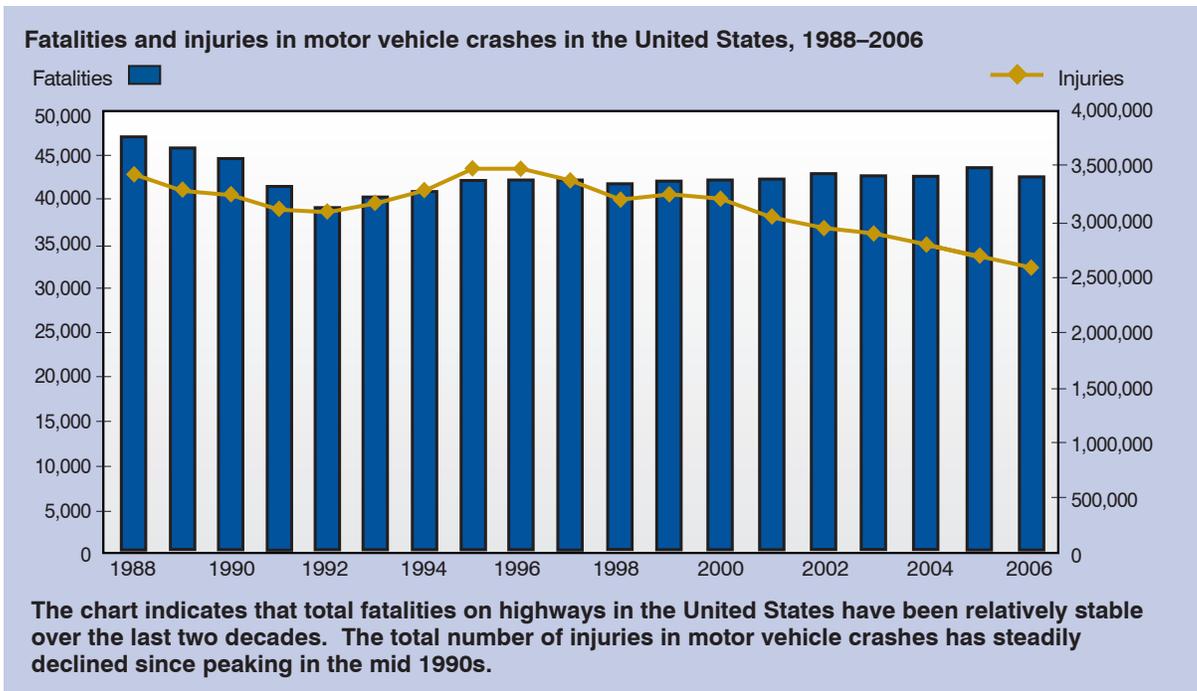
We urge Congress to broadly define “metropolitan area” for the purposes of the program, such as employing the concept of combined statistical areas defined by the Office of Management and Budget.



The scale of human life extinguished by

**(4) SAVING LIVES: A National Safe Mobility Program.** Travelers on the Nation’s surface transportation system have a right to expect safe and uniform transportation conditions from coast to coast. The Federal role in establishing safe conditions for travel is well established through agencies such as the National Transportation Safety Board, the Federal Motor Carrier Safety Administration, and the National Highway Traffic Safety Administration, and through Federal safety regulation of air, land, and sea travel. It is, therefore, the Commission’s recommendation that a national plan for safety be developed that both informs investments in all other transportation programs and leads to transportation investments undertaken purely for safety purposes.

Currently, highway travel accounts for 94 percent of the fatalities and 99 percent of the injuries on the Nation’s surface transportation system. In 2006, 42,642 persons were killed and approximately 2,575,000 were injured in highway crashes. Significant progress has been made over the last 50 years in improving highway safety. Fatality rates dropped from 5.3 fatalities per 100 million VMT in 1965 to 1.42 fatalities per 100 million VMT as of 2006. However,



Source: National Highway Traffic Safety Administration

compared with other developed countries, a few of which have fatality rates at or below 1.0 fatalities per 100 million VMT, it is clear that the U.S. still has much room to improve its highway safety. Were we presently at a rate of 1.0 fatalities per 100 million VMT, total highway fatalities would be at just over 30,000 per year—still much too high but some 12,600 fewer than we currently sustain as a Nation, year after year.

The USDOT would define safety performance metrics (e.g., fatalities and serious injuries per 100 million VMT) to be used by all Federal, State, and local agencies to measure progress. **The Commission recommends that the USDOT establish national safety standards, beginning with an ambitious but reachable goal to cut surface transportation fatalities in half from current levels by 2025.** Specific standards for individual States and metropolitan areas would

be established through consultations with safety interests including State and local departments of transportation and other governmental units. States and metropolitan areas would then develop strategies for reaching their specific safety goals, both by incorporating safety projects within the Safety plan and by including safety features into projects listed in the various Freight Transportation, Metropolitan Mobility, and Rebuilding America plans proposed by the Commission. Reflecting the importance the Commission assigns to improved safety, it recommends that the Federal share of the funding of qualifying safety projects be 90 percent of the project cost.

Because the users of every transportation mode are affected by injuries and fatalities, the solutions to improving the overall level of transportation safety must be broad and multifaceted. The following

strategies should be considered in State and local plans:

- Highway improvements to reduce roadway departures, create a safer environment for pedestrians and bicyclists, and reduce intersection crashes
- Stronger enforcement of safety laws including speed limits, seat belt laws, and impaired driving laws, making the maximum use of technology to do so
- Enhanced adjudication of highway safety laws to impose penalties commensurate with the seriousness of the offenses
- Enhanced motor carrier safety programs to reduce crashes caused by driver fatigue, unsafe operators, and automobile drivers who do not know how to share the road with large trucks
- Stronger licensing requirements that take into account age and experience
- Highly visible public education campaigns to make everyone aware of the severity of highway safety problems
- Low-cost safety enhancements such as guardrails and striping
- Enhanced efforts to deploy technology, equipment and grade separate rights-of-way to reduce rail-highway grade crossing accidents and reduce trespass incidents, which are the fastest-growing aspect of rail-related accidents and incidents
- Research and deployment of new technologies that hold the promise of substantially reducing highway fatalities, such as improvements in vehicle safety features, ignition interlocks to prevent persons whose blood alcohol content is too high from starting vehicles, and Vehicle Infrastructure Integration (VII) that could help avoid unsafe movements in traffic while improving traffic flow.



**(5) CONNECTING AMERICA: A National Access Program for Smaller Cities and Rural Areas.** Virtually all of the Nation’s natural wealth and basic food production—the abundance found in its farms, forests, mines, and other resources—is located outside of the major metropolitan areas. The Nation has an enormous interest in providing efficient transportation connections to these industries, allowing capital and labor to reach them and products to flow out from them to U.S. and foreign markets and consumers. Over time, vast economic and demographic changes have occurred throughout the Nation that have led to the emergence of new cities, suburbs, and exurban centers. **Updating the basic backbone of the surface transportation**

“County roads are a vital component of this country’s transportation system.

Every trip begins or ends on a local road.” – Sue Miller, Secretary Treasurer, National Association of County Engineers and Freeborn County Engineer, at the Commission’s Minneapolis field hearing.



**system must take into account those urban and rural communities, especially those that were not developed when the initial highway and rail infrastructure networks were created.** High-performing connections for the movement of freight and people are necessary to link the Nation's population and economic centers that currently do not have such connections. Efficient transportation is important for those industries and for people who depend on those industries as well as for the many Americans who live in these areas or travel through them.

The Commission concludes that there are inadequate highway connections to fully develop the Nation's heartland communities. The Commission also concludes that public transportation in rural and urban areas is vital to providing access to essential human services for those who do not have access to automobiles. For instance, over 1,200 transit operators provide service in rural areas, and these systems are often the only means of transportation available to older and disabled citizens by which to access critical medical and social services. Many rural areas lack public transportation services entirely. This leaves individuals without access to automobiles with very limited mobility options. It also creates hardships for those unable to drive, such as older adults and persons with disabilities.



In establishing criteria for this plan, the USDOT should develop population thresholds that would be suitable for various forms of public transportation. The USDOT would establish standardized measures of access (e.g., all weather access to agricultural and industrial sites by large trucks, or mobility by at least one transportation mode available to all citizens), as well as national accessibility goals. The full range of public and private stakeholders (including system owners, operators, and users) involved in the planning, construction, and operation of regional transportation systems would be involved in developing these standards and measures. There will be many small metropolitan areas within the heartland areas that will already have benefited from the metropolitan planning done under the provisions of previous Federal transportation legislation. The Commission recommends that the metropolitan planning requirements be retained and that these smaller areas continuously measure themselves against the national mobility standards and accommodate their economic and demographic growth with those performance standards in mind.

Each State would develop State-specific performance standards in terms of these performance measures and develop plans to meet these objectives in an economically justified manner. The Commission recommends that Federal funding of projects in approved plans cover 80 percent of project costs.

**(6) INTERCITY PASSENGER RAIL: A Program to Serve High-Growth Corridors by Rail.** The growing congestion of the air and highway transportation systems is an issue of major concern to the Nation. Amtrak and State-supported corridors have demonstrated that fast, frequent, and reliable rail service can offer competitive efficiencies in congested passenger travel markets that can significantly reduce pressure on the other modes.

**Passenger rail transportation is a key component of the Commission’s vision for the future, and the Nation should pursue the development of a fast and reliable rail passenger network.** The Commission believes that Intercity Passenger Rail is a critical missing link in the Nation’s surface transportation system. Over the past 50 years, passenger rail lines have shrunk dramatically in parts of the country, and some lines with the potential for passenger rail service are in need of investment. Intercity passenger rail investment would help meet important national energy and environmental goals by shifting travel to trains, which consume approximately 17 percent less energy per passenger mile than air carriers and 21 percent less energy per passenger mile than automobiles.

The Commission envisions an intercity passenger rail network that provides competitive, reliable, and frequent passenger service, comparable to world-class systems in other countries. This network would primarily connect regions and population centers within 500 miles of each other. To build the network, the States, in coordination with the USDOT, would develop an Intercity Passenger Rail Program consisting of State and regional passenger rail plans. These plans would be based on benefit-cost analyses that include both the user and non-user benefits of passenger rail. Track access for passenger rail service, and the cost of present and future capacity requirements, would be negotiated between freight and passenger rail interests.

The States’ rail plans would also include performance measures that address national performance criteria. Key performance measures for the rail system would include reliable on-time performance, congestion mitigation, safety and environmental benefits, improved transportation choices, mobility options for communities with limited options, and reduced energy use. Specific regional goals would be established through



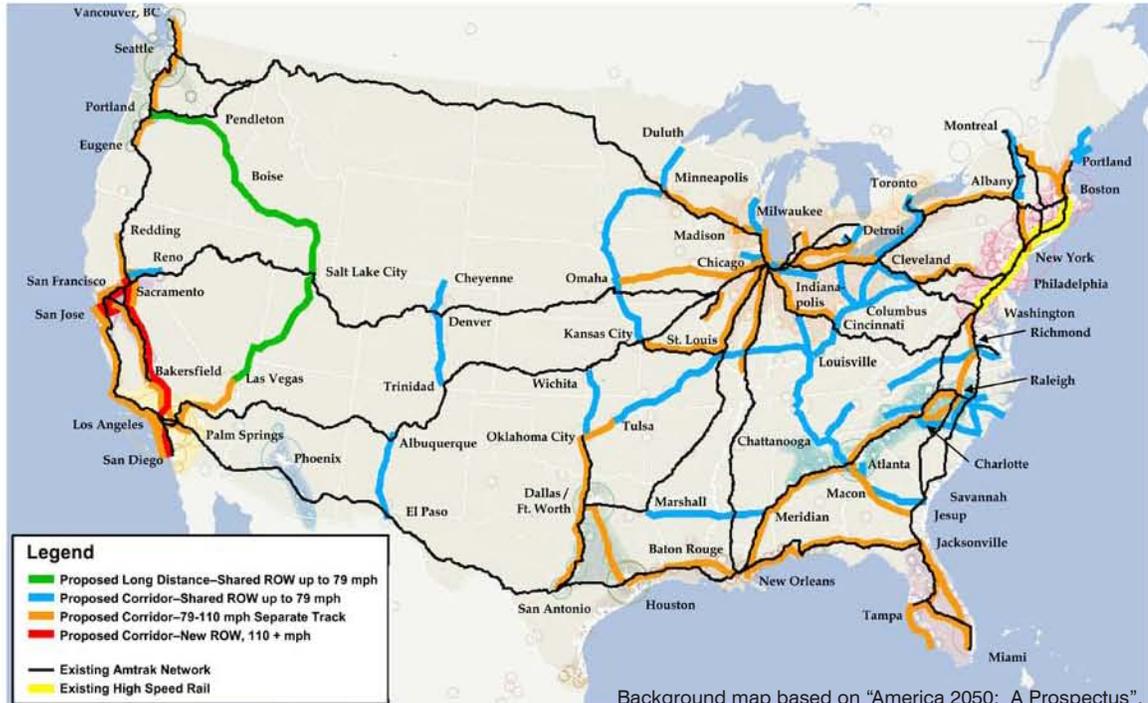
consultation among State and local governments, Amtrak, and the freight railroads, which own most of the rail infrastructure and rights-of-way over which the passenger trains would operate.

The Commission supports policy options that permit passenger trains to achieve their full potential concerning speed, frequency of service, and on-time performance and that assures that the freight rail industry can provide service required to meet its own growth in demand. Outside the Northeast Corridor, passenger rail depends on the freight system for access to track capacity, but freight rail capacity is limited and freight rail capacity needs are growing. Investment in a robust passenger rail system in the U.S. will need to be appropriately scoped to ensure that performance criteria on joint-use lines can be achieved, that passenger rail service providers pay for their capacity on freight rail lines, that investments to support capacity and performance requirements are made for both passenger and freight service, and that rights-of-way can be

“What is missing [is] a federal funding partner that recognizes that rail should be part of the national transportation system in spite of the privateness of the industry.”  
– David King, Triangle Transit Authority, at the Commission’s New York field hearing.



**PRWG proposed 2050 intercity passenger rail network**



Background map based on "America 2050: A Prospectus".  
www.america2050.org. Regional Plan Association

**This map identifies the passenger rail network that corresponds to the long-term capital costs and ridership projections identified in Exhibit 4-17. The PRWG describes this map as illustrative, as the exact routes that would be included in such a network could differ.**

Source: *Vision for the future: U.S. intercity passenger rail network through 2050*, prepared for the Commission by the Passenger Rail Working Group.

developed or expanded to allow for separate passenger and freight operations as passenger and freight demands grow.

The first step in resolving the rail infrastructure capacity crunch is to address problems occurring in specific corridors. The public and private sectors must come together to create solutions. The USDOT would ensure that State and regional plans are coordinated and that they complement one another. The Intercity Passenger Rail Program should be funded on a cost-to-complete basis with an 80 percent Federal share, primarily for capital costs.

**(7) ENVIRONMENTAL STEWARDSHIP: A Transportation Investment Program to Support a Healthy Environment.** The relationship of transportation to the environment has been a source of national concern for more than a half-century. Roads and the vehicles that use them can have adverse effects on air and water quality, noise, undeveloped land, community structures, and other natural and human resources that influence our quality of life. These impacts usually fall on people and places that are beyond the boundaries of the transportation facility; they can even reach national and global communities, thus justifying a



Federal interest in their mitigation. It is important for the transportation sector to minimize its impacts on the natural environment.

“Develop a tangible set of outcomes tied to goals and purpose...carbon dioxide and energy reduction, increase in travel options for people and goods, safety and health.” – *Anne P. Canby, President of the Surface Transportation Policy Partnership, at the Commission’s Washington, D.C., field hearing.*

**The Commission believes that an Environmental Stewardship Program should be established and authorized at a level equivalent to 7 percent of the total funding for the Federal surface transportation program.** This percentage constitutes approximately a 2 percentage point increase over the current share of Federal funding devoted to these types of purposes, and is recommended because of the broader scope of activities that would be included in this program, as described below. This consolidated program would replace several existing environmental programs, providing more flexibility to States in their efforts to mitigate the environmental impacts of transportation.

These program funds would be distributed to the States on a per-capita basis and would be eligible for the following purposes, with a Federal share of up to 80 percent of project costs. At least 10 percent of the program funding by State would be required to be spent on each of the following four sets of purposes, leaving the remaining 60 percent for flexible State investment:

- **Air Quality:** Eligible projects would smooth traffic flow, mitigate vehicular congestion related to rail crossing, encourage use of

intermodal freight options, encourage alternative commute options such as carpooling and transit, scrap older vehicles, and encourage more energy-efficient construction and lighting materials in the transportation system, to reduce carbon dioxide and other greenhouse gas emissions.

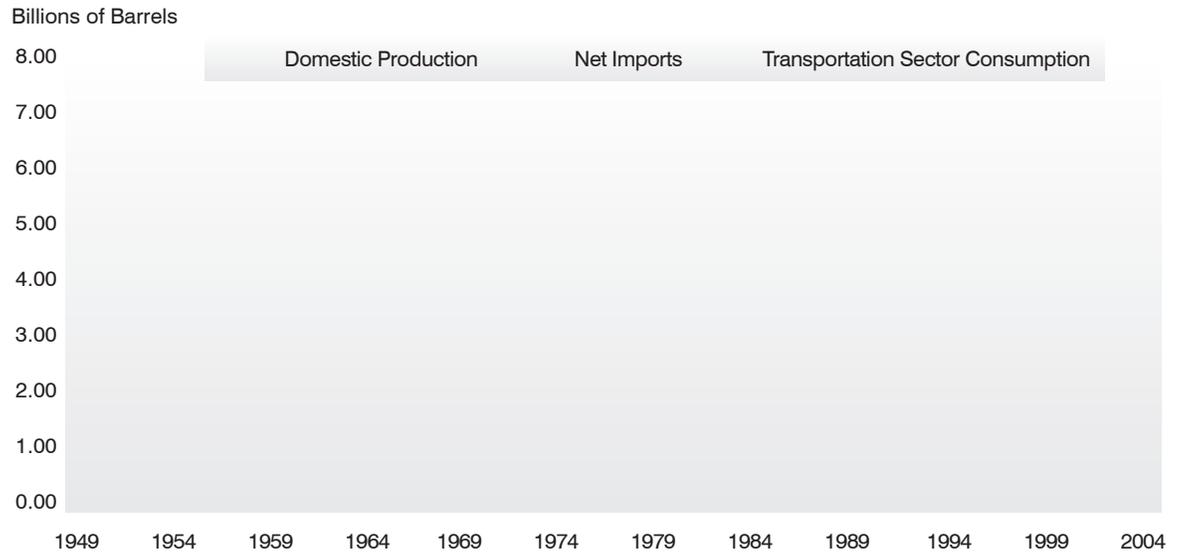
- **Vehicle Retrofit:** Stimulate retrofitting of existing diesel vehicles and equipment (trucks, buses, and locomotives) as a means of reducing pollutants caused by older equipment, e.g., pre-1998 vehicles. Incentive models include the \$1 billion trade corridor mitigation program enacted as part of California’s 2006 transportation bond measure.
- **Transportation Enhancements:** Continue dedication of funding for actions that would mitigate the impact of transportation activities on communities. This would build on the existing Transportation Enhancement Program, with a tighter focus on transportation features.
- **Programmatic Mitigation:** In addition to specific enhancement projects, the Commission also recommends consideration of more programmatic approaches, such as banking both money and land to preserve endangered habitat and other open space. Models include an \$850 million program in San Diego County’s 2004 transportation sales tax measure.

The Commission also supports Federal tax incentives for early deployment of next-generation, cleaner-burning and more fuel-efficient vehicles and locomotives.

**(8) ENERGY SECURITY: A Program to Accelerate the Development of Environmentally-Friendly Replacement Fuels.** Energy has become a critical transportation issue. The Nation’s mobility is largely dependent on gasoline



**Annual petroleum production, imports, and consumption in the United States, 1949–2006**



**The chart shows that U.S. petroleum imports have increased rapidly over the last 25 years, as domestic production has declined and consumption has increased, led by the transportation sector.**

Source: Energy Information Administration

and diesel fuel, with transportation accounting for two-thirds of U.S. petroleum use. Price increases in gasoline and diesel over the last several years have had major impacts on the budgets of American industries and families, inflation, and economic growth. Projections indicate that growing world demand for fuel and dwindling petroleum reserves only will exacerbate these problems. The U.S. dependence on unstable areas of the world for some of our petroleum supplies also introduces the risk of economically disruptive oil price shocks and constrains our ability to respond appropriately to national security concerns. The production and consumption of petroleum for transportation purposes is also a leading source of the Nation's output of greenhouse gas emissions. For these reasons, the Federal government has a vital interest in supporting initiatives that cost-effectively reduce the Nation's dependence on petroleum for transportation.

**The Commission recommends that a distinct transportation energy research and development program be authorized in conjunction with ongoing research programs of the U.S. Department of Energy to address these goals, at a level of \$200 million annually over the next decade.** For transportation to make a significant contribution to reducing energy consumption, policies to that end cannot be marginal, but instead must be basic to mobility. Therefore, the Commission recommends the development of a national research program and commitment to accomplish this end.

In its 2004 report, the National Commission on Energy Policy recommended a doubling of Federal funding for energy research and development between 2005 and 2010. According to that report, Federal spending on transportation-related energy research was \$178 million in 2004. In evaluating long-term alternatives to gasoline, the

panel identified hydrogen as a replacement by the year 2050, but cautioned that “efforts to speed deployment of a hydrogen transportation system should not displace other activities that can deliver significant results in the next twenty years.”

The Commission recognizes that the evolution of energy security for the U.S. transportation industry will require a true public-private partnership, one that provides incentives for the private sector to accelerate the development of widely distributed infrastructure for alternative fuels and for the incorporation of multi-use elements in new developments and land use planning. The Commission recommends that Congress establish an accelerated tax credit program and a revolving loan program to encourage early investment in such facilities and opportunities. Accelerated tax credits could also be made available to encourage the early transition of fleets and motor power away from dependence on petroleum-based fuels.

**(9) FEDERAL LANDS: A Program for Providing Public Access.** Of the 2.3 billion acres in the U.S., the Federal government has title to about 650 million acres (or about 30 percent of the total area of the U.S.). **The Commission believes the Federal government should continue to be responsible for transportation access to this Federal property.**

Although Federal lands are largely located in rural areas, urban growth is constantly expanding closer to these areas. This growth is placing new pressures on natural landscapes, including but not limited to increased demand for recreational activities and energy/alternative energy sources. The growth of domestic and international tourism is also contributing significantly to increased visitation rates on Federal lands. These demands place increasing emphasis on the need for adequate public transportation access. Providing such access requires cross-jurisdictional collaboration



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“The rural west also needs the Public Lands Highway Program and the Indian Reservation Roads Program because those lands cannot be used or taxed by the State to support the provision of transportation and other State services.” – *Judith Payne, Secretary, South Dakota Department of Transportation, at the Commission’s Minneapolis field hearing.*

and integrated planning with adjoining State and locally owned transportation infrastructure.

The existing Federal Lands Highway Program (FLHP) is administered through partnerships and interagency agreements between FHWA’s Office of Federal Lands Highway and Federal Land Management Agencies and Native American Tribal customers. FTA’s Alternative Transportation in Parks and Public Lands Program funds transit and non-motorized transportation serving Federal lands. Federal Land Management Agencies include the Bureau of Indian Affairs, U.S. Forest Service, National Park Service, Federal Wildlife Service, Bureau of Public Lands, Military Surface Deployment and Distribution Command, U.S. Army, U.S. Army Corps of Engineers, U.S. Navy, Tennessee Valley Authority, and the Bureau of Reclamation. NASTRAC would work closely with the FHWA and the Federal Land Management Agencies through the FLHP to develop appropriate performance standards and goals for transportation facilities on Federal lands.

Funding of improvements on Federal lands would be the responsibility of the Federal government and, as such, would be funded with no matching share. To bring the same degree of accountability and transparency to this new program, the

USDOT would establish standardized measures of performance, bringing into the process the full range of public and private stakeholders (including system owners, operators, and users) to develop these goals and measures.

**(10) RESEARCH, DEVELOPMENT, & TECHNOLOGY: A Coherent Transportation Research Program for the Nation.** Research plays an essential role in the development of technology and science. It has made possible much of the progress in transportation over the last century through the development of new materials, production methods, design and planning tools, and data management techniques. The Federal role in transportation research, development, and technology (RD&T) is particularly vital because the Federal government has the resources to undertake and sustain large-scale, high-risk, long-term research that is cost-prohibitive for small private and public sector organizations.

**The Federal government is best suited to monitor the vast scope of research activities underway across the Nation and the world, targeting funds to research gaps.** As Congress noted in Title 23 of the U.S. Code, “research and development are critical to developing and maintaining a transportation system that meets the goals of safety, mobility, economic vitality, efficiency, equity, and environmental protection.” As of the present, however, too much Federally sponsored surface transportation research is undertaken without clearly defined anticipated payoffs. The research efforts that are funded are sometimes redundant with other efforts and the research quality is inconsistent. In many cases, Federal research funds are distributed by political earmarking.

The Commission recommends that dedicated Federal funding of RD&T be provided, and that this funding be subject to careful planning and review by the transportation industry. The



“We need a strong Federal presence for transportation research in the new bill.

It pays for itself time and time again.”

– Colleen Landkamer, President, National Association of Counties and Commissioner, Blue Earth County, Minnesota, at the Commission’s Minneapolis field hearing

USDOT should work with the modes, industries, and stakeholders in the Nation’s research community, such as the Transportation Research Board and institutions of higher learning, to establish performance measures and goals for a National RD&T plan. Given the fundamental importance of good performance data and modeling to all of the plans discussed in this report, the Commission recommends that an important goal for research under the National RD&T plan should be to improve the Nation’s ability to measure project performance data, including research into improved traffic, safety, environmental, and energy modeling. Improved tools for benefit-cost analysis and other forms of economic analysis for projects would also be another priority.

Data collection is necessary to support good transportation decision-making at all levels of government, and the Commission believes that there must be robust, predictable Federal investment in this area. In particular, developing the national strategic plan proposed by this Commission will require extensive data and analytical resources. Data on household travel behavior, freight movement, vehicle use, infrastructure condition, and operational performance will be particularly critical to identifying emerging trends, supporting transportation research, and evaluating the effectiveness of transportation programs, while

assuring that future decision makers have the information they need to respond and adapt to changing conditions.

As in the Federal Lands Program, these research activities are a Federal responsibility and would be funded with no matching share.

### **Interaction Among the Programs**

While the 10 programs identified above represent 10 distinct areas of Federal interest, individual projects may contribute to achieving goals in multiple areas, and thus the programs cannot be considered completely independent. The Commission believes that coordination among the planning activities required for each of the programs will be essential. Coordination should begin as plans are developed at the local, State, and regional level, but the USDOT will need to take an active role in consolidating these separate plans into a national strategic plan. Examples of interactions among programs would include the following:

- Federal policy should comprehensively support freight mitigation efforts not only through the proposed Freight Transportation program, but also through eligibility in the Metropolitan Mobility, Connecting America, Intercity Passenger Rail, Environmental Stewardship, and other programs. There should be broad eligibility across programs for activities that support the aims of each respective program, toward achieving the vision of the most efficient and sustainable transportation system possible.
- Robust State and metropolitan planning will be essential to the success of the national strategic planning process we envision. Accordingly, the Commission recommends continuing the practice of funding these planning activities as a percentage of the total



authorized funding for the Federal surface transportation program.

- While the Metropolitan Mobility program focuses on the largest metropolitan areas with populations greater than 1 million, it is expected that States would develop comparable mobility plans for smaller urbanized areas in cooperation with the MPOs of these areas. Funding for improving connectivity within smaller urbanized areas would be available through the Connecting America Program. States with metropolitan areas over 200,000 that are not encompassed within the definition of major metropolitan areas would be required to annually measure and report on the extent to which these areas comply with the performance standards developed for the major metropolitan areas. This would allow emerging patterns of congestion to be detected well before the areas grow beyond a population of 1 million.
- Improving safety performance would be an overarching goal for all the programs and would not be limited to the National Safe Mobility program. For example, the Metropolitan Mobility and Connecting America programs could improve the overall level of safety in different-sized communities. The National Freight Transportation Plan could address deployment of train control technology relevant to safety and capacity on critical corridors that carry passengers and hazardous materials.
- The projects identified under the Intercity Passenger Rail program would likely be a component of the Metropolitan Mobility plans for the areas they connect; they would also have a strong nexus to the Connecting America, Freight Transportation, and National Safe Mobility Plans.

- Although the Federal government will play a more direct role in the development of plans for the Federal Lands and RD&T programs, it is critical that State and local partners and other stakeholders be actively consulted in the projects identified under these programs.

### ***Role of an Independent Commission***

Our recommendations for reform of the Federal surface transportation program constitute three legs of a stool. The first leg is accelerating the lengthy process by which transportation projects are delivered, saving both time and money. The second leg is consolidating the numerous investment categories of current law into a more focused, performance-based set of transportation programs related to objectives of genuine national interest. **The third leg involves creating an independent National Surface Transportation Commission (or NASTRAC) to oversee development of a national strategic plan for transportation investment and to recommend appropriate revenue adjustments to the Congress to implement that plan.**

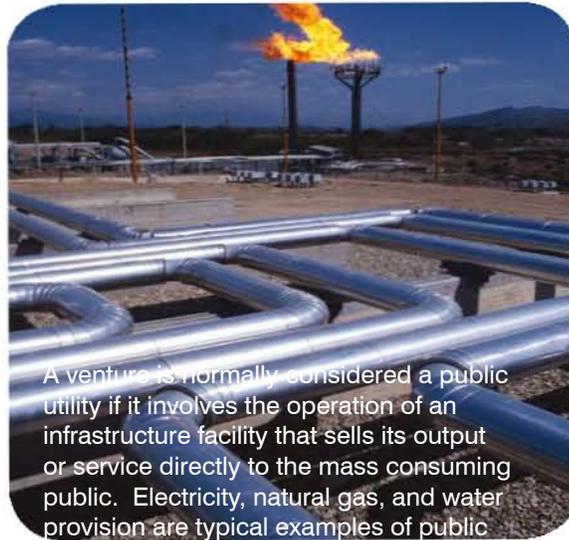
There are several models for such an independent commission at both Federal and State levels of government. At the Federal level, two notable examples are the Base Closure and Realignment



Commission (BRAC) and the Postal Regulatory Commission. These two commissions were created by Congress to de-politicize difficult policy actions—closing military bases and raising postal rates. The Commission heard compelling testimony from representatives of both bodies that these objectives have largely been achieved. At the State level, many States have created transportation commissions independent of the Legislature to oversee statewide transportation planning and project selection. A related State model is the public utility commission, which is typically empowered to regulate rates for electricity, heating, and telephone service independent of direct legislative action.

“One method that worked for...the postal raise increase is an independent Commission that makes recommendations based on research. If a model like this is applied to our road infrastructure, they could adjust the user fee associated with driving or identify new options that may be more appropriate for the nature of our transportation network.” – *Tim Waltze, President, The Griffith Company, at the Commission’s Los Angeles field hearing.*

The NASTRAC would build on the success of these other models. Its purpose would be to de-politicize how we make Federal transportation investment decisions, as well as how we choose to pay for them. For example, one explanation for the long periods of inaction in raising the Federal fuel tax during the past few decades is that Congress has not been presented with a clear mission for the Federal transportation program since completion of the Interstate Highway System. The Commission’s recommendation for



A venture is normally considered a public utility if it involves the operation of an infrastructure facility that sells its output or service directly to the mass consuming public. Electricity, natural gas, and water provision are typical examples of public

NASTRAC to oversee development of a national strategic plan to guide future Federal investment is intended to cure that deficiency. It is also intended to strengthen public confidence that our tax dollars are being wisely invested, and that those investments will produce not just good projects—but better performance—for our transportation network.

The proposed NASTRAC would have the following structure:

1. Composition—Ten members appointed by the President and confirmed by the Senate. Appointments should be based on technical qualifications, professional standing, and geographical representation. No more than six members should be from the same political party. Commissioners would serve on a part-time basis, meeting periodically, and would be



compensated for their time and expenses. The U.S. Secretary of Transportation should serve as one of the ten members.

2. Term—Six years, two-term limit, staggered terms.
3. Staff—This Commission would retain its own independent, full-time staff and would be able to hire outside consultants to discharge its duties.
4. Funding—This Commission would be funded from its own charge to system users. This charge, which could be adjusted periodically based on its operational needs, would be incorporated into its overall user fee recommendation to Congress. Congress could not adjust this charge except in so far as Congress would accept or reject the overall user fee rate recommendation. Congress would establish this Commission with an initial appropriation until charges could be implemented and self-sustaining funds could be collected.
5. Congressional Veto—This Commission's revenue recommendations would be sent directly to Congress. The recommendations would then be subject to congressional veto by 2/3-recorded vote of both houses within 60 days of receiving them. If no actions were taken, the recommendations would become law. No amendments would be allowed.

The USDOT would lead the strategic planning process with policy oversight provided by NASTRAC. USDOT would consult with multiple stakeholders in this effort, including State departments of transportation, MPOs, and key private sector interests such as the freight railroads. The role of the NASTRAC in implementing the 10 performance-based investment programs described in the preceding section is as follows:

- Oversight of the USDOT-led process by which performance standards would be set on

a national basis for reducing traffic congestion, improving highway safety, and other performance indicators. The standards would be incorporated into Federal grants to require progress toward achieving those goals.

- Oversight of the USDOT-led process to adopt standards for demonstrating that only economically justified projects that accomplish plan objectives would be eligible for Federal funding.
- Approval of the USDOT-led effort to integrate the various programmatic plans for asset management, freight movement, and other functions into a national strategic plan for surface transportation.
- Recommendation to Congress of the user fee rates and adjustments necessary to fund the Federal share of the national strategic plan.
- Authority to adjust the Federal share for particular activities as an incentive, rewarding States and MPOs that demonstrate creativity and innovation. If States and MPOs exceeded performance objectives, Federal participation rates for future funding would be increased. Conversely, Federal participation rates would be reduced for grantees that fail to meet agreed-upon objectives.
- Adoption of maintenance of effort requirements. Even with increases in Federal funding, a commensurate increase in funding from other levels of government and sources is required and expected. Therefore, maintenance of effort checks would be built into the grants to mitigate the tendency to substitute Federal funds for State and local resources.

We acknowledge that creation of the NASTRAC is one of the most far-reaching of our recommended reforms to the Federal surface transportation program. This Commission is convinced,



however, that the crisis confronting the customers of the Nation’s transportation system demands a bold departure from past practice. Businesses are frustrated at their inability to move goods efficiently. Commuters feel trapped by growing levels of traffic congestion. Many stakeholders are alarmed about transportation’s impact on the environment and community character. Congress itself is undoubtedly troubled by the impression that the Federal program has been overwhelmed by earmarking. The NASTRAC is intended – in addition to its explicit duties described above – to give a voice to these customers in improving the national transportation network on which they so heavily rely.

***Relationship to Performance and Accountability***

The Commission acknowledges that recommendations that entail performance standards represent a major departure from the current public project delivery processes. Federal programs have evolved into what is now essentially a block grant model, with little accountability for specific outcomes. While considerable work has been done on techniques

to measure performance, there are relatively few examples of using performance standards to build into grant relationships accountability for achieving improved levels of performance at the overall program level. **Developing performance standards and integrating them into a performance-driven regimen that would be applicable to all States and metropolitan areas will be a challenge since local conditions are so different, but the rewards will be worth the effort.**

“I would suggest that the responsibilities and outcomes of each level of government be clearly identified, and that the consequences of failure be directed to the responsible parties, and that the penalties...be proportionate to the consequences for failure to attain standards.” – *Alan Clark, Director of Transportation and Air Quality Planning, Houston-Galveston Area Council, at the Commission’s Dallas field hearing.*

**Process Overview: Implementation of a new strategic direction for transportation**

**Create plans with stakeholders based on standards and outcomes**  
(Lead institutions)

**Submit plans to USDOT**  
(Lead institutions)

**Submit consolidated plan to NASTRAC**  
(USDOT)

**Allocate funds to projects**  
(State and local governments)

**Act on NASTRAC revenue recommendations**  
(Congress)

**Approve consolidated national strategic plan and develop revenue recommendations**  
(NASTRAC)



Current programs rarely link project performance to funding, and the economic justification for projects is seldom fully evaluated either before or after projects are implemented. State and local agencies prepare metropolitan area transportation plans, and projects receiving Federal funds go through environmental and design reviews, but there is little or no accountability for meeting specific performance standards. Transparency in performance targets and achievement can be seen as threatening to governmental units who fear the inevitable ranking of various jurisdictions and believe that rating success by common benchmarks is simplistic and unfair. In addition to making better use of public monies to accomplish critical national objectives, and thus obtain better value for the Nation from existing transportation spending levels, the Commission's recommended approach of performance standards and economic justification would do much to restore public confidence in the transportation decision-making process. In such an environment, Congress and the public would be more amenable to agreeing to invest, whether through taxes or other user fees, to meet the Nation's transportation investment needs.

*“Funding should be predictable, dedicated, and sustained. It should be based on objective merit-based criteria with higher-cost projects subject to a more stringent evaluation than lower costs.” – Tony Grasso, San Bernardino Association of Governments, at the Commission's Las Vegas field hearing.*

**Federal organizational and grant administration changes.** Federal transportation programs have historically focused around modes (FHWA, FTA, the Federal Railroad Administration, etc.) rather than functional areas (e.g., freight, metropolitan

mobility, etc.). Such structures have strength because the agencies build upon the necessary technical competencies but present barriers to the problem-solving that should occur during both the system planning and implementation phases. Implementing agencies, when oriented along functional lines, are more likely to be outcome-oriented. The Commission endorses changes in the structure of the USDOT that would reinforce the functional orientation of the 10 new recommended programs rather than the current modal orientation.

### ***Transition to the New Programs***

This report proposes a major restructuring of the Federal surface transportation program. The institutional reforms that the Commission recommends will take some time to be realized, especially the reorganization of the USDOT. The Commission recognizes that performance-based planning would represent a significant departure from current planning processes. However, the Commission envisions the new processes as a substitute for current processes, rather than as an overlay on top of them. The Commission also expects that the design for the new process will build upon lessons learned under the current programs. In the long run, these reforms should greatly improve the delivery process and reduce the time it takes to complete projects, while still





respecting the need for thorough planning and public involvement. These programmatic reforms also involve consolidating the highway and transit titles in the U.S. Code, which have been separate for their entire existence.

**Given the scope and scale of these changes, the Commission urges Congress to pay particular attention to several transition issues that will need to be addressed in the early phases of implementing our recommendations.** These transition issues include:

- Dealing with projects in the development pipeline so these projects can continue to advance in a timely manner.
- Carrying out existing or pending Federal financial commitments under full funding grant agreements in the New Starts transit major capital investments program.
- Authorizing USDOT to obligate Federal funds to a limited number of new projects and activities that are clearly in the national interest, prior to completion of the performance-based planning process to be overseen by NASTRAC.

## Recommendations for Paying the Bill

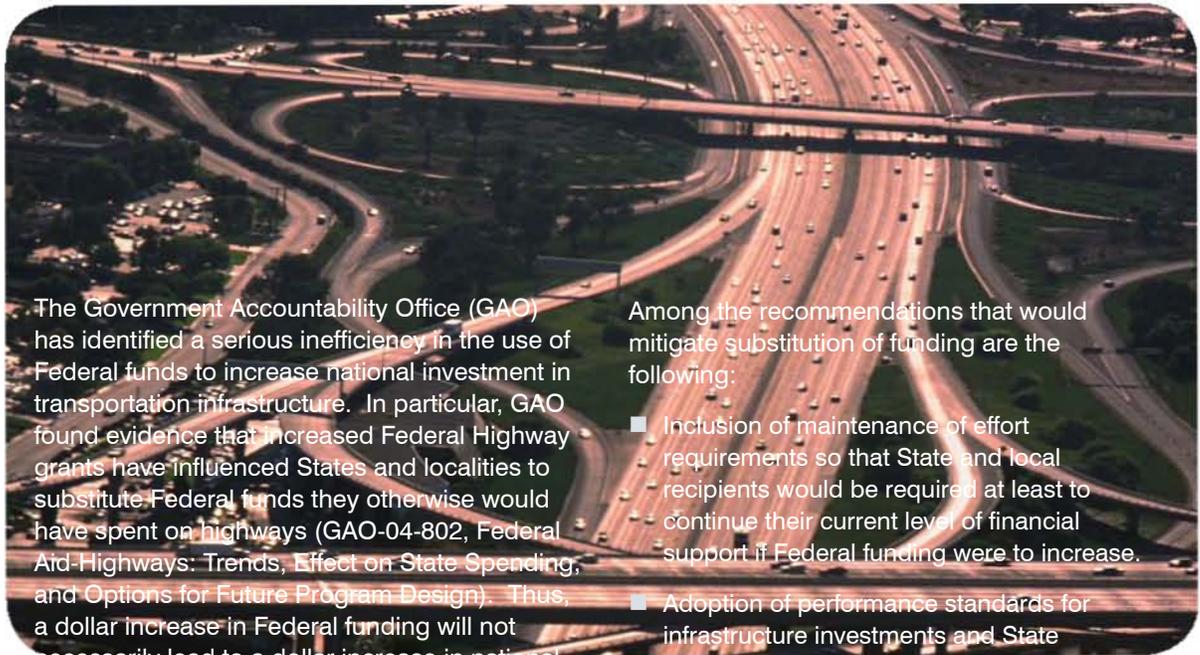
Among the most controversial issues the Commission dealt with in its work was the issue of how future surface transportation programs should be financed. Most who offered testimony to the Commission favored continuing reliance on motor fuel taxes to finance highway programs in the short and medium terms. Many also recognized that States and local governments would need to employ a variety of financing mechanisms to meet the large future investment requirements.

The Commission studied the current patterns and sources for revenue for the surface modes including highways, transit, rail, ports, and waterways as well as the options that are open to the Congress. This information is presented in Chapter 5 of Volume II, with further background data in Volume III.

Different surface transportation financing issues require action over different timeframes. Immediate action is required to prevent Highway Trust Fund balances from going negative; action is required over the next 20 years to finance improvements needed to enhance surface transportation system conditions and performance; and actions will be required after 20 years to replace the fuel tax with a more sustainable revenue source.

*“It’s key to the integrity of long-term funding that the Highway Trust Fund be maintained and strengthened.” – Scott Bennett, Arkansas Department of Highways and Transportation, at the Commission’s Memphis field hearing.*

As articulated in the previous pages, the Commission recognizes that the financing question does not stand alone but is fundamentally tied to the underlying policy questions. Simply raising the Federal fuel tax and putting more money into the same programs will not be acceptable. The Commission strongly believes that, before Federal financial support for surface transportation is increased, the Nation’s surface transportation programs must be fundamentally reformed. As discussed above, those reforms include limiting the scope of programs eligible for Federal assistance to those having a true national interest, making



The Government Accountability Office (GAO) has identified a serious inefficiency in the use of Federal funds to increase national investment in transportation infrastructure. In particular, GAO found evidence that increased Federal Highway grants have influenced States and localities to substitute Federal funds they otherwise would have spent on highways (GAO-04-802, Federal Aid-Highways: Trends, Effect on State Spending, and Options for Future Program Design). Thus, a dollar increase in Federal funding will not necessarily lead to a dollar increase in national

Among the recommendations that would mitigate substitution of funding are the following:

- Inclusion of maintenance of effort requirements so that State and local recipients would be required at least to continue their current level of financial support if Federal funding were to increase.
- Adoption of performance standards for infrastructure investments and State

State and local agencies receiving Federal funds accountable for meeting performance objectives, reducing unnecessary and wasteful project delivery requirements, and requiring that major projects be subject to benefit-cost analysis. Additionally, the Commission believes that requirements must be put in place to assure that State and local agencies do not reduce their level of financial support when Federal support is increased. It is imperative that all levels of government and the private sector contribute their appropriate share if the U.S. is to achieve its vision of having the pre-eminent surface transportation system in the world.

### ***Immediate Options for Keeping the Highway Trust Fund Solvent***

Balances in the Federal Highway Trust Fund (HTF) are rapidly declining, especially in the Highway Account. The latest projections by the U.S. Department of the Treasury and the

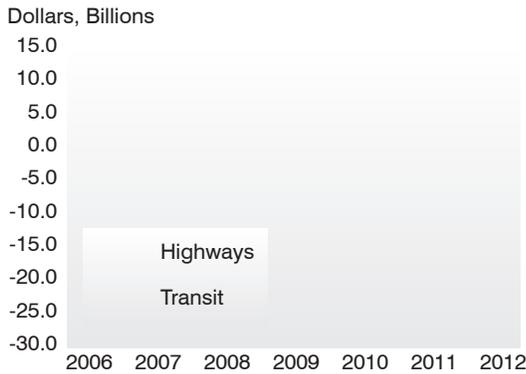
Congressional Budget Office indicate that, by the end of Federal Fiscal Year (FY) 2009, the Highway Account of the HTF will have a negative balance of between \$4 and \$5 billion if no corrective actions are taken. **The Commission recommends that legislation be passed in Federal FY 2008 to keep the Highway Account of the HTF solvent and prevent highway investment from falling below levels guaranteed in SAFETEA-LU.**

The following are several options that have been recognized as having the potential to address immediate shortfalls in the Highway Account of the HTF:

- Increasing one or more of the existing taxes that go into the HTF.
- Ensuring that the HTF receives the full amount of the taxes levied on highway use by shifting the cost of exemptions from and refunds of taxes for certain highway users to the General Fund of the Treasury.



### Projections of Highway and Transit Account Balances Through 2012



**This exhibit shows projected balances in the Highway and Transit Accounts of the Highway Trust Fund through 2012 assuming no change in revenues or program levels.**

Source: U.S. Department of the Treasury projections.

- Retroactively reinstating the crediting of interest on the invested balances of the HTF. The crediting of interest ceased after Federal FY 1998 pursuant to section 9004(A) of TEA-21, P.L.105-178.
- Crediting the proceeds of the gas guzzler tax under section 4064 of the Internal Revenue Code to the Highway Account.
- Dedicating a portion of the revenue generated from transportation-related taxes, such as customs fees, to transportation purposes.
- Taking measures to reduce evasion of fuel and other highway user taxes.
- Crediting the Highway Account of the HTF with funding that has been provided for emergency purposes from the HTF, thus shifting that burden to the General Fund which has been the source for appropriations for these purposes in recent years.

### Surface Transportation Finance Through 2025: Increasing Federal Revenues

As noted above, the Commission believes that significant additional investment by all levels of government and the private sector will be required to serve a growing population and to support the Nation's economic growth and international competitiveness. We strongly support the principle of user financing that has been the backbone of transportation finance for the last 80 years. Personal and commercial travelers should pay for the transportation systems and services they use in proportion to the costs associated with their use.

Historically, the fuel tax has been an important component of the user financing system. At the Federal level, fuel taxes represent almost 90 percent of total HTF revenues. While there is a growing consensus that alternatives to the fuel tax may be necessary in about 20 years, the fuel tax should remain an important component of surface transportation finance until viable alternatives are found. Among the attributes that make fuel taxes particularly attractive sources of surface transportation revenues are their (1) low administrative and compliance costs, (2) ability to generate substantial amounts of revenue, (3) relative stability and predictability, and (4) ease of implementation. A limitation of the fuel tax is that it is not responsive to increasing construction costs when levied on a per gallon basis. That weakness can be remedied by indexing the tax to inflation, using either a broad measure (such as





the Consumer Price Index) or a more targeted measure (such as the Producer Price Index for Highway and Street Construction).

While the absolute level of Federal funding ultimately should be tied to what is necessary to achieve national goals, it is clear from our analysis that combined public and private investment must substantially increase to improve the conditions and performance of the transportation system.

“Indexing the Federal gas tax to inflation must be considered. It’s the only major existing user fee not presently indexed.”

– *Gerry Shaheen, Group President, Caterpillar, Inc., and Chairman of the Board for the U.S. Chamber of Commerce, at the Commission’s New York field hearing.*

The Federal share of total transportation spending has varied over time. In the last decade, the annual Federal share of total highway capital investment has ranged from 37 to 46 percent, while the annual Federal share of transit capital investment has ranged from 39 percent to 54 percent. **The Commission recommends that, in the short term, the Federal government should contribute approximately 40 percent of total surface transportation capital outlay in line with the Federal share in recent years.**

As noted in the *Future Surface Transportation Investment Requirements* section above, the 2055 investment gap is estimated to range from \$0.59 to \$1.03 per gallon of fuel. Applying a 40 percent Federal share to this gap would be equivalent to a Federal fuel tax increase of approximately 25 to 40 cents per gallon. **The Commission recommends that the Federal fuel tax be increased from 5 to 8 cents per gallon per year over the next 5 years, after which it**

#### Taxes supporting the Highway Trust Fund

Dollars, billions



This exhibit shows increases in Highway Trust Fund revenues in current dollars between 1980 and 2005.

Source: 2005 Highway Statistics, Table FE-210.



**should indexed to inflation.** The exact tax rate required within this range would be confirmed by the strategic planning process and the new commission described above.

One tenet of highway taxation, dating back to the creation of the HTF, is that different vehicle classes should be charged in proportion to their contribution to highway investment requirements. The Federal government and many State governments have conducted highway cost allocation studies to assess the cost responsibility of different vehicle classes. Increasing the fuel tax without commensurate changes in truck taxes could exacerbate the current situation where heavy trucks pay less than their share of highway costs. **When adjusting Federal fuel tax rates, the Commission recommends that tax rates on existing Federal truck taxes be adjusted proportionately to maintain the current allocation of highway cost responsibility.**

“The best solution...is to find some additional revenue, either through indexing of the motor fuel tax or some adjustment of the other taxes on heavy vehicles.”  
– Arlee Reno, *Cambridge Systematic, at the Commission’s Dallas field hearing.*

**Federal Funding for Transit.** Eighty percent of Federal funding for transit currently comes from the Highway Trust Fund and the remaining 20 percent comes from the Federal General Fund. The portion from the General Fund reflects transit’s role in providing basic mobility for those who do not have other travel options. The Commission believes this same split between Trust Fund and General Fund revenues should continue in the future. The maximum Federal share of transit project costs under any of the

new programs also should be 80 percent. The Commission believes that the “user pays” philosophy should extend to the transit program. **Therefore, the Commission recommends that a Federal ticket tax be levied on all transit trips to supplement revenues from the Federal fuel tax and General Fund.**

**Funding Dedicated for Freight-Related Transportation Improvements.** Given the strong Federal interest in freight movement, Congress will need to make available a variety of funding sources to meet the needs of the Freight Transportation program. At the Federal level these include increased gas tax revenues, tax credits, a portion of Customs duties revenues, and a Federal freight fee. It is also anticipated that highway tolling and public-private partnerships would play an important role. A full range of financing options will be needed.

Freight fees have been used previously to fund key projects that benefit freight users. For example, fees on all containers passing through the ports of Los Angeles and Long Beach are levied to help finance Alameda Corridor improvements. A freight fee such as a container charge, freight waybill surcharge, or other equitable fee could be used to fund projects that remediate chokepoints and increase throughput. **The Commission recommends that a Federal freight fee help finance freight-related improvements as part of an overall freight program.** Congress should create an accountable and transparent programmatic linkage between an assessed freight fee and the selection and funding of projects that facilitate increasing volumes of primarily trade-driven freight. The payers of such a fee must realize the benefit of improved freight flows resulting from projects funded by the freight program. Such a fee should be designed to ensure that commerce is not burdened by local and State proliferation of such fees; no mode of transportation or port of entry is disadvantaged; and the ultimate consumer bears the cost.



“We charge \$45 for every container that gets picked up and put on a railcar... That \$45...is not creating a huge burden on the users of our system, and as a result, that huge investment which we are making at risk, we believe is a sound one based on the fact that we have a reliable revenue stream associated with that.” – *Richard Larrabee, Director, Port Commerce Department, The Port Authority of New York and New Jersey, at the Commission’s New York field hearing.*

Another potential revenue source for funding freight-related improvements is a share of the Customs duties paid on all imports. Most Customs duties are deposited in the General Fund. If five percent of Customs duties were dedicated to freight transportation improvements, revenues would be approximately \$1.8 billion per year, which is equivalent to a fuel tax increase of about one cent per gallon. Because of the large transportation requirements associated with imported commodities, **the Commission recommends that a portion of Customs duties be dedicated to help pay the costs of freight-related improvements.** As with the new freight fees, Customs fees dedicated for freight transportation improvements would be deposited in the new Surface Transportation Trust Fund (STTF) described below.

The railroads have indicated that anticipated future revenues will be inadequate to allow them to privately finance all capacity improvements required to maintain their current market share of freight traffic. Rail capacity expansion improvements may include intermodal facilities, terminals, ports, and freight gateways. To help

them make the capital investments that will be required to move the increasing volumes of goods, freight railroads have proposed that a 25 percent Federal tax credit be granted for investments to expand capacity. They have also proposed that they be allowed to expense capital expenditures since other modes can expense their Trust Fund payments. Although such tax incentives for freight rail capacity expansion would be credited against the General Fund, they would help bridge the funding gap between demand and available private funding in the coming years in a way that could offset the cost of the tax incentive. **The Commission recommends that a Federal Investment Tax Credit be granted to transportation facility owners for freight capacity expansion.**

**Funding Dedicated to Passenger Rail.** The Commission proposes three sources of Federal funding for intercity passenger rail service: (1) ticket surcharges, (2) highway user revenues, and (3) Federal general fund revenues as are used for some transit programs. To implement the new Intercity Passenger Rail Program, the Commission recommends initial Federal funding of \$5 billion per year for grants to States, Amtrak, or other competitive service providers. **The Commission recommends that a new Federal ticket tax be levied on users of the system to supplement funding from fuel taxes and general funds.** This ticket tax should not be imposed until new service begins in a corridor. As previously noted, funding should be provided on a cost-to-complete basis for intercity rail corridors that are shown to be cost-beneficial. The Federal share of capital costs should be up to 80 percent of capital. As with transit funding, 80 percent of funding should come from the new STTF described below, and 20 percent from general funds.

**Carbon Taxes or Trading.** In the near term, Congress may enact a tax on carbon or a “cap and trade” system to reduce greenhouse gas emissions.



To the extent that such a taxation or trading system encompasses transportation-related sources, Congress should ensure that transportation activities that reduce greenhouse gas emissions receive a proportionate share of any revenue generated by these new schemes.

### ***Surface Transportation Finance Through 2025: Remove the Barriers to Options for Increasing State and Local Revenues Over the Next 20 Years***

Based on the investment gap discussed at the beginning of this Volume and explained further in Chapter 4 of Volume II, the State and local share of additional investment requirements could range between the equivalent of 34 and 63 cents per gallon of fuel tax. This range could vary considerably among individual States depending on several factors, including their share of overall investment requirements and the extent to which they have the ability to use and choose to use other revenue sources. Overall, fuel taxes represent about 47 percent of total current highway revenues (excluding bond sales) for State transportation agencies, so States already rely on funding from sources other than the fuel tax to finance their highway programs.

**As we have mentioned previously, a significant increase in funding from all sources will be needed to upgrade our existing surface transportation system to a state of good repair and create a more advanced system. This means that significantly more investment will be needed from State and local governments, as well as from the private sector.**

**Increase State fuel taxes and other highway user fees.** As noted above, the gas tax has been a staple of highway finance at both the Federal and State levels for 80 years. Public acceptance of this mechanism, its ability to raise considerable

revenues, and its low administrative cost have been significant positive attributes. Raising the fuel tax could generate about \$1.9 billion nationally for each 1-cent increase. Indexing the fuel tax or converting to a gasoline sales tax would allow revenues to increase with rising highway construction costs. The Commission expects that States and local governments will have to raise additional revenues as part of the effort to increase investment in our surface transportation system.

**Provide new flexibility for tolling and pricing. The Commission recommends that Congress remove certain barriers to tolling and pricing. States and local governments should be given the flexibility to toll and/or implement congestion pricing. This will give States and local governments that wish to make greater use of tolls and congestion pricing the flexibility to do so.** While the use of these tools is discretionary with State and local governments, the Commission believes that increased tolling and pricing must be part of the overall solution if we are to indeed create and sustain the pre-eminent surface transportation system in the world.

*“I would hope this Commission might consider commending a further reduction of Federal restrictions on the use of tolling, including on existing toll-free roads.” – Ed Regan, Senior Vice President of Wilbur Smith Associates, at the Commission’s Dallas field hearing.*

Tolls currently account for about 5 percent of total highway-related revenues and 9 percent of current State highway revenues. This percentage has remained relatively stable for many years. It understates, however, the importance of tolls in funding highway capacity expansion. A



recent FHWA study reports that “during the last 10 years, an average of 50 to 75 miles a year of new access-controlled expressways has been constructed as toll roads out of an overall average of 150 to 175 miles of urban expressways opened annually. Toll roads, therefore, have been responsible for 30 to 40 percent of new “high end” road mileage over the past decade.” With some exceptions toll revenues historically have been used almost exclusively on the tolled facilities themselves. The direct connection between use of the facility and the toll charge has been one reason that economists have tended to favor tolls over the gas tax. If toll rates produce more revenues than are needed for the facility itself and the excess revenues are used for other purposes, the connection between facility use and toll charges is weakened and the toll takes on some characteristics of a tax rather than a direct user charge. By the same token, a toll road’s commercial vehicles should not be required to pay an additional tax for the use of the highway. It should be noted that administrative costs of tolling are higher than the costs of administering the fuel tax, but the move toward greater use of electronic toll collection should reduce those costs.

In our analyses of gaps in future investment levels, the lower estimates of highway investment in 2035 and 2055 assume widespread implementation of congestion pricing. While widespread pricing

reduced additional investment requirements by 30 percent, considerable investment in new capacity would still be required. In estimating the investment gap, no assumption was made that pricing revenues would be used to offset requirements for revenues from other sources. To the extent that pricing revenues were used for highway and transit purposes they would reduce requirements for revenues from other sources.

Most of the advantages and disadvantages of tolling in general also apply to congestion pricing. Pricing has been controversial and there are many unanswered questions about how it might be implemented. The major additional advantages of congestion pricing compared to tolls are that pricing manages demand on congested facilities thereby reducing congestion, and it can generate additional revenues that could be used to expand highway and transit capacity in the corridor to reduce congestion. An additional advantage is that congestion pricing encourages the use of other routes and other modes of travel, such as public transportation. The major disadvantage of pricing is that during peak periods, tolls are higher for those who cannot change their destination or time of travel. For some travelers this could impose a hardship.

It should be recognized that commercial trucks usually do not have the discretion to change either their routes or the times when they must





travel in response to tolls or congestion fees. Shippers determine pick-up and delivery times and trucking operators have little or no influence over these decisions. Because tolls are not easily passed directly by the carrier to the customer (e.g., how to allocate a toll payment among multiple customer shipments on one vehicle), there is little incentive for the shipper or receiver to adjust their schedules. Another concern for motor carriers dealing with a dynamically variable pricing scheme is determining the actual cost of a delivery and consequently the price quoted to the customer. Providing a direct incentive to shippers and receivers may be a more effective means of influencing trucking industry delivery schedules. Finally, the restrictions under driver Hours of Service rules maybe in conflict with congestion pricing designed for road use management. Truck drivers no longer have the option to “log-off”

during rest breaks. Consequently, truck drivers who otherwise might want to alter their driving schedule through a peak period congestion pricing scheme by taking a rest break, cannot do so without violating the Hours of Service restrictions. Therefore, it is recommended that an adjustment be made to the Hours of Service regulations to take into consideration the need for rest breaks to accommodate congested metropolitan areas.

It should be noted that not all States have the authority to toll. Thirty-one States have one or more toll facilities. Since 1991, 27 States have initiated toll projects. Federal law currently prohibits tolling Interstate Highways except under several pilot programs.

**The Commission recommends two basic changes to the Federal prohibition on tolling on the Interstate System.**

#### **States with toll facilities**

**This exhibit shows the 31 States that currently have toll facilities.**

Source: *Highway Statistics 2005*, Tables SF-4B and LGF-4B.



**First, the Commission recommends that flexibility be given to use tolls to fund new capacity on the Interstate System, as well as the flexibility to price the new capacity to manage its performance.**

**And second, the Commission recommends that flexibility be given to implement congestion pricing on the Interstate System, on both new and existing capacity, in metropolitan areas with populations greater than 1 million.** As noted above, congestion pricing likely will be used more widely in coming years as metropolitan areas explore strategies to manage their ever-increasing congestion problems. Congestion pricing could come in the form of high-occupancy toll (HOT) lanes, express toll lanes, full facility pricing, or area-wide pricing. The amount of revenues that can be generated by pricing will vary depending on how widely it is applied and the severity of the congestion. It is expected that this strategy will be limited to heavily congested corridors in the Nation's major metropolitan areas. The Commission believes that demand management in the form of pricing will be necessary as part of the solution to addressing congestion in major metropolitan areas.

**In implementing the tolling or congestion pricing recommendations, the Commission believes that Congress should put into place an approval process with strict criteria for tolling or pricing routes that are on the Interstate System:**

- Revenues should not be used for non-transportation purposes or to subsidize transportation improvements in other parts of a State or metropolitan area, but rather should be used to improve and expand the tolled facilities and to expand capacity on transportation alternatives within the same corridor.
- The use of tolls or pricing should be consistent with, and reflected in, freight,

metropolitan mobility, and other plans developed in connection with the new surface transportation programs. The use of toll or pricing revenues should be transparent so that all know where the funds will be expended.

- Adequate facilities for the trucking industry, including access to food, fuel, and safe parking accommodations for long-term rest, should be ensured.
- Rates should be set so as to avoid discrimination against Interstate travelers or any other group of users. Restrictions, conditions, or fees that discourage use of the facility by classes of vehicles (e.g., motor carriers) or commodities (e.g., hazardous materials) should be prohibited.
- Tolls should be collected with technologies that do not interfere with traffic flow and that are compatible across regions and are transparent to users so that they can make informed choices as they are choosing travel routes.
- Decisions on whether to toll particular facilities or to increase tolls on existing toll roads and bridges should explicitly consider the potential diversion of motor carriers onto adjacent routes that could lead to congestion, safety problems, and infrastructure damage.





**The Commission also recommends that Congress promote the use of a nationwide, uniform system of electronic tolling so that toll collection does not become a burden on interstate travel and commerce.**

Tolls already are being collected electronically on high occupancy toll lanes in California, Colorado, Minnesota, Texas and Utah as well as the recently completed Westpark toll road in Houston and the new elevated express toll lanes on Tampa's cross-town expressway. Electronic toll collection is planned for several new toll roads in Texas and HOT lanes in northern Virginia, Miami, Dallas, and for existing toll roads operated by the North Texas Tollway Authority and the Miami-Dade Expressway Authority.

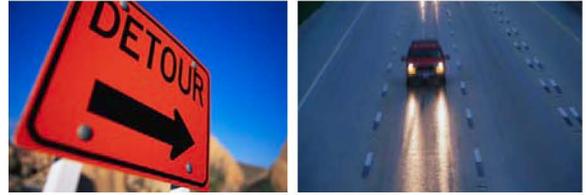
In the future, electronic toll collection is likely to replace toll booths on most if not all toll roads. The advantages of electronic toll collection are the virtual elimination of delays, crashes, and pollution caused by long lines of vehicles waiting at toll booths; reduced right-of-way requirements for toll booths; lower administrative and operations costs; and increased convenience for the user. In addition to transponders, other technologies also are being used for electronic toll collection systems including automatic license plate recognition systems.

An alternative to tollbooths, during the transition to full deployment of electronic payment, could be redirection of cash-paying drivers to toll booths off the main traveled lanes that would not impede the flow of traffic but provide a cash option. Early variations of this option are provided on many toll roads that have separate lanes for those with transponders who do not have to stop to pay a cash toll. The delays for drivers without transponders ultimately would be an incentive for them to purchase single use transponder devices if not multiple-use devices.

**Encourage the use of public-private partnerships, including concessions, for highways and other surface modes.** A wide variety of public-private partnership (PPP) arrangements have been used in connection with surface transportation improvements. Private sector participation is not simply about supplying revenues. PPPs also can (1) prioritize projects that generate the highest returns, (2) improve life cycle investing, and (3) provide incentives for more efficient operations and maintenance. Private sector financing has been widely used in Europe, South America, and Australia.

*“In a PPP, the public sector defines what’s required to meet the public’s needs. Ideally in the form of service outputs such as the private sector can contribute to defining precisely how these needs would be best delivered...therefore, in a PPP the government role changes from that of directing and managing infrastructure to one of contractual oversight with quality outcomes.” – David Peterson, Vice President, Royal Bank of Canada, at the Commission’s Atlanta field hearing.*





As public sector revenue sources have been stretched in the U.S., there has been increasing interest by some States in the private sector directly contributing to project financing. This has taken two general paths. One involves private sector participation in “greenfield” projects that involve the construction of new highways or the addition of new capacity to existing highways. The other major type of private sector financing involves the long-term leasing of existing toll facilities, so-called “brownfield” transactions. About 40 percent of the States have statutory authority to enter into public-private partnerships. Several of those States have only recently passed enabling legislation and several others have modified their legislation to expand their ability to enter into partnership agreements.

**The Commission believes that public-private partnerships should play an important role in financing and managing our national surface transportation system. It can be another important financing tool for State and local governments. Therefore, the Commission recommends that Congress encourage the use of PPPs where States or local governments are willing to use them.**

**With respect to the Interstate System, PPP arrangements that involve tolling or congestion pricing should be subject to the same limitations and conditions discussed in the previous section. In addition, in order to ensure that the public interest is protected, the Commission recommends that the following conditions also be met when States use PPPs**

#### **States having PPP enabling legislation**

**The exhibit shows the 23 States that currently have authority to enter in public-private partnerships.**

Source: U.S. DOT Public Private Partnership Website: <http://www.fhwa.dot.gov/ppp/legislation.htm>.

**(including concession arrangements) on the Interstate System:**



- Transparency should be a key element in all aspects of the process and the arrangement, including all terms and conditions in the agreement.. There should be adequate public participation and all applicable planning and environmental requirements should be met. Confidentiality should be limited only to those instances where it is legally required.
- The terms of the agreement should include the following:
  - The condition and performance of the facility are adequately maintained over the life the concession agreement and that at the end of the agreement the facility is returned to the State in a state of good repair.
  - There are no non-compete clauses that prohibit the construction or improvement of adjacent facilities; however, provisions that require the public entity to compensate private operators for lost revenues when improvements are made to adjacent facilities would be acceptable.
  - Should the private partner enter into bankruptcy, become insolvent, or if the partner fails to meet all terms and conditions of the agreement, the facility will revert to the State.
  - Customers' interests are protected by capping the rate of increase in tolls at the level of the Consumer Price Index minus an adjustment factor for productivity improvements.

Note: The Commission has explicitly rejected the use of rate-of-return regulation for public-private partnerships. The learning in regulatory economics has proven that rate-of-return regulation blunts

incentives for efficiency, and that a price cap approach is superior. This is also true in transportation. Private sector entities should be allowed to keep any added profits they obtain due to enhanced efficiencies, subject to the price cap.

- Revenue sharing provisions should be included in the lease agreement to ensure the public sector shares in the rewards if toll revenues are higher than projected during the valuation process. Alternatively, the



lease agreement could include rebalancing provisions to bring the agreement terms back into the financial balance achieved in the original negotiation.

- Concession agreements should not exceed a reasonable term. Following the termination of a concession agreement, public input and review must be undertaken before any renewal of the agreement.
- Concessions or other payments to public entities should not be used for non-transportation purposes or to subsidize transportation improvements in other parts of the State or metropolitan area, but rather should be used to improve and expand the tolled facilities and to expand capacity on transportation alternatives within the same corridor.
- No conflicts of interest exist involving any parties to the agreement.
- The private sector financing provides better value for money than if the concession were financed using public funds (similar to the public sector “comparator” used in several European countries). This assessment must take into account the loss of Federal tax revenue from tax-exempt municipal bonds, as well as the tax consequences of depreciation and other features of the private sector option. The assessment should also consider the impact on alternative roads in the system.

### **Surface Transportation Finance Beyond 2025: Long-Term Federal and State Revenue Options**

As discussed above, over the next 20 years revenue needs can be addressed through significant increases to existing taxes and fees and through

greater use of tolling, pricing, and public-private partnerships. The Commission agrees with the findings of the Transportation Research Board (TRB) as they concluded in a 2006 report, *The Fuel Tax and Alternatives for Transportation Funding*: “A reduction on the order of 20 percent in average gallons of fuel consumed per vehicle mile by the light-duty vehicle fleet is possible by 2025 if fuel economy improvement is driven by new regulations or large and sustained fuel price increases. Offsetting the revenue effect of a gain of this size would not require fuel tax rate increases that were extraordinary by historical standards, although the willingness of legislatures to enact increases may be in question.” The Commission concludes that, considering its widespread acceptance and use at both the State and Federal levels, the fuel tax will continue to be one of the principal revenue sources for highway and transit programs for the next 15 to 20 years.

There is a developing consensus that alternatives to the fuel tax should be explored as long-term revenue sources to finance highway and transit programs, even though the fuel tax has served that purpose well for 80 years. Increasing disparities in vehicle fuel efficiency will gradually erode the equity of the fuel tax, and in the long run many vehicles may be operating on fuels such as electricity that are difficult to tax. Most believe that the current financing structure will be viable until at least 2025. After that date, uncertainties concerning the ability of the fuel tax to serve as the financial base for highway and transit programs are great enough that Federal and State transportation agencies should plan on moving to an alternative revenue source. Given the many uncertainties and complexities of moving to a new revenue source, States and the Federal government must begin developing a transition strategy immediately. In fact, as will be discussed later, several pilot projects have already been completed or are underway.



**Mileage-Based User Fees.** Recent studies by TRB, the American Association of State Highway and Transportation Officials (AASHTO), the National Cooperative Highway Research Program, the National Chamber Foundation, the University of Iowa, and the Oregon Road User Fee Task Force (among others) have concluded that a fee based on VMT would be the preferred long-term alternative to the current fuel tax. One advantage of a VMT fee is that it could equitably be applied to any vehicle, no matter what type of fuel it used or what its fuel efficiency. Another advantage is that rates could be adjusted to reflect congestion levels; to encourage use of more fuel efficient, less polluting vehicles; or to charge trucks based on factors contributing to infrastructure wear and tear. An important byproduct of such a system that was recognized by the Commission was the data that could be generated on system use, probing the system and providing important information for system management that, if privacy concerns could be addressed, would be very important to system operators.

Before a VMT fee could be implemented, several technical and institutional issues would need to be overcome. There currently is no consensus on the specific technologies that should be used to implement a VMT fee. Depending on the specific capabilities that might be included, different technologies might be used both to record mileage driven in different jurisdictions and to transmit that information to the public or private entity that would charge motorists for miles driven in each taxing jurisdiction and distribute revenues to those jurisdictions.

In addition to technological issues that must be resolved, the Commission suggests further exploration of several institutional issues associated with VMT charges, the most prominent of which is privacy. Many motorists are sensitive about government agencies knowing when and where they travel. Systems must be developed to minimize the amount of unnecessary information

that is sent to tax-collecting entities, while providing a way for motorists to verify that they have been charged correctly. Potential evasion is another significant issue that must be resolved. Equipment on the vehicle must be tamper-resistant and backup systems may also be necessary when critical equipment malfunctions.

Another institutional issue concerns how the tax would be collected. The Commission envisions that a VMT tax would be levied instead of current fuel taxes at both the Federal and State levels, and potentially by local jurisdictions as well. How might this be done most efficiently and seamlessly? Collection costs and other administrative costs associated with the implementation of different strategies could vary significantly and will be important considerations in how VMT fees might be collected. The Commission believes the collection system should be as comprehensive and simple as possible. Administration and collection of VMT fees should be transparent to users and consistent nationwide.

Another issue concerns how a VMT fee might capture not only the mileage traveled by particular vehicles, but also the effects of vehicle weight on infrastructure costs. Several studies have addressed this conceptually, but more information is needed on specific strategies to reflect vehicle weight, and axle configuration impacts on wear and tear, in a mileage-based fee.

Several demonstration projects are underway or have recently been completed that will help address these concerns. Pilot studies in both Oregon and Washington State were recently completed. Preliminary findings from both studies are encouraging in terms of the technology





for mileage-based charging, but both concluded that more work is necessary before the fees could actually be implemented. A larger-scale demonstration called for in SAFETEA-LU is just getting underway through the University of Iowa. That study will assess technological, institutional, and public acceptance issues with VMT taxes in six locations across the country.

If the Nation is to transition to a VMT fee or some other alternative to the fuel tax by 2025, it is crucial to go beyond the very limited pilot projects that have been undertaken to date. A broader consensus must be developed on the basic architecture of a VMT fee. To the maximum extent possible the technology should build upon technologies that will be implemented in connection with VII and other initiatives. Strategies must be explored to reduce risks of evasion, protect privacy, and keep administrative costs as low as possible. **The Commission recommends that the next surface transportation authorization act require a major national study to develop the specific mechanisms and strategies for transitioning to an alternative to the fuel tax to fund surface transportation programs:**

- A Phase I study should be conducted through the National Academy of Sciences in coordination with the Federal Highway Administration, the Internal Revenue Service of the U.S. Department of the Treasury, State highway and revenue agencies, and affected stakeholder groups to address the technological and institutional barriers that would need to be overcome to implement a VMT fee. These would include evasion, privacy, the relationship to wear and tear of the highways, and administrative costs. The study should draw upon findings from VMT fee demonstration projects in this country and mileage-based user charge systems that are in place in other countries. The role of VII infrastructure and services in implementing a

VMT fee should be assessed. An important goal of this study would be to confirm that a VMT fee is feasible and, if so, to agree upon a system architecture for implementing such a fee.

- While the issues related to implementing a VMT fee are being addressed, the Phase I study should also examine other potential long-term surface transportation revenue options. This analysis should build on the work that has already been done in this area and focus on alternatives to a VMT fee, including ways to equitably tax alternative fuels that cannot be taxed in the same way as current motor fuels, annual registration fees for motor vehicles, and other options that were judged to be promising. Results of the Phase I study should be provided within 2 years of project initiation and should include recommendations concerning which alternative(s) should be explored in greater detail in Phase II.
- If a VMT fee is judged to be feasible in Phase I, a Phase II study involving the same organizations should be conducted to develop a specific plan and timetable for implementing a Federal VMT fee and for coordinating that fee with VMT fees levied at the State and local levels. An important part of this Phase II study will be to conduct several large-scale pilot programs to test alternative mechanisms for levying a VMT fee. These pilot programs should include both passenger and freight vehicles and should evaluate the full range of potential issues that might arise in the implementation of a VMT fee. The study should also assess necessary standards that must be set, the roles of public and private sector organizations in implementing the tax, transitional techniques such as incentives for rental and leased fleets, and other key elements of a transition strategy. Results should be mandated within 3 years. If



questions still remain about the feasibility of a VMT fee, the Phase II study should develop transition strategies for implementing other recommended alternatives.

### Surface Transportation Trust Fund

In light of the recommendation to restructure future Federal surface transportation programs around functional lines rather than individual modes, the Commission recommends that the Federal Highway Trust Fund be restructured to be compatible with the new program structure. To emphasize the multimodal nature of future programs, **we recommend that the name of the Highway Trust Fund be changed to the Surface Transportation Trust Fund (STTF).**

The Commission recommends that many of the features of the current HTF be retained. Funds deposited to the Surface Transportation Trust Fund should continue to be dedicated to surface transportation purposes, budgetary firewalls should continue to guarantee annual spending levels from the STTF, and a mechanism should be retained similar to Revenue Aligned Budget Authority (RABA) to adjust spending levels based on the latest estimates of available revenues.

The STTF would continue the user fee principles of the HTF and extend those principles to other modes and other Federal revenue sources recommended below. Under the Commission’s recommendations, the mix of highway and transit investments would be driven by the capital costs for the particular projects included in the plans developed under each program. Thus, there would be no need to direct fuel tax revenues into specific subaccounts, as is done today.



As outlined above, the Commission recommends extending the user fee principle to several areas such as freight and passenger rail. Congress should consider whether it is necessary to establish new subaccounts to which these new revenue streams would be directed.

## Conclusion

The concept of mobility is so fundamental to the American Dream, integral to our national character, and necessary to our economic well-being, that it is imperative that our surface transportation system, in all its varied modes, be the best in the world. The American people need it, demand it, and deserve it. The Commission believes that the Nation’s leaders must provide it for them—free of parochial interests, cognizant of energy sustainability and environmental impacts, and providing for the needs of all who use it and depend upon it.

This will require a sea change in the way surface transportation is planned, funded, and delivered. It will require courageous decision making, financial innovation, and unity of purpose. Most importantly, it will require a return to a national vision of a system that is integrated in its network, varied in its modes, and dedicated to providing safe, efficient, and congestion-free movement of people and goods. The United States of America should do no less.

*“We must create and sustain the pre-eminent surface transportation system in the world.”*



## Supplemental Views of Commissioner Francis X. McArdle

Let me begin by affirming my support for the work of the Commission and the staff that supported our efforts over the past two years. I accept with only one exception the findings and recommendations of the Commission. I believe that the document ably frames the choices that lay before the nation in surface transportation and makes a series of recommendations that, if adopted, will provide the most robust underpinnings possible for the American economy over the next fifty years.

I take only one exception to the recommendations of the Commission. I believe that the issue of energy security requires that we move as a nation much more rapidly to the use of centrally-generated power in transportation and non-petroleum fuels and away from our reliance on petroleum based fuels for transportation. We now rely on petroleum fuels for 97% of our transportation power. I believe that leaves the nation much too vulnerable to disruptions in supply and volatility in price over the next fifty years. Central generation of electricity gives us choices in fueling that we don't now have with our dependence on petroleum. In addition to the provisions of the Commission's recommendations in this area, I would urge the Congress to consider raising the federal share for state and local investments in electrified mass transit to 95%, from the 80% share recommended in our report for communities willing to create the land use patterns that will support such investments. I believe that a higher federal share will lead more communities to make the choice for electrified mass transit in their pursuit of mobility and growth objectives and will thus contribute to both better mobility and a higher degree of energy independence.

I would also urge the Congress to fully address the issue of what it will take to turn the additional dollars recommended by the Commission

into productive investments, a task which is beyond the work done by the Commission. The Commission is recommending that the nation almost triple the amount now being invested in surface transportation. I concur with the recommendation. But I am also acutely aware that it is not enough to just make more money available. We must also create the additional capacity in the public agencies, design community and the construction community to make certain that these additional funds buy us the vitally needed additional surface transportation capacity at the lowest possible cost and as quickly as possible.

The market alone will not take care of the supply of heavy construction companies and workers to match the newly available funds. We will need to systematically increase the numbers of professional engineers that our schools and universities produce and we must stimulate the development of both the entrepreneurs and the skilled craftsmen and women that will build the projects that the engineers design. We are asking every level of government to transform the way they think about surface transportation systems and performance. We also need to make sure that the human resources and professional tools are in place to allow those levels of government to carry out the new missions that we wish them to assume.

I urge the Congress to task the National Academy of Engineering to review the demands created by our recommendations on the heavy construction industry in the United States and the infrastructure agencies of our nation and to make recommendations on what will be needed in the way of additional research, education, scholarships, and financial support to assure that the facilities that the Commission knows are needed over the next fifty years are there when the demand for them is there.



## Supplemental Views of Commissioner Matthew K. Rose

The work of this Commission shows that infrastructure capacity for all modes is now maximized and must be expanded in anticipation of future goods movement demand and to maintain U.S. competitiveness. I am pleased that, in an effort to assist the Commission's analysis, the freight rail sector has more formally analyzed its capacity in key corridors and projected its capacity requirements in the years to come. In my discussions with policy makers over the years, I invariably ask them to weigh policy proposals against whether implementation of the proposals will result in facilitating more freight capacity, or less. The study undertaken by the industry puts empirical context around how much freight rail capacity needs to be created, if the country will continue to realize the economic and environmental benefits of the national freight rail network. Understanding the future capacity needs of freight rail will also help policy makers evaluate whether public policy proposals relating to passenger rail, public-private partnerships and economic and other regulation help achieve needed freight rail capacity expansion, the vast majority of which has been, and will continue to be, privately funded, financed and maintained by the railroads.

I share the conclusion of the Commission's report that passenger rail--intercity and commuter--will need to grow in order to supplant VMTs and give Americans more affordable, sustainable choices in light of higher fuel prices, growing transportation congestion and related environmental concerns. The report specifically recognizes that the future of passenger rail is in shorter haul corridors, where there exists a track record of increasing demand and success by states in meeting it. The Commission's report clearly asserts that expanding passenger rail cannot be achieved at the expense of freight rail operations--the most fuel efficient and sustainable mode of freight transportation--as freight volumes are expected to grow. It also recognizes that separating freight and passenger rights of way, in dense corridors and at higher

passenger speeds, allows freight and passenger rail achieve their full potential, consistent with passenger rail networks in other countries.

In order to obtain my support for the Commission's vision for passenger rail, it had to include the principle that access by passenger providers to freight rail networks, where reasonable, must be negotiated at an arm's length with freight railroads, and the impact on present and future corridor capacity must be mitigated to ensure that rail freight capacity is not reduced, but enhanced. This recognizes that speed differences between passenger and freight trains and certain well-defined passenger service requirements must be taken into account. There must be a fair assignment of costs based on the ongoing cost of passenger services, including the cost of upgrading and maintaining track, signals and structures to support joint freight and passenger operations and the cost of maintaining and improving the safety and reliability of highway/railroad intersections in joint use corridors. Finally, it goes without saying that all host railroads must be adequately and comprehensively protected through indemnification and insurance for all risks associated with passenger rail service. The Commission's vision is intended to fully address the need for expanding needed rail infrastructure capacity to provide for growth in demand for freight and passenger rail. It recognizes that in order to be a true transportation alternative for Americans, passenger rail cannot be achieved on the cheap, as it has been to date.

I support the Commission report's strong recommendations about a national commitment to transportation safety. I believe that the Section 130 grade crossing program is consistent with that commitment. Since 1974, this dedicated program to target funding of grade crossing protective devices and separations has saved thousands of lives and greatly increased the safety of motorists at public crossings. Considering the thousands of public crossings that remain without protective devices, it is important to retain the historic

Section 130 funding levels to continue this important work.

Finally, the Commission makes groundbreaking recommendations relating to a freight program intended to fund projects which increase freight volumes through freight origins, such as ports, key corridors and megapolitan terminal destinations. The Commission's recommendations sketch broad outlines of a program and proposals to fund it. There should be robust debate among private and public stakeholders to determine whether and how to implement these recommendations in a way that does not impede commerce, tax freight providers (who must continue to fund underlying capacity expansion) and direct funding to worthy projects that serve national freight mobility goals.

The Commission's recommendations recognize several key principles that are essential to Congress' consideration of a federal freight program. The first is that public benefits should be paid for by public entities and any private benefits by private beneficiaries. There are many freight projects that entail extensive public benefits--such as environmental enhancements and improved national freight efficiency--which a private railroad would not otherwise fund, due to the constraints of capital budgets, the requirement that rail investment must be directed at network expansion and return on investment, or the overwhelmingly public benefits presented by a project. Public funding in these instances is appropriate and does not represent a public subsidy of private beneficiaries, since a rail carrier will contribute financially commensurate with its benefit, if any.

With regard to the assessment of a freight fee, I believe it is essential to recognize that any freight fee is the shipper's money--private funding--which should be invested in ways that result in increased freight velocity, capacity and additional reliability, which are private and public benefits. Projects should be part of an integrated goods-movement strategy which will improve national competitiveness in conjunction with world trade and goods movement, while also positively

affecting regional safety, road congestion, environment, and air quality. The investments that address broader public interests--such as, but not limited to, reducing VMTs on the nation's highways, grade separations, improving air quality in many of our nation's metropolitan areas, energy security, and urban mobility--are valid public policy objectives and ought to be funded by a variety of public funding sources, including the National Highway Trust Fund, other federal sources, and contributions by the state and local sector.

The integrity of a freight fee collection process is vital. The Commission did not define the details of the freight fee, a task better handled by a broader set of constituents before Congress. However, the Commission recognized several principles upon which I would like to expand. First, it is key that any freight fee is paid by the beneficial cargo owner, not transportation intermediaries such as steamship, trucking, or rail companies. An issue with fees assessed against carriers is their inability to pass these fees on in a competitive marketplace, which will result in reducing their ability to reinvest. Should Congress consider a freight fee, it should not put the burden on the private sector to bill and administer the fee. Third, a national freight fee is preferred to individual state fee initiatives that are now emerging in several states which may inadvertently distort global trade flows, and only result in diverting congestion from one port region to another. Any national fee should preempt local fees, which is the best way of keeping a level playing field across national freight networks.

In conclusion, there is risk in moving forward with a freight program--a freight assessment could burden commerce, and projects could be funded which do not facilitate increased freight throughput. However, if done consistent with the principles of accountability broadly outlined in the Commission's report, there is an opportunity for the next surface transportation bill to benefit all transportation users.

## Minority Views of Secretary Mary Peters, Commission Chair; Commissioner Maria Cino; and Commissioner Rick Geddes

America's surface transportation system is faced today with a new and unprecedented challenge – one that is very different from anything the system has faced before. The most pressing transportation problem of the 21st Century is not connectivity, as it was during the second half of the 20th Century, or connecting farms to markets, as it was in the first half.

Today, the most important challenge is the consistent, precipitous decline in transportation system performance and the increased politicization of transportation investment decisions. These twin but related threats represent a growing risk to the United States economy at a time when the efficiency of our transportation networks is more critical than ever to our prosperity.

The U.S. Department of Transportation estimates that transportation system congestion costs the U.S. economy as much as \$200 billion a year. The projected growth of urban and suburban populations and the concomitant growth in both domestic and international commerce are straining our transportation system as never before. When the demand for transportation infrastructure overwhelms the transportation system's current capacity during many periods of the day, America's productivity and mobility are compromised. The energy and environmental policy implications of growing transportation system failure are increasingly apparent.

Most goods and services in America's market economy are sold to consumers at prices determined by the interplay of supply and demand. Our country's willingness to allow this interplay to determine the allocation of the vast majority of our resources has propelled a boom in innovation and technology. It is largely this interplay that has guided the development and modernization of other similar network industries, including telecommunications, electricity,

railroads, pipelines and many water systems. While experiences are varied across these sectors, in each, we have seen important improvements in system pricing, network efficiency, innovation, competition, resource allocation and customer service. Yet, when it comes to our highways and mass transportation systems, we have been reluctant to embrace those beneficial forces.

The explanation for this divergence is in some ways simple. Throughout the recent history of our highway and mass transportation systems, engineering and political considerations have trumped economic ones. Since the end of World War II, the overriding objective in both the highway and mass transit sector was to build robust connections between various destination points in the U.S. and within cities. The question of how to create efficient financing mechanisms for these systems is far less important when the test of success is how much highway or track mileage was added or rehabilitated in a given year. In other words, such an approach promotes relative indifference to the revenue mechanisms themselves so long as adequate revenue is generated. This is not a sustainable policy.

It is a virtual economic certainty that congestion and system unreliability will worsen if we continue to rely on a tax-based financing system that has little or nothing to do with the true costs of using or providing transportation infrastructure. Today, a fundamentally new transportation policy must focus on system performance rather than simply connectivity and the size of the system.

Because the Commission was not able to forge a consensus on the underlying nature of the problem facing our transportation system today, it should not be surprising that we were unable to reach agreement on a common set of solutions. Many of our fellow Commissioners believe the principal challenge is that, while our federal, state, and local governments have the ability to generate much higher levels of tax revenues for

transportation investments, they have not done so because they have not sufficiently recognized the seriousness of the transportation crisis.

We believe, however, that a failure to properly align supply and demand, not a failure to generate sufficient tax revenues, is the essential policy failure. When consumer demand determines supply, it will engender funding sufficient to meet the demand. The problem is not how to raise a certain level of revenue, but rather how to develop a policy framework that will unleash efficient capital investments, empower consumers, reduce congestion, stimulate technology improvements, improve America's quality of life, and support the increased productivity of American businesses.

The broad policy failures we experience in these areas today are further exacerbated by a Federal-centric funding and regulatory structure that stifles creativity and innovation at the State and local levels. Yet a majority of our colleagues on the Commission urge as a central recommendation, an expansion of that very system. The Commission Report thus serves only to reinforce the misconception that substantially more Federal spending will improve America's surface transportation system.

As a result of this core difference of opinion, our Commission has been unable to reach consensus on the report. The following pages set forth our views on some of the key recommendations contained in the Commission Report. We do not express opinions on all recommendations, however.

## Discussion

Although we fundamentally disagree with a number of the central elements of the Commission's Report, that disagreement in no way detracts from our respect for our colleagues on the Commission. They are to be commended for their

hard work and dedication in the production of the report. Over the last 20 months, the Commission has met on numerous occasions and has engaged in wide ranging discussions in a serious effort to address the Nation's current and future transportation needs.

Our comments reflect the following themes:

The Federal role in transportation policy and investment should be determined only by that which is essential to the national interest. The Commission report, however, derives the Federal responsibility based on the historic 40% share of transportation funding. The Commission Report recommends an increase of \$0.25 to \$0.40 per gallon in Federal fuel taxes over the next five years (with automatic increases every year after that) and assumes substantial increases of State and local transportation taxes to ensure a Federal share representing 40% of total capital investments.

The fact that the public has overwhelmingly opposed an increase in Federal fuel taxes since 1993 represents a lack of investor confidence in current transportation policy. The public correctly understands that increased fuel taxes will not remedy the woefully inadequate transportation system performance they so frequently experience today. Accordingly, neither Congress nor successive Administrations have supported increases in gas taxes, despite the obvious and rapid deterioration in transportation system performance.

Continued dependence on fuel taxes not only fails to align supply and demand properly, it is also inconsistent with national energy policy. That policy, reflected in recently enacted legislation, seeks to reduce our nation's dependence on imported oil, dramatically increase vehicle fuel economy and increase the use of alternative and renewable fuels. A majority of our Commission colleagues propose to expand transportation capacity by increasing government taxation of a commodity whose consumption we seek to

discourage. Placing our energy, environment and transportation infrastructure funding policies into direct conflict with each other guarantees failure of one or all policies.

While the Commission Report recognizes the potential of road pricing to reduce congestion and improve system efficiency, it does not recognize pricing as the essential element in a proper alignment of supply and demand as it is in almost every other major sector of our economy. It also fails to recognize that prices are part of a fundamental shift in capacity policy. They are not just a demand management tool. In addition to generating resources, prices help de-politicize investment decisions by sending clear signals where new capacity is most badly needed.

Although the Commission Report identifies the growing availability of private infrastructure capital, the Commission Report actually proposes unprecedented new national regulations on States wishing to contract with the private sector. The Commission Report also fails to adequately consider the important role the private sector can play in a performance-based investment model. There is a vast amount of private sector capital and capacity for investment and innovation that can be brought to bear to improve the U.S. transportation system in a price-and-invest versus a tax-and-spend policy. Important trends are underway in many States and around the world to reform the way in which transportation systems are financed. These trends coincide with changes in public opinion regarding transportation financing and congestion.

### **Areas of Agreement**

We agree with each of the following conclusions and themes listed in the Commission's Report:

- 1. Importance of the transportation system and need for sustained investment.** The Commission has clearly recognized the key importance of the transportation system to our Nation's economic prosperity, as well as the vast scale of the nation's transportation challenge over the next 50 years. To address these problems, the Commission has properly recognized the multimodal nature of our surface transportation challenges, encompassing highway, transit, freight and passenger rail, intermodal, and port requirements. It has also recognized that our transportation system will need to be substantially recapitalized even as we seek to add capacity to the most congested parts of the system. Such efforts will require additional resources. Both the recommended policy framework and the magnitude of investment necessary to achieve these objectives, however, are not appropriately addressed in the Commission Report.
- 2. Opportunities for simplification, consolidation, and streamlining of Federal programs.** The Commission Report correctly identifies opportunities to simplify Federal programs and funding categories. In recent years, there has been a proliferation of special interest programs that do little to improve our surface transportation system. Fewer, more focused programs will deliver better results for the Federal taxpayer. Moreover, current programmatic approaches largely do not take into account the impact that investment and management decisions in one mode can have on other modes. The Commission Report makes concrete proposals for streamlining the current planning and environmental processes to save time and money. The speed of transportation infrastructure and technology deployment must be increased to save money and maximize throughput from our existing resources.
- 3. Need for greater accountability and rationality in investment decisions.** The Commission emphasized the need for much

more efficient investment in, and operation of, the transportation system. We strongly support recommendations to improve the targeting of investments through a greater emphasis on performance and outcomes, as well as the application of benefit–cost analysis to ensure that projects generate benefits at least equal to the value of resources invested in them. States should be encouraged to increase their reliance on these tools in making decisions. Specific sanctions against States, however, are unlikely to be either politically acceptable or desirable as policy. A more effective and sustainable policy approach would be for the Federal program to meaningfully reward States that are willing to reform decision-making processes so as to incorporate economic analysis and a focus on performance.

Importantly, the Commission has attempted to link Federal participation in each of its ten proposed programs to a more clearly defined Federal interest. The Commission Report rightfully seeks to minimize or eliminate the intrusion of political processes and special interests into the transportation planning and funding process. Unfortunately, the report’s recommended mechanism for doing so, the proposed National Surface Transportation Commission (NASTRAC), is both impractical and ill-advised, as further explained below.

### **Areas of Disagreement**

We fundamentally disagree with a number of the Commission Report’s major recommendations. Moreover, because the Commission Report focuses on recommendations rather than alternatives for Congress to consider, it is appropriate that we identify alternatives to some of the recommendations in the Commission Report and explain why these alternatives are preferable.

#### **1. Federal Fuel Tax increases are not a solution.**

- *An Ineffective Tax.* As noted in the preceding pages, congestion has grown virtually unchecked because of a severe imbalance between the supply of and demand for transportation infrastructure in both urban and suburban areas. This imbalance is largely attributable to ineffective and indirect pricing mechanisms in the provision of surface transportation facilities that bear little or no relation to system costs. While the prices for most goods and services are a function of supply and demand, pricing associated with surface transportation infrastructure – predominantly fuel taxes, sales taxes and other indirect taxes – is essentially uninfluenced by market forces. Users pay the same per gallon fuel tax or other indirect tax to use a higher-value facility at peak travel hours as they do to use a significantly lesser-value facility in off-peak travel hours. As a result, severe over-consumption occurs in some locations and times, and under-consumption in others. While the other network service industries cited earlier are driven by a strong customer focus, the current surface transportation funding model effectively ignores consumer choice. Because transportation services are not rationally priced, market discipline is largely eliminated as a driver of service quality in the provision of transportation infrastructure.
- *Breeds Wasteful Spending.* Raising fuel taxes in the existing financial and planning environment would be wasteful because our current transportation infrastructure system is neither performance driven nor accountable. Only a handful of States currently utilize benefit-cost

analysis and rampant earmarking at the Federal level has continued to erode the returns on U.S. highway investments. While the Commission Report makes some meaningful programmatic reform recommendations, there is a real danger that the principal message many readers will take from the Commission Report is that we should immediately increase fuel taxes. In that case, reforms listed as preconditions for such an increase may be ignored or never enforced.

- *Commission Report fails to adequately consider the potential of more effective and bold alternatives.* Only one of the five future investment scenarios used by the Commissioners to calculate the proposed fuel tax increase considered the option of directly pricing highways. Even this scenario contains unjustified investment needs and does not factor in the potential use of revenues raised by direct pricing to offset the need for a gas tax increase. Recent estimates in a forthcoming paper, *Toward a Comprehensive Assessment of Road Pricing Accounting for Land Use* by economists Clifford Winston and Ashley Langer at the Brookings Institute conclude that utilizing congestion pricing in the largest 98 metropolitan areas would generate approximately \$120 billion a year in revenues while simultaneously solving the recurring congestion problem in those areas and allowing State and local officials to reduce taxes.
- *Timing of alternatives to replace fuel taxes.* The Commission asserts that the current fuel tax based financing structure will be adequate until 2025, after which a replacement revenue source, such as congestion pricing or the Vehicle Miles of Travel (VMT) tax would be necessary. This approach would prolong for at least

another eighteen years a tax-based system that neither sends the correct price signals to users nor promotes accountability for project delivery. This timeframe is far too pessimistic from a technological and administrative perspective. It also fails to recognize the growing willingness of State and local leaders to experiment with different approaches. Replacement of fuel taxes by a variety of direct user charges (which can be varied by time of day, congestion, vehicle characteristics, and location depending on the policy objectives of the implementing jurisdiction), can and should be expedited as a matter of national policy. Given current technologies and international experiences, we believe that within a decade, the vast majority of metropolitan areas in the U.S. could finance their transportation systems through direct user charges instead of indirect taxes.

2. *Unnecessarily large Federal role.* There is no question that we urgently need a renewed national focus on infrastructure policy. Unfortunately, the Commission's Report mistakenly converts this need into a recommendation for a larger Federal role in directly financing and managing project development. The massive Federal fuel tax increase recommended by the Commission Report is based on an assumption that the Federal Government should continue to pay 40% of national infrastructure capital costs. There is no analysis to support this percentage. Rather, 40% simply reflects the historic Federal participation share, established over the last decade by the political system. In practice, this recommendation would directly conflict with other parts of the report that are critical of Federal process requirements and recommend that the Federal government should become more focused on matters

of national concern. It is implausible that the Federal government would substantially increase its financial participation in surface transportation infrastructure while simultaneously eliminating many of the burdensome processes that have been put in place.

Far more likely is that increased financial participation will come with additional procedural requirements, greater delays in project decision-making, more special interest programs and projects and unjustified Federal involvement in issues that are best treated as local policy matters. In contrast, revenues collected at the State and local levels allow greater flexibility, responsiveness, and accountability to local transportation consumers. Planning and construction flexibility is much greater without the onerous procedural requirements and “one size fits all” approach that come with Federal funds. Accountability is also improved by State and local funds because those agencies have a stronger incentive to be accountable to their voters than to the Federal Government, which can often be blocked from acting through political intervention. Taxpayers are less inclined to hold State and local officials accountable for the careful spending of Federal funds, in part because these funds are perceived (often incorrectly) to come from outside the State.

Given that today’s principal transportation problems are congestion and system unreliability, a far more effective policy would be for the Federal government to stimulate creative new investment approaches. Federal programs should focus on truly Federal objectives, such as preservation and improvement of the Interstate Highway System, interstate freight movement, safety programs (e.g., those of the National Highway

Traffic Safety Administration and the Federal Motor Carrier Safety Administration), projects of truly national or regional significance, and research supportive of national goals.

- 3. *An inappropriate definition of “need.”*** It is inappropriate to cite the highway and transit investment “needs” estimates in the Commission’s fuel tax calculations (see “Summary of range of ‘high’ average annual capital investment levels analyzed for all modes”) as these estimates are simply an estimate of projects whose benefits slightly outweigh their costs. Mistakenly, the Commission Report assumes that any project, whose benefits outweigh its costs, even if only by a dollar, should in fact be constructed. This is not a criterion on which we base investment decisions in any other sector of the economy. If utilized, it would translate into extremely low investment returns when analyzed on a rate of return basis. In addition to being a flawed taxing strategy, it also neglects the fact that resources are limited. A dollar invested in a low return transportation project is a dollar not invested in some higher return enterprise. In many areas of the economy – education, health care, waste water treatment – we have far more in “needs”, even “needs” that can pass a cost-benefit test, than we have money to pay for them. The existence of a dedicated funding stream in the form of the federal excise tax on fuels leads some to believe that the tax should be raised whenever the benefits of increased investments exceed their costs. Yet raising the fuel tax reduces revenues available for other forms of government expenditure and for private sector expenditures – many of which may have benefits even greater in excess of their costs. After all, if their benefits didn’t exceed their costs, people probably wouldn’t spend money on them anyway.

Second, several of the investment assumptions used in the Commission analyses include unjustifiable investments. One scenario contains \$23 billion per year in highway and transit “needs” that go beyond what even a benefit-cost test would likely support, much less a more realistic standard for fiscal prudence. Some of the transit investments are not based on a strict benefit-cost analysis. The estimates for rail passenger investment needs (\$7 - \$9 billion per year, of which over \$6 billion would be Federal grants) are similarly unrealistic. It is not clear that even our current investments in passenger rail yield benefits in excess of their costs; it is highly unlikely that \$9 billion per year in cost-beneficial investment opportunities in passenger rail could be found.

And, as noted above, the exclusion of congestion pricing from four of the five investment scenarios explored by the Commission causes these scenarios to overstate America’s infrastructure “needs” by a substantial measure.

**4. *An independent governance commission is neither practical nor good policy.***

The Commission’s proposal to create an independent governance commission (NASTRAC) to oversee the development of a national strategic plan and recommend funding levels for the plan is neither politically realistic nor good policy. Although the motivation for establishing such a commission is commendable, to insulate the transportation planning process from political intervention, it is unlikely that either Congress or the Executive Branch would cede control of infrastructure investment to an autonomous body. Moreover, there is little reason to believe that such a body would itself not soon be subjected to the same political forces that are currently undermining Federal investment

policies. Although well-intended, the creation of such a commission would simply add another layer of bureaucracy to the decision-making process. No program or policy recommended by the Commission Report should be made contingent on the creation of an independent governance body.

**5. *New Federal restrictions on pricing and private investment.***

While correctly recognizing that direct pricing and private investment have a role to play, the Commission’s Report actually proposes to increase and tighten Federal restrictions on the use of these increasingly important solutions. Each of the recent major Federal surface transportation bills has expanded the ability of States to experiment with pricing and innovative procurement. In addition to being an unprecedented call for greater Federal regulations of the financial flexibility of States, this element of the Commission Report also conflicts with other passages that stress the need for greater investment from all sources. Additionally, the Commission Report proposes no restrictions on the ability of States to raise transportation revenues from non-users. The somewhat striking implication is that the Commission Report believes it is less desirable to charge transportation system users than people buying homes or consumer products.

The Commission report would limit tolling and congestion pricing of existing Interstate highway capacity to metropolitan areas of 1 million or more in population. There are clearly major sections of Interstates through rural and small urban areas where pricing would be viable. The Commission’s proposed restrictions on such segments therefore do not represent good policy. The Commission recommendations would also

restrict the use of toll revenues, or payments by private operators to States for the lease of a transportation facility, to the facility itself, or to roads within the same corridor, or the same network of facilities. This latter restriction puts pricing at an artificial disadvantage relative to traditional funding sources such as fuel taxes, which are not constrained in this manner. States are currently allowed to spend Federal and State gas tax dollars on any eligible facility they wish to, even if the taxes are not raised from users of the facility.

The report states that commercial transportation users have limited flexibility to respond to prices, and therefore must be protected from them. In fact, experience has shown that our free enterprise system can adapt to pricing in many innovative ways, and in the end will operate more efficiently. The restrictions on toll levels recommended by the Commission to “protect” commercial users would, in fact, simply undermine the efficacy of tolls to allocate and fund capacity. Trucks and other commercial users can in fact incorporate tolls and other fees into their commercial operations. This has been our experience with container fees for rail access improvements in Southern California.

With respect to public private partnerships, the Commission Report recommends that Congress encourage the use of PPP's. While we strongly agree, the Commission Report contains no proposals in this regard. Instead, without any basis, problem or risk cited, the Commission Report proposes new Federal regulations of State contracts with the private sector. The Commission Report includes recommendations to replace what would otherwise be specifically negotiated terms and conditions with a national regulatory scheme for public-private partnerships that goes well beyond any regulations currently in place.

In fact, despite finding substantial flaws with current programs and policies, the Commission Report strangely subjects innovative forms of project delivery to greater Federal scrutiny than traditional procurement approaches. The Commission Report would also subject private toll operators under contract with a State to greater Federal scrutiny than the scrutiny to which local public toll authorities are subject. There is no basis for this distinction. The Commonwealth of Virginia recently reached financial close on an unsolicited private sector proposal to construct four dynamically priced lanes on one of the most congested highway stretches in the United States, I-495. This transaction is the latest in a growing line of innovative public private infrastructure partnerships being developed in the U.S. and around the globe. The majority of major new highway projects in America are currently being developed as toll roads, and toll revenues are growing far faster than gasoline tax revenues on a percentage basis.

It should also be noted that public opinion results show a clear preference for toll roads over increases in gasoline and other traditional transportation taxes in recent years. A just completed analysis of public opinion surveys conducted for the Transportation Research Board revealed 56% support for tolling or road pricing concepts on average. All across Europe, Asia and South America, the trend lines are also absolutely clear in this regard. The Commission Report fails to consider successful international public private partnerships and tolling projects while simultaneously stressing the global nature of the U.S. economy.

6. ***The Commission Report is inconsistent in its approach to earmarking.*** Although the Commission clearly recognized the inefficiencies introduced in transportation

planning by the use of earmarking, the Commission has itself inadvertently resorted to this practice in some of its own recommendations. It recommends that 7 percent of transportation funding be set aside for environmental compatibility purposes, but without tying this funding level to any identified actual needs. Similarly, the Federal funding share that the Commission recommends for projects under each of the 10 Federal programs is at least 80 percent of project cost, even though many of the projects in these programs will not be of sufficient Federal interest to justify such a large share of funding. Lower Federal interest would be especially prevalent in many Metropolitan Mobility or Intercity Passenger Rail projects, as well as some projects to rehabilitate local infrastructure, more properly a State and local responsibility.

7. ***The Commission's energy research and investment recommendations are inappropriate.*** The recommendations by the Commission pertaining to energy research and investment are not appropriate. National energy research is not under the purview of the Commission, but rather the Department of Energy. Earmarking of funds proposed by the Commission to fund ongoing research at the Department of Energy is almost certain to miss actual funding needs or responsibilities.

### ***A Path Forward***

As is evident from the preceding observations, we would advocate a substantially different approach than that proposed by the Commission Report. Our approach would sustain current gasoline and diesel tax levels and refocus Federal efforts on (a) maintaining the Interstate Highway System; (b) alleviating freight-related bottlenecks that

impede the flow of commerce and goods; and (c) providing States with appropriate analysis, incentives, and flexibility regarding the adoption of market-based reforms to their highway systems.

Under this approach, our existing Highway Trust Fund receipts would be re-programmed at the Federal level for the achievement of these key Federal objectives. The remaining funds would stay at the State level. States have been slow to pursue experiments at least in part because of the large Federal presence in State and local transportation decisions. A recast Federal role would encourage experimentation and innovation among the States. U.S. DOT would maintain regulatory oversight related to the safety of transportation infrastructure. Federal infrastructure regulations that are not cost-beneficial would be eliminated, most importantly restrictions against tolling and participation by the private sector.

Every effort should be made to facilitate the application of tolling and congestion pricing to the transportation system so as to attain the greatest efficiency from the system. Thanks to technology development and the leadership of a number of State and local officials, the move toward direct pricing is underway at the State and local level. A change from an indirect to a direct pricing system can and should ensure continued access to transportation systems for all Americans, regardless of income. In fact, when contrasted to the highly regressive nature of higher fuel taxes and congestion itself, direct pricing is likely to be a far more fair system.

Instead of creating additional regulatory barriers as contemplated by the Commission's report, the Federal government should send a clear signal that it is willing to reward State and local innovators. Federal programs and regulations should be restructured so as to reward, not stifle, a focus on efficiency and system performance.

## Conclusion

In summary, we must seize the opportunity presented in the upcoming reauthorization of the surface transportation programs to make fundamental changes to the way our system is built, maintained, and operated. The importance of selecting the right path forward for the Nation—one that introduces greater State responsibility and accountability, rational pricing, and market discipline into our transportation system—cannot be overstated. To simply modify historic methods of providing infrastructure, relying on increases in the Federal fuel tax and inviting political earmarking, is a recipe for failure that we, as a Nation, can no longer afford.

# Volume II

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- Chapter 2** What Are the Future Demands on the Surface Transportation System?
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# Chapter 1

## Why Was This Commission Created?

### Congressional Mandate

The National Surface Transportation Policy and Revenue Study Commission was established under Section 1909 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU). This legislation, signed by President George W. Bush on August 10, 2005, is the latest in a series of

reauthorizations of the major Federal grant-in-aid surface transportation programs.

In laying out the parameters for the Commission, Section 1909 noted that “it is in the National interest to preserve and enhance the surface transportation system to meet the needs of the United States for the 21st century.”



The conceptual plan would be developed after an examination of various dimensions of the Nation's surface transportation network, now and in 15, 30, and 50 years. These dimensions include the physical condition of bridges and pavement; operational characteristics and performance; the potential for expansion, upgrades, and other improvements to the surface transportation system; alternatives for addressing environmental concerns; and current and future capabilities for conducting system-wide real-time performance data collection and analysis, traffic monitoring for the highway system, operations and management.

The original submission deadline for the report was July 1, 2007. The Commission requested an extension due to the scope of its mandate, and the Congressional authorizing committees recognized the need to extend the deadline to December 31, 2007, a provision included in HR 6233 and HR 5689. The Commission will expire six months after its report is submitted to Congress.

## How Did the Commission Satisfy This Mandate?

The Commission implemented a workplan built around several distinctive tracks: public outreach, technical analysis, and the logistics and physical production of the report.

**Outreach.** The Commission implemented a program that solicited widespread input from the public in addition to the hearings required by Section 1909. A Blue Ribbon Panel of Transportation Experts was established to provide the Commission with recommendations and additional insight. This panel included 77 experts from different levels of government, the private sector, and research and academic institutions. To further expand its knowledge base, the



The Commission heard testimony

Commission held field hearings in ten cities: Dallas, Portland (Oregon), Memphis, New York, Las Vegas, Los Angeles, Atlanta, Washington, D.C., Minneapolis, and Chicago. During these hearings, 231 witnesses testified about a wide range of topics covering all surface transportation modes. The hearings often included tours of facilities, or discussion of issues unique to certain parts of the country. Several of these field hearings were cosponsored with major transportation stakeholder groups.

The Commission met in public and executive session in Washington, D.C., 12 times during the course of its activities, and heard from 62 expert witnesses during these sessions. Individual Commissioners regularly participated in conferences and meetings to solicit input from key transportation stakeholders, and provided interviews to the media.



The Commission also developed a public World Wide Web site, [www.transportationfortomorrow.org](http://www.transportationfortomorrow.org), which included testimony from the field hearings and public sessions, as well as key information about the Commission's work. The Web site included a comment form that allowed the public to submit comments and suggestions for the record.

**Technical Analysis.** The Commission supplemented the insights from invited experts and witnesses with extensive analyses on key issues impacting the future surface transportation system. Commission staff prepared more than 100 briefing papers at the request of the Commissioners, which can be found in Volume III. The Blue Ribbon Panel of Transportation Experts was invited to review these papers.

The bulk of the Commission's analysis was conducted by staff, furnished by the U.S. Department of Transportation, who studied the impacts of potential policy changes on performance and investment requirements under different sets of assumptions. Staff developed scenarios to determine the effectiveness and cost of various strategies that could deal with challenges to a well-performing surface transportation system. Staff also developed a Base Case, which assumed the current mix of investments and technologies. The scenarios involved making maximum use of operational strategies to improve performance; implementing strategies to reduce energy consumption and travel demand; providing greater mobility and intercity connectivity; separating passengers from freight transportation in key highway and rail corridors; and making maximum use of technology to improve performance and safety. These strategies were evaluated at several different investment levels, ranging from the level that could be sustained at current tax rates (adjusted for inflation) to the level at which all cost-beneficial improvements could be made.

## Why is Transportation Important?

The Nation's surface transportation system is a network of public and private elements—highways, railroads, transit routes, ports, and waterways—that interact to provide service for the American people. The American economy works, in large measure, because shippers, manufacturers, and service providers have a transportation system that provides many ways to access labor and move raw materials and finished products. Individuals are able to travel to work places, shopping, educational institutions, recreation, medical care, and other locations critical to their quality of life.

For much of the past half-century, a grid of highways, railroads, waterways, and transit lines provided an unparalleled fluidity of movement. The mobility offered by the surface transportation network gave Americans an unequalled degree of choice and freedom. The transportation network broadened opportunity, eliminating barriers and sustaining the most pluralistic society in world history.

Unfortunately, the strong and dynamic American surface transportation system is becoming a thing of the past. The Nation's infrastructure may have appeared resilient to change in the 1970s and 1980s, but more recent forces have overwhelmed





the system and threatened its basic functionality. Congestion was once just a nuisance. Today, gridlock is a way of life, and it has greatly eroded the quality of our transportation network.

By the middle of the Twenty-First Century, social and economic forces will have altered the United States in ways that were unimaginable just 50 years ago. The Nation's population will swell to 420 million people.<sup>1</sup> That is the equivalent of 11 new Los Angeles metropolitan areas spread out on a transportation grid already strained by congestion and disrepair. Many researchers believe this population growth will be accompanied by a doubling of the country's Gross Domestic Product (GDP), which is highly correlated with transportation demand.

**“We have a shared responsibility with the public sector to ensure there is a fair commerce system and a national investment policy and strategy for transportation infrastructure that keeps America a secure and competitive place to manufacture products, deliver services, and to work and live.”**

*– Ken Andrews, Dow Corporation, at the Commission's New York field hearing.*

To accommodate the tremendous pressures on its infrastructure network, the Nation must renew its commitment to developing a world-class transportation system. The vision adopted by this Commission is that *the United States will create and sustain the preeminent surface transportation system in the world.* Understanding the seven central roles that transportation plays can help today's leaders build a transportation system for tomorrow.

### ***Making Goods More Convenient and Accessible***

Transportation has made goods convenient to households and businesses in every corner of the Nation. Because of improved transportation, vegetables and fruit from California can arrive fresh on dinner tables in New York City. There are products in our stores and in our homes that come from places unheard of a half-century ago. Hospitals have medicine and medical equipment ready at a moment's notice because the transportation system can bring them right into our neighborhoods.

Unfortunately, the Nation's transportation systems can no longer move these goods as efficiently as possible. Congestion not only delays the shipment of these goods, but it increases costs to businesses—and ultimately consumers—as trucks and railroad cars are slowed at chokepoints.

### ***Improving International Competitiveness***

Transportation links the United States to the global economy. The rate by which international trade is growing is staggering. Since 1970, imports to the United States have tripled and exports have doubled, when measured against the value of the GDP. The volume of new cargo moving along our freight corridors will continue to increase. For





example, between 2000 and 2008, the world's ocean-going fleet capacity is expected to grow at an annual rate of nearly 10 percent. Currently, more than 1,000 new container ships are being built in the world's shipyards.<sup>2</sup> In addition, the complexion of that trade has recently changed. While the countries of Western Europe remain strong trading partners, commerce with Canada, Japan, Mexico, and rapidly growing Asian nations such as China and India is increasing.

As commerce grows with faraway countries, the distance that shipments must travel between origin and destination also increases. This makes it even more important to move cargo efficiently through seaports and along freight corridors. The Nation's top 20 international freight gateways move more than \$2.6 trillion worth of goods, and they are all located in fast-growing urban areas. As development occurs around these freight gateways, trucks and railroads must deal with increased traffic. Freight also must be moved safely and securely, with minimum adverse impacts on the environment and public health. The location of the Nation's ports in urbanized areas creates special challenges with regard to protecting the health and safety of the public.

## ***Developing Markets Within the United States***

Transportation opens up new markets. In the Nineteenth Century, waterways and railroads allowed entrepreneurs to access isolated places in the South and West. During the Twentieth Century, paved roads and Interstate highways extended low-cost automobile and truck transportation across the entire continent. Transit extended the reach of cities by allowing people to commute to central cities along trolley and rail lines.

***“Strong, efficient transportation systems are a vital component in global competitiveness...there is a need for a strong federal role in setting the goals for the Nation's transportation system...to ensure a comprehensive, multi-modal, and coordinated approach to transportation.”***

*– Maggie Walsh, President, Chicago Chapter of the Women's Transportation Seminar, at the Commission's Chicago field hearing.*

Today, new trade corridors are transforming undeveloped parts of the country. In the ten years after the enactment of the North American Free Trade Agreement (NAFTA), the International Trade Administration estimates that total trade more than doubled between the United States and its immediate neighbors, Canada and Mexico.<sup>3</sup> Trade generates development in addition to jobs in manufacturing plants and distribution centers along these corridors. People move to communities where there are jobs, so the growth of these communities leads to new housing developments, shopping centers, schools, and hospitals.



## **Enhancing Personal Mobility**

Transportation determines personal mobility. Many of the Nation's social, governmental, and legal principles were built around the concept of mobility. Freedom of movement has been a defining theme in American history. The United States prides itself as a country of mobility, where people can not only choose where they work, live, and visit, but may do so without the barriers often found in other countries. The Nation's surface transportation system must complement this way of life.

Today, traffic congestion restricts the mobility of much of this country's population. Congestion affects Americans in communities throughout the country, large and small, and is often as severe on weekends as it is during weekday commutes. With the anticipated steep increase in our population, the impacts will be beyond anything we have yet experienced.

Mobility is a key factor in our quality of life. For example, reducing congestion would give parents more time with their children, save fuel, and provide people with more choice when they decide where to live, work, and raise a family. The concept of mobility does not just mean traveling in a congestion-free environment. It also means that the system is accessible to all users, including the disabled, senior citizens, low income individuals, and persons without access to a car. An important element of mobility is the concept of choice: Americans want to have a menu of options from which to choose as they travel from origin to destination.

## **Supporting National Defense and Homeland Security**

Transportation is key to National defense and homeland security. No one can fully predict the

challenges associated with the Nation's defense, but the past provides clear evidence that an efficient surface transportation system forms the backbone for military mobilization. The Nation's highways, railroads, airports and seaports must accommodate the flow of material "from factory to foxhole." During Operations Desert Storm and Desert Shield in the early 1990s, more than 3.5 million tons of material was moved on the road and rail networks throughout the United States.<sup>4</sup>

When mobilizing for an emergency, the U.S. Department of Defense emphasizes speed, precision, and accuracy. The Nation's surface transportation network must reflect these characteristics. At the same time, the Nation's tradition of mobility creates a special challenge for those charged with maintaining its security. Americans expect they will be able to travel throughout the country with relative ease. Fluid movement within the country makes its communities and infrastructure more vulnerable.

A transportation system that works will save lives in an emergency. Improvements to our transportation system have brought us more effective police, fire, and rescue services, making them more mobile; but their significance goes beyond what we experience in our everyday lives.





Recent natural disasters and terrorist attacks have proven the importance of an effective surface transportation system when responding to large-scale emergencies. The public transportation systems in New York City and Washington, D.C., performed this function admirably during the terrorist attacks of September 11, 2001.

The network must have the capability to accommodate police, fire and rescue vehicles at a moment's notice. The surface transportation system must also be able to accommodate evacuations. In a study of all types of incidents between 1990 and 2003, the U.S. Nuclear Regulatory Commission estimated that a large-scale evacuation of at least 1,000 people occurred every three weeks.

The National Response Plan formulated by the U.S. Department of Homeland Security recommends that most incidents be handled at the lowest jurisdictional level possible, closest to the emergency. That is why State and local planners are working to better coordinate homeland security operations. They are attempting to accommodate the movement of senior citizens, individuals with disabilities, and persons without cars, as well as using technology to improve the flow of traffic during emergencies.



## ***Determining the Nation's Energy Use***

Transportation is essential to another element of the Nation's long-term security: whether the country's economy can become less reliant on foreign oil. Some of the world's major petroleum exporting nations are currently hostile to the United State and/or located in often unstable parts of the world such as the Middle East and Africa. If these countries suddenly shut off their exports of petroleum to the United States, this action could cripple the Nation's economy and threaten its security.

Many leaders are also concerned about the future supply of petroleum. Much of the world's easily accessible petroleum reserves have already been tapped, and some experts believe that the world's supply will be exhausted by the end of the Twenty-First Century.

Automobiles and trucks consume more than two-thirds of the Nation's petroleum supply, which is used to manufacture gasoline and diesel fuel. While automakers have introduced more fuel-efficient vehicles over the past three decades, petroleum consumption continues to rise at an alarming rate.

By shifting highway users onto transit systems that require less per capita energy, public transportation can play an essential role in reducing petroleum consumption. There are other ways in which the amount of petroleum consumed by highway users may be minimized: ridesharing, teleworking, and increasing the use of non-motorized modes of transportation, such as bicycling and walking. Similar energy savings could be achieved by moving more goods by rail or water than by truck.

The nature of the Nation's surface transportation system will largely determine its energy use for decades to come. For this reason, many policymakers believe that designing a less energy-dependent transportation network is fundamental to the Nation's security.



## Impacting Health and Safety

In addition to its many positive contributions to the country's economy and quality of life, the Nation's surface transportation network regrettably exacts a terrible toll in lost lives and damaged health. According to the National Highway Traffic Safety Administration, highway crashes are the leading cause of death for Americans aged 4 through 34.<sup>5</sup> Additionally, the particulate and greenhouse gas emissions from the Nation's motor vehicle fleet are a growing public health concern.

The United States made impressive gains in reducing the number and rate of traffic fatalities during the early decades of the Interstate era, but that progress has stalled over the past decade. The growing amount of vehicle travel also threatens to overwhelm earlier regulatory gains in cleaning up the vehicles and fuels Americans use. In the interest of the health and safety of all Americans, the Federal transportation program must provide more vigorous leadership in this vital area of public policy.



## Endnotes

- <sup>1</sup> U.S. Department of Commerce, U.S. Census Bureau. Press Release. Washington, D.C.: March 18, 2004.
- <sup>2</sup> Research from Howe Robinson & Company Ltd., shipbrokers, October 2006.
- <sup>3</sup> U.S. Department of Commerce, International Trade Administration. International Trade Update. Washington, D.C.: July/August 2006.
- <sup>4</sup> U.S. Department of Transportation, Federal Highway Administration, Office of Operations Web Site, [http://ops.fhwa.dot.gov/freight/freight\\_analysis/nhs\\_connectors/role\\_nhs\\_conn/role\\_sys\\_conn\\_3.htm](http://ops.fhwa.dot.gov/freight/freight_analysis/nhs_connectors/role_nhs_conn/role_sys_conn_3.htm).
- <sup>5</sup> U.S. Department of Transportation, National Highway Traffic Safety Administration. *2004 Motor Vehicle Occupant Protection Facts*. Washington, D.C.: 2004.

## What Are the Future Demands on the Surface Transportation System?

Travel is integral to the economy and our quality of life. It gets us to work and to play, to worship and to school, to shopping and to health care, to weddings and to funerals. The average American spends more than 75 minutes per day in travel. Every product in our homes, on our dinner tables, and at our workplaces depends on transportation. Transportation is the lifeblood of tourism; it is fundamental to agriculture, forestry, and mining; indispensable to manufacturers; and critical to the military, healthcare, and education sectors. It is an important element of virtually every sector of the economy and every aspect of people's lives. Mobility has become an important part of our basic freedoms and expands our opportunities.

This chapter focuses on economic and demographic factors that drive the demand for passenger and freight travel on the Nation's surface transportation system, both at the present and in the coming decades. The impact of growing demands on surface transportation performance and investment needs, alternative mechanisms to finance that investment, the potential impact of new technologies, and recommended policies to address imbalances between transportation supply and demand and to mitigate the impact of the surface transportation system on the environment are covered in subsequent chapters.





## Current Use of the System

Exhibit 2-1 shows data on passenger travel in the United States using different surface transportation modes. Autos and light trucks are the dominant form of passenger transportation in the U.S., accounting for over 96 percent of the 4.5 trillion passenger miles traveled in 2005. Despite its relatively low overall market share, public transportation plays a critical role in providing high-capacity transportation service into dense urban cores and in providing basic mobility to those without access to private autos.

Most surface passenger travel occurs within cities. Almost 60 percent of highway vehicle-miles traveled (VMT) are in urbanized areas over 50,000 in population, and 32 percent occurs in major urbanized areas with populations over 1 million. Public transit use is more concentrated in large cities; urbanized areas with populations over 1 million account for 89 percent of transit passenger miles.

**Exhibit 2-1. Passenger miles by mode**

|                            | Passenger Miles in 2005 (billions) | Percent |
|----------------------------|------------------------------------|---------|
| Auto <sup>1</sup>          | 4,366.2                            | 96.2%   |
| Public Transit             | 47.1                               | 1.0%    |
| Intercity Passenger Rail   | 5.5                                | 0.1%    |
| Intercity Bus <sup>2</sup> | 17.1                               | 0.4%    |
| Other Bus <sup>3</sup>     | 104.4                              | 2.3%    |

<sup>1</sup> Includes light trucks

<sup>2</sup> Scheduled service only; 2004 data

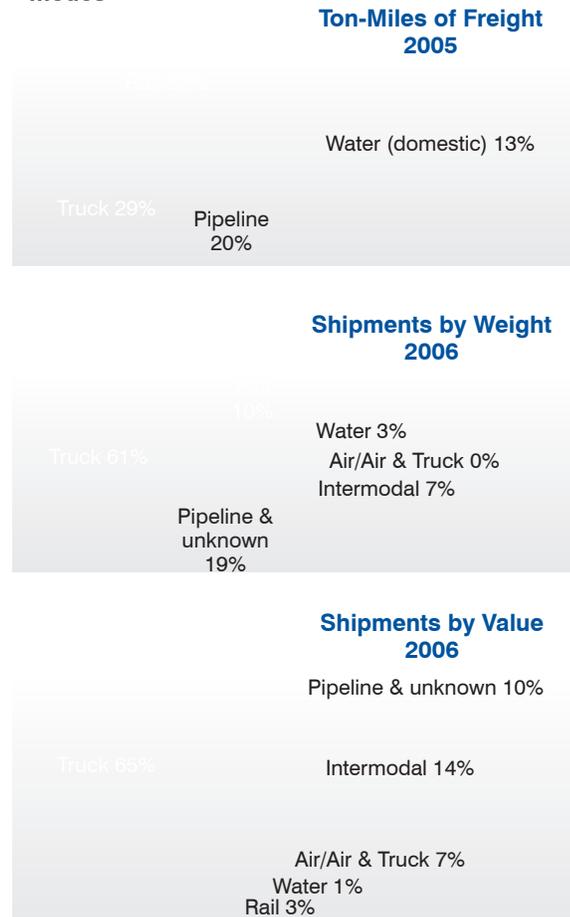
<sup>3</sup> Includes charters, shuttles, tour buses, and school buses

**Table shows passenger miles traveled by mode. Over 96 percent of passenger travel on the surface transportation system in the U.S. is in private autos, while public transportation plays a key role in certain markets.**

Sources: *Highway Statistics*; National Transit Database; Federal Railroad Administration; American Bus Association

Exhibit 2-2 shows the distribution of freight movement in the U.S. by different modes, as measured by distance, weight, and total value of shipments. Trucks account for the majority

**Exhibit 2-2. Freight movement by different modes**



**This exhibit identifies shares of freight movement by mode measured in terms of ton-miles, weight, and value. Trucks are the dominant mode of freight transportation in the U.S., as measured by the total weight or total value of shipments. Railroads are the largest mode in terms of ton-miles, reflecting the longer average haul distances for products carried by rail.**

Source: BTS, *National Transportation Statistics 2006*; FHWA, *Freight Facts and Figures 2007*



of freight movement by weight and value (and almost all local deliveries), while rail accounts for the largest share of total ton-miles, reflecting the longer average haul of rail shipments.

Given the great contribution of the surface transportation system to the strength of the U.S. economy at the national, State, and local level, and the importance it has assumed as a factor in the quality of life in the U.S., we can expect many aspects of passenger travel—except its total volume—to remain relatively constant over the next several decades. Interactions for economic and social benefit that are supported by the existing surface transportation system are likely to continue as long as it remains reliable, efficient, and safe. The specialization of various kinds of labor and production in specific geographic locations is likely to continue as long as the services and goods are delivered quickly and economically to the consumers who want them, whatever the distance separating producers from end users.

## Critical Factors Influencing Future Passenger Travel Demand

Travel behavior in the U.S. has changed significantly in the past 60 years, with the emergence of auto and air travel as dominant forms of passenger transportation. Changes in the economy and technology have helped drive a redistribution of people and jobs, with continued movement from rural areas to cities and from concentrated central cities to dispersed suburban locations. The specialization of labor, the growth in influence of national and regional retail chains,

“With the projected population growth and the expected trip generation growth, [residents of Atlanta] can reasonably expect that commute times will double even more quickly than our population...Our quality of life and economic competitiveness are suffering.” – *Wayne Shackelford, Senior Vice President of Gresham Smith Partners, at the Commission’s Atlanta field hearing.*

the dramatic growth in labor force participation by women, and the growth and maturation of the baby boom generation have all influenced travel behavior in the late 20th Century and in this first decade of the 21st. The shift toward a service and information economy, dramatic advances in communications and computerization, and globalization of the economy are other significant factors that we all must incorporate into our thinking about what lies ahead in the next 50 years.

Travel demand growth has outpaced population growth and has undergone a pronounced shift toward faster, more flexible means of travel increasingly dominated by single occupant vehicles (SOVs). Highway travel growth over the past quarter-century can be attributed to both population growth and changes in travel behavior, including increases in trip making (trip frequency), increases in trip length, and changes in mode choice.

In projecting future passenger travel demand, one must evaluate the extent to which the trends that have accompanied rapid VMT growth over the past half-century might continue or be replaced with new trends that will impact VMT.



Several factors that contributed to VMT growth in the past do not appear to be as significant in the future. For instance, the growth in vehicle ownership per household may not be as significant, as there is near saturation of vehicle availability for the able-bodied adult population. While income growth may result in some increases in vehicle availability, the magnitude of the potential for new vehicle ownership is modest. Women entered the workforce in large numbers in recent decades, and the resulting shift in travel behavior cannot be duplicated in the future to the same degree. In addition, the maturation of the baby boom generation from children (who do not make single-occupant auto trips) to a highly mobile adult population with high labor force participation has placed upward pressure on travel demand. However, as this cohort leaves the labor force, it will have less effect on travel growth.

Similarly, mode shifts away from alternative modes such as biking, walking, transit, and multi-occupant vehicles to SOV travel cannot have as significant an impact on VMT growth in the future, simply because it is mathematically impossible for the proportionate use of these modes to drop as much as they have in the past. Thus, any continued decline in the travel share of alternative modes would likely be modest at most. Indeed, in some recent years transit use has grown at a faster rate than VMT, for the first time in decades.

### **Future Population Growth**

The most basic factor influencing the demand for passenger transportation is projected population growth. Between 1950 and 2000, the total population of the U.S. grew from 150 million to 281 million, reaching 300 million in 2007. Based on these trends, the Census Bureau projects the total U.S. population to reach 364 million

by 2030 and 420 million by 2050, an increase of roughly 50 percent over 50 years. Adding 120 million new Americans between now and 2050 will by itself create significant demands on our transportation system.

As fertility rates in the U.S. have stabilized, national population growth has largely become a function of immigration. Immigration rates themselves are primarily a function of relative economic conditions and government policies. While such considerations are beyond the scope of this report, it is clear that future immigration rates to the U.S. will have a significant impact on our population totals and thus our transportation system.

Regional migration and urban development patterns will also play a significant role. The last 50 years have seen a significant shift in the population of the U.S. to the South and West, a trend that is expected to continue. According to the Census Bureau, over 60 percent of total population growth between 2000 and 2030 is projected to occur in just six states, all of them located in the Sunbelt as shown in Exhibit 2-3. To the extent that future growth is concentrated in areas that do not have significant existing capacity in their transportation infrastructure, this will place additional burdens on the system.





**Exhibit 2-3. Projected population growth by state, 2000–2030**

3 to 13 Million  
 1 to 3 Million  
 100,000 to 1 Million  
 Less than 100,000

**This map shows that over 60 percent of the population growth in the U.S. between 2000 and 2030 is projected to be concentrated in just six states: Florida, California, Texas, Arizona, North Carolina, and Georgia.**

Source: Census Bureau

### ***Income Growth***

Americans are becoming more prosperous, which also has significant implications for future travel growth. Historical trends have shown that increases in real income have contributed significantly to increasing travel demand, particularly on highways. Real income growth has contributed to a shift from shared ride and transit to solo driver trips, increases in trip length from residential suburbs to dispersed workplace and recreation locations, and increases in trips for activities such as dining out and organized school or social activities. Real income has contributed to more consumption of products and services, which has led to an increase in service and commercial trips and deliveries as consumers spend less personal time on household functions, shopping, and other errands.

The key question for future travel demand in the U.S. is whether this relationship between income and travel growth is likely to continue.

Competing demands for other expenditures, such as health care and other social priorities, could affect travel demand in the future. Changes in preferences for housing and travel modes among higher-income households could also limit the impact of income growth. One might reasonably speculate that, at some level of income, travel demand will reach a peak, and higher income will no longer lead to increased travel demand. These must remain gray areas in the Commission's analysis; historical trends do not provide any basis for identifying a level at which increases in travel with growing real income will moderate, nor does the Commission have any basis for assuming that future Americans will have significantly different travel behavior preferences from those of today. In fact, several Commissioners believe that the development of Internet shopping has accelerated the demand for transportation, as people want to be able to order and receive goods at any time, not just during an organized trip to a store or mall.



## **Land Use**

Roughly 60 percent of the population of the U.S. lives in large metropolitan areas over 1 million, and another 20 percent live in smaller metropolitan areas. Current and future land use patterns within these cities will have a significant impact on both the amount of travel within cities and the form that that travel takes.

Suburbanization has been an ongoing trend for more than a century, both in the U.S. and abroad, ever since the development of motorized transport enabled the separation of residences from workplace locations. Over the last half-century, suburbanization has been linked to the growth of automobiles as the dominant form of transportation in urban areas. Cities have evolved to a point where suburbs are now the dominant location of residential, employment, and retail activities. Urban travel patterns and networks have shifted from predominantly radial travel between residential areas and central business districts to more complex travel in multiple directions across cities. While more recent trends include the reemergence of downtown as diverse activity centers with retail and cultural activities and increased residential development, we have also seen the continuing dispersion of employment away from high-rise downtown locations and the emergence of downtown-like centers for suburban communities.

Whether urban or suburban, however, the majority of economic activity is occurring within a metropolitan context. In many cases, nearby metropolitan areas are growing together, both physically and economically. A growing literature is referring to the largest of these metropolitan concentrations as “megaregions,” which are depicted in Exhibit 2-4.

Extensive research has focused on the extent to which urban land use and urban design considerations can influence travel. There

is a consensus that various land use choices, including density, mix of uses, contiguity of development, scale of activities (the size and market area for facilities such as schools, churches, hospitals, stores, etc.), urban design features, and transportation and land use configuration all influence travel behavior. Although the magnitude of the impact and the political and market acceptance of initiatives to leverage these aspects of development so as to minimize VMT and travel demand in the future remain in dispute, the choices made in these areas in the future can significantly improve the attractiveness of alternatives to solo driving.

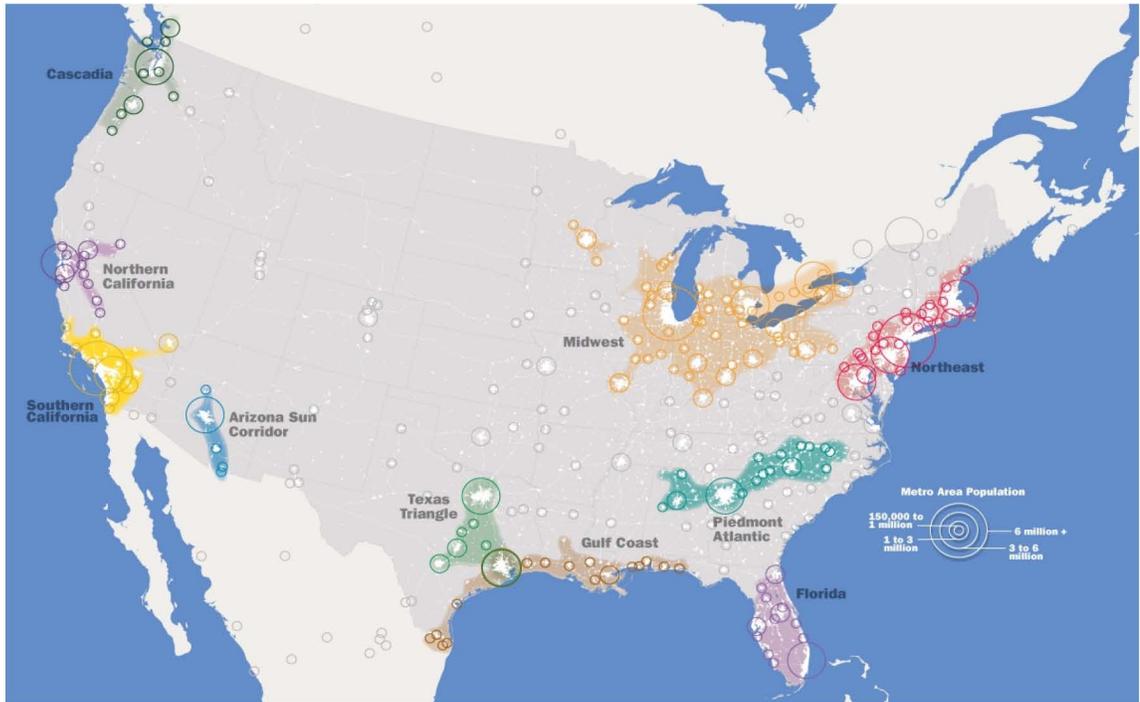
As shown in Exhibit 2-5, research on household travel behavior has found that more densely developed areas tend to have a lower level of VMT relative to their populations. In dense areas, for example, people often choose to walk rather than drive to available shopping. If this relationship holds in the future, the concentration of new population growth in higher-density areas has the potential to moderate travel demand growth.

A number of factors will affect any trends toward increasing urban development densities in the future, including stabilization in household sizes, consumer reactions to increasing energy costs and land prices, consumer choice of independence from the automobile, national economic growth generated by and concentrated in large urban areas, and government policies to promote dense development. On the other hand, real income growth, ubiquitous transportation and communications networks, an aging population less tied to workplace access in their housing location decisions (and anxious to avoid the congestion of large cities), and the high costs of living in dense urban areas may counterbalance the motivations for increased population density.

Historically, high-density population concentrations have been associated with low and



**Exhibit 2-4. Emerging megaregions in the U.S.**



**Economic activity in the U.S. is becoming increasingly concentrated in closely linked groups of metropolitan areas, referred to as “megaregions.”**

Source: Regional Plan Association

moderate income households. However, recent high-density residential construction has been targeted to higher income household segments. The key question for future travel demand is whether the travel behavior of such households will tend toward those typical of other high-density

residents or those typical of the high income population. Recent experience from the siting of such developments in mixed-use neighborhoods with high-quality transit access, however, would seem to indicate that increases in transit usage and walking would be expected to continue.

**Exhibit 2-5. Impact of population density on per capita VMT**

|   |   |        |        |        |        |
|---|---|--------|--------|--------|--------|
| Change in per capita VMT (relative to areas under 500 persons/sq. mile) | - | -11.6% | -17.7% | -28.6% | -56.8% |
|---|---|--------|--------|--------|--------|

**This table reflects that, as population density increases, the amount of highway travel per person decreases.**

Source: Commission analysis of National Household Travel Survey data



## **Demographic Considerations**

Demographic characteristics, including the age and gender distribution of the population and the share that is foreign-born, are known to strongly influence travel behavior. Young people are dependent on adults to provide vehicle mobility. At the age of drivers license attainment, travel levels increase, peaking in the middle-age working years when persons have both the economic resources to travel and work and family responsibilities that often involve extensive travel. As children move away and adults enter their senior years, travel generally declines and changes in nature. The need for work travel diminishes, material item consumption generally slows, and health or stamina issues may begin to moderate travel levels. Travel typically declines significantly for those beyond 80 years of age.

As the baby boom cohort reaches retirement age, one might expect some moderation in travel demand. While this trend may reduce pressures on travel demand growth, it is not likely to be significant enough in the realm of all of the factors that influence travel demand to have a pronounced effect. Senior baby boomers are anticipated to continue to have high levels of mobility, as indicated by the very high licensure rates among females (relative to previous generations), their high mobility lifestyles, the dispersion of their siblings and offspring, and their generally healthy physical condition and economic status. In addition, the dominant influence of the baby boom generation has been dampened by strong immigrant population growth over the past few decades, resulting in the baby boom cohorts comprising a far smaller share of the total population than they have in the past. The change in the shape of the population age profile has the composite effect of reducing the demand for travel a few percentage points relative to when

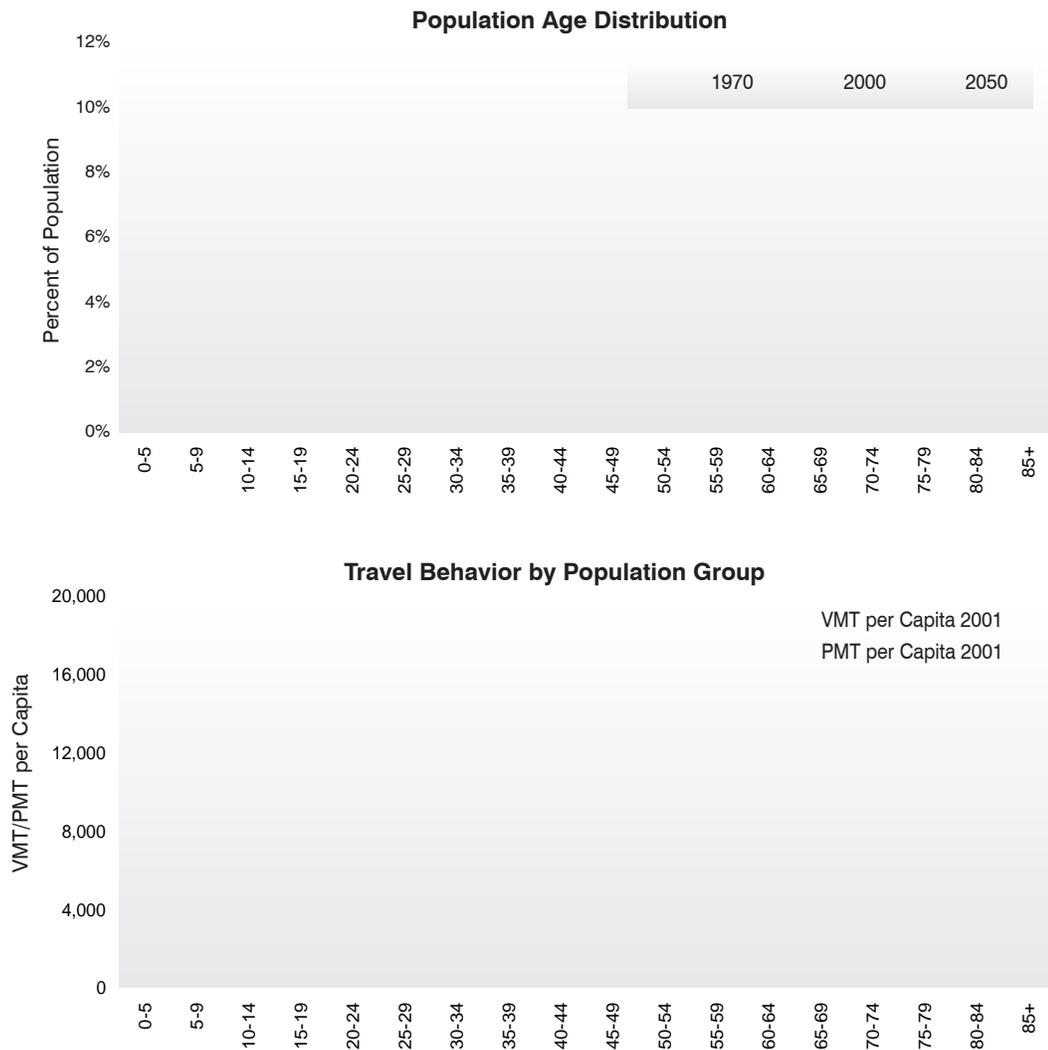
the baby boomer age cohort was moving toward their peak travel years. Exhibit 2-6 overlays the population age profile on a graphic of travel levels as a function of age.

Immigration also influences travel demand, both in terms of location decisions and travel tendencies. Research has shown a marked difference in travel behavior between the domestic population and immigrants. In particular, recent immigrants are far more likely to use transit or carpool, and their rates of auto ownership are much lower, resulting in relatively more modest travel demands for this segment of the population. Over time, however, foreign-born individuals tend to assimilate such that their travel behavior becomes more similar to the domestic population. In addition, the travel demand impacts of future immigrants will be dependent on the nature of that immigrant population. Often, immigrants are young working adults who, if economically successful, become active consumers of travel. The educational and economic backgrounds of future immigrants as well as their choices of settlement locations will likely influence their travel demand impact, as shown in Exhibit 2-7. Some decades from now, the future immigrant population may well be entering this country from places with mobility levels and expectations far higher than is the case for many of today's immigrants.





**Exhibit 2-6. Population age distribution and travel behavior in the U.S.**

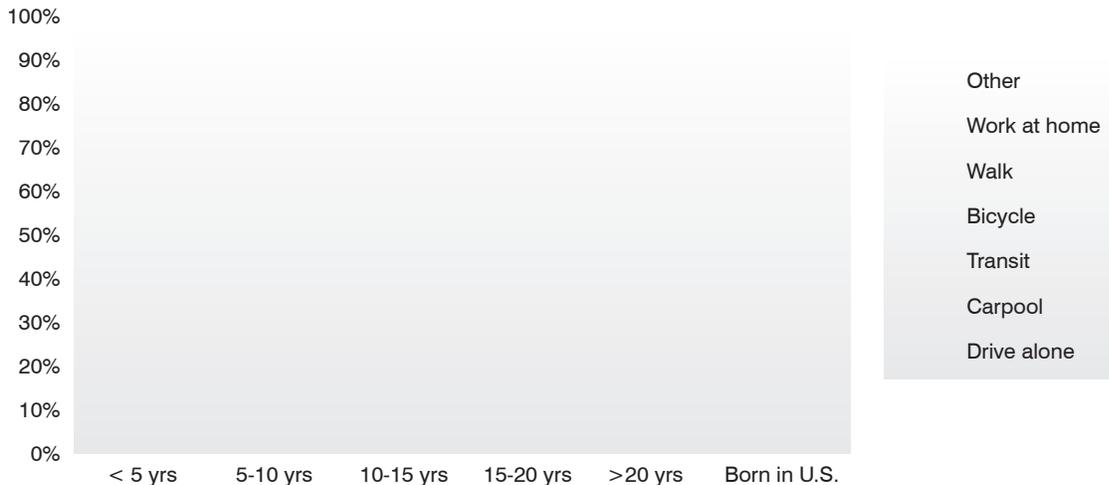


The line chart identifies changes in population age distribution, while the bar chart highlights differences in travel behavior by age group. From 1970 to 2000, the population profile of the U.S. shifted significantly from children toward adults in their peak driving and travel years, as the baby boom generation entered the work force. Over the next several decades, the population is expected to shift toward older adults, who tend to engage in less driving (measured by vehicle miles traveled, or VMT) and overall travel (measured by person miles traveled, or PMT), dampening the effect of future population growth on travel demand.

Source: Commission analysis of National Household Travel Survey and Census data



**Exhibit 2-7. Immigrant travel behavior mode use by years in the U.S.**



**This chart shows that recent immigrants are much less likely to drive alone to get to work, and much more likely to carpool or use transit than are those born in the U.S. However, the longer immigrants remain in the country, the more their travel behavior becomes similar to that of the native-born population.**

Source: 2000 U.S. Census

## Critical Factors Influencing Future Demand for Freight Movement

The demand for the movement of goods and materials is largely a function of economic activity. As the economy grows, more goods will be produced and consumed, requiring the transportation of raw materials to manufacturing plants, parts to assembly plants, and finished goods to markets and consumers.

One trend changing the relationship between economic growth and transportation demand is growth in the services sector of the U.S. economy. Over the last 50 years, the goods-producing industries' share of total gross domestic product (GDP) has fallen by nearly half. Increasingly, information technology and globalization are

“We have a transportation infrastructure of more than 100 million square feet in industrial space tailored to the big box industrial market. Memphis is providing a vital role in our Nation’s economy in global trade...but more must be done to keep the demands of our Nation and our growing trade.” – *John Moore, President and CEO of the Memphis Regional Chamber, at the Commission’s Memphis field hearing.*



accelerating the shift within the U.S. economy toward service industries, which has a dampening impact on VMT and freight tonnage growth. According to forecasts by Global Insight, Inc., economic output in the U.S. is projected to grow by 150 percent over the next 30 years, while the total freight movement (measured by ton-miles) is projected to increase by 92 percent over that same period.

Although total freight movement is linked to overall economic growth, changes in the structure of the economy will affect the type of freight that is transported and the routes and modes that are used to deliver freight to its destination. Efficiency improvements in different sectors of the freight transportation industry will also play an important role. These changes include increasing international trade, growth rates in different sectors and commodities, and changes in manufacturing and business practices.

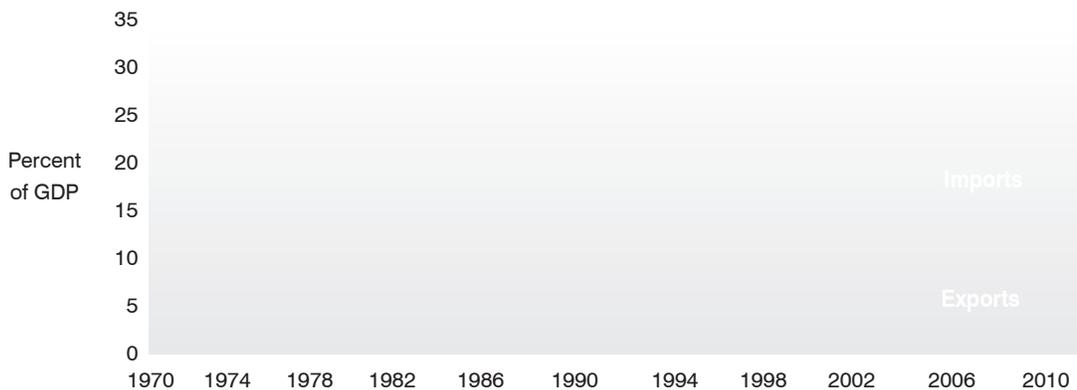
### **International Trade**

The economy of the United States is linked to that of the rest of the world through international

trade, a tie that continues to grow stronger. Since 1970 the import share of GDP has tripled, while the export share has doubled, as shown in Exhibit 2-8. The opening of global markets for many products has expanded opportunities for U.S. producers to sell their products overseas, while U.S. consumers and businesses have been able to take advantage of lower production costs available overseas, importing products and components at low prices. The upward trend in foreign trade's share of the economy is projected to continue, linking an increasing amount of business activity and freight movement to international trade.

The pattern of foreign trade with the U.S. is moving away from the traditional trading partners in Western Europe, as trade with Canada, Mexico, and East Asia grows more rapidly. Trade with oil-producing countries has also increased as oil imports comprise an increasing share of total fuel consumption in the U.S. The distribution of trade in bulk resource commodities such as oil, coal, and grain is following developments in production and consumption among our trade partners. The continued liberalization of trade through bilateral

**Exhibit 2-8. U.S. exports and imports as a share of GDP**

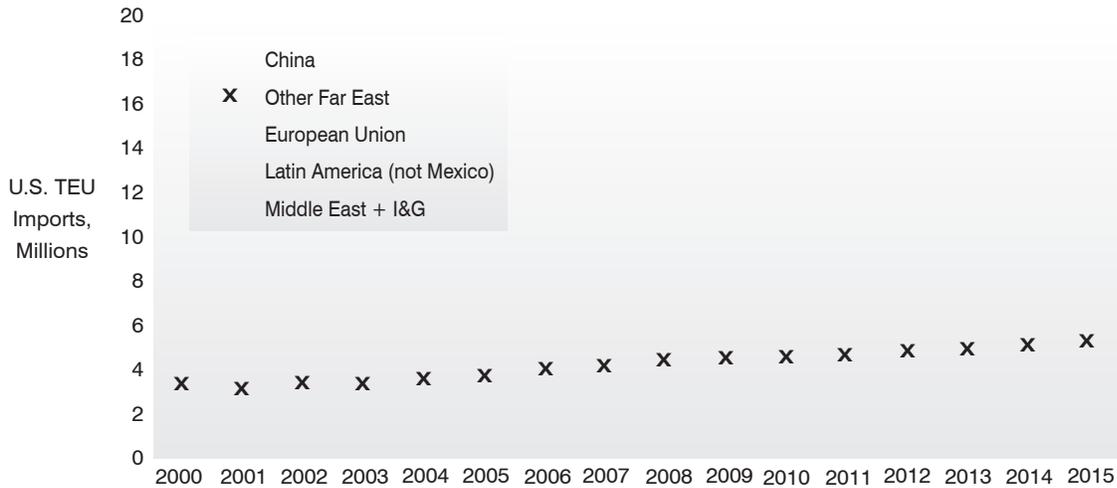


**This chart shows that foreign trade is playing an increasing role in the U.S. economy, a trend that is expected to continue in the near future.**

Sources: Bureau of Economic Analysis (2006); Global Insight, Inc., forecast to 2010



**Exhibit 2-9. Projected growth in container imports to the U.S. merchandise trade by export region, 2000–2015**



**This chart shows that containerized imports have grown dramatically in recent years, particularly from China. The growing dominance of China in the containerized trade is expected to continue in the future.**

Sources: Global Insight World Trade Service

and multilateral agreements will further expand trade opportunities for the U.S.

As a result of this growing importance of international trade in the U.S. economy, international merchandise trade (especially from Asia) is growing faster than overall freight transportation, as shown in Exhibit 2-9. An increasing share of the domestic freight system is also serving international trade shipments. This is placing increasing pressure on international gateways (including seaports, airports, and land border crossings) and the surface transportation infrastructure feeding into and leading out of those gateways. The geography of the international freight transportation gateways is tied to the historical development of the country, with many cities having grown up around seaports. While this provided many advantages over 100 years ago, and does so today, it also provides challenges to operations sharing dense

urban areas with many neighbors and competing land uses.

Changing trade patterns also have implications for the regional impacts of foreign trade. Imports through West Coast ports are predicted to grow by 183 percent by 2035, while imports through the remaining ports are projected to grow at 48 percent. This reflects both the continued domination of Asian trade, and the ability of West Coast logistics to handle this extraordinary volume of freight. Other factors that could affect the distribution of foreign trade between West and East Coast (and Gulf) ports include the planned expansion of the Panama Canal, which is projected to divert significant flows from Pacific U.S. ports to Atlantic and Gulf ports; the long-projected shift of Asian cargo to Suez routings, and hence the shift of Far Eastern trade to East Coast ports (though this is progressing more slowly than originally anticipated); and potential increases in

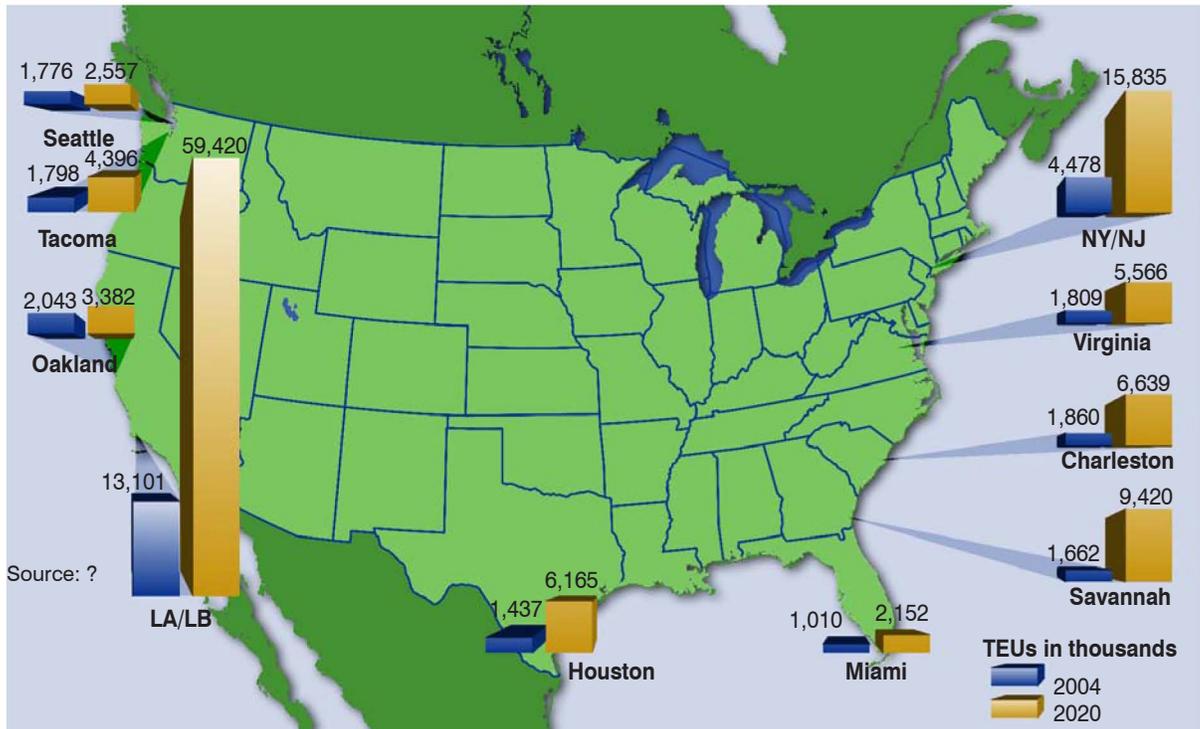


the use of Canadian and Mexican ports for U.S.-bound cargo, which could shift more trade to rail and truck crossings at borders with our NAFTA neighbors. No matter where foreign commodities enter the U.S., however, this burgeoning growth in international trade will place strains on an already overcrowded domestic port, road, and rail network. Exhibit 2-10 shows the projected growth in container shipments at key U.S. ports through 2020.

### Commodities and Freight Movement

“Freight” is a broad term used to characterize transported commodities; however, the products themselves vary tremendously in weight, value, time sensitivity, and average length of haul. Specific physical characteristics often determine the particular mode of transportation: heavy bulk commodities with long average hauls over 750 miles are typically moved by rail or water;

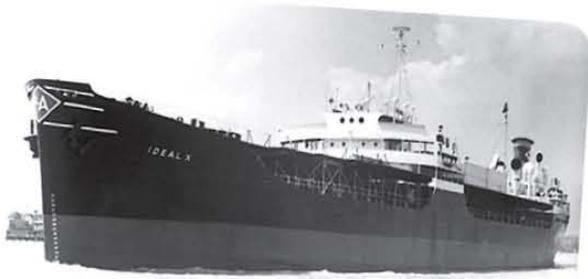
**Exhibit 2-10. Projected growth in container shipments to U.S. ports, 2004–2020**



*Forecasted figures are based on 10-year linear regression.*

**This map shows that based on current trends, U.S. ports are expected to see significant increases in container shipments over the next decade and a half, particularly at the West Coast Ports of Los Angeles and Long Beach (LA/LB). [Note that the forecasts are based on a linear projection of trends over the previous 10 years. They are not constrained by current or expected capacity at existing container ports, and do not account for the planned development of new container ports.]**

Source: USDOT



liquid and gaseous fuels are transported by pipelines; and higher-value goods and those with short hauls and diverse destinations are typically transported by truck. Trucks are also dominant in “last mile” freight movements and local deliveries, even for products transported by air, water, or rail for the major portion of their journey.

Because economic growth is rarely uniform across all sectors of the economy, the mix of commodities being transported is likely to change over time. As this mix changes, so would the modal split of overall freight traffic. Economic forecasts indicate that higher growth in the future is generally expected for commodities that also have a relatively high truck market share. As a result, absent other factors, the share of freight traffic carried by truck would be projected to continue to increase in the future.

### ***Operational Efficiency Improvements***

Freight transportation in the U.S. will continue to be significantly affected in the coming decades by improvements in efficiency among freight carriers. Productivity in the freight transportation sector is affected by several factors, including technology, labor rules, and government regulations.

Perhaps the most significant change in freight transportation over the last 50 years has been the growth of containerized shipping. Containers have dramatically reduced the costs of handling freight at ports, and have made possible the seamless transfer of freight between ships, railcars, and trucks. Further efficiency gains are being achieved through the increased use of double-stacked containers on railcars (which has been limited in some cases by bridge and tunnel clearances). Containerization is also creating opportunities for and placing demands on freight distribution infrastructure, particularly the need for new facilities to handle the transfer of containers between different modes. The siting of such facilities in densely developed urban areas has proven to be a major challenge.

Productivity is also significantly affected by changes in labor rules and government regulations. Labor productivity in freight transportation has increased significantly, a result of both technological factors and changes in work rules. Government regulation also has a significant impact, through both labor regulations and limitations on carrier operations, such as truck size and weight regulations. Future changes to such regulations could have either positive or negative impacts on freight transportation productivity. To the extent that such changes affect one mode relatively more than another, the modal mix of freight could also be affected.

### ***Changes in Business Practices***

Changing business practices will continue to affect freight transportation in the future. Perhaps most significant among such practices in recent decades has been the increasing adoption of just-in-time (JIT) manufacturing and construction, in which inventory stocks are kept at a minimum and inputs are delivered immediately prior to their



use. Such a structure demands speed for most goods and reliability for all, placing a premium on these qualities of freight transportation. For many products, JIT requires greater numbers of vehicles hauling smaller, more valuable payloads shorter distances to meet market demands. While such practices can reduce logistics costs overall, they can also lead to a loss in efficiency in the freight transportation sector by limiting the ability of carriers to take advantages of economies of scale or forcing the use of less efficient forms of transportation.

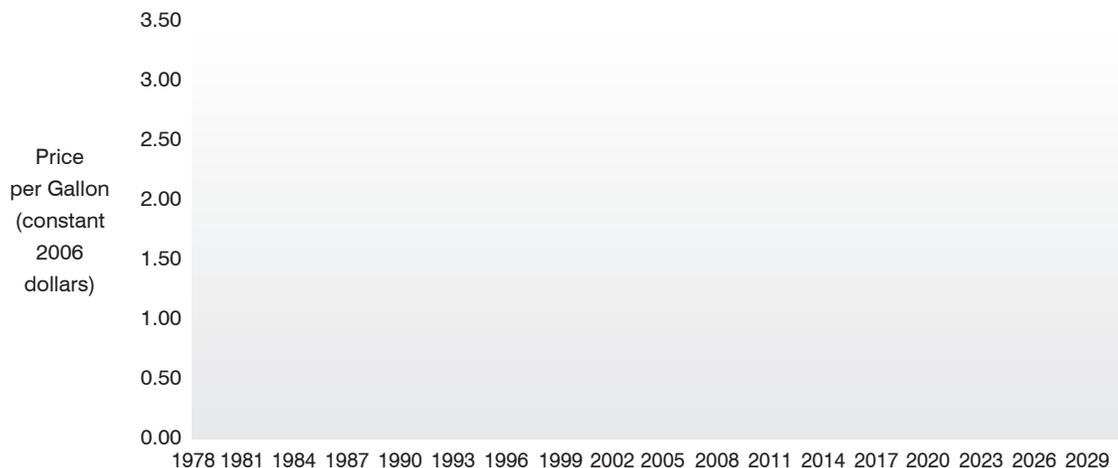
While JIT is typically considered to be an aspect of manufacturing and construction, it is also showing up in the demands of service industries. For example, office product suppliers have found that workers (perhaps encouraged by the ease of online ordering) are placing increasingly small orders with the expectation of minimal delivery times, which has required an increase in the required number of distribution centers and delivery vehicles to serve that market.

## User Costs and Transportation Demand

The preceding discussion has focused on economic and demographic trends expected to affect the base level of demand for transportation in the U.S. in future years. These trends reflect external factors that are essentially independent of the performance of the transportation system itself. Like any other product or service, however, the level of system use will also depend on the costs that users of the transportation system bear. This includes both direct costs (such as for motor fuel, vehicle purchase and maintenance, and tolls and fares) and indirect costs (such as travel time, waiting time, and the risk of personal injury). These costs can affect the level of travel demand, the time period in which that travel occurs, and the choice of travel mode for both passengers and shippers.

Transportation system user costs can be affected by many factors. Fuel prices, as shown in Exhibit 2-11, may be affected by both market

**Exhibit 2-11. Gasoline prices in the U.S., 1978–2030**



**This chart shows that after peaking in the early 1980s, gasoline prices (adjusted for inflation) fell to much lower levels for the next two decades. However, fuel prices have recently rebounded to historically high levels, and are expected to continue to increase in the future.**

Sources: Energy Information Administration, *Annual Energy Review 2006*, *Annual Energy Outlook 2007* (High Price Forecast)

conditions and government energy and taxation policies. Government policies and subsidies can also affect the direct costs that users face for tolls, fares, and tariffs. The operational performance of different modes also plays a significant role, affecting users' expectations of travel times and system reliability, which in turn affects choices about where, when, and how to travel. The use of the transportation system in the future will thus be affected by the level of investment in transportation infrastructure; choices of financing mechanisms; and other transportation, energy, and environmental policies. These topics will be discussed in the following chapters.



## Forecasts of Future Travel Demand

Forecasts of travel demand include the implicit and highly important presumption that the relative relationship between supply and demand will be comparable to that which exists today. Transportation technologies, petroleum availability, economic conditions, immigration policies, health care conditions and longevity, electronic communications, energy production and storage, and propulsion technology breakthroughs are among the key factors that may influence the ultimate level of travel 30 to 50 years in the future. Phenomena such as climate change and dramatic changes in petroleum-based fuel availability or cost are among the factors that may potentially cause significant changes in the Nation's ability to continue to have low-cost travel as we know it today. Unanticipated changes also may arise. If conditions result in meaningful changes in travel cost or speed, one can expect changes to forecasts of future travel.

The demographic and economic trends described in this chapter have important implications for the

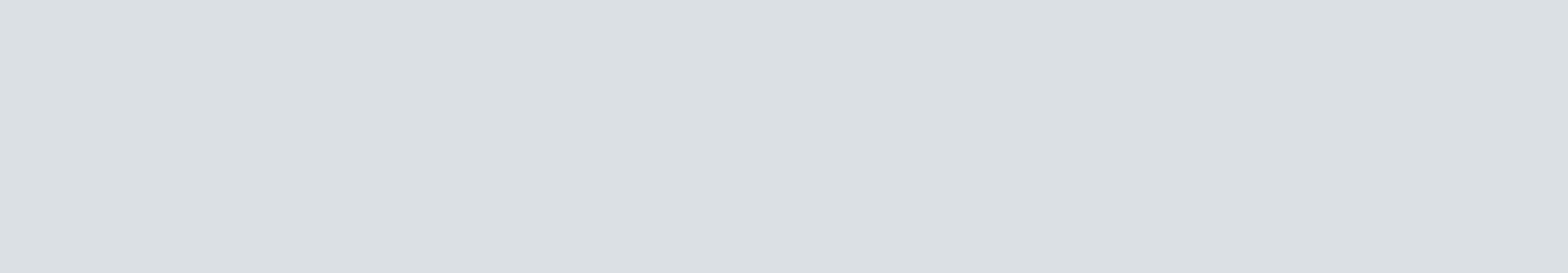


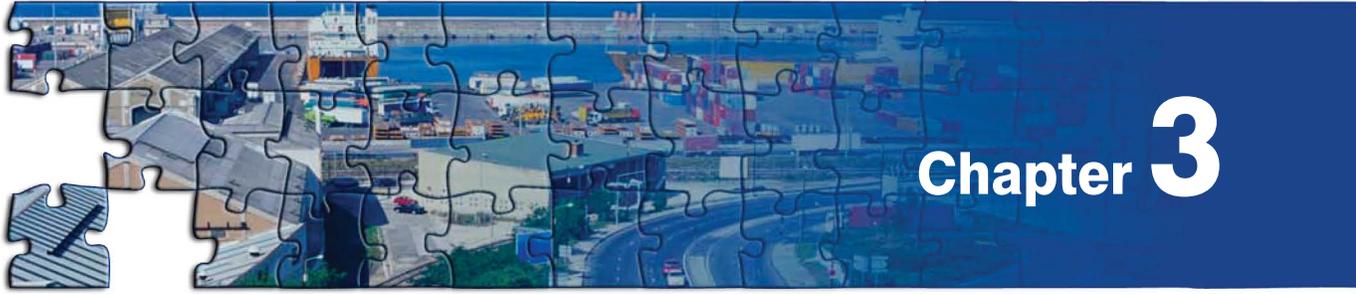
future of the surface transportation system in the U.S. A growing, increasingly wealthy population will continue to demand increasing levels of goods and services, and will rely on that system to access those services and to bring those products and services to them. Absent significant changes in investment, technology, or policy, increasing levels of transportation system use could also bring increasing congestion, worsening safety, and increased use of scarce energy resources. Rising congestion and pollution levels could also feed back into the economy, limiting future economic growth and diminishing the quality of life for all Americans.

Many of these forces affecting the future demand for travel (such as population and demographics) are effectively beyond the control of transportation policy makers, and will need to be dealt with in formulating future policies and strategies. However, there are also many opportunities and avenues for policy makers to influence the level, timing, and form that travel demand will take in the future through decisions about land use, taxation and pricing, and investment. The following chapters will explore these opportunities in greater depth.

TRANSPORTATION FOR TOMORROW

National Surface Transportation Policy  
and Revenue Study Commission





## Chapter 3

# How Does Our System Function Today?

This chapter describes the Nation's surface transportation system, one of the engineering marvels of the modern world. This network of highways, transit routes, railroads, and waterways

moves massive numbers of people and goods, and was key to the Nation's economic superiority in the late Twentieth Century.



on the Nation's transit networks increased by 2.4 percent annually, climbing from 39 billion

without these alternative systems that move the Nation's goods.



Today's surface transportation network is diverse and decentralized, spread out over the vast geography of the United States. The system has proven resilient to growing demand over the past few decades, but the Commission is greatly concerned about its long-term strength and sustainability. The Commission is particularly concerned about five key challenges that threaten to overwhelm the Nation's transportation network:

- Many highways, transit lines, railroads, and waterways are old and deteriorating, buckling under levels of traffic that were unforeseen by the engineers who designed them.
- Congestion—once limited to just the big coastal cities—now affects communities in every region of the country.
- Despite four decades of efforts to improve public safety, the Nation's surface transportation system—particularly its highways—is far too dangerous.
- The Nation's transportation network is too dependent on petroleum, a finite resource largely imported from other parts of the world. The transportation sector's energy use has greatly harmed the world's environment.
- The Nation's population is expected to swell to 420 million residents by 2050. Without proper planning, this growth could overwhelm the Nation's infrastructure and damage its environment.



## The Elements of the Nation's Surface Transportation System

The United States has one of the most extensive surface transportation networks in the world. Its highways, transit networks, railroads, ports, and waterways supplement and interact with one another. These different modes of transportation should not be thought of separately, but as parts of a system that can meet the Nation's needs.

### Highways

Highways form the backbone of the Nation's transportation system, connecting every State and region of the country. The extensiveness and vitality of this highway network helped position the United States as one of the world's superpowers.

Traditionally, roads in the United States have been built, owned, and maintained by the public sector. The effectiveness of the country's highway system, however, depends greatly on interaction with the private sector. Most vehicles that use the Nation's highway network are owned by private individuals or companies. This interaction contrasts with the Nation's transit infrastructure, which is generally provided by public agencies, and with freight railroads, where infrastructure and vehicles are owned by private companies.

Highways provide Americans with a high degree of personal mobility, allowing people to travel where and with whom they want. Unlike most forms of public transit, there are no set schedules as to when highways may be used. Highways are popular with many Americans because they represent convenience and freedom, although congestion and other problems have increasingly limited the mobility of this part of the transportation system.



Highways have improved the quality of life and economic well-being of many rural

Surveys conducted by the U.S. Department of Transportation prove the popularity of the country's highway system. The National Household Travel Survey includes detailed information on daily and long-distance trips, the use of household vehicles, and public attitudes about transportation issues. Every survey completed between 1969 and 2001 showed that highways were the overwhelming mode of choice for most Americans. In 2001, the year of the last survey, about 87 percent of daily trips involved the use of personal vehicles on the Nation's highway system.<sup>1</sup>

Highways are also a key conduit for freight movement in the United States. Trucks carried 60 percent of the 19 billion tons of goods shipped in 2002, and they made up about 70 percent of the value of all freight shipments. As described previously in Chapter 1, the American highway system has helped make goods convenient to households and businesses in every corner of the Nation.

The Federal-Aid Highway Act of 1956 laid the foundation for the modern highway system. This legislation established a system in which

the Federal government provides financing for Interstates, but the States construct and maintain these higher-order roads. The Nation's highway system reflects this tradition of decentralized ownership. While Interstates carry much of the Nation's traffic, they only made up slightly more than one percent of all road mileage in the United States in 2004 (see Exhibit 3-1). About 69 percent of road mileage consists of local routes, the lowest order of the Federal Highway Administration functional classifications.

The American highway system also reflects the country's vast geography and widespread population. A 1996 study for an American automobile magazine found that no point in the 48 contiguous States is more than 30 miles from a dwelling or paved highway. In 2004, about 75 percent of the 4 million miles of public roads in the United States were in rural areas (those with fewer than 5,000 residents). Another 20 percent of road miles were in urbanized areas with 50,000 or more people. The remaining miles lay within small urban areas with populations between 5,000 and 50,000 people.<sup>2</sup>

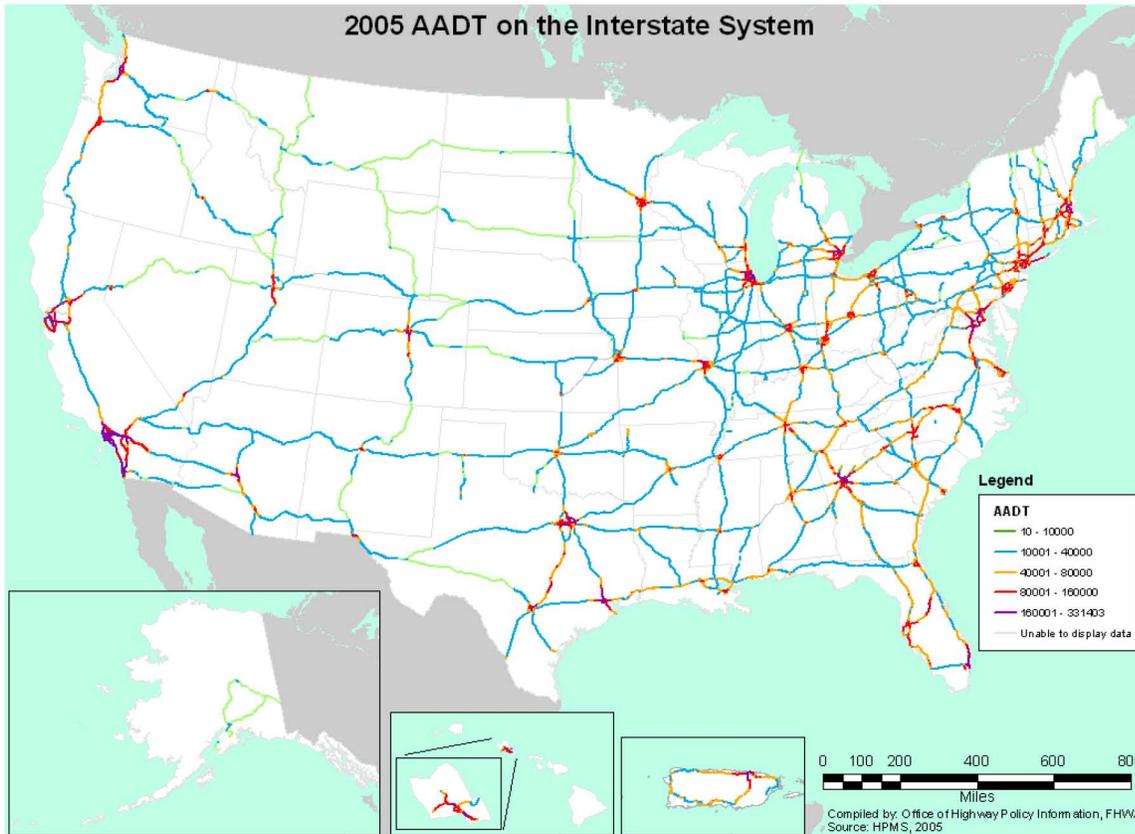
**“We must integrate highway planning and funding into a broader focus for our entire transportation network... The integration of highway, transit rail, waterway, and aviation planning is essential if we're going to meet the demographic needs and development needs of the future.”**

*– Gerald Nicely, Tennessee Commissioner of Transportation, at the Commission's Memphis field hearing.*

There were 594,101 bridges in the United States in 2004. The “typical” bridge in the United States serves a local road in a rural community. About



**Exhibit 3-1. Average daily traffic volumes on the Interstate Highway System**



**The map shows average daily traffic volumes on the Interstate Highway System. High traffic volume routes are concentrated in and around major cities, while traffic volumes in rural areas are much lower.**

Source: Highway Performance Monitoring System

77 percent of the Nation's bridges in 2004 were in rural areas, while the remaining 23 percent were in urban communities.<sup>3</sup>

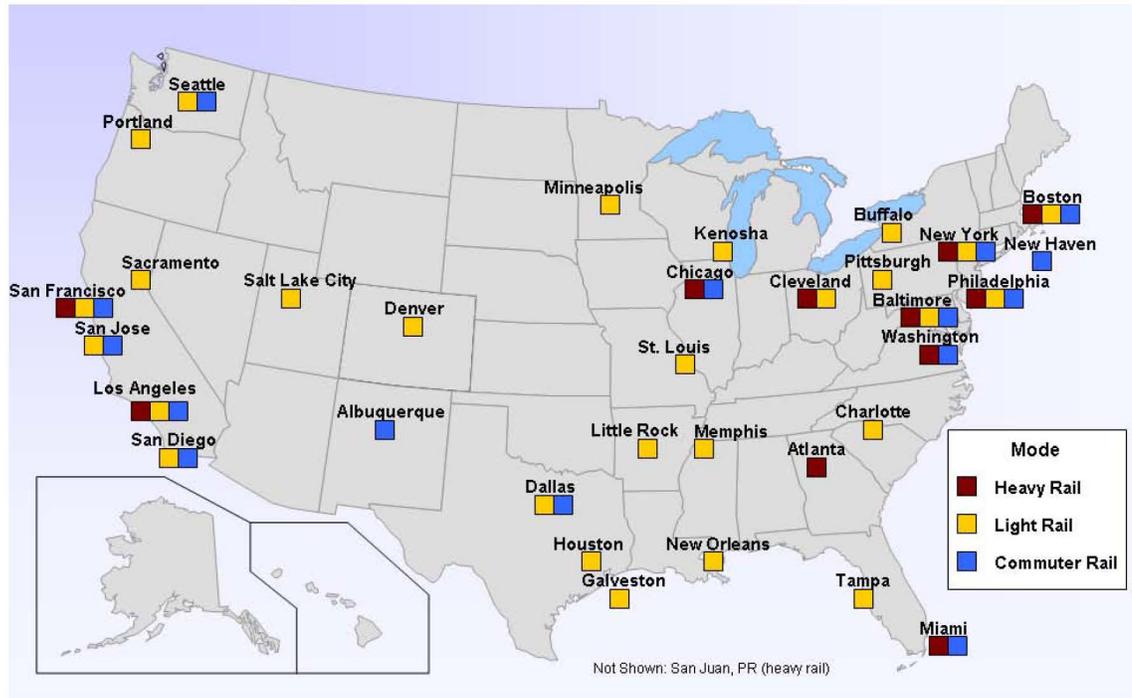
### **Public Transit**

Public transit takes on many forms. Electrified urban railways are generally classified as either heavy rail (multiple car trains operating on exclusive, separated right of way) or light rail (smaller trains with operations at grade or in right of way shared with cars and pedestrians). Commuter rail lines operate with diesel or electric

locomotives over tracks shared with freight rail or intercity passenger rail, connecting suburban residents with central city employment centers. Exhibit 3-2 shows the current extent of urban rail transit systems in the United States; systems in additional cities are also being developed. Other transit modes, including buses, demand response (also called paratransit), and vanpools, provide service across a broader area and operate over streets and highways shared with private vehicles (although exclusive busways are being developed in some cities).



**Exhibit 3-2. Cities with rail transit systems in 2007**



**The map shows rail transit systems, including heavy rail, light rail, and commuter rail, in cities both large and small throughout the United States.**

Source: National Transit Database

Transit is an essential element of the Nation's transportation network, providing basic mobility for people who do not own cars. The 2001 National Household Travel Survey found that 43 percent of the Nation's transit riders live in households with yearly incomes of less than \$20,000, and that 44 percent come from households without cars. Transit use is not, however, limited to those who cannot afford private vehicles.<sup>4</sup> Many riders come from households that own cars, but these riders choose to use public transit because it is often more convenient and less expensive than highway transportation. Just as an adequate highway network provides mobility for people who prefer

a suburban or rural lifestyle, a high-quality transit system does the same for people who opt to live in a dense, urban environment.

Transit is critical to the Nation's productivity and economic development. Businesses and governments depend on transit to move large numbers of people during peak periods. Transit greatly reduces the number of motorists on the Nation's highways, lessening the impact of congestion. Transit also plays an important role in the development of new communities. Corridors with well-functioning transit systems often attract restaurants, office buildings, and retail establishments.



Like highway infrastructure, the Nation's transit network is not a Federal asset, but is overwhelmingly owned and operated by local governments. Only five States directly own and operate transit systems. Each government has its own method for planning, building, maintaining, operating, and reporting on the components it owns. This gives governments great flexibility, but makes it difficult to coordinate action for objectives beyond individual State and local jurisdictions.

The Nation's transit infrastructure is extensive. Bus and demand response systems serve residents in 359 of the total 465 urbanized areas in the United States. Rail transit systems serve residents in 34 American cities. The Nation's transit infrastructure, however, is not limited to urban communities.<sup>5</sup> A mix of fixed route bus systems and demand response systems serve many rural communities, providing critical services to residents, especially persons with disabilities, senior citizens, and low income individuals. There are also 1,215 transit systems providing basic mobility services to residents in rural or small urban areas.

In 2004, transit agencies in urban areas operated more than 120,000 vehicles. Rail systems included nearly 11,000 miles of track and nearly 3,000 stations. There were close to 800 bus and rail maintenance facilities in urban areas. In rural communities, according to the most recent survey of operators in 2000, there were over 19,000 transit vehicles in service.<sup>6</sup>

### ***Intercity Passenger Rail***

Intercity passenger rail was a crucial factor in the settlement and economic development of the United States. It was the primary means of mid- and long-distance transportation from the

mid-1800s until the early 1950s. It provided a vital connection between the East and West coasts, opened the Western and Central United States to settlement, and was important to the military in transporting troops and supplies.

Most trains during this early time period carried both passengers and freight. Trains provided faster, more reliable, and safer transportation than previous modes. They allowed heavier goods and more people to be transported over longer distances, and they contributed to the Nation's economic and military strength.

Many large and small cities were served at one time by more than one railroad, each with its own station. Some cities developed union stations, bringing two or more railroads under one roof and efficiently serving many passenger train routings. Since the middle of the Twentieth Century, the use of this infrastructure for passenger rail has slowly diminished. In the 1970s, all passenger service was consolidated under Amtrak. Passenger route-miles were rationalized and reduced due to significant unprofitability. Several factors have contributed to this trend, including the rapid expansion of low-cost air travel and the encroachment of urban development.

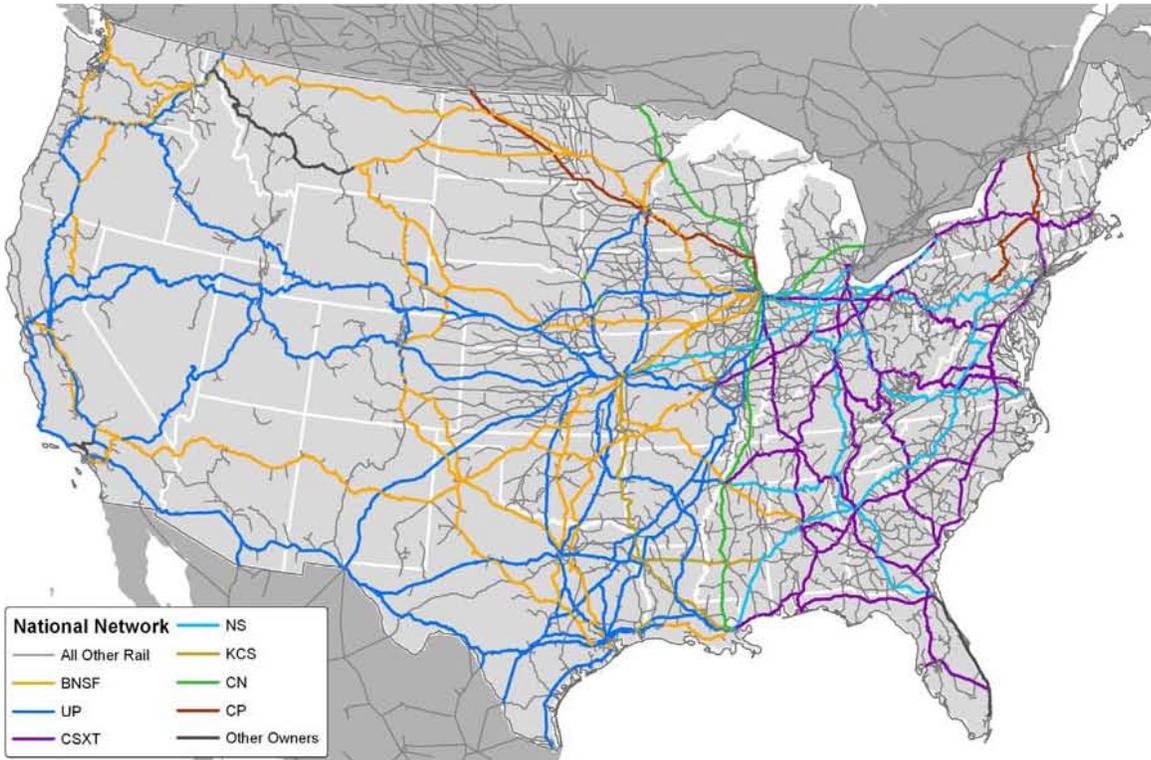
Today, the Alaska Railroad and Amtrak operate a national passenger rail network of long-distance and corridor trains, serving more than 500 stations in 47 states over 21,000 route-miles. Exhibit 3-3 provides a map of this system. All passenger lines in the United States are joint-use with freight operations. Most intercity passenger rail is operated over privately owned freight rail networks. Amtrak's Northeast Corridor and several State-owned intercity passenger rail corridors also have freight use.

Some intercity passenger trains can reach speeds of at least 110 miles per hour. For this reason, rail





**Exhibit 3-4. The U.S. freight rail network**



**The map shows the freight rail network in the United States, including routes operated by both the major carriers and smaller railroads.**

Source: Association of American Railroads

rail network. The total number of trains that operate on the national network ranges from 200 trains to none per day on each of the freight rail corridors.

### **Ports and Waterways**

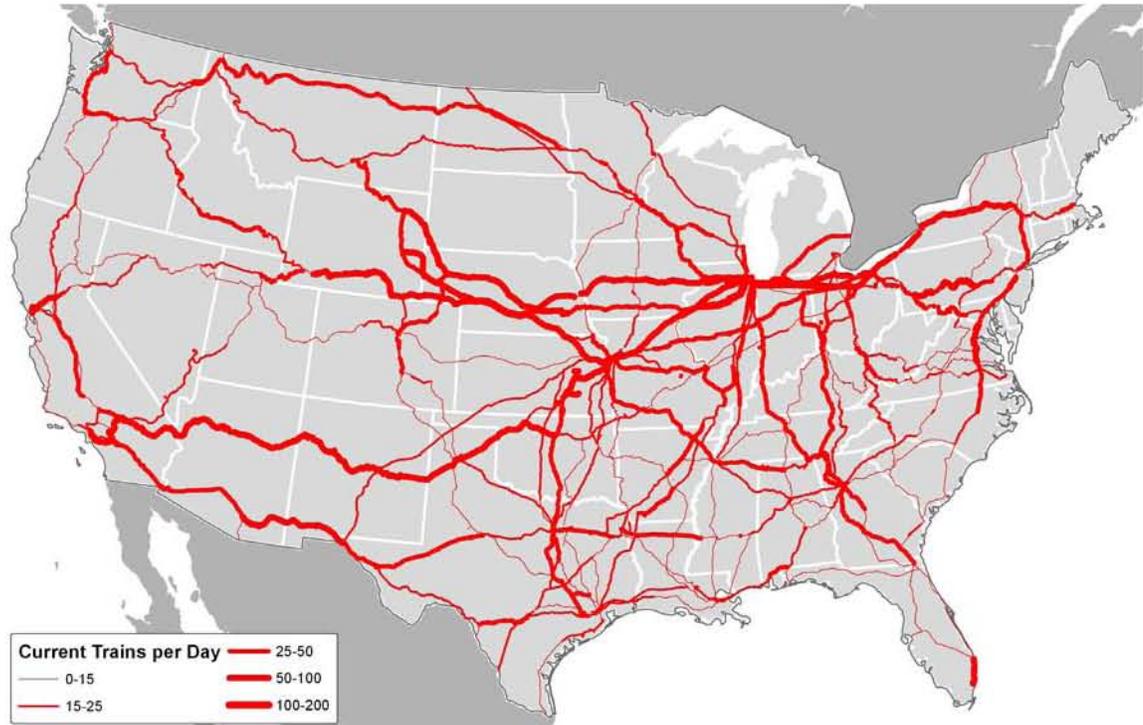
As described in Chapter 1, one of the most important functions of the surface transportation network is to strengthen the Nation's economic relationship with the rest of the world. The Nation's ports and waterways link the United States to the majority of its international commerce. About 95 percent of the country's

overseas foreign trade is moved by ship. One way or another, this cargo moves on the Nation's





**Exhibit 3-5. Train traffic on the U.S. freight rail network**



**The map shows average daily freight and passenger train traffic on routes operated by major freight railroads in the United States.**

Source: Association of American Railroads

highways or railroads, either as goods to be exported or imports arriving for distribution in the United States.

According to the American Association of Port Authorities, there are 360 American sea and river ports. This number includes facilities along the Great Lakes and the Atlantic, Gulf, and Pacific Coasts of the continental United States, as well as Alaska, Hawaii, Puerto Rico, Guam, and the U.S. Virgin Islands. There are 150 public agencies that manage parts of these ports, some with broader powers than simply maritime transportation. Port authorities, for example, may have jurisdiction

over airports, bridges, tunnels, transit networks, investment zones, and economic development districts. The Nation's publicly owned port facilities are complemented by thousands of private terminals that process and distribute goods.

In addition to the Nation's ports, there is an extensive system of inland and intracoastal waterways that transports materials throughout the United States. The dominant form of is the towboat, which pushes a series of barges. On smaller waterways, a tow may consist of 15 barges, while it is not uncommon for a tow on larger passages to include over 40 barges.



The Great Lakes St. Lawrence Seaway System. The binational waterway is expected to

According to the U.S. Army Corps of Engineers, there are over 12,000 miles of inland and intracoastal waterways in the United States. Exhibit 3-6 describes this network. Most of these are located in the eastern United States, including the Gulf Coast, the Mississippi and Ohio River Valleys, and the American portion of the Saint Lawrence Seaway. This system includes 191 commercially active lock sites and 237 lock chambers. These locks allow tows to “stair-step” their way through the waterway network and reach distant inland ports. In addition to the locks, the inland and intracoastal waterway system also includes 1,000 harbor channels and 3,700 passenger and cargo terminals.

## Challenges Facing the Nation’s Infrastructure

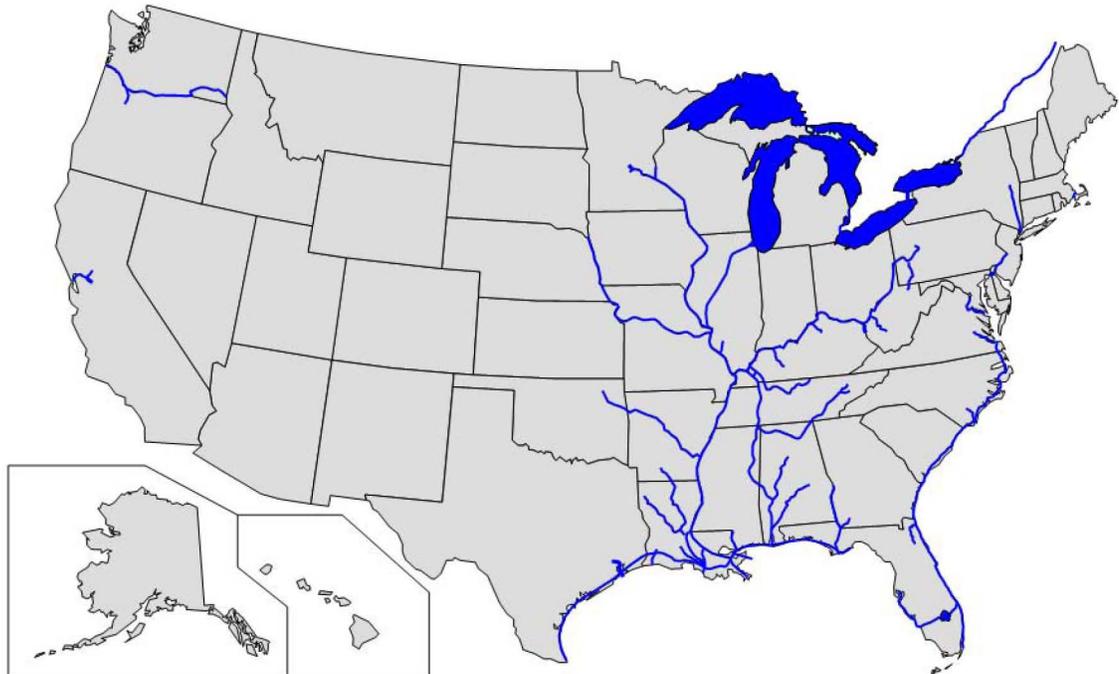
The Nation faces serious challenges that threaten the quality and integrity of its surface transportation network. Harmful trends are

“Transportation in this country is breaking down. We talk about a crisis in the future. We’re there now.”

– *Gerald Shaheen, Group President of Caterpillar, Inc., and Chairman of the Board for the U.S. Chamber of Commerce, at the Commission’s New York field hearing.*



**Exhibit 3-6. The inland waterway system in the United States**



**The map shows that the inland waterway system of the United States primarily includes the Mississippi River and its tributaries, as well as intracoastal waterways along the Gulf and Atlantic seaboard.**

Source: U.S. Army Corps of Engineers

already impacting families, businesses, and communities in countless ways. Left unchecked, they will continue to erode the transportation system and undermine the basic foundations of our economy.



### ***Age and Deterioration***

One of the greatest threats to the Nation's surface transportation network is the deterioration that comes naturally from age and use. Many highways, bridges, transit lines, and railroad lines are buckling under levels of traffic that were unforeseen by the engineers who designed them. Weather, air pollution, and the corrosive impact of road salt have caused decay throughout much of the transportation network.

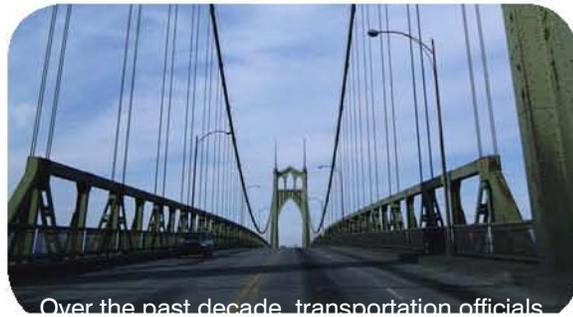
Other problems are caused by what is below the surface transportation network, including water pipes and other utility conduits. Many of the Nation's water systems were built during periods when cities grew the fastest: at the end of the Nineteenth Century, in the 1920s,

and after the Second World War. The U.S. Environmental Protection Agency estimates that unless cities invest more in water and sewer system improvement, almost half of the Nation's underground pipes will be in poor, very poor, or "life elapsed" status by 2020. As these aging pipes burst, they create sinkholes in the roads above them that are sometimes so large they swallow whole cars.

Throughout the United States, agencies are working to repair and upgrade the Nation's aging transportation infrastructure. There are many success stories, such as advancements that have greatly improved pavement quality and extended the lives of the Nation's highways and bridges. The Commission concludes, however, that much more must be done to upgrade the Nation's entire transportation network to acceptable conditions. Despite some hopeful signs, the Commission is greatly concerned about the age and deterioration of the Nation's roads, bridges, railroads, transit systems, ports and waterways.

Much of the Nation's highway network was built before the Second World War and during the construction of the Interstate System. The most heavily used bridges in the U.S., those on the Interstate System, were built during the early years of the Federal-Aid Highway Program. According to the National Bridge Inventory, about 17 percent were built during the 1950s, 44 percent were constructed during the 1960s, and 20 percent were erected in the 1970s.

Today, 13 percent of all bridges in the U.S. are structurally deficient, which means they need significant maintenance, rehabilitation, or replacement. Another 14 percent are functionally obsolete, which means they do not have the lane widths, shoulder widths, or vertical clearances adequate to serve traffic demand. Meanwhile, about one of every seven miles traveled on the Nation's roads (or 15.1 percent) is on pavement



ranked "not acceptable" by the Highway Performance Monitoring System.

The Nation's transit infrastructure is also impacted by age and deterioration. Almost one-third of urban bus maintenance facilities—31 percent—were in an unacceptable condition in 2004. The estimated average condition of the urban bus fleet that year was 3.08, which corresponds to a rating of "fair" on a scale of 1 to 5. In 2004, 51 percent of urban rail passenger stations were rated as substandard. The average condition of a rail vehicle condition was 3.50, or "fair," on a scale of 1 to 5. Eight percent of rail transit track was found to be in a substandard or poor condition. The average age of a rail transit vehicle was 20 years in 2004, according to the National Transit Database.



There is no national database for freight rail infrastructure comparable to the Highway Performance Monitoring System or the National Transit Database. The general consensus of the industry is that the overall physical condition of the Class I rail system is good, although there is a need to upgrade critical points of Class I infrastructure such as tunnels, mountain passes, and unstable alignments. Analysts believe that the condition of Class II and Class III lines varies from good to poor.

On the Nation's inland and intracoastal waterway system, many locks are simply too old to accommodate modern barge traffic. Older locks were designed to process 600 foot tows, while many tows today are twice that length. As a

result, longer tows must be broken down into two or more segments and reassembled after passing through a lock.

Overall, the American Society of Civil Engineers gave the Nation's infrastructure—including its surface transportation network, dams, wastewater treatment facilities, and energy facilities—a grade of "D" in 2005.<sup>7</sup>

### ***Crippling Levels of Congestion***

Without a doubt, congestion is one of the greatest threats to the integrity of the Nation's transportation system and the country's overall vitality and quality of life. Over the past decade, congestion has reached alarming levels across the United States. Gridlock is becoming a shared experience for tens of millions of motorists every day, impacting communities across the country.

The planners who designed the country's modern transportation system likely never imagined the demands of the Twenty-First Century. All elements of the surface transportation network are overwhelmed by congestion in one form or another, although it is the Nation's highway system that is perhaps the most visible sign of this crisis.

In 2005, the Vehicle Miles Traveled (VMT) on the Nation's highways reached 3 trillion miles for the first time, five times the level experienced in 1955. Over the past decade alone, travel growth on the Nation's highways has averaged 2.2 percent annually. While most roads are in rural areas, most highway travel is in metropolitan communities. Nearly two-thirds of all travel is in large urban areas, while the remaining one-third is in rural areas.

Throughout the United States, our metropolitan areas have become traffic chokepoints, mired in gridlock that seems to worsen every year. The Texas Transportation Institute's 2007 Urban



Mobility Report lays out the problem in stark terms. In 1982, there was only one metropolitan region where the average traveler experienced 40 or more hours of delay per year—Los Angeles.<sup>8</sup> Today, that number has grown to 28 metropolitan areas in every corner of the Nation, as shown in Exhibit 3-7.

The effects of congestion are worst in the Nation’s largest communities. In the 14 largest urban areas, annual delay rose from 21 hours per peak-period traveler in 1982 to 54 hours in 2005. Gridlock, however, is no longer just a “big city problem.” The average traveler in an urban community, regardless of size, wasted 38 hours stuck in traffic in 2005, compared to 14 hours in 1982.<sup>9</sup> This means that motorists in metropolitan regions are wasting the equivalent of an entire workweek stuck in traffic. Americans in mid-sized communities are dealing with congestion that was once limited to the largest regions, and those in the largest communities are suffering through traffic jams that would have been unimaginable to many commuters a generation ago.

The effects of congestion are easy to understand on an individual scale—the loss of time a traveler might spend at work or at home, wasted gasoline, and added stress. On a National level, however, the impact is huge. According to the 2007 Urban Mobility Report, drivers in metropolitan areas in 2005 experienced 4.2 billion hours of delay, enough for 105 million weeks of vacation. Americans in these areas wasted 2.9 billion gallons of fuel, enough to fill 58 supertankers. The combined “congestion cost” was a staggering \$78 billion.

Because of heavy congestion and rising fuel prices, the total logistics cost to American businesses—the expense of managing, moving, and storing goods—rose to 10 percent of Gross Domestic Product (GDP) in 2006. This followed a period in which the Nation’s low cost of moving products help make the American economy one of the most productive in the world. The burden of congestion is particularly significant for the Nation’s port operators and shippers, since most of the country’s largest ports are located in already crowded urban areas.

**Exhibit 3-7. Congested urban areas**



**In 1982, only Los Angeles experienced over 40 hours of delay per peak traveler. By 2005, 28 cities across the United States exceeded that threshold.**

Source: Texas Transportation Institute

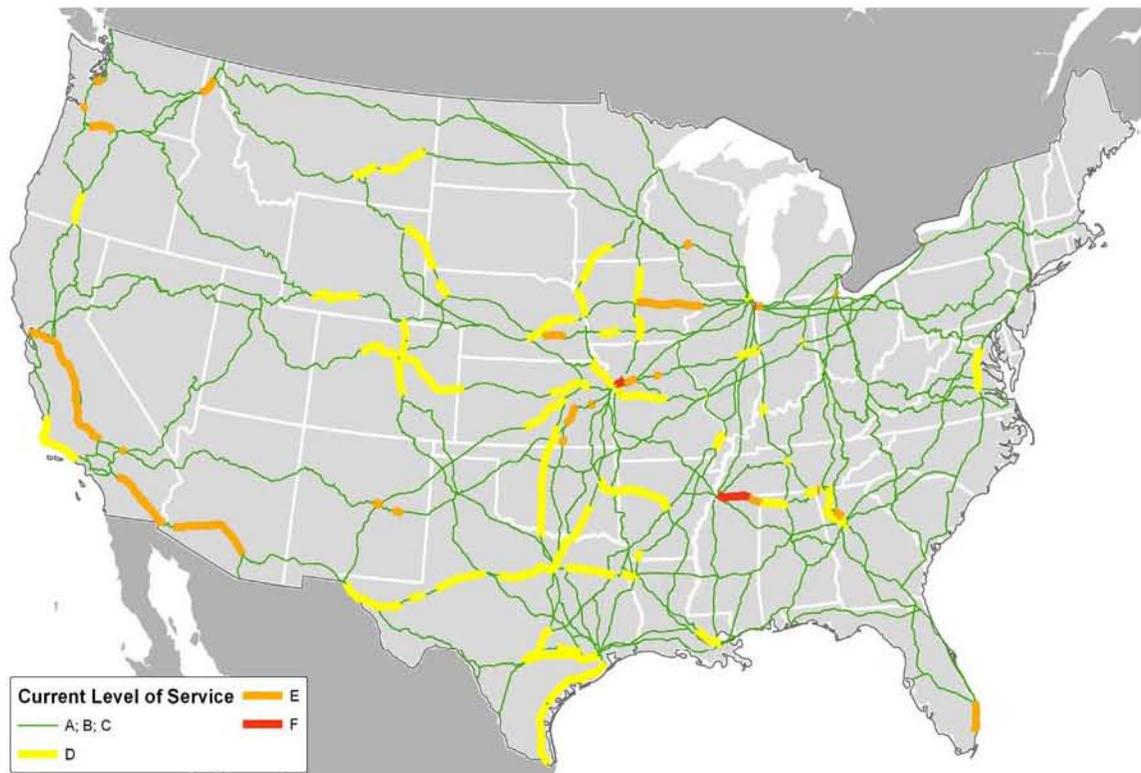


By contrast, the Nation's freight rail network is relatively uncongested at current volumes of cargo (see Exhibit 3-8). Eighty-eight percent of today's primary freight rail corridor mileage is operating below practical capacity (Levels of Service (LOS) A/B/C). About 12 percent is near or at practical capacity (LOS D/E), and less than 1 percent is operating above capacity (LOS F). Over the next three decades, however, growing volumes of cargo are expected to lead to a significant deterioration in LOS on the freight rail network.

### ***Too Many Injuries and Deaths***

When a train crashes or a bridge collapses, it gets national media attention. The day-to-day crashes that occur near our homes and work places are virtually invisible. The reason for this reduced focus may be understandable—the loss of a single life when a car leaves the roadway is less dramatic than the loss of 10 lives in a train accident. The cumulative toll caused by smaller incidents, however, is much more costly because of the larger number of car and truck crashes.

**Exhibit 3-8. Levels of service on the U.S. freight rail network in 2006**



The map shows levels of service (LOS) on major U.S. railroads. Rail corridors operating at LOS A, B, or C (shown in green) are below practical capacity. Corridors operating at LOS D (shown in yellow) are near practical capacity, and those operating at LOS E (shown in orange) are at practical capacity. The most severe congestion is on corridors at LOS F (shown in red), where traffic exceeds capacity.

Source: Association of American Railroads



Because the Nation has devoted significant resources to making transportation systems safer, fatality and injury rates have greatly declined over the last several decades. While the Commission acknowledges this progress, it still views the carnage of over 40,000 annual deaths on our transportation networks as unacceptable. Transportation safety, particularly highway safety, must be raised to the highest level of national priorities.

Highways are the most dangerous way to travel, despite great progress in reducing crashes over the past half-century. The fatality rate dropped from 5.3 fatalities per 100 million VMT in 1965 to 1.7 fatalities per 100 million VMT in 1995. Since 1995, however, the rate of decrease has slowed, declining to 1.4 fatalities per 100 million VMT by 2006. Exhibit 3-9 describes this flattening trend.

In 2006, there were 42,642 fatalities and 2,575,000 injuries on the Nation's highways,

many more than the number on all other modes of transportation combined (see Exhibit 3-10). The Nation's road system, in fact, accounts for 94 percent of the fatalities and 99 percent of the injuries that occur on the Nation's surface transportation network. The fact that highway travel accounts for such a high share of fatalities and injuries reflects many factors, not the least of which is that more than 99 percent of the miles traveled by vehicles carrying passengers takes place on the Nation's highway and road system (although transit and rail carry many more passengers than automobiles per vehicle-mile). In addition, commercial transportation services often operate in enclosed systems with professional operators.

The scope of this problem is enormous. The economic cost alone for motor vehicle crashes in 2000, both reported and unreported, was estimated to be \$231 billion, equal to over two percent of the Nation's GDP. That includes lost

**Exhibit 3-9. Highway fatality rates in the United States, 1975–2006**

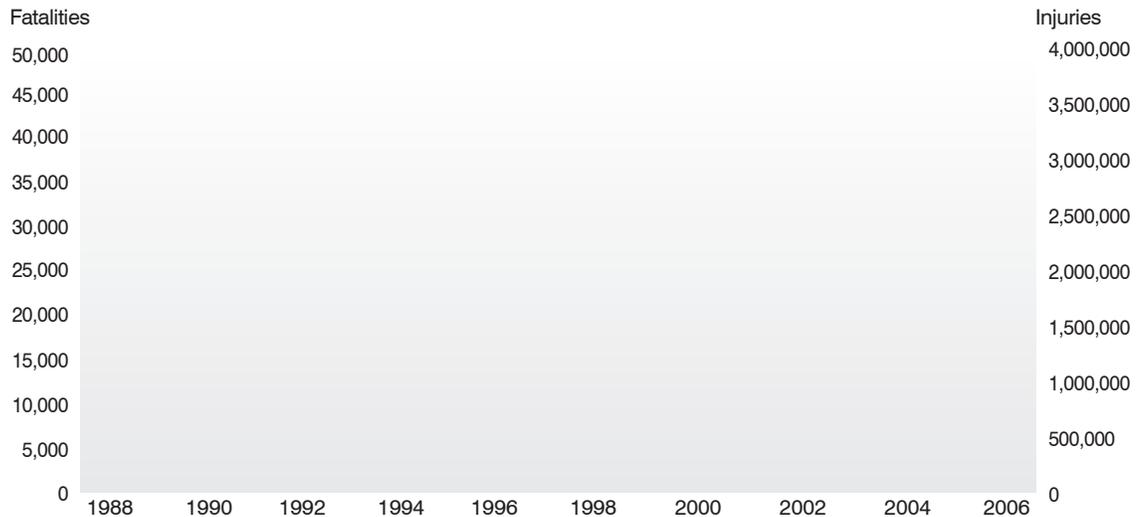


**The chart shows that the highway fatality rate in the United States today is less than half what it was 30 years ago. Most of these gains, however, occurred in the 1980s; the rate has declined much more slowly since then.**

Source: National Highway Traffic Safety Administration



**Exhibit 3-10. Fatalities and injuries in motor vehicle crashes in the United States, 1988–2006**



**The chart indicates that total fatalities on highways in the United States have been relatively stable over the last two decades. The total number of injuries in motor vehicle crashes has steadily declined since peaking in the mid 1990s.**

Source: National Highway Traffic Safety Administration

productivity, medical expenses, property damage, and crash-related highway delay. This value does not include the immense personal costs of loss of life and quality of life for crash victims and their families and friends.

The highest fatality rates in the United States are associated with roadway departure, rural roads, unbelted occupants, alcohol involvement, and speeding. An area of particular concern is motorcycle safety, where fatalities have risen sharply since the mid-1990s. By 2005, motorcycle fatalities more than doubled from their levels a decade before, while registrations rose roughly 50 percent and VMT remained virtually unchanged. This trend has been so pronounced that the increase in motorcycle fatalities has essentially offset the impact of higher belt use and improved vehicle safety.

On a per passenger-mile basis, transit is one of the safest forms of surface transportation. Transit

safety has also improved in recent years, falling from a fatality rate of 13.6 per 100 million VMT in 1990 to 7.9 per 100 million VMT in 2004. Put another way, the absolute number of fatalities dropped from 339 lives in 1990 to 248 lives in 2004, and most of those in 2004 were not passengers. The National Safety Council estimates that riding a transit bus is 79 times safer per passenger mile than traveling by automobile. Transit rail passengers are 42 times safer than those traveling by car. Still, the 248 fatalities and 18,982 injuries that occurred on transit systems in 2004 remain a source of concern for Federal officials and transit operators. Security is also a critical concern, as recent acts of terrorism on European and Indian transit systems have demonstrated the vulnerability of these networks.

Safety has substantially improved on the Nation's freight rail network, although the number of deaths and injuries at rail crossings is still too



high. The railroad industry's overall safety record has significantly improved over the past several decades, and most safety trends are moving in the right direction. In 1975, rail-related fatalities totaled 1,492 nationally. That number had declined to 892 fatalities by 2005. About 97 percent of these deaths were at grade crossings or related to trespassing on railroad tracks. Trespassing is a major problem for the railroad industry and the Nation as a whole, accounting for two-thirds of all rail-related fatalities. Greater steps must be taken to limit access to railroad tracks and discourage trespassers from entering railroad facilities.

Transportation on the Nation's inland and coastal waterways has become increasingly safer. Excluding recreational boating, the safety of transportation on the Nation's inland and coastal waterways has improved significantly. Fatalities fell from 598 deaths in 1970 to 93 deaths in 2004. Recent accidents have involved tourist vessels rather than freight vessels, including the capsizing of the *Ethan Allen* on Lake George and a water taxi in Baltimore's Inner Harbor, both in 2004.

### ***Moving Beyond Oil and Protecting the Environment***

Transportation is inherently dependent on energy. For the first several millennia of civilization, that energy was supplied by people, draft animals, and wind power. The development of the steam engine paved the way for rapid advances in transportation technology, and culminated in the development of the internal combustion engine, which remains the dominant form of propulsion technology today. Although the modern transportation system has led to an unprecedented degree of prosperity and mobility, there have also been negative consequences. Combustion-based engine technologies are largely powered by non-renewable fossil fuels, and produce emissions that harm the environment.

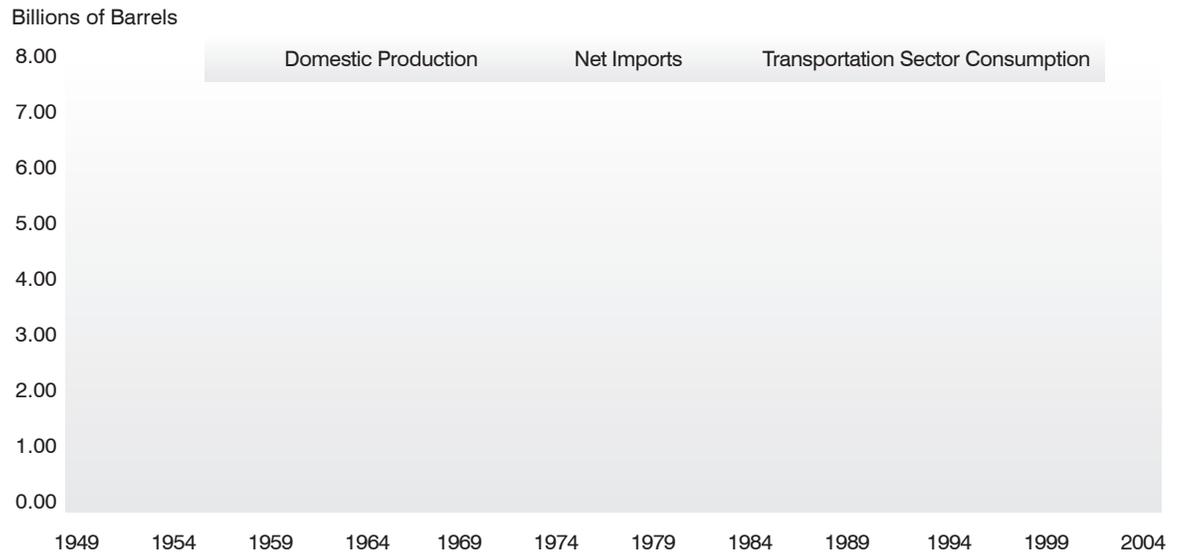
Today, the transportation sector is almost entirely dependent on petroleum. In 2005, petroleum-based fuels represented 97 percent of the total energy consumed by the American transportation network. Sixty percent of all the oil consumed in the United States is imported. This leaves the transportation sector particularly vulnerable to supply interruptions and price volatility in world petroleum markets, potentially threatening national security. As shown in Exhibit 3-11, growing transportation sector energy consumption is largely responsible for the increasing level of imported oil entering the United States.

Conventional oil production outside the major oil-exporting countries is expected to peak within the next decade, which could mean even greater price volatility and supply uncertainties. Oil sands, extra heavy oil, coal, and oil shale can be converted into conventional fuels at costs comparable to current oil prices, but it will take many years to develop the capacity to produce large quantities of fuel from these "unconventional" sources. The transportation sector accounts for 68 percent of total petroleum consumption in the United States (and 16 percent of total world oil consumption), a share that has risen in recent decades as the use of petroleum-based fuels has declined in other sectors of the economy. Thus, any policies aimed at conserving limited oil supplies must be focused on transportation.

Energy supply constraints are not the only reason for concern about high transportation energy consumption. Evidence of global climate change is mounting. Emissions of greenhouse gases from the burning of fossil fuels by transportation and other sources will exacerbate global warming. Within the United States, one-third of greenhouse gas emissions come from transportation sources (see Exhibit 3-12). Even if supplies of liquid fuels from the unconventional sources noted above were adequate to support transportation needs, the use



**Exhibit 3-11. Annual petroleum production, imports, and consumption in the United States, 1949–2006**



**The chart shows that U.S. petroleum imports have increased rapidly over the last 25 years, as domestic production has declined and consumption has increased, led by the transportation sector.**

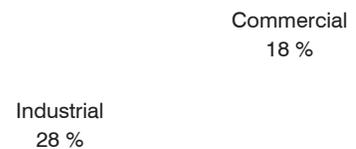
Source: Energy Information Administration

of those fuels would continue to produce large quantities of greenhouse gases.

There are essentially three strategies for reducing petroleum dependency and greenhouse gas emissions from surface transportation. In light of the severity of emission reductions necessary to stabilize global temperature rise, it is likely we will need to pursue a combination of all three strategies. The first approach would focus on improving the fuel economy of motorized vehicles, either through government-mandated targets (such as more stringent Corporate Average Fuel Economy standards) or by supporting research into more efficient engine technologies.

A second approach is to further the development of alternative fuel sources for surface transportation, such as biomass fuels, hydrogen, and electricity derived from renewable sources; nuclear energy; or fossil fuels (with carbon capture

**Exhibit 3-12. U.S. carbon emissions from fossil energy consumption by end-use sector in 2005**



**The chart shows that the transportation sector is the largest contributor of greenhouse gas emissions in the United States.**

Source: Energy Information Administration



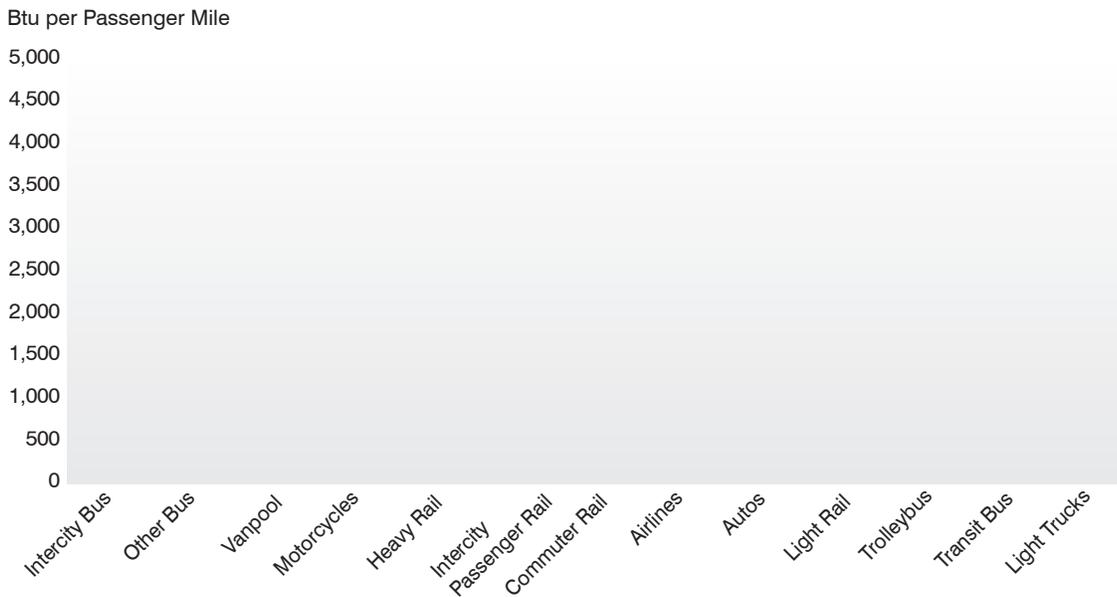
and sequestration). The technology to produce such fuels in quantity is still in its infancy, however, and significant challenges remain in developing both vehicle propulsion systems and the fuel delivery systems to support widespread adoption of alternative fuels and electrical propulsion.

Third, transportation energy consumption may also be reduced by focusing on the demand for transportation. Trip generation and trip lengths can be addressed through land use and economic development policies (discussed more below) that encourage efficiency in the location of economic activities. In some cases, policies aimed at other goals (such as encouraging development in low-density rural areas or zoning policies encouraging the separation of residential and

commercial uses) have unintended consequences that may increase travel. Ensuring that origins and destinations are more closely spaced could reduce travel demand while maintaining accessibility to economic and social opportunities. In freight, allowing longer combination vehicles could also reduce the amount of truck travel on the Nation's principal highways (though this would raise other issues regarding modal equity and highway cost allocation). The balance of transportation system use among different modes can also affect energy consumption (see Exhibits 3-13 and 3-14).

Burning fossil fuels for surface transportation causes pollutants as well as greenhouse gases to be emitted, affecting ambient air quality and directly impacting health and wildlife. The maps in

**Exhibit 3-13. Energy intensity for different passenger transportation modes**

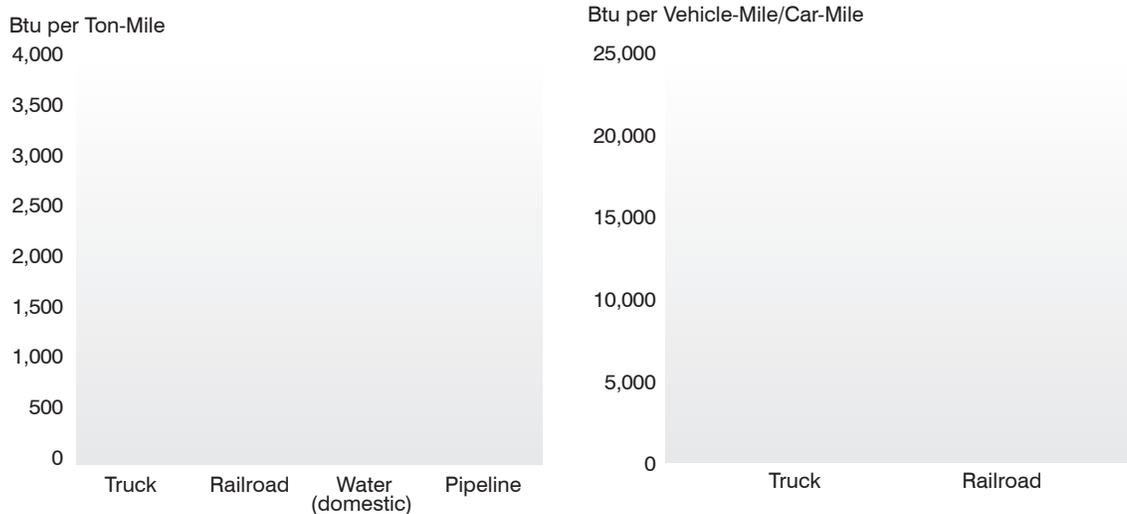


**Intercity buses and other buses (including charters, tour buses, and school buses) are the most energy-efficient form of passenger transportation on a per-passenger-mile basis due to their relatively high load factors (high percentage of seats filled on a given trip). On average, most forms of urban and intercity passenger rail service are less energy-intensive than airlines, cars, light trucks, or transit buses.**

Sources: *Highway Statistics; National Transportation Database; Transportation Energy Databook; American Bus Association*



**Exhibit 3-14. Energy intensity for freight transportation modes**



**On a per-ton basis, trucking uses more than 10 times as much energy on average to transport freight than rail transportation. However, the average truck carries just under 6 tons of freight, while the average railcar carries a load of 46 tons, reflecting the heavier, bulky commodities that railroads generally haul. Thus, when comparing energy intensity on a per-vehicle-mile or per-car-mile basis, the differences between the two modes are significantly reduced (though rail is still less energy intensive).**

Sources: *Transportation Energy Databook, National Transportation Statistics*

Exhibit 3-15 depict the areas of the U.S. that fail to attain national health-based standards for two key pollutants: ground-level ozone (or smog) and fine particulate matter. The transportation sector is the largest source of emissions for both pollutants.

One of the key environmental successes in the U.S. over the last 40 years has been the dramatic reduction in emission rates for carbon monoxide, nitrogen oxides, hydrocarbons, and particulates through the adoption of advanced emissions control technologies. As a result, air quality has greatly improved in our cities. However, there

are concerns about the extent to which further technological advances can continue to outpace growing levels of highway travel. As a result, continued travel growth threatens to limit or even reverse these gains in the future.

### **Planning for 120 Million More Americans**

One of the greatest challenges facing the United States is its population growth over the next half-century. As noted in Chapter 1, the Nation's population is expected to swell to 420 million residents by 2050. A population of this size would strain any country's transportation network, but the magnitude of this increase has the potential to overwhelm an already saturated transportation network in the United States. The challenge for transportation agencies is not only to design and



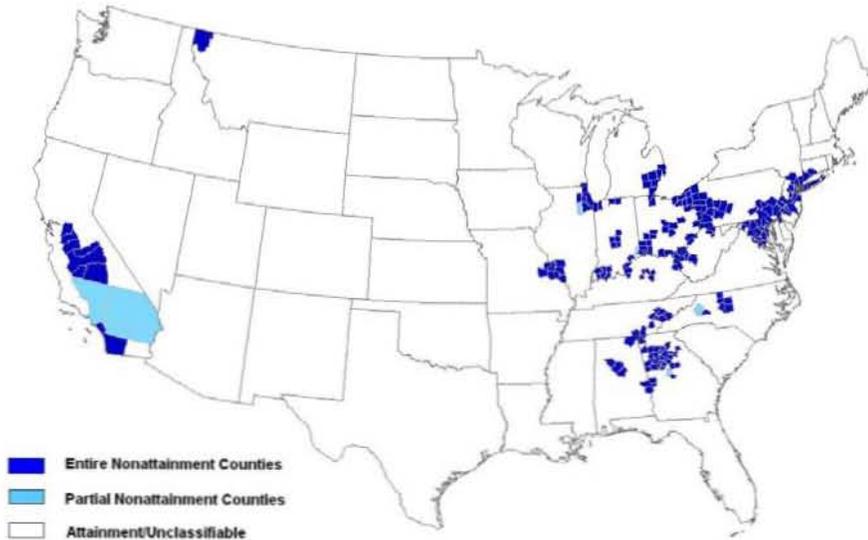


**Exhibit 3-15. Nonattainment areas for air quality in the United States: 8-hour ozone standard and PM2.5 standard**

### 8-Hour Ozone Standard

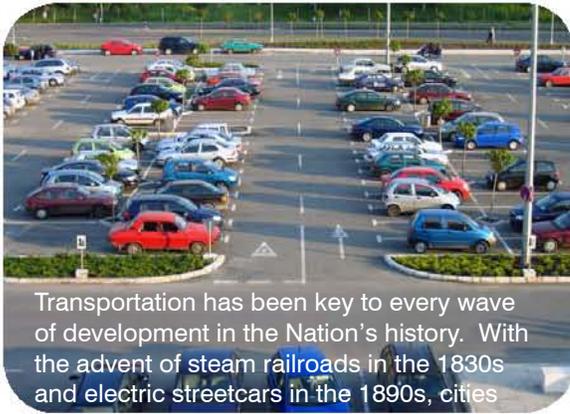


### PM2.5 Standard



The maps indicate that many areas of the country still do not meet the minimum air quality standards set by EPA, especially for ground level ozone and fine particulate matter.

Source: Environmental Protection Agency



Transportation has been key to every wave of development in the Nation's history. With the advent of steam railroads in the 1830s and electric streetcars in the 1890s, cities

implement tomorrow's transportation system, but to do so in a way that accommodates population growth and protects the environment.

Transportation is not merely impacted by new development; it influences the character of new growth by determining how land is accessed and developed. In recent years, development has consumed land at a rapid rate. In the 1990s, open space was converted to developed land at the rate of 2.2 million acres per year, or 252 acres per hour. This was 50 percent greater than the rate of conversion a decade before.

New development has numerous environmental effects, including the destruction of wildlife habitat and additional runoff from paved surfaces. In some of the Nation's fastest-growing communities, the property claimed by urbanization had once been the most productive. This land, ideal for farming, had originally contained hardwood forests and tall grass prairies with good soil.

The United States is in no danger of running out of land, although there are signs that future development cannot continue in the same manner as it has in the past half-century. In its report *Toward a New Metropolis*, The Brookings Institution notes that 427 billion square feet of new homes, shopping centers, and other buildings will be needed to accommodate the Nation's population in 2030. Half of that building space has not yet been constructed. Much of the country's remaining open space is located in deserts or mountains, suited only to low-density development.

As early as a century ago, cities such as New York were implementing their zoning and infrastructure models at the same time. Over the past two decades, planners have tried to mimic these policies, which worked well in the years before large-scale suburban growth. Many communities have clustered development around transit lines, reducing the need for automobile travel and related congestion and environmental impacts. Local officials have also recommended mixed-use development in which housing, employment centers, and institutions such as schools are blended into a new community rather than being zoned into separate areas. By doing so, these officials hope to shorten the distances people need to travel, increase pedestrian activity, and encourage the use of non-motorized forms of transportation, such as bicycles.





The surge in population anticipated between now and 2050, however, has led some to argue for bolder approaches toward accommodating development, and to criticize the fragmented planning and development process. Many have argued that State governments or metropolitan planning agencies must set boundaries beyond which growth is not allowed.

“The population of the United States is expected to increase by 50 percent by 2050, with much of the growth coming in heavily populated urban areas along the coasts, in the south, and in megaregions such as Chicago. So we must optimize our land-use patterns using sensible growth strategies that guide regions to make tough investment choices. Investments that support mixed-use, mixed-income developments near transit, retail, and jobs should move to the front of the line... The harsh truth is that continuation of past build-out policies will bankrupt our transportation system.”

– *John Gates, CEO and President of PortaeCo and Founder of Centerpoint Properties, on behalf of the Metropolitan Planning Council, at the Commission’s Chicago field hearing.*

Organizations such as the Regional Plan Association in New York have argued that planning decisions must be realigned along broader lines than existing political boundaries. The Regional Plan Association convened the National Committee for America 2050, which

examined the growth of “megaregions” that will contain more than 70 percent of the Nation’s growth by mid-century (see Exhibit 2-4 in Chapter 2). These megaregions span hundreds of miles, crossing State boundaries and linking cities that were previously isolated by farms and forests. The America 2050 report notes that “increasingly, investments and interventions must occur at the megaregional scale, which provides the necessary breadth of resources to grow and compete globally.” The Commission agrees that transportation and planning agencies must have a broader perspective, which is why the Commission has endorsed new strategies that will improve mobility in larger urban communities.

In addition to considering the environmental impacts of new infrastructure, transportation agencies must determine how they will affect existing communities. There must be a clear break from the past, when some projects were hurried along with little input from local neighborhoods. This sometimes had terrible consequences.

During the early years of the Interstate Highway System, it was common practice to build expressways through low-income and minority communities that lacked the political, economic, and legal power to influence such projects. In many cases, these projects divided or destroyed thriving neighborhoods, and air pollution from automobiles and trucks increased medical problems such as asthma. Other surface transportation networks impacted communities in similar ways. Freight rail also moves through many low-income and minority communities. Maintenance facilities for all forms of transportation have sometimes been located in communities that can least resist these operations. At the same time, however, many of these facilities provide much-needed and well-paying jobs for these communities. Increasingly, any new such facility is built with extensive input from the community with regard to environmental impacts and mitigation.



In recent years, officials at all levels of government have tried to make environmental justice—which refers to the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income—a key part of the decision-making process. This is not a new concept. Under Title VI of the Civil Rights Act of 1964, the U.S. Department of Transportation is required to ensure that recipients of Federal aid do not discriminate. A 1994 Presidential Executive Order directed every Federal agency to make environmental justice part of its mission by addressing the effects of all programs, policies, and activities on “minority populations and low-income populations.”

It is the Commission’s conclusion that environmental justice should be considered in all surface transportation decisions. The concept does not just refer to minimizing the adverse impacts of highways and other transportation networks. It also means fitting transportation systems more harmoniously into communities. Our clear objective must be ensuring that mobility is enhanced for minority and lower-income communities, and the benefits of transportation policies are distributed equitably among all the Nation’s citizens.

## Endnotes

- <sup>1</sup> U.S. Department of Transportation, Federal Highway Administration. *2006 Status of the Nation’s Highways, Bridges, and Transit: Conditions & Performance*. Washington, D.C.: 2007.
- <sup>2</sup> Ibid.
- <sup>3</sup> Ibid.
- <sup>4</sup> Ibid.
- <sup>5</sup> National Transit Database.
- <sup>6</sup> U.S. Department of Transportation, Federal Highway Administration. *2006 Status of the Nation’s Highways, Bridges, and Transit: Conditions & Performance*. Washington, D.C.: 2007.
- <sup>7</sup> Yardley, William. “Gaping Reminders of Aging and Crumbling Pipes.” *The New York Times*. February 8, 2007.
- <sup>8</sup> Texas Transportation Institute. *2007 Annual Urban Mobility Report*. College Station, Texas: 2007.
- <sup>9</sup> Ibid.

TRANSPORTATION FOR TOMORROW

National Surface Transportation Policy  
and Revenue Study Commission





# Chapter 4

## What Are the Long-Term Capital Investment Needs of the System?

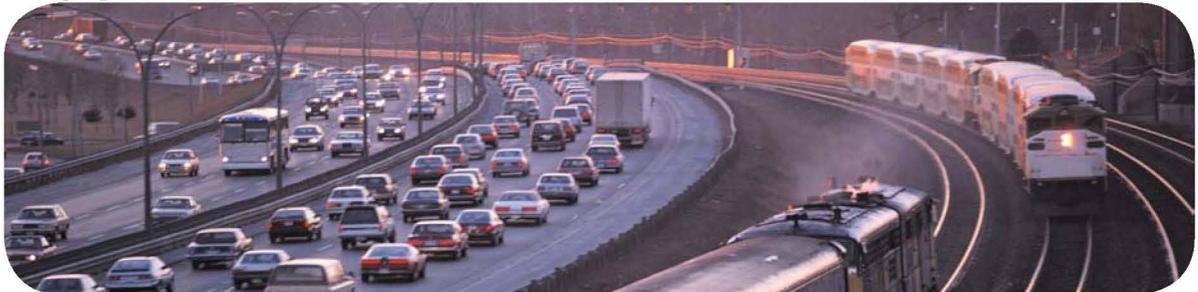
Volume I of this report includes recommendations for the development of a strategic plan to improve the condition and performance of the Nation's surface transportation infrastructure. This plan would be based on a rigorous, systematic transportation planning process incorporating a strong economic analysis component to identify the relative benefits and costs of alternative potential investments, and would serve to provide a greater understanding of the investment needs of the system as a whole. In the absence of such a plan today, a series of analyses were conducted as part of this study to quantify capital investment needs using currently available data and analytical tools. These analyses are intended to convey a sense of scale of the overall needs and facilitate discussions of alternative financing options, but would ultimately be supplanted by the cost estimates developed as part of the recommended strategic plan.

“Avoid the temptation of ‘solving’ the funding problem without first understanding what it is we need to fund.”

– Robert L. Darblenet, President and Chief Executive Officer of the American Automobile Association, at the Commission's Washington, D.C., field hearing.

Long term future surface transportation capital investment needs will be influenced by a number of key parameters, including:

- Future demographic and economic demands on the transportation system;
- External forces that may impact future travel demand; and
- Impacts that alternative transportation system program policies, financing strategies, or investment levels may have on traveler behavior.



Some factors that would influence future transportation demand, such as population growth and energy policies, fall largely outside the control of transportation agencies. For the purposes of this study, specific assumptions were made about these types of factors based on existing analyses available from other sources. Chapter 2 includes an extended discussion of drivers of future demand; additional resource material on these topics is available in Volume III.

Other factors that would influence future transportation demand are more directly under the control of the transportation community. These include decisions about where and how transportation investments are made, how these investments are financed, and the overall level of investment in different transportation modes. Such decisions have the potential to significantly impact the travel choices made by individuals. For these types of factors, this study includes analysis of various scenarios that incorporate packages of transportation policy options. These scenarios have been used to identify ranges of potential investment that would be expected to achieve different performance impacts at various points in time in the future.

The scenarios include a Base Case, which assumes a continuation of current institutions and technologies, and five thematically oriented alternative approaches. The scenarios include such program and policy features as (1) making maximum use of operational strategies to improve transportation system performance; (2) implementing strategies to reduce energy consumption and travel demand; (3) providing greater mobility and intercity connectivity through aggressive system expansion; (4) separating passenger from freight transportation in key highway and rail corridors; and (5) making the maximum use of technology to improve transportation system performance and safety.



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These scenarios were evaluated at multiple investment levels, ranging from current levels to much higher levels aimed at aggressively improving the system. The analytical assumptions and key findings pertaining to individual scenarios are described in Volume III of this report; this Chapter addresses the scenarios more generally, in terms of their collective implications and the



## Observations

The demographic and economic trends projected over the next 50 years (see Chapter 2) have major implications for surface transportation investment requirements. Meeting the mobility needs of a significantly larger population in terms of access to housing, employment, and a broad range of services will present a significant and growing challenge over time, particularly in the largest urbanized areas where capacity expansion is limited by the scarcity and escalating cost of land. At the same time, major investments will be required to repair and replace our aging infrastructure assets. In short, improving the performance of the system while simultaneously accommodating higher travel volumes will pose tough challenges and carry a high price tag.

## Highway and Bridge Findings

Based on the latest information available to this Commission, it is estimated that current financial and institutional structures could sustain an average annual level of capital investment on Federal-aid highways from all sources of approximately \$68 billion per year in the short term, stated in constant 2006 dollars. The analyses developed by the Commission demonstrate that this level of funding would not be adequate to maintain the operational performance and physical condition of the nation's highway assets in the face of expected increases in highway travel, even if every dollar were utilized in the most effective manner.

### ***Implications of Sustaining Current Levels of Highway Investment***

Assuming no changes in current technologies, financing mechanisms, and institutional

relative magnitude of future capital investment needs.

While the scenarios were designed as packages of multimodal strategies, the degree of quantitative analysis conducted varied widely by mode, reflecting the relative availability of data and appropriate analytical tools.



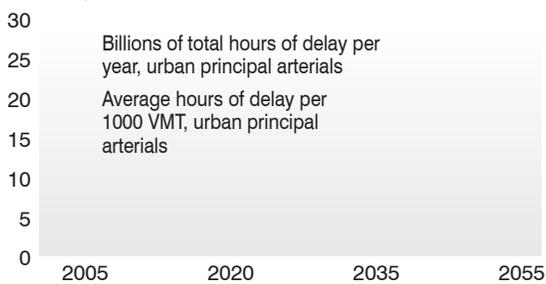
arrangements (these are the Base Case assumptions), and assuming that current funding levels are sustained in constant dollar terms for an extended period of time, it is projected that highway travel delay would continue to increase. Even under the best of circumstances, the level of delay experienced by the average traveler on urban principal arterial highways would be projected to increase by one-fifth by 2020, increase by one-half by 2035, and double by 2055, as shown in Exhibit 4-1. With VMT increasing over time, total delay on urban principal arterials would be projected to rise even more, growing by over one-half by 2020, more than doubling by 2035, and more than quadrupling by 2055. These billions of hours lost to delay each year would represent a serious drag on economic growth, translating to many billions of dollars of lost economic opportunity for both individuals and businesses.

The physical condition of the Nation's highway assets is also projected to deteriorate significantly, as shown in Exhibit 4-2, imposing additional costs on drivers in the form of higher vehicle

maintenance costs, travel time costs, and crash costs. The extent to which existing inefficiencies in the investment allocation processes continue to exist would exacerbate these problems, since every dollar spent in a less than optimal fashion would reduce the funding available for more beneficial highway investments.

The performance results for the Base Case assuming current funding levels should serve as an urgent call to action to the Congress and the Nation's surface transportation leaders. On a limited scale, several strategies explored in the scenario analyses have the potential for improving this picture. Accelerated deployment of existing operations strategies and Intelligent Transportation System (ITS) technologies could achieve measurable performance benefits at a relatively low cost. Longer term improvements such as the deployment of advanced vehicle infrastructure integration (VII) technologies on a widespread basis have the potential to improve the effective capacity of the highway system, while aggressive travel demand management strategies have the potential to address the problem from

**Exhibit 4-1. Projected average and total highway delay, base case—assuming current funding**



**This chart identifies the hours of delay per 1000 miles traveled on urban principal arterial highways that vehicles are expected to encounter if capital investment is sustained at current levels over time in inflation-adjusted terms. The exhibit also shows the total delay in billions of hours per year that all vehicles combined are projected to experience on urban principal arterials over time.**

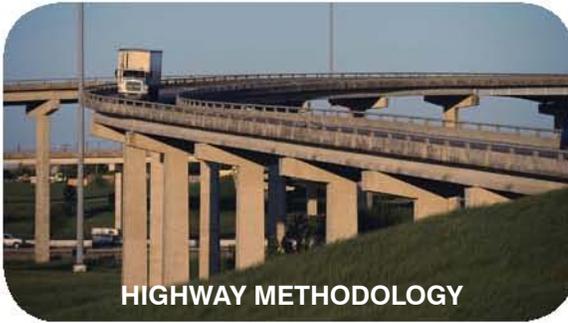
Source: Commission staff analysis.

**Exhibit 4-2. Projected ride quality, base case—assuming current funding**



**This chart identifies the projected percentage of VMT that will occur on roads meeting a standard for ride quality that is described by the U.S. DOT as "Acceptable" for pavements on the National Highway System (NHS), assuming current funding levels are sustained over time.**

Source: Commission staff analysis.



the demand side. At current funding levels, such approaches are projected to have the potential to reduce average or total delay by more than about 40 percent over 50 years relative to the large increases in delay identified in Base Case figures. Although such a reduction represents a significant difference in projected future system performance, it would still result in a highway system with significantly more delay than is currently the case.

One might expect different combinations of strategies and other policy and institutional options to have even greater impacts on system conditions and operational performance than was observed in the specific scenarios analyzed as part of this study. However, the findings noted above suggest that future needs of the transportation infrastructure system cannot be addressed simply by optimizing the allocation of existing resources; we face the reality of considerable shortfalls in the overall level of resources currently devoted to transportation infrastructure.

The \$68 billion currently sustainable funding level identified in the Base Case analysis for highways includes two components: (1) projected nominal dollar receipts for the Highway Account of the Federal Highway Trust Fund, converted into constant 2006 dollars; and (2) current amounts of State and local revenues being utilized for capital improvements to Federal-aid highways. While the purchasing power of these revenue sources will tend to be eroded by inflation over time, such effects would be largely offset in the short term by increases in revenues from financial mechanisms linked to rising overall travel volumes (such as fuel taxes).

In evaluating the relative system performance implications of alternative levels of future investment, it is important to note that maintaining current investment levels over the long term in constant dollars does not reflect a true “do nothing” alternative. In the medium and long term, the sustainability of current revenue



sources for highways will be more problematic as the growth in the use of alternative sources of energy for vehicle propulsion would lead to corresponding reductions in revenues from taxes on petroleum-based fuels. Consequently, some degree of changes in financing mechanisms would be required over time even to simply maintain current levels of investment. Issues pertaining to alternative revenue sources and financing mechanisms are discussed in more detail in Chapter 5.

### **Investments to Maintain and Improve Highways**

The scenario analyses developed by this Commission also explored the impact that higher levels of funding could have on highway system performance, focusing on two particular levels: “Medium” investment levels intended to at least maintain specific separate measures of highway conditions and performance and “High” investment levels targeted at the maximum level of potentially cost-beneficial investment

(where such determinations could be made). As shown in Exhibit 4-3, these analyses produced ranges of average annual capital investment from \$130 billion to \$240 billion (stated in constant 2006 dollars) for the 15-year period from 2005 to 2020, \$133 billion to \$250 billion for the 30-year period from 2005 to 2035, and \$146 billion to \$276 billion for the 50-year period from 2005 to 2055. These ranges shift upward over time due to the impact of cumulative VMT growth; accommodating travel demand in 2055 to a certain performance standard would be much more challenging (and expensive) than accommodating current travel volumes to the same performance standard.

The lower end of the ranges noted above reflects the estimated costs of maintaining key conditions and performance measures at current levels, assuming a combination of aggressive strategies to reduce energy consumption and travel demand and the adoption of new technologies to improve the operational performance of the highway system. One critical component of such strategies

**Exhibit 4-3. Estimated impacts of alternative highway capital investment levels**

|   |      |           |           |           |           |           |           |
|---|------|-----------|-----------|-----------|-----------|-----------|-----------|
| Average Annual Highway Capital Investment (billions of 2006 \$) [2005 through the year 2020, 2035, or 2055] | \$68 | \$130-166 | \$207-240 | \$133-188 | \$182-250 | \$146-195 | \$185-276 |
| Vehicle Miles of Travel (VMT) on all roads (trillions)  | 3.0  | 4.1 - 4.1 | 4.3 - 4.3 | 5.2 - 5.4 | 5.5 - 5.6 | 6.9 - 7.4 | 7.3 - 8.0 |
| Percent of VMT on roads with NHS-quality pavements  | 85%  | 85-86%    | 94-94%    | 86-87%    | 92-93%    | 83-84%    | 85-92%    |
| Average Delay (hrs/1000 VMT) on urban principal arterials   | 5.8  | 5.1 - 5.3 | 4.1 - 4.2 | 5.8 - 5.8 | 4.1 - 5.2 | 5.7 - 7.8 | 5.5 - 6.5 |
| Total Delay (billions of hours) on all Federal-aid Highways   | 12   | 16 - 17   | 15 - 15   | 22 - 24   | 20 - 23   | 28 - 39   | 29 - 37   |

**This table identifies the projected impacts on certain key performance indicators of alternative highway capital investment levels. The high and low ends of the ranges shown represent the best case and worst case identified from a set of scenarios assuming alternative packages of future transportation policy options.**

Source: Commission staff analysis.



would be the adoption of congestion pricing on a widespread basis in the Nation's urban areas. The higher end of the ranges noted above represent the additional costs that could be incurred from aggressive expansions to the highway system for purposes of improving rural connectivity or separating freight traffic from passenger traffic via a nationwide system of dedicated truck-only lanes, beyond other highway capacity expansion modeled in the scenarios.

Although different combinations of strategies and other policy and institutional options (not explored as part of this study) might bring down the low end of these investment ranges, it is clear from the findings summarized in the table above that a significant gap exists between the level of investment that is currently sustainable from existing financing mechanisms and the amount that would be required to maintain or improve the conditions and performance of the highway system in light of increasing travel demand.

The high ends of the ranges shown above are also not definitive upper limits; a more rigorous analysis of specific proposed projects might cause this number to go up or down. These figures include broad estimates of the potential costs of aggressively adding new components to the system

(such as new Interstate routes directly connecting more communities to the existing Interstate system and new truck-only lanes). However, these new components were not subjected to the same sort of benefit-cost analysis applied to the remainder of the highway system, and when examined on a corridor-by-corridor basis, some of these potential investments would likely be much more promising than others. Conversely, such detailed analysis at a local level may identify additional costs not captured by the national-level approach utilized in this study.

Exhibits 4-4 and 4-5 highlight the relative implications of the alternative funding levels on future highway operational performance and physical conditions. The implication of these findings is that if we are going to experience the economic and population growth we expect, it's going to cost a lot just to keep system performance at today's level, let alone improve it. However, while significantly higher levels of highway system investment combined with improved project selection, new technologies, demand management strategies, and strong land use decision making show significant potential for reducing average congestion levels through 2035, there are limits as to what can be achieved. Preserving these

**Exhibit 4-4. Projected average delay per 1000 VMT on urban principal arterials**

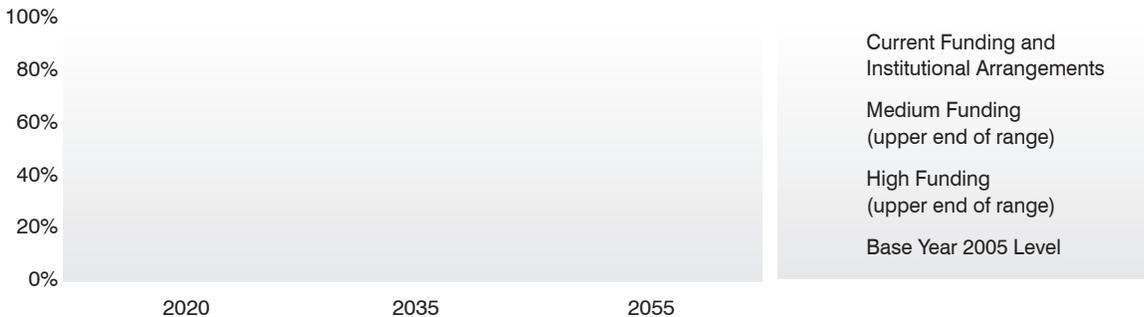


**This chart identifies the hours of delay per 1000 miles traveled on urban principal arterial highways that vehicles are expected to encounter if capital investment is sustained at current levels in inflation-adjusted terms, or increased to the “Medium” and “High” funding levels identified in Exhibit 4-3 (chart reflects the lower end of the projected delay ranges).**

Source: Commission staff analysis.



**Exhibit 4-5. Projected percent of VMT on pavements with acceptable ride quality**



**This chart identifies the projected percentage of VMT that will occur on roads meeting a standard for ride quality that is described by the U.S. DOT as “Acceptable” for pavements on the National Highway System (NHS), if capital investment is sustained at current levels in inflation-adjusted terms, or increased to the “Medium” and “High” funding levels identified in Exhibit 4-3 (chart reflects the upper end of the ride quality ranges).**

Source: Commission staff analysis.

gains through the 2055 horizon will be extremely challenging since much of the projected future delay is expected to occur in the most heavily populated megaregions, where land available for transportation capacity expansion projects will become increasingly scarce over time. Smaller urbanized areas outside of the megaregions will also face significant increases in congestion during this period.

Although the costs of meeting these challenges and accommodating the transportation needs of a growing population and expanding economy are significant, the implied costs of inaction are also very high. Simply maintaining the status quo in terms of funding levels and program design would impose significant costs on the American public in the form of increased travel time and vehicle operating costs, and would negatively impact commerce and the potential for future economic growth. To the extent that well-chosen infrastructure investments can be implemented in a timely manner to reduce or at least slow the increase of such future costs, this would clearly be of benefit to both the current traveling public and to future generations.

### ***Investments in Subsets of the Highway System***

The “Medium” and “High” capital investment levels cited above pertain to all “Federal-Aid Highways,” a term that includes all roadways that are currently eligible for Federal funding including all urban arterials and collectors and all rural arterials and major collectors.

The Interstate Highway System represents one key subset of the overall highway system; although it represents just over 1 percent of overall mileage, it carries 24 percent of highway passenger and freight travel. The National Highway System (NHS) constitutes another important subset, encompassing the entire Interstate System plus other critical highway routes and connections to defense installations and intermodal terminals.

Of the \$130 billion to \$240 billion (stated in constant 2006 dollars) range of average annual capital investment identified earlier for the 15-year period from 2005 to 2020, approximately 25 to 30 percent would be devoted to the Interstate Highway System. The high end of this range assumes a significant expansion of the Interstate system to connect growing communities without



direct Interstate connections. Another 21 percent of this total would be directed to other portions of the NHS. The remaining capital investment (approximately 49 to 54 percent) would be directed toward rehabilitating and expanding other rural and urban Federal-Aid Highways that are not designated as part of the NHS.

Of the \$133 billion to \$250 billion range of average annual capital investment identified earlier for the 30-year period from 2005 to 2035, approximately 24 to 29 percent would be directed to the Interstate System, and another 21 to 23 percent would be directed to other portions of the NHS, as shown in Exhibit 4-6. Of the \$146 billion to \$276 billion range of average annual capital investment identified earlier for the 50-year period from 2005 to 2055, approximately 24 to 26 percent would be directed to the Interstate System, and another 21 to 22 percent would be directed to other portions of the NHS.

### ***Investments in Bridges***

Each of the highway investment estimates presented above includes a component pertaining to potential future bridge rehabilitation and replacement investments aimed at addressing deficient bridge elements. These analyses indicate that simply maintaining the current overall level of bridge conditions at current levels (i.e., not allowing the backlog of existing bridge deficiencies

**Exhibit 4-6. Average annual highway capital investment (billions of dollars)**

|                               |           |           |           |           |           |           |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| All Federal-aid Highways      | \$130-166 | \$207-240 | \$133-188 | \$182-250 | \$146-195 | \$185-276 |
| Interstate Highways           | \$32-55   | \$49-73   | \$32-60   | \$42-73   | \$35-57   | \$42-73   |
| Other National Highway System | \$27-31   | \$43-51   | \$28-37   | \$37-57   | \$31-41   | \$39-60   |

**This table identifies the portion of the highway capital investment levels presented in Exhibit 4-3 for all Federal-aid Highways that would be associated with two key system subsets: the Interstate System, and the portion of the National Highway System (NHS) that extends beyond the Interstate system.**

Source: Commission staff analysis.



to grow above today’s levels) would require a combined investment of public and private sector resources of \$650 billion over 50 years in 2006 dollars, equating to an average annual investment level of \$13 billion.

The cost of eliminating all existing bridge deficiencies and addressing all such deficiencies as they arise over the next 50 years (where cost-beneficial to do so) is estimated to be \$850 billion in 2006 dollars, equating to an average annual investment level of \$17 billion. Over this period, it is projected that a large percentage of existing structures would need to be replaced.

In 2004, the most recent year for which data are available, all levels of government invested a combined \$10.5 billion in bridge rehabilitation and replacement—nearly 40 percent less than the annual optimal investment level.

## Transit Findings

The latest information available to this Commission suggests that current financial and institutional structures could sustain an average annual level of total transit capital investment from all sources of approximately \$13 billion per year, calculated in constant 2006 dollars.

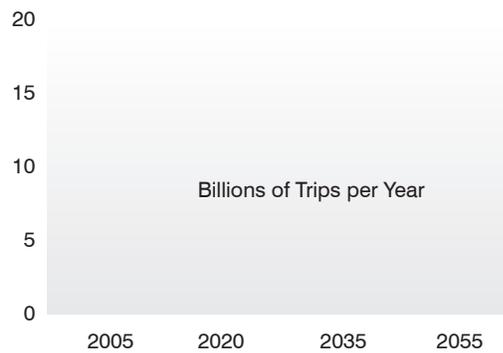
### **Implications of Sustaining Current Levels of Transit Investment**

If investment were sustained at this level, and assuming no significant changes in current institutional arrangements, it is estimated that transit ridership would grow from 9 billion passenger trips in 2005 to 11 billion in 2020, 14 billion in 2035, and 18 billion in 2055, as shown in Exhibit 4-7. The average condition of transit assets would be expected to gradually decline over time, from a rating of 3.9 on a

5-point scale in 2005 down to ratings of 3.7 in 2020, 3.6 in 2035, and 3.5 in 2055.

The projected transit ridership figures cited above imply a gradual decline in transit’s market share over time, as shown in Exhibit 4-8. The values

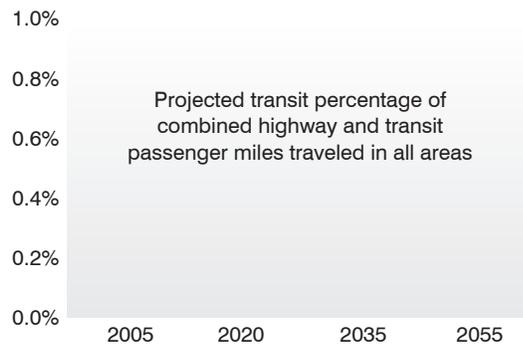
**Exhibit 4-7. Transit ridership, base case—assuming current funding**



**This chart identifies projected transit ridership (in terms of numbers of trips) if capital investment is sustained at current levels over time in inflation-adjusted terms, and current program structures and policies are retained.**

Source: Commission staff analysis.

**Exhibit 4-8. Projected transit market share, base case—assuming current funding**



**This chart identifies transit’s projected share of combined highway and transit passenger travel if capital investment is sustained at current levels over time in inflation-adjusted terms, and current program structures and policies are retained.**

Source: Commission staff analysis.



are based on a compilation of long-term transit forecasts of Metropolitan Planning Organizations (MPOs), and they can be assumed to reflect what is likely to occur in the absence of significant new funding or institutional changes. As a relative shift in traffic away from transit toward highways would conflict with national interests in terms of energy independence and environmental considerations, the Commission has explored alternative strategies to increase transit's mode share. Both transit-driven approaches (improving transit connectivity within urbanized areas and increasing the frequency and quality of transit service to attract additional riders) and highway-driven approaches (increasing the price of highway use relative to transit use by imposing highway congestion

charges on a widespread basis) were considered as potential levers to encourage additional transit ridership. More integrated land use decision making would have a significant impact on shaping future demand and encouraging growth in transit ridership.

### ***Investments to Maintain and Improve Transit***

The scenario analyses developed by this Commission explored "Medium" capital investment levels intended to maintain specific separate measures of transit conditions and performance and "High" investment levels targeted at bringing such measures up to a level of "Good". These analyses include widely different assumptions about future levels of transit passenger travel, producing wide ranges of average annual capital investment from \$14 billion to \$32 billion (stated in constant 2006 dollars) for the 15-year period from 2005 to 2020, \$17 billion to \$34 billion for the 30-year period from 2005 to 2035, and \$20 billion to \$46 billion for the 50-year period from 2005 to 2055. These ranges shift upward over time due to the impact of cumulative growth in passenger miles of travel (PMT); accommodating transit travel demand in 2055 to a certain performance standard would be much more challenging (and expensive) than accommodating current passenger travel volumes to the same performance standard. Details are provided in Exhibit 4-9.

The lower end of the ranges noted above reflects the estimated costs of maintaining the current level of physical conditions and operating performance assuming no fundamental shifts in institutional arrangements or existing policies. Under these assumptions, transit ridership would be expected to rise from 9 billion passenger trips to 20 billion over 50 years. While this represents an



**Exhibit 4-9. Estimated impacts of alternative transit capital investment levels**

| Average Annual Transit Capital Investment (billions of 2006 \$) [for 2005 through the year 2020, 2035, or 2055] | \$13 | \$14-18 | \$21-32 | \$17-25 | \$23-34 | \$20-40 | \$26-46  |
|---|------|---------|---------|---------|---------|---------|----------|
| Transit Ridership (billions)  | 9    | 12-14   | 13-17   | 15-25   | 17-35   | 20-66   | 24-71    |
| New Vehicles Added (thousands, cumulative)  | –    | 26-51   | 51-96   | 66-186  | 112-232 | 121-710 | 194-783  |
| New Rail Route Miles (thousands, cumulative)  | –    | 1.1-1.5 | 3.0-4.4 | 2.4-3.5 | 5.5-8.0 | 4.6-6.7 | 9.1-12.5 |
| Average Asset Condition (scale 1-5)   | 3.9  | 4.0-4.0 | 4.0-4.1 | 4.1-4.2 | 4.1-4.3 | 4.2-4.4 | 4.2-4.4  |

**This table identifies the projected impacts on certain key performance indicators of alternative transit capital investment levels. The high and low ends of the ranges shown represent the best case and worst case identified from a set of scenarios assuming alternative packages of future transportation policy options.**

Source: Commission staff analysis.

improvement relative to the projected 2055 figure of 18 billion passenger trips cited earlier assuming no increase in transit spending above currently sustainable levels and a gradually declining level of transit system performance, it would not represent a significant increase in transit market share. Details are shown in Exhibits 4-10 and 4-11.

The higher end of the ranges noted above reflect the estimated costs of improving the current level of physical conditions and operating performance while accommodating significantly higher levels of transit trips inspired by a set of strategies aimed at changing the competitive mix between transit and highways (by increasing the extent, frequency, and quality of transit service and/or raising the price of highway use relative to transit use). Under these assumptions, transit ridership could nearly double over 15 years, nearly quadruple over 30 years, and increase by nearly 8 times over 50 years. In addition, the transit market share would increase by more than 50 percent over 30 years and could triple by 2055.

“If America is to compete internationally, it has to make dramatic investments in its metropolitan infrastructure systems. . . Our metropolitan regions can accommodate the projected increases in population in this country if we focus density around transit stations and continue to expand our transit systems. History has shown that, as public authorities invested in the safety, efficiency, and operation of these systems, the public has responded by riding transit more frequently.” – *Robert D. Yaro, President of the Regional Plan Association, at the Commission’s New York field hearing.*



## Freight Rail Findings

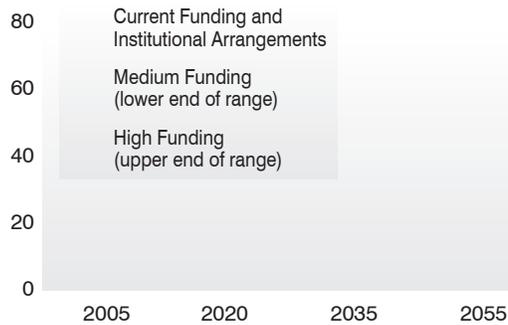
As described in Chapter 2, total ton-miles of freight movement in the U.S. is projected to increase by 92 percent over the next 30 years. If the freight rail system were to maintain its current market share of each freight commodity without expanding the capacity of the system, the overall performance of the system would be expected to degrade significantly.

As described in Chapter 3, approximately 88 percent of primary rail corridors are currently operating at levels below their theoretical capacity, leaving sufficient capacity available to accommodate periodic maintenance activities and to recover from incidents that interfere with routine operations. Approximately 9 percent of these corridors are currently operating near their theoretical capacity (with moderate capacity to accommodate maintenance and incidents), and 3 percent are currently operating at their theoretical capacity (with very limited capacity to accommodate maintenance and incidents).

Assuming no increases in capacity or changes in rail's market share, projected increases in freight rail demand would reduce the percentage of primary rail corridors operating below their theoretical capacity to 44 percent, as shown in



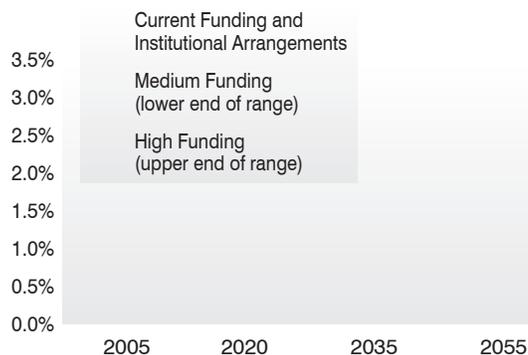
**Exhibit 4-10. Alternative projections of future transit passenger trips**



**This chart identifies projected transit ridership (in terms of numbers of trips) if capital investment is sustained at current levels over time in inflation-adjusted terms or increased to the “Medium” and “High” funding levels identified in Exhibit 4-9 (chart reflects the lower end of the ridership range for the “Medium” funding level and the upper end of the ridership range for the “High” funding level).**

Source: Commission staff analysis.

**Exhibit 4-11. Alternative projections of future transit market share**



**This chart identifies transit’s projected share of combined highway and transit passenger travel if capital investment is sustained at current levels over time in inflation-adjusted terms, or increased to the “Medium” and “High” funding levels identified in Exhibit 4-9 (chart reflects the lower end of the ridership range for the “Medium” funding level and the upper end of the ridership range for the “High” funding level).**

Source: Commission staff analysis.



Exhibit 4-12. The percentage of corridors near capacity would rise slightly to 10 percent, while the percentage of corridors at capacity would rise to 15 percent. An estimated 30 percent of primary rail corridors would be operating above their theoretical capacity, and would be characterized by unstable flows and service breakdown conditions. Exhibit 4-13 identifies the corridors where these problems are expected to develop.

**Investments to Improve Freight Rail While Sustaining Current Market Share Through 2035**

An average annual total investment of \$5.3 billion per year from all sources is expected to be adequate

to accommodate projected freight rail demand in 2035 to a point at which 98 percent of primary rail corridors operate at a level below their theoretical capacity. This would provide sufficient flexibility to accommodate routine maintenance activities and to recover from incidents affecting the operation of the corridor. One percent of the primary rail corridors would be operating at a level near their theoretical capacity, 1 percent would be operating at capacity, and a small number (about 0.01 percent) would still operate at a level above their theoretical capacity. Details are provided in Exhibit 4-14.

This \$5.3 billion average annual investment level is stated in constant 2007 dollars and translates to a cumulative level of \$148 billion over a 28-year

**Exhibit 4-12. Freight rail level of service grades**

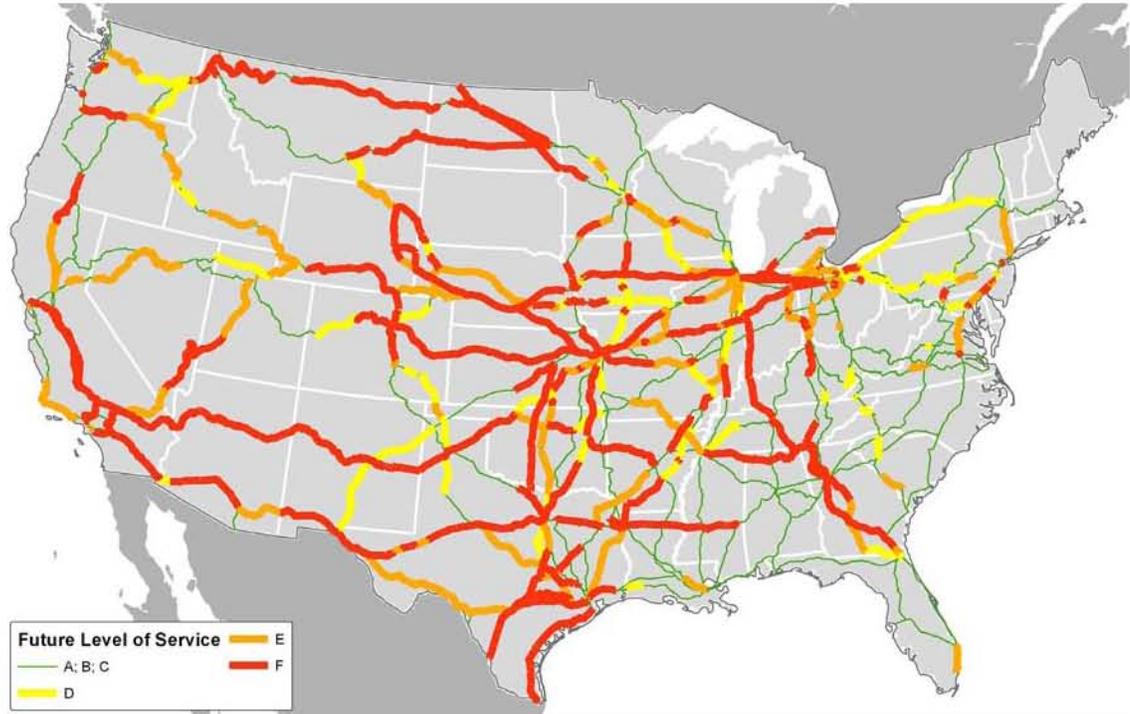
|         |                |   |        |     |        |     |
|---------|----------------|---|--------|-----|--------|-----|
| A, B, C | Below Capacity | Low to moderate train flows with capacity to accommodate maintenance and recover from incidents.        | 45,819 | 88% | 23,229 | 44% |
| D       | Near Capacity  | Heavy train flow with moderate capacity to accommodate maintenance and recover from incidents           | 4,952  | 9%  | 5,353  | 10% |
| E       | At Capacity    | Very heavy train flow with very limited capacity to accommodate maintenance and recover from incidents. | 1,461  | 3%  | 7,980  | 15% |
| F       | Above Capacity | Unstable flows; service breakdown conditions  | 108    | 0%  | 15,778 | 30% |

**This table identifies the track mileage and percent of total track mileage falling into different level of service classifications based on current conditions and projected 2035 conditions if no new capacity is added.**

Source: *National Rail Freight Infrastructure Capacity and Investment Study* prepared for the Association of American Railroads by Cambridge Systematics, Inc.



**Exhibit 4-13. Projected 2035 train volumes compared to current train capacity**



**This map identifies the relationship between projected freight train volumes on an 85<sup>th</sup>-percentile day in 2035 with the theoretical capacity of individual rail sections, assuming that no additional capacity expansion occurs before that time. Levels of Service A, B, and C are all considered to be under capacity; Levels of Service D, E, and F are considered to be nearing capacity, at capacity, and over capacity, respectively.**

Source: *National Rail Freight Infrastructure Capacity and Investment Study* prepared for the Association of American Railroads by Cambridge Systematics, Inc.

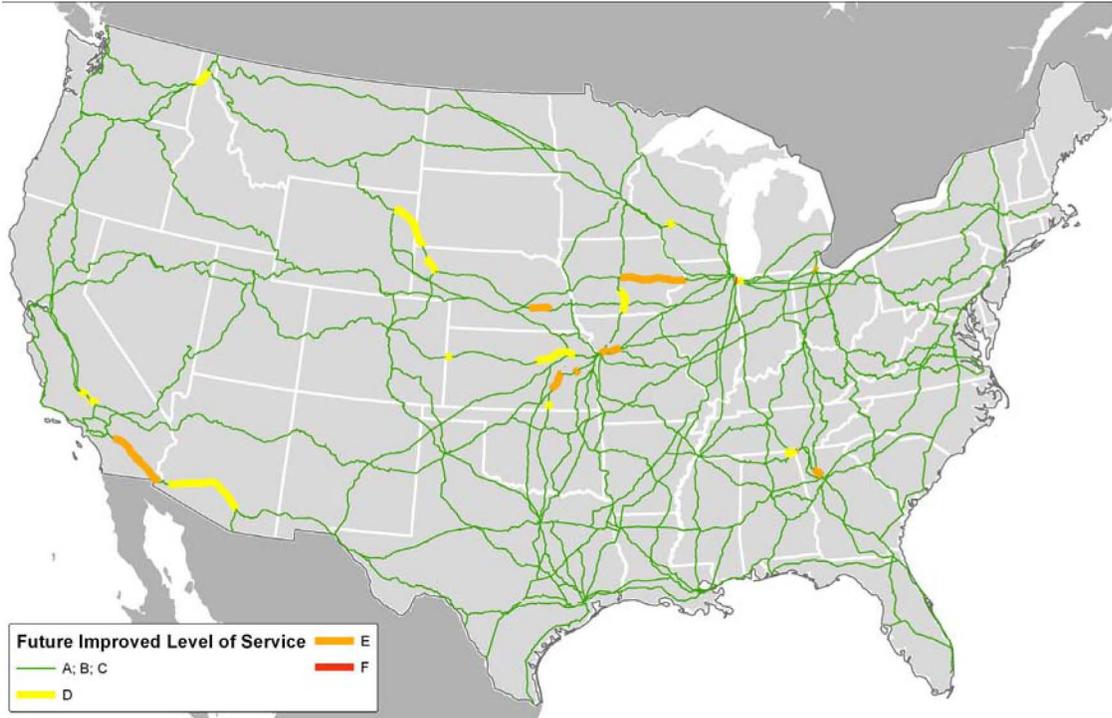
period from 2007 to 2035, of which the portion attributable to Class I railroads is projected to be \$135 billion. This level of investment reflects the need for new tracks, signals, bridges, tunnels, terminals, and service facilities in the primary rail corridors. This estimate does not reflect the cost of acquiring additional property, the cost of buying additional locomotives and freight cars, or the cost of replacing and updating existing track, locomotives, and freight cars.

The *National Rail Freight Infrastructure Capacity and Investment Study* performed by the Association

of American Railroads (AAR) assumes the Class I railroads will be able to generate approximately \$96 billion of the \$135 billion cumulative 28-year investment identified above through increased earnings from revenue growth, higher freight rail volumes, and productivity improvements. This would leave a gap of approximately \$39 billion (\$1.4 billion per year) to be funded from other sources in order to achieve performance improvements while maintaining the current rail market share of freight shipments for different commodities.



**Exhibit 4-14. Projected 2035 train volumes compared to potential 2035 train capacity, assuming expansion to system**



This map identifies the relationship between projected freight train volumes on an 85<sup>th</sup>-percentile day in 2035 with the theoretical capacity of individual rail sections, assuming that significant capacity expansion occurs before that time. Levels of Service A, B, and C are all considered to be under capacity; Levels of Service D, E, and F are considered to be nearing capacity, at capacity, and over capacity, respectively.

Source: *National Rail Freight Infrastructure Capacity and Investment Study* prepared for the Association of American Railroads by Cambridge Systematics, Inc.

### ***Investments to Improve Freight Rail While Accommodating a Rising Market Share Through 2035***

The \$148 billion (\$5.3 billion per year) identified in the preceding section represents the estimated freight rail capacity expansion investment that would be required for the period from 2007 through 2035 to achieve the level of performance identified in Exhibit 4-12, assuming 2.75 trillion annual rail ton-miles are carried on the primary rail corridors in 2035. However, if

freight rail’s market share were to increase, the level of investment required to accommodate this increased traffic would also increase, as demonstrated in Exhibit 4-15.

Extrapolating from the analysis conducted in the *National Rail Freight Infrastructure Capacity and Investment Study*, it is estimated that if total freight rail tonnage in 2035 were 20 percent higher than was assumed in that study, the estimated level of freight rail capacity expansion investment would rise 34 percent from \$148 billion (\$5.3 billion per



**FREIGHT RAIL METHODOLOGY**

The freight rail investment requirements analysis conducted as part of this study was performed by the Association of American Railroads (AAR) at the request of members of this Commission. The AAR released a separate publication in September 2007 documenting this analysis, the *National Rail Freight Infrastructure Capacity and*

The cost estimates include upgrades and expansions to mainlines, branch lines, and facilities. However, these estimates do not include all line expansion costs for non-Class I railroads nor the costs of expanding tunnels, bridges, and service facilities on non-Class I railroads. Also excluded are the cost of acquiring new

**Exhibit 4-15. Impact of market share on annual freight rail investment requirements**

|                               |      |       |
|-------------------------------|------|-------|
| Reduce Current Market Share   | 2.46 | \$3.9 |
| Maintain Current Market Share | 2.75 | \$5.3 |
| Increase Market Share 5%      | 2.89 | \$5.7 |
| Increase Market Share 10%     | 3.03 | \$6.0 |
| Increase Market Share 20%     | 3.30 | \$7.1 |

**This table projects the capital costs required to accommodate alternative levels of rail ton-miles consistent with changes in freight rail’s market share.**

Source: Analysis conducted by Cambridge Systematics in support of the Commission.



year) to \$198 billion (\$7.1 billion per year). Such a shift from truck to freight rail would reduce the level of highway capacity investment required, but the impacts of these modal shifts would vary widely depending on the specific corridors in which they occur.

If the \$39 billion investment gap identified in the preceding section is not addressed, it is estimated that the rail infrastructure would be able to accommodate only 2.46 billion rail ton miles on primary rail corridors in 2035, rather than the 2.75 annual rail ton-miles consistent with maintaining freight rail’s market share. Traffic that could not be accommodated on the freight rail system would need to shift to truck or another freight mode.

### **Investments to Improve Freight Rail Through 2055**

Extrapolating from the analysis conducted in the *National Rail Freight Infrastructure Capacity and Investment Study*, it is estimated that the level of investment required to accommodate projected increases in freight rail traffic and maintain current

market share through 2055 would be \$272 billion, or \$5.7 billion per year for 48 years. These per year costs are higher than the \$5.3 billion average annual figure cited above for the 28-year period through 2035, reflecting the fact that many of the less expensive capacity improvement options will have been exhausted by 2035, leaving only the more expensive options of adding full second, third, or fourth tracks.

It is likely that the incremental costs associated with increasing freight rail’s market share by 20 percent would be at least as large proportionally as the 34 percent increase (\$7.1 billion compared to \$5.3 billion) for the period through 2035 reflected in the preceding section. Applying the same percentage to the \$5.7 billion average annual figure through 2055 would yield an estimated average annual cost of \$7.7 billion to accommodate a 20 percent increase in the freight rail market share over this period. Exhibit 4-16 summarizes these findings.

Note that the extrapolations from the *National Rail Freight Infrastructure Capacity and Investment Study* described here and in the preceding section

**Exhibit 4-16. Freight rail capital investment requirements**

| Average Annual Freight Rail Capital Investment (billions of constant dollars) [2005 through the year 2035 or 2055] | \$3.9 | \$5.3 | \$7.1 | \$5.7 | \$7.7 |
|--|-------|-------|-------|-------|-------|
|--|-------|-------|-------|-------|-------|

**This table summarizes the estimated capital costs required to maintain freight rail’s market share or increase freight rail’s market share by 20 percent through 2035 and 2055. The sustainable funding level represents the average amount of freight rail investment projected to be sustainable based solely on increased earnings from revenue growth, higher volumes, and productivity improvements, assuming freight rail’s market share is maintained through 2035.**

**Source:** *National Rail Freight Infrastructure Capacity and Investment Study*, prepared for the Association of American Railroads by Cambridge Systematics, Inc., and supplemental analyses conducted by Cambridge Systematics in support of the Commission.

were not as analytically rigorous as the core analysis conducted as part of that study, and have not been subject to the same type of detailed review by the members of the AAR. However, these estimates are believed to be a good indication of the general magnitude of the impact of the changes that were analyzed.

It is important to note that these estimates do not take into account any increase in passenger rail routes or frequencies above current levels. The intersection of increasing freight demand and increased passenger service would be reflected in potentially higher capital investment requirements for additional needed capacity, which should be provided by the public sector and accounted for in the national passenger rail plan.

## Passenger Rail Findings

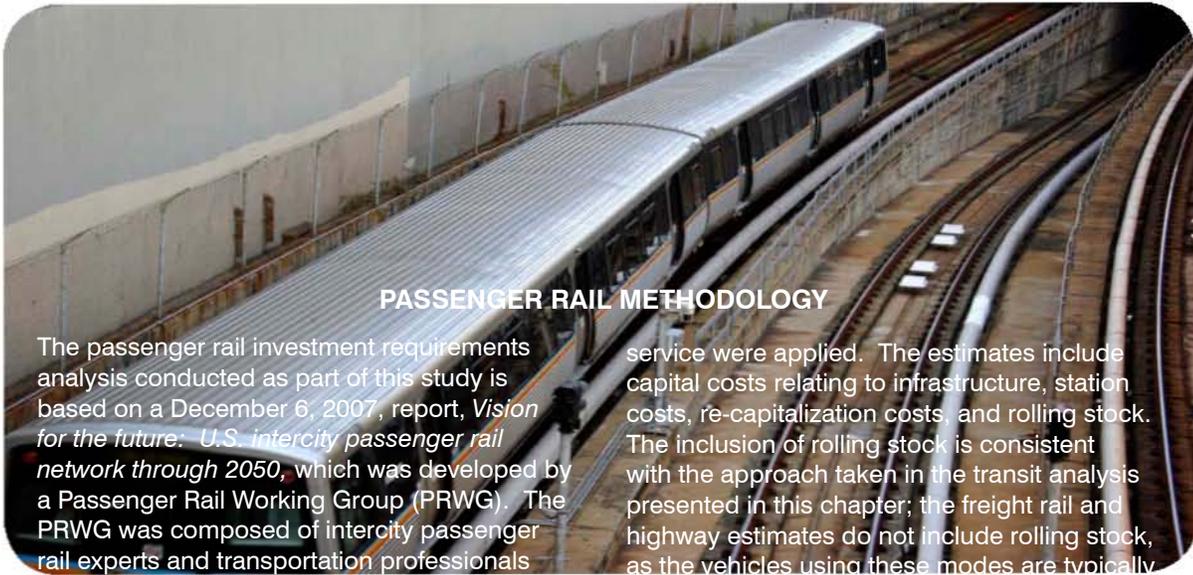
For short to medium distance trips of 100 to 500 miles, enhanced intercity passenger rail service can offer travel time savings relative to air and highway transportation. The requirements for air travelers to check in well before scheduled departure times coupled with rising rates of flight arrival delays give passenger rail a competitive advantage in many markets, particularly in situations where downtown rail stations are more

accessible than airports located farther away from the city center. Intercity passenger rail can also provide a mobility alternative for travelers on our congested highway system.

As noted in Chapter 3, intercity passenger rail is also more energy efficient than many other modes of passenger transportation. The 2005 Energy Data Book produced by Oak Ridge National Laboratory shows that intercity passenger rail consumes 17 percent less energy per passenger mile than airlines and 21 percent less per passenger mile than automobiles. The average intercity passenger rail train produces 60 percent lower carbon dioxide emissions per passenger mile than the average auto, and half the carbon dioxide emissions per passenger mile of an airplane. In conjunction with urban transit systems, the city-center to city-center service offered by intercity passenger rail can also support dense, transit-oriented development in downtown areas, helping to reduce highway travel demand for both local trips and intercity trips.

Combining estimates of the long-term capital costs of maintaining existing AMTRAK operations with estimated capital costs associated with a set of new or upgraded passenger rail routes currently in the planning or early discussion stages and a set of potential additional intercity passenger rail connections yields a combined estimate of





### PASSENGER RAIL METHODOLOGY

The passenger rail investment requirements analysis conducted as part of this study is based on a December 6, 2007, report, *Vision for the future: U.S. intercity passenger rail network through 2050*, which was developed by a Passenger Rail Working Group (PRWG). The PRWG was composed of intercity passenger rail experts and transportation professionals

service were applied. The estimates include capital costs relating to infrastructure, station costs, re-capitalization costs, and rolling stock. The inclusion of rolling stock is consistent with the approach taken in the transit analysis presented in this chapter; the freight rail and highway estimates do not include rolling stock, as the vehicles using these modes are typically

\$357 billion of potential passenger rail capacity investments over a 44-year period, translating into an average annual investment of \$8.1 billion, as shown in Exhibit 4-17. This expansion scenario is primarily focused on new and enhanced “regional service” in high growth intercity corridors.

It is estimated that the construction of such a network could potentially accommodate an expansion in intercity passenger rail use of 8 to 9 times above the current level of 5.5 billion annual passenger miles, resulting in a significant increase in passenger rail’s market share, as shown in Exhibit 4-18. Assuming the trains



**Exhibit 4-17. Estimated intercity passenger rail costs and travel**

|   |     |       |        |       |
|---|-----|-------|--------|-------|
| Intercity Passenger Rail Capital Costs (billions of constant dollars), within time period | –   | \$66  | \$159  | \$132 |
| Average Annual Capital Costs (billions of constant dollars), within time period           | –   | \$7.4 | \$10.6 | \$6.6 |
| Capital Costs (billions of constant dollars), cumulative through end of time period       | –   | \$66  | \$225  | \$357 |
| Average Annual Capital Costs (billions of constant dollars), based on cumulative costs    | –   | \$7.4 | \$9.4  | \$8.1 |
| Annual Passenger Miles of Travel (billions), assuming 45 percent load factor              | 5.5 | 8.2   | 26.9   | 46.7  |

**This table shows estimated capital costs associated with the proposed intercity passenger rail network developed by the PRWG for the short-term (2007-2015), mid-term (2016-2030) and long-term (2031-2050). Costs within each time period and cumulative costs from the present through the end of each time period are identified. The table also shows projected annual passenger miles traveled for the system for each of these time periods, which assume that 45 percent of passenger rail seats would be filled on average.**

Source: *Vision for the future: U.S. intercity passenger rail network through 2050* prepared for the Commission by the Passenger Rail Working Group.

**Exhibit 4-18. Projected future passenger rail market share**



**This chart identifies passenger rail’s projected share of combined highway and passenger rail travel, assuming construction of the passenger rail network described in this chapter. Both projections assume that 45 percent of passenger rail seats would be filled on average. The higher projected passenger rail market share assumes the widespread adoption of highway demand management strategies. The lower projected passenger rail market share assumes aggressive investments in the expansion of highway system connectivity that would tend to compete with passenger rail in some corridors.**

Source: Commission staff analysis.



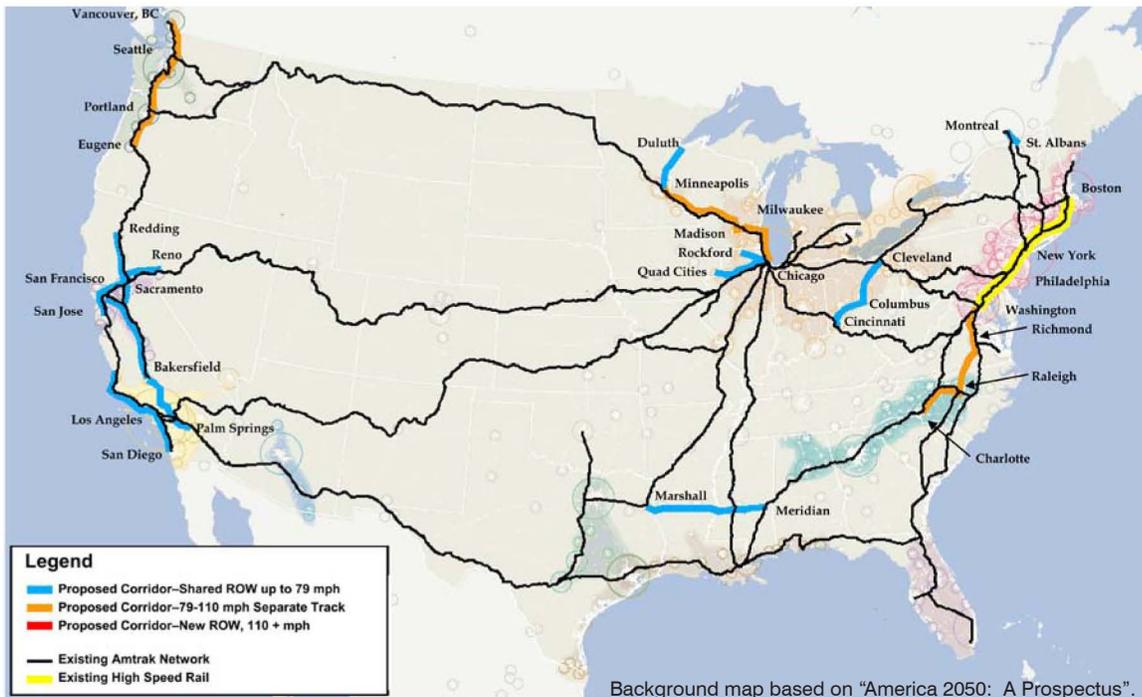
operate with 45 percent of their seats filled, this would translate into approximately 46.7 billion annual passenger miles traveled by the end of the 44-year period. To the extent that these trips are diverted from other modes such as aviation and highways (as opposed to representing new trips that would not have otherwise occurred), this would tend to reduce the level of capital expansion investment required for these modes. However, the magnitude of these effects would vary widely by corridor.

The short-term passenger rail needs identified in Exhibit 4-17 reflect the costs of maintaining existing service, upgrading existing service where

demand is greatest, and adding new service where environmental and engineering work are complete. It is estimated that a \$66 billion investment over 9 years to construct the network identified in Exhibit 4-19 would accommodate approximately 8.2 billion passenger miles annually.

The mid-term passenger rail needs identified in Exhibit 4-17 reflect a period of significant expansion of the passenger rail network, as the majority of proposed new regional corridor routes would be added during this time period. It is estimated that a \$159 billion investment over 15 years to expand the network to the extent identified in Exhibit 4-20 would accommodate

**Exhibit 4-19. PRWG proposed 2015 intercity passenger rail network**

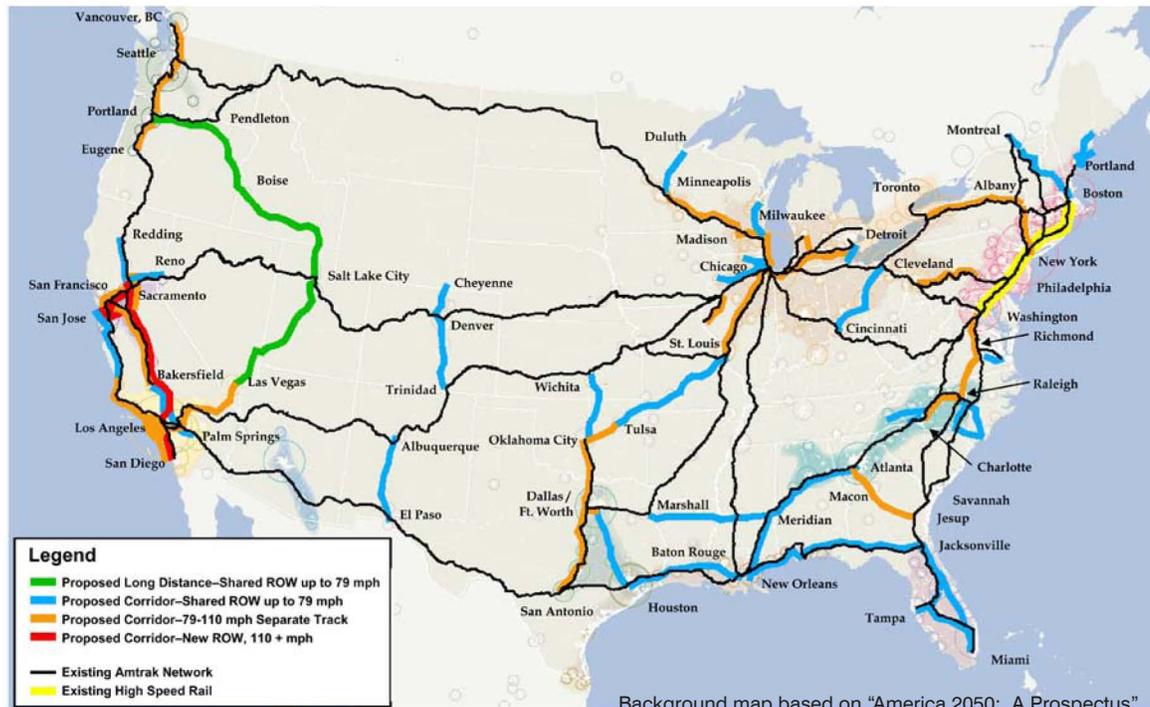


**This map identifies the passenger rail network that corresponds to the short-term capital costs and ridership projections identified in Exhibit 4-17. The PRWG describes this map as illustrative, as the exact routes that would be included in such a network could differ.**

Source: *Vision for the future: U.S. intercity passenger rail network through 2050*, prepared for the Commission by the Passenger Rail Working Group.



**Exhibit 4-20. PRWG proposed 2030 intercity passenger rail network**



**This map identifies the passenger rail network that corresponds to the mid-term capital costs and ridership projections identified in Exhibit 4-17. The PRWG describes this map as illustrative, as the exact routes that would be included in such a network could differ.**

Source: *Vision for the future: U.S. intercity passenger rail network through 2050*, prepared for the Commission by the Passenger Rail Working Group.

approximately 26.9 billion passenger miles annually.

The long-term passenger rail needs identified in the Exhibit 4-17 reflect the cost of completing the proposed passenger rail network. During this period, corridor routes would be added to connect regions and population centers. It is estimated that a \$132 billion investment over 20 years to expand the network to the extent identified in Exhibit 4-21 would accommodate approximately 46.7 billion passenger miles annually.





**Exhibit 4-21. PRWG proposed 2050 intercity passenger rail network**



**This map identifies the passenger rail network that corresponds to the long-term capital costs and ridership projections identified in Exhibit 4-17. The PRWG describes this map as illustrative, as the exact routes that would be included in such a network could differ.**

Source: *Vision for the future: U.S. intercity passenger rail network through 2050*, prepared for the Commission by the Passenger Rail Working Group.

## Summary of Findings: All Modes

While there are significant differences in the analyses of the individual modes presented in this chapter, it is useful to combine them to get a better sense of scale of the overall surface transportation needs for the next 50 years. Exhibit 4-22 summarizes ranges of potential investment levels presented earlier in this chapter for different modes. This summary focuses on

“High” capital investment levels; by comparison, the highway and transit analyses included both a “Medium” and a “High” range of funding levels, and the freight and passenger rail analyses each contain only a single set of projections which correspond to the “High” range of funding levels in the other modes.

Combining the low ends of the ranges of the period through 2035 reveals a combined average annual capital investment level for all modes of \$220 billion, which is \$134 billion higher than



In November 2007, the U.S. Department of Transportation, Transport Canada, and the U.S. Army Corps of Engineers released the

a blueprint for what is needed to maintain the commercial navigation infrastructure at its current level of reliability over the next 50 years.

the \$86 billion combined amount of currently sustainable annual funding identified for all modes. Dividing this figure by the total highway motor fuel gallonage associated with the highway investment level produces an equivalent per-gallon figure of \$0.63, indicating that an increase in motor fuel taxes of this magnitude would generate this amount of revenue. Combining the high end of the ranges through 2035 reveals an average annual investment level of \$301 billion, which is \$215 billion higher than the combined currently sustainable funding level. This equates to the revenue that could be generated by a \$1.00 increase in the motor fuel tax.

The inclusion of per-gallon comparisons in the table above is intended to provide a sense of scale regarding the large investments that are needed; this should not be misconstrued to mean that the motor fuel tax should necessarily be the primary source of all future transportation funding by all levels of government. Future revenue options are discussed in more detail in Chapter 5, but it is worth noting here that different revenue sources are more amenable to certain types of investment. In particular, investments in new capacity may provide opportunities to draw upon a broader array of financing options than investments in system rehabilitation. Of the

\$220 billion identified above as the low end of the combined “High” funding level range, nearly one-half is associated with system rehabilitation improvements, as shown in Exhibit 4-23.

Combining the upper and lower ends of the investment ranges for the individual modes has some conceptual shortcomings. For example, the low ends of the highway ranges through 2035 and 2055 are associated with a scenario incorporating aggressive demand management strategies including the widespread adoption of congestion pricing. This scenario would not be consistent with the low end of the transit ranges, as it explicitly assumes sharp increases in transit ridership. Thus, the range of investment required to achieve the goals of the high investment levels in terms of improving key condition and performance measures for each mode may be narrower than what is implied in Exhibit 4-22. It is also important to note that the computation of investment gaps does not involve deducting out potential revenues associated with policy strategies incorporated in some of the analyzed scenarios. The aggressive congestion pricing strategy associated with the low ends of the highway ranges was estimated to have the potential to generate \$69 billion annually through 2035 and \$103 billion through 2055.

**Exhibit 4-22. Summary of range of “high” average annual capital investment levels analyzed for all modes**

**Range of “high” capital investment levels analyzed (billions of constant dollars)**

|                                       | Currently Sustainable <sup>1</sup> | Range Through 2020 |              | Range Through 2035 |              | Range Through 2055 |              |
|---------------------------------------|------------------------------------|--------------------|--------------|--------------------|--------------|--------------------|--------------|
|                                       |                                    | From               | To           | From               | To           | From               | To           |
| Highway                               | \$68                               | \$207              | \$240        | \$182              | \$250        | \$185              | \$276        |
| Transit                               | \$13                               | \$21               | \$32         | \$23               | \$34         | \$26               | \$46         |
| Freight Rail                          | \$4                                | \$5                | \$7          | \$5                | \$7          | \$6                | \$8          |
| Passenger Rail                        | \$1                                | \$7                | \$7          | \$9                | \$9          | \$8                | \$8          |
| <b>All Modes Combined<sup>2</sup></b> | <b>\$86</b>                        | <b>\$241</b>       | <b>\$286</b> | <b>\$220</b>       | <b>\$301</b> | <b>\$225</b>       | <b>\$338</b> |

**“Gap” between high capital investment levels and currently sustainable revenue (billions of constant dollars)<sup>3</sup>**

|                           | Currently Sustainable | Range Through 2020 |              | Range Through 2035 |              | Range Through 2055 |              |
|---------------------------|-----------------------|--------------------|--------------|--------------------|--------------|--------------------|--------------|
|                           |                       | From               | To           | From               | To           | From               | To           |
| Highway                   |                       | \$139              | \$172        | \$115              | \$182        | \$117              | \$208        |
| Transit                   |                       | \$8                | \$19         | \$10               | \$21         | \$13               | \$33         |
| Freight Rail              |                       | \$1                | \$3          | \$1                | \$3          | \$2                | \$4          |
| Passenger Rail            |                       | \$6                | \$6          | \$8                | \$8          | \$7                | \$7          |
| <b>All Modes Combined</b> |                       | <b>\$155</b>       | <b>\$200</b> | <b>\$134</b>       | <b>\$215</b> | <b>\$140</b>       | <b>\$252</b> |

**Investment “gaps” stated in constant cents per gallon of highway motor fuel<sup>4</sup>**

|                           | Currently Sustainable | Range Through 2020 |               | Range Through 2035 |               | Range Through 2055 |               |
|---------------------------|-----------------------|--------------------|---------------|--------------------|---------------|--------------------|---------------|
|                           |                       | From               | To            | From               | To            | From               | To            |
| Highway                   |                       | \$0.71             | \$0.88        | \$0.54             | \$0.85        | \$0.49             | \$0.85        |
| Transit                   |                       | \$0.04             | \$0.10        | \$0.05             | \$0.10        | \$0.06             | \$0.13        |
| Freight Rail              |                       | \$0.01             | \$0.02        | \$0.01             | \$0.01        | \$0.01             | \$0.02        |
| Passenger Rail            |                       | \$0.03             | \$0.03        | \$0.04             | \$0.04        | \$0.03             | \$0.03        |
| <b>All Modes Combined</b> |                       | <b>\$0.79</b>      | <b>\$1.02</b> | <b>\$0.63</b>      | <b>\$1.00</b> | <b>\$0.59</b>      | <b>\$1.03</b> |

<sup>1</sup> The estimated “Currently Sustainable” funding for highways and transit is based on short-term Federal Highway Trust Fund revenue projections and assumes State, local, and private funding remains steady in constant dollar terms (i.e., growth equals inflation), while the estimate for freight rail assumes that private freight rail capital investment keeps pace with revenue growth. The amount shown for intercity passenger rail assumes estimated current capital investment by Amtrak and State governments remains steady in constant dollar terms.

<sup>2</sup> The combined figures do not account for cross-modal impacts.

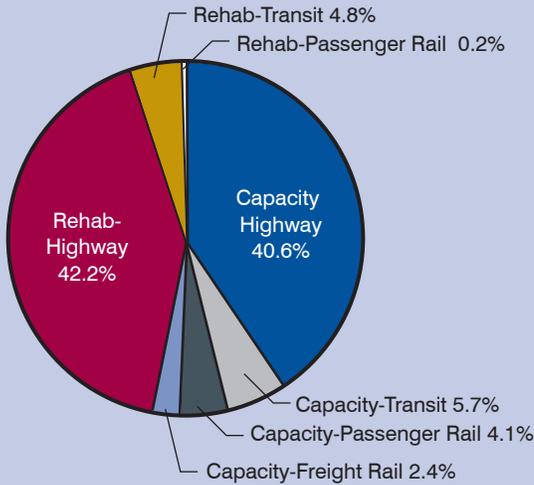
<sup>3</sup> “Gaps” reflect the difference between the “High” and “Currently Sustainable” capital investment levels.

<sup>4</sup> The implied cents per gallon for the lower and upper ends of the range for each time period are based on the estimated fuel consumption derived from the highway scenario consistent with the highway funding level in each column.

**This table shows the range of potential annual investment levels in highways, transit, freight rail, and passenger rail and the equivalent fuel tax increase that would be required to fill the gap between current sustainable investment levels and the high investment levels shown in the table. Each range represents average annual amounts from the current year through the date shown.**

Source: Commission staff analysis.

**Exhibit 4-23. Capital improvement type distribution for \$220 billion of average annual investments through 2035**

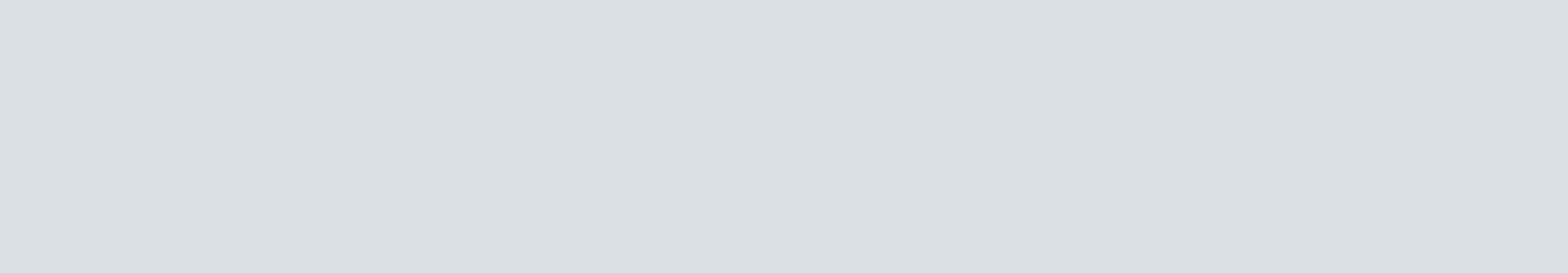


**This chart identifies the distribution by mode and improvement type of the \$220 billion representing the lower end of the range of investment levels through 2035 identified in Exhibit 4-22. Amounts shown for system rehabilitation include some improvements that are primarily oriented to safety and other enhancements to the existing system. No amount is shown for freight rail rehabilitation, as the freight rail needs analysis presented in this chapter only includes capacity expansion needs.**

Source: Commission staff analysis.

Despite the difficulties that arise when dealing with diverse and complex data such as these, it is clear from the analysis that there are significant gaps between current sustainable funding and the combined level of public investment required to improve the performance of the transportation system, particularly in the face of a growing population and an expanding economy. Because these values are stated in constant dollar terms, it would be necessary to increase investment over time above the levels shown to keep pace with construction cost inflation and achieve the performance impacts associated with these investment ranges.







# Chapter 5

## What Revenue Sources Are Available for Financing Surface Transportation Improvements?

### Current Surface Transportation Revenue Sources

Surface transportation improvements are financed from a variety of user fees, general taxes, special purpose taxes, and private charges. Funds for highway and transit improvements come from all levels of government as well as the private sector. Freight rail improvements are financed almost entirely from charges to customers although some public-private partnerships (PPPs) recently have been established. Within each of the modes, there are differences in how individual projects are financed, depending on characteristics of the projects and the State or local area in which they

are being constructed. This section provides an overview of the current surface transportation finance system and options for the future.

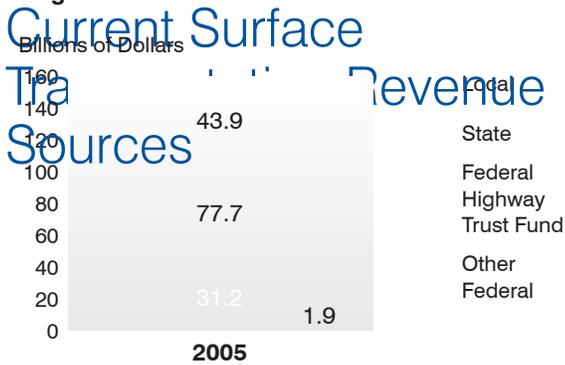
#### *Highways*

The Federal, State, and local governments all play substantial roles in financing the Nation's highway system. The Federal government established the Highway Trust Fund (HTF) in 1956 to guarantee revenue for constructing the Interstate Highway System and other Federal-aid highways. In 2005, motor-fuel and vehicle taxes deposited in the HTF generated about \$31.2 billion. State and local governments raised \$78 billion and \$44 billion, respectively, for highway purposes in 2005. Exhibit 5-1 shows a breakdown of highway revenue by level of government.





**Exhibit 5-1. Highway revenue by level of government**



**This exhibit shows 2005 revenues for highway purposes by level of government.**

Source: 2005 Highway Statistics, Table HF-10

Exhibit 5-2 shows highway revenues by source for each level of government. Fuel taxes represent about 90 percent of total revenues to the Federal HTE. Federal fuel tax rates have remained

unchanged since 1993. Since that time, however, the real Federal gasoline tax rate has decreased by 40 percent as measured by changes in the Producer Price Index for Highway and Street Construction. The other taxes supporting the Federal HTF are truck-related taxes. The largest of those taxes, the truck sales tax, increases with the sales price of trucks and truck trailers. The other Federal taxes—the tire tax and the Heavy Vehicle Use Tax—do not vary with either prices or costs. In 2005, about \$3 billion came from sales taxes on trucks and trailers, \$1 billion from the annual Federal Heavy Vehicle Use Tax, and about \$500 million from the Federal tax on tires rated for heavier loads. In total, Federal revenues accounted for 21 percent of the total of \$155 billion spent for highways by all levels of government in 2005.

At the State level, a broader variety of taxes supports highway construction, but fuel taxes are still the largest source of revenue. Other sources

**Exhibit 5-2. 2005 revenues used for highways (by collecting agencies) in millions and percent**

|                                      |          |    |          |    |          |    |          |    |
|--------------------------------------|----------|----|----------|----|----------|----|----------|----|
| Motor-Fuel and Vehicle Taxes         | \$31,179 | 20 | \$49,176 | 32 | \$2,234  | 1  | \$82,589 | 53 |
| Tolls                                | -        |    | \$6,356  | 4  | \$1,398  | 1  | \$7,754  | 5  |
| Property Taxes and Assessments       | -        |    | -        |    | \$7,811  | 5  | \$7,811  | 5  |
| General Fund Appropriations          | \$1,488  | 1  | \$3,384  | 2  | \$17,233 | 11 | \$22,105 | 14 |
| Other Taxes and Fees                 | \$388    | 0  | \$4,291  | 3  | \$4,620  | 3  | \$9,299  | 6  |
| Investment Income and Other Receipts | \$15     | 0  | \$2,897  | 2  | \$5,199  | 3  | \$8,111  | 5  |
| Bond Issue Proceeds                  | -        |    | \$11,622 | 8  | \$5,400  | 3  | \$17,022 | 11 |

**This exhibit shows 2005 revenues for highway purpose by level of government and source of revenues.**

Source: 2005 Highway Statistics, Table HF-10.



of revenue for highways at the State level include vehicle registration fees, motor carrier taxes, tolls, general fund appropriations, other taxes and fees, and the sale of bonds. There are significant differences in the extent to which individual States rely on these various revenue sources. State revenues accounted for just over 50 percent of total funds spent for highways in 2005.

Local highway revenues come from a variety of sources including motor fuel and motor vehicle taxes, tolls, property taxes, other special taxes, bonds, and general fund appropriations which are the largest of the local revenue sources. In total, local revenues accounted for approximately 28 percent of total funds generated for highways in 2005.

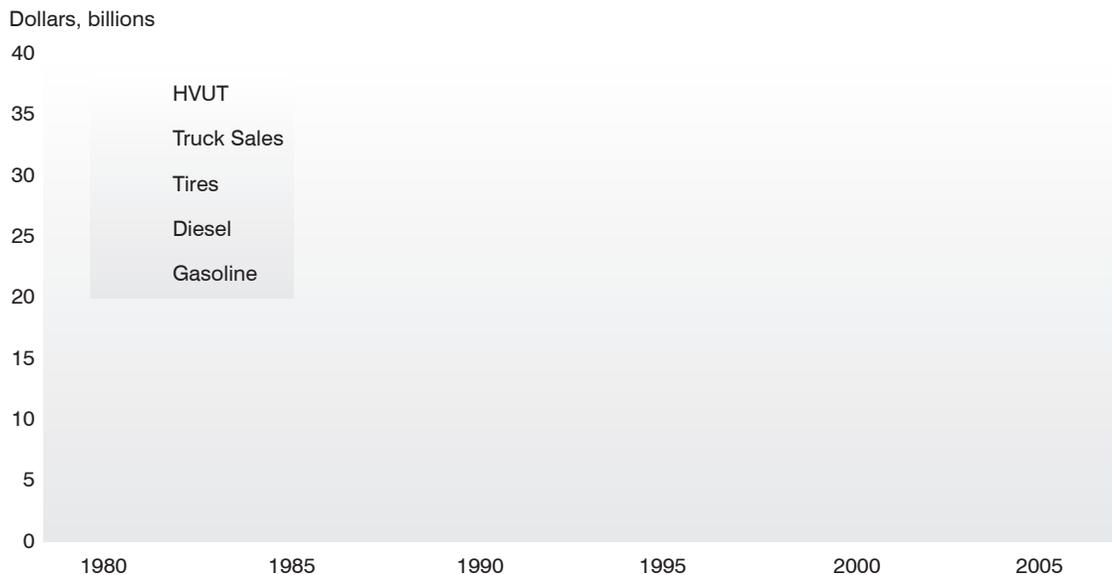
Exhibit 5-3 shows trends in revenues from the various Federal highway user taxes since 1980. Receipts from the Federal gas tax (including gasohol) represent about two-thirds of total

HTF revenues, diesel taxes 23 percent, and the remaining truck taxes about 12 percent. Relative shares of revenue from each source have remained relatively stable over time. The fastest-growing tax in recent years has been the truck sales tax.

While HTF revenues have grown substantially since 1980 in current dollars, the growth in constant dollars has been much slower.

Exhibit 5-4 shows the growth in HTF revenues from 1987 to 2005 in 1993 dollars, deflated by the Bureau of Economic Analysis Producer Price Index for Highway and Street Construction. The average annual growth in real HTF revenues between 1987 and 2003 was 3.5 percent. The spike in 1999 was attributable to a provision in the Taxpayer Relief Act of 1997 that allowed taxpayers to delay the deposit of estimated fuel tax liabilities due in August and September of 1998 until October 5, 1998. Since 2003 HTF revenues have fallen by 4 percent a year in real terms.

**Exhibit 5-3. Taxes supporting the Highway Trust Fund**



**This exhibit shows increases in Highway Trust Fund revenues in current dollars between 1980 and 2005.**

Source: 2005 Highway Statistics, Table FE-210.



**Exhibit 5-4. Change in Highway Trust Fund revenues in constant 1993 dollars**



**This exhibit shows the change in Highway Trust Fund revenues in constant 1993 dollars between 1987 and 2006.**

Source: Commission Staff analysis.

Exhibit 5-5 shows how Federal fuel tax rates have changed since 1983, the first year that a portion of Federal gasoline taxes was dedicated for transit purposes. In 1990 the gas tax was raised from 9 to 14 cents per gallon, with half the increase going to the General Fund for deficit reduction. In 1993 the gasoline tax was raised another 4.3 cents per gallon, all of which went for deficit reduction. The amount for deficit reduction was reduced to 4.3 cents per gallon in 1995, and in 1997 the remaining 4.3 cents was returned to the HTF. Although the Federal gasoline tax rate has more than doubled since 1983, the real value in terms of purchasing power is at about the same level as in 1983 due to inflation. In 1957 the Federal gasoline tax rate was 3 cents per gallon; it would have to be raised to 22 cents per gallon to have the same buying power today that it had in that year.

Since 2000, balances in the Highway Account have been declining because expenditures from the Account have exceeded revenues. As will

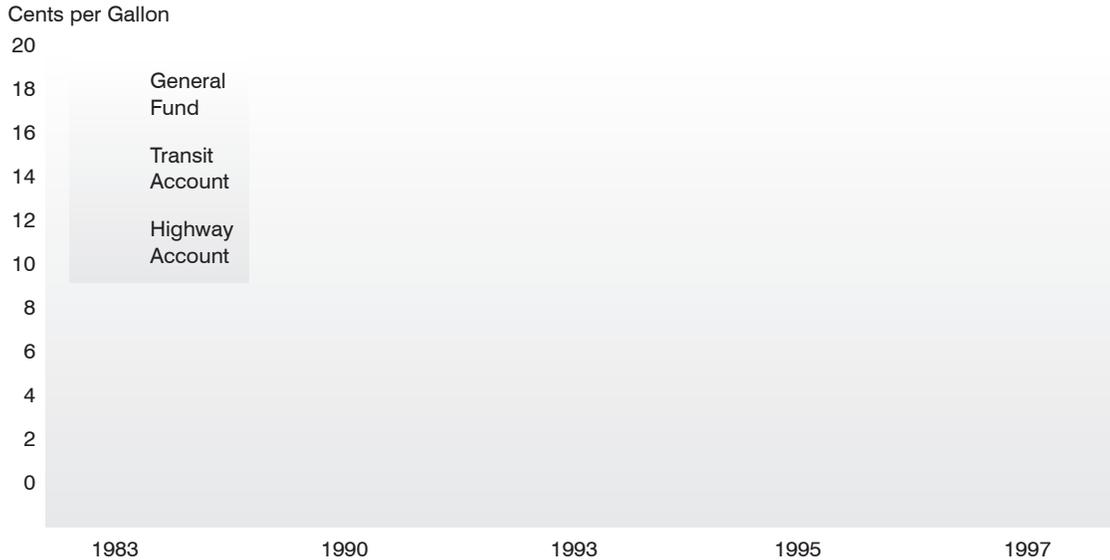
be discussed later in this chapter, the Highway Account is projected to have a negative balance of about \$4.3 billion at the end of FY 2009.

Exhibit 5-6 shows the growth in Federal, State, and local highway revenues from 1980 to 2005. The relative shares of total revenues have remained fairly constant over time. Federal revenues were between 21 and 27 percent of total revenues during this period, State revenues between 47 and 53 percent of the total, and local revenues between 24 and 29 percent of the total.

Fuel taxes, motor vehicle fees, and other traditional highway user taxes account for over 70 percent of total State highway revenues, while tolls, general funds, and other specialized taxes have accounted for the remainder. Shares of each of these revenue sources have remained fairly stable over the period, although other specialized taxes doubled from 3 to 6 percent of total revenues over the period. This reflects in part the difficulty



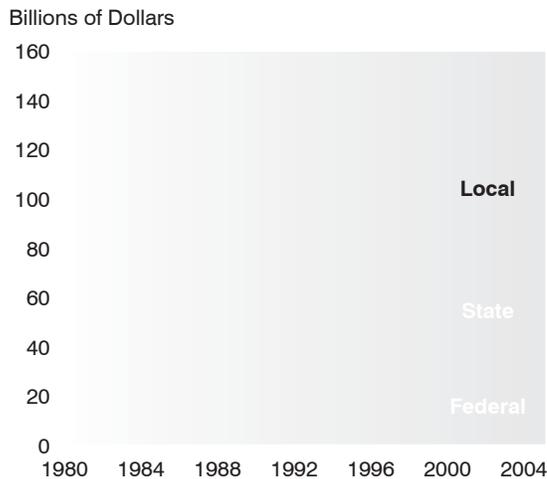
**Exhibit 5-5. Federal gasoline tax rates**



**This exhibit shows the change in Federal gasoline tax rates since 1983 and the amounts going to the Highway and Transit Accounts of the Highway Trust Fund and to the Federal General Fund.**

Source: 2005 Highway Statistics, Table HF-10.

**Exhibit 5-6. Federal, State, local highway revenue, 1980–2005**



**This exhibit shows growth in the Federal, State, and local highway revenues between 1980 and 2005.**

Source: Highway statistics (various years), Table HF-10.

some States have had in raising fuel taxes to fund new highway construction.

Exhibit 5-7 shows gasoline tax rates for each State. All States have a per-gallon excise tax, and many States impose additional taxes on gasoline and other motor fuels. Total excise taxes range from 8 cents per gallon in Alaska to 36 cents per gallon in Washington. Most fuel tax revenues are dedicated to highway and transit purposes, and in fact a number of States have Constitutional prohibitions against diversion of fuel tax revenues for non-highway purposes. Many States, however, also dedicate a portion of their fuel tax revenues for non-transportation purposes. Nationwide about 6 percent of total State motor fuel tax receipts went for purposes other than highway and transit in 2005. While there are large differences in State motor fuel tax rates, many States rely heavily on motor vehicle fees to finance



**Exhibit 5-7. Motor fuel excise tax rates, January 1, 2007**

|                       |      |       |        |  |
|-----------------------|------|-------|--------|--|
| Federal               | 18.3 | 0.1   | 18.4   | Leaking underground storage tank (LUST) tax  |
| Alabama <sup>1</sup>  | 16.0 | 2.0   | 18.0   | Inspection fee                               |
| Alaska                | 8.0  |       | 8.0    |  |
| Arizona               | 18.0 |       | 18.0   | <sup>2</sup>                                 |
| Arkansas              | 21.5 |       | 21.5   |  |
| California            | 18.0 |       | 18.0   | Sales tax applicable                         |
| Colorado              | 22.0 |       | 22.0   |  |
| Connecticut           | 25.0 |       | 25.0   |  |
| Delaware              | 23.0 |       | 23.0   | Plus 0.5% Gross Receipts Tax <sup>3</sup>    |
| Dist. of Columbia     | 20.0 |       | 20.0   |  |
| Florida <sup>4</sup>  | 4.0  | 11.3  | 15.3   | Sales tax added to excise <sup>4</sup>       |
| Georgia               | 7.5  | 7.7   | 15.2   | Sales tax added to excise                    |
| Hawaii <sup>1</sup>   | 16.0 |       | 16.0   | Sales tax applicable                         |
| Idaho                 | 25.0 |       | 25.0   | <sup>5</sup>                                 |
| Illinois <sup>1</sup> | 19.0 | 1.1   | 20.1   | Sales tax add., env. & LUST fee <sup>2</sup> |
| Indiana               | 18.0 |       | 18.0   | Sales tax applicable <sup>2</sup>            |
| Iowa                  | 21.0 |       | 21.0   |  |
| Kansas                | 24.0 |       | 24.0   |  |
| Kentucky              | 18.3 | 1.4   | 19.7   | Environmental fee <sup>6, 2</sup>            |
| Louisiana             | 20.0 |       | 20.0   |  |
| Maine                 | 26.8 |       | 26.8   | <sup>3</sup>                                 |
| Maryland              | 23.5 |       | 23.5   |  |
| Massachusetts         | 21.0 |       | 21.0   |  |
| Michigan              | 19.0 |       | 19.0   | Sales tax applicable                         |
| Minnesota             | 20.0 |       | 20.0   |  |
| Mississippi           | 18.0 | 0.4   | 18.4   | Environmental fee                            |
| Missouri              | 17.0 | 0.55  | 17.55  | Inspection fee                               |
| Montana               | 27.0 |       | 27.0   |  |
| Nebraska              | 27.1 | 0.9   | 28.0   | Petroleum fee <sup>3</sup>                   |
| Nevada <sup>1</sup>   | 24.0 | 0.805 | 24.805 | Inspection & cleanup fee                     |
| New Hampshire         | 18.0 | 1.625 | 19.625 | Oil discharge cleanup fee                    |
| New Jersey            | 10.5 | 4.0   | 14.50  | Petroleum fee                                |
| New Mexico            | 17.0 | 1.875 | 18.875 | Petroleum loading fee                        |



**Exhibit 5-7. Motor fuel excise tax rates, January 1, 2007, continued**

|                           |      |      |       |                                       |
|---------------------------|------|------|-------|---------------------------------------|
| New York                  | 8.0  | 16.6 | 24.6  | Sales tax applicable, Petrol. Tax     |
| North Carolina            | 29.9 | 0.25 | 30.15 | <sup>6</sup> Inspection tax           |
| North Dakota              | 23.0 |      | 23.0  |                                       |
| Ohio                      | 28.0 |      | 28.0  | Plus 3 cents commercial               |
| Oklahoma                  | 16.0 | 1.0  | 17.0  | Environmental fee                     |
| Oregon <sup>1</sup>       | 24.0 |      | 24.0  |                                       |
| Pennsylvania              | 12.0 | 19.2 | 31.2  | Oil franchise tax                     |
| Rhode Island              | 30.0 | 1    | 31.0  | LUST tax                              |
| South Carolina            | 16.0 |      | 16.0  |                                       |
| South Dakota <sup>1</sup> | 22.0 |      | 22.0  |                                       |
| Tennessee <sup>1</sup>    | 20.0 | 1.4  | 21.4  | Petroleum Tax & Envir. Fee            |
| Texas                     | 20.0 |      | 20.0  |                                       |
| Utah                      | 24.5 |      | 24.5  |                                       |
| Vermont                   | 19.0 | 1.0  | 20.0  | Petroleum cleanup fee                 |
| Virginia <sup>1</sup>     | 17.5 |      | 17.5  | <sup>7</sup>                          |
| Washington <sup>8</sup>   | 34.0 |      | 34.0  | 0.5% privilege tax                    |
| West Virginia             | 20.5 | 11.0 | 31.5  | Sales tax added to excise             |
| Wisconsin                 | 29.9 | 3.0  | 32.9  | <sup>3</sup> Petroleum Inspection fee |
| Wyoming                   | 13.0 | 1    | 14.0  | License tax                           |

<sup>1</sup> Tax rates do not include local option taxes. In AL, 1 to 3 cents; HI, 8.8 to 18.0 cents; IL, 5 cents in Chicago and 6 cents in Cook county (gasoline only); NV, 4.0 to 9.0 cents; OR, 1 to 3 cents; SD and TN, one cent; and VA 2%.

<sup>2</sup> Carriers pay an additional surcharge equal to AZ-8 cents, IL-6.3 cents (g) 6.0 cents (d), IN-11 cents, KY-2% (g) 4.7% (d).

<sup>3</sup> Portion of the rate is adjustable based on maintenance costs, sales volume, or inflation.

<sup>4</sup> Local taxes for gasoline and gasohol vary from 10.2 cents to 18.2 cents. Plus a 2.07 cent per gallon pollution tax.

<sup>5</sup> Tax rate is reduced by the percentage of ethanol used in blending (reported rate assumes the max. 10% ethanol).

<sup>6</sup> Tax rate is based on the average wholesale price and is adjusted quarterly. The actual rates are: KY, 9%; and NC, 17.5¢ + 7%.

<sup>7</sup> Large trucks pay an additional 3.5 cents.

<sup>8</sup> Tax rate scheduled to increase to 36 cents on July 1, 2007.

Source: Compiled by Federation of Tax Administrators from various sources.



their highway systems. Nationwide fuel taxes accounted for about 56 percent of total State highway user revenues, excluding tolls, in 2005; but, for individual States, that percentage ranged from 28 percent in Vermont to 98 percent in South Dakota.

### **Transit**

Unlike highways where the bulk of funding comes from Federal and State sources, most transit funding is local. Federal funds accounted for 17 percent of total transit funding in 2005. About 80 percent of the Federal revenues were from gasoline taxes deposited in the Transit Account of the Highway Trust Fund. Since 1997, 2.86 cents per gallon have been deposited to the Transit Account of the HTF; the remainder came from general funds. State funds represented 20 percent of total transit funding in 2005; but, unlike the Federal Government, only a small portion of State transit funding was from gasoline and other

highway user taxes. Almost all State funds for transit were from either special purpose taxes or State general funds. Local funds accounted for over 60 percent of total transit funding in 2005. Over 45 percent of those funds came from fares and other user fees, 25 percent from special purpose taxes, and the remainder from local general funds. Exhibit 5-8 shows the revenues and their sources.

Exhibit 5-9 shows the growth in transit revenues from Federal, State, and local governments, and fares and miscellaneous transit agency revenues from 1993 to 2005. As with highway revenues, the relative shares of transit revenues have not changed substantially over the 12-year period. Federal revenues have accounted for between 15 and 19 percent of total revenues over the period, State revenues between 18 and 21 percent, local revenues between 18 and 22 percent, and transit agency fares and miscellaneous revenues between 40 and 48 percent of the total.

**Exhibit 5-8. 2005 revenues used for transit (by collecting agencies) in millions and percent**

|                         |         |      |         |     |          |      |         |      |
|-------------------------|---------|------|---------|-----|----------|------|---------|------|
| Fuel Tax                | \$5,484 | 13.5 | \$459   | 1.1 | \$183    | 0.5  | \$6,141 | 15.1 |
| Income Tax              |         |      | \$292   | 0.7 | \$91     | 0.2  | \$383   | 0.9  |
| Sales Tax               |         |      | \$2,401 | 5.9 | \$4,571  | 11.3 | \$6,979 | 17.2 |
| Property Tax            |         |      |         |     | \$565    | 1.4  | \$565   | 1.4  |
| Other Specialized Taxes |         |      | \$994   | 2.4 | \$1,030  | 2.5  | \$2,027 | 5.0  |
| Other Public Funds      |         |      | \$1,832 | 4.5 | \$4,889  | 12.0 | \$6,725 | 16.6 |
| General Fund            | \$1,371 | 3.4  | \$2,219 | 5.5 | \$2,688  | 6.6  | \$6,278 | 15.5 |
| Fares                   |         |      |         |     | \$11,528 | 28.4 | 11,528  | 28.4 |

**This exhibit shows 2005 transit revenues by level of government and source of funds.**

Source: National Transit Database.



**Exhibit 5-9. Federal, state, local agency transit revenue, 1993–2005**



**This exhibit shows the growth in transit revenues between 1993 and 2005.**

Source: National Transit Database.

Exhibit 5-10 shows the distribution of transit revenues by source since 1993. No one source predominates to the extent that user taxes dominate for highways. Perhaps the biggest change in transit funding has been the growth in property, sales, and other specialized taxes dedicated to transit and the decline in the amount of funding coming from general funds at all levels of government. Specialized taxes now represent the largest source of transit funding, accounting for 40 percent of the total.

### ***Freight Rail***

Freight rail infrastructure and operations are financed almost entirely by the private sector. This is especially true for the large Class I railroads, whose capital expenditures for infrastructure totaled \$8.5 billion in 2006. Of this total, about \$1.5 billion was spent on equipment, and \$7.0 billion on roadway and structures. Combining operating and capital spending

**Exhibit 5-10. Distribution of transit revenues, 1993–2005**



**This exhibit shows changes in the sources of transit revenues between 1993 and 2005.**

Source: National Transit Database.



and adjusting for depreciation, 40 percent of the Class I railroads' revenue is spent on maintenance, replacement, or expansion of their track, structures, and equipment. In 2006, the Class I railroads spent \$10.6 billion maintaining and improving their infrastructure, and another \$8.7 billion on equipment.<sup>1</sup> Short line and regional railroads have received State and local funding in recent years to provide needed service to their jurisdictions that cannot be provided economically without public assistance. Short line railroads have also been the beneficiaries of a tax credit that is intended to assist them with upgrade and maintenance of their track to handle increasingly heavier rail traffic. State funding comes primarily from general funds and may be in the form of either loans or direct grants.

Currently, there are two Federal loan programs that may be used to provide both passenger and freight railroads with funding for rehabilitation or the development of significant transportation infrastructure. These include the FRA's Railroad Rehabilitation and Improvement Financing (RRIF) Program and the Transportation Infrastructure Finance and Innovation Act (TIFIA) loan program. The RRIF program was established by the Transportation Equity Act for the 21st Century (TEA-21) and amended by the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Under this program, the FRA Administrator is authorized to provide direct loans and loan guarantees up to \$35.0 billion. Up to \$7.0 billion is reserved for projects benefiting freight railroads other than Class I carriers. The TIFIA program provides Federal credit assistance to nationally or regionally significant surface transportation projects, including highway, transit, and rail. The program is designed to fill market gaps and leverage substantial private co-investment by providing projects with supplemental or subordinate debt.

Intermodal freight facilities are funded primarily through private operating revenue, although greater flexibility has been provided in SAFETEA-LU to finance public intermodal facilities from the HTF. These facilities are unique because they often link public and private infrastructure. This factor makes financing decisions difficult because of the intricate relationships among the public and private entities. There are no data that break out funding from all sources for intermodal facilities, but the public sector's role has been predominant in recent years.

### Passenger Rail

Almost all intercity passenger rail services in the country are operated by Amtrak, known more formally as the National Railroad Passenger Corporation. Amtrak was established by Congress in 1971 to provide intercity passenger rail in the United States. In 2006, Amtrak's operating revenues were about \$2 billion and its operating expenses were about \$3 billion. Exhibit 5-11 highlights Amtrak's revenue sources. In order to maintain operations, Amtrak requires annual Federal grants for both operations and general capital funding. Amtrak operates most of its trains on tracks that are privately owned by the freight railroads, except for a portion of the Northeast Corridor.

**Exhibit 5-11. Amtrak revenue sources**



**This exhibit shows the source of Amtrak revenues in 2006.**

Source: Amtrak Annual Report – 2006



Most Amtrak lines do not earn sufficient passenger revenues to cover operating expenses. The Northeast Corridor is the notable exception. In total, fares and other system revenues cover about 60 percent of operating expenses; Federal and State funds make up the difference. About 47 percent of total revenue comes from fares and other passenger revenues, almost 40 percent comes from Federal and State grants, 3 percent comes from contractual arrangements to operate commuter services, and 10 percent comes from other sources.

For a period Amtrak experimented with some limited freight transportation, but has largely given up that business except for hauling mail in some corridors. As congestion increases in competing highway and air corridors, Amtrak should be able to increase fares in those corridors. It may also be able to earn additional revenues by operating commuter services in certain corridors. Fourteen States currently provide operating support to Amtrak for intercity passenger service within their jurisdiction.

### Ports and Waterways

Ports and inland waterways are critical components of the Nation's freight transportation

system. As highways and railroads become increasingly congested, ports and waterways can help relieve the pressure on the freight transportation system.

Exhibit 5-12 shows the sources of revenues used to finance port improvements between 2001 and 2005, based on surveys of members of the American Association of Port Authorities.<sup>2</sup> Different ports are represented in the data for individual years, so no trend analysis is possible and data cannot be directly compared from one year to another.

Over the 5-year period covered by the surveys, port revenues amounted to over half of all revenues supporting U.S. port improvements. Another third represented bond sales, some of which will be repaid from port revenues. The remainder came from loans, grants, and other sources.

The Federal Government participates in the cost of port feasibility studies, construction, and operating and maintenance (O&M) expenses. The maximum Federal share for harbor navigation projects varies depending on the size of the harbor, ranging from 80 percent for harbors less than 20 feet to 40 percent for harbors greater than

**Exhibit 5-12. Revenues to finance U.S. port improvements, 2001–2005 (\$ thousands)**

|                          |         |         |         |         |           |
|--------------------------|---------|---------|---------|---------|-----------|
| Port Revenues            | 802,331 | 547,040 | 751,044 | 299,667 | 1,422,016 |
| General Obligation Bonds | 96,478  | 334,372 | 206,051 | 345,837 | 348,696   |
| Revenue Bonds            | 449,088 | 188,120 | 223,557 | 183,794 | 107,979   |
| Loans                    | 12,401  | 60,281  | 45,429  | 8,467   | 7,306     |
| Grants                   | 94,453  | 110,047 | 100,005 | 72,909  | 94,191    |
| Other                    | 119,005 | 187,076 | 191,299 | 56,304  | 69,874    |

**This exhibit shows the sources of port-related revenues between 2001 and 2005.**

Source: U.S. DOT, Maritime Administration, *U.S. Public Port Development Expenditure Report (FYs 2005 and 2006 to 2010)*, July 2007.



45 feet. These funds come from general revenues. The Federal Government pays 100 percent of O&M costs for harbors less than or equal to 45 feet in depth and 50 percent of the cost for deeper harbors. The O&M costs come from the Harbor Maintenance Trust Fund, which receives proceeds from a 0.125 percent ad valorem tax on commercial port users collected by U.S. Customs. The Federal Government's participation generally is limited to the navigable channels. Individual berths and piers are generally dredged by the port or terminal operators.

Inland waterway navigation improvements are financed entirely by the Army Corps of Engineers. Feasibility studies, O&M costs, and 50 percent of construction costs are paid from general revenues, while the remaining 50 percent of construction costs are paid for through the Inland Waterways Trust Fund (IWTF). The IWTF receives proceeds of a 20-cents-per-gallon fuel tax on commercial vessels using inland waterways.

## Future Surface Transportation System Financing Issues

This section discusses issues facing future financing of the surface transportation system. It presents forecasts of future revenues from existing sources and recommendations for meeting increased surface transportation investment requirements discussed in Chapter 4. Long-term alternatives to the fuel tax are also discussed.

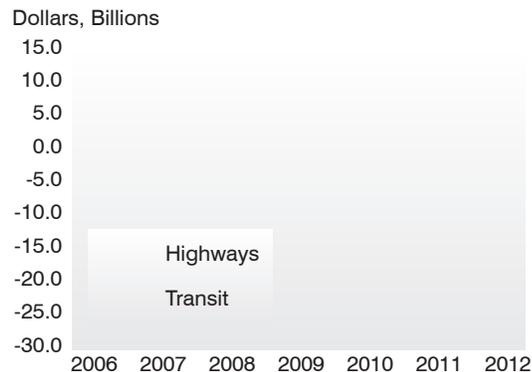
### **Keeping the Highway Trust Fund Solvent**

It is widely known that balances in the HTF are falling, especially in the Highway Account.

Exhibit 5-13 shows projected cash balances in the Highway and Transit Accounts of the HTF from 2006 to 2012. The Highway Account balances are projected to decline from \$9.2 billion in 2006 to -\$4.3 billion in 2009 if corrective actions are not taken. Without action, Highway Account balances would become increasingly negative, reaching -\$26 billion by 2012; Transit Account balances are projected to increase slightly through 2008 but then decline to -\$0.7 billion in 2012.

**The Commission recommends that legislation be passed in FY 2008 to keep the Highway Account of the HTF solvent and prevent highway investment from falling below levels guaranteed in SAFETEA-LU.**

**Exhibit 5-13. Projections of Highway and Transit Account Balances Through 2012**



**This exhibit shows projected balances in the Highway and Transit Accounts of the Highway Trust Fund through 2012 assuming no change in revenues or program levels.**

Source: U.S. Department of the Treasury projections.

The following are several options that have been recognized as having the potential to address immediate shortfalls in the Highway Account of the HTF.

- Increasing one or more of the existing taxes that go into the HTF



- Ensuring that the HTF receives the full amount of the taxes levied on highway use by shifting the cost of exemptions from and refunds of taxes for certain highway users to the General Fund of the Treasury
- Retroactively reinstating the crediting of interest on the invested balances of the HTF. The crediting of interest ceased after FY 1998 pursuant to section 9004(A) of TEA-21, P.L.105-178)
- Crediting the proceeds of the gas guzzler tax under section 4064 of the Internal Revenue Code to the Highway Account
- Dedicating a portion of the revenue generated from transportation-related taxes, such as customs fees, to transportation purposes
- Taking measures to reduce evasion of fuel and other highway-user taxes
- Crediting the Highway Account of the HTF with funding that has been provided for emergency purposes from the HTF, and shifting that burden to the General Fund, which has been the source for appropriations for these purposes in recent years.

### **Federal Surface Transportation Trust Fund**

In light of the recommendation to restructure future Federal surface transportation programs around functional lines rather than individual modes, the Commission recommends that the Federal HTF be restructured to be compatible with the new program structure recommended in Chapter 6. To emphasize the multimodal nature of future programs, **the Commission recommends that the name of the Highway Trust Fund be changed to the Surface Transportation Trust Fund.** With no separate highway or transit programs and no Federal funding dedicated specifically for transit as there is currently, separate highway and transit accounts would not be necessary under the Surface Transportation Trust Fund (STTF).

The STTF would continue the user fee principles of the HTF and extend those principles to other modes and other Federal revenue sources recommended below. Under the Commission's recommendation, the mix of highway and transit investments would be driven by the capital costs for the particular projects included in the plans developed under each program. Since no funding would be specifically dedicated for transit purposes, there would be no need to direct fuel tax revenues into specific subaccounts as is done today.

As outlined below, the Commission recommends extending the user fee principle to freight and passenger rail. Congress should consider whether it is necessary to establish new subaccounts into which these new revenue streams would be directed.

The Commission recommends that many of the features of the current HTF be retained. Funds deposited to the STTF should continue to be dedicated to surface transportation purposes, budgetary firewalls should continue to guarantee annual spending levels from the STTF, and a mechanism should be retained similar to Revenue Aligned Budget Authority (RABA) to adjust spending levels based on the latest estimates of available revenues.

### ***Surface Transportation Finance Through 2025***

Motor fuel taxes have been the principal source of highway funding at the State and Federal levels for 80 years, although other revenues are more prominent in the funding of local roads and transit. In the past, revenues were sufficient to construct the world's most extensive highway system; however, future costs to maintain the physical condition of this aging system and to improve its performance will exceed projected highway revenues.



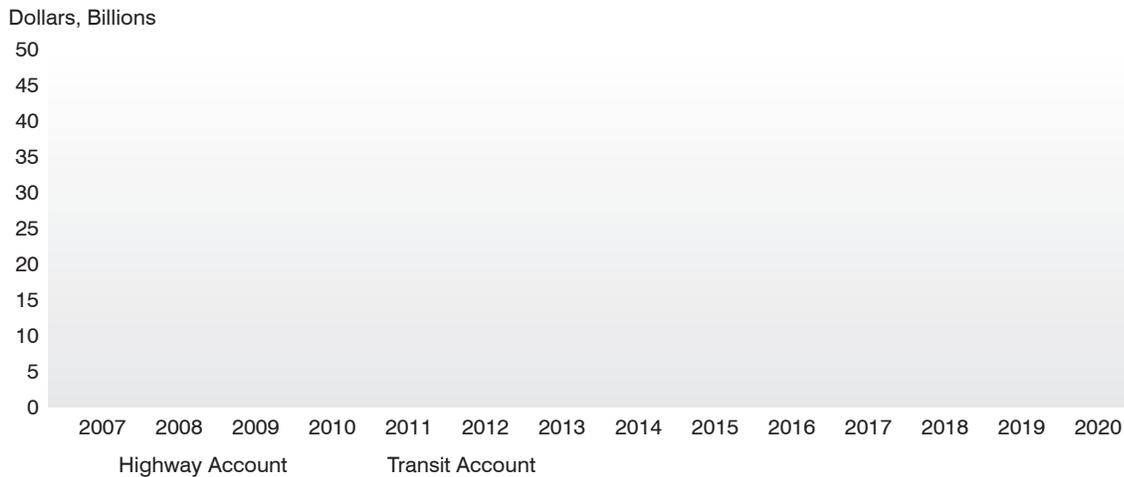
There are several reasons why future revenues will fall short of meeting highway and transit investment requirements unless highway and transit revenues are increased. First, the fuel tax, which typically is levied on a per-gallon basis, fails to keep pace automatically with rising construction costs unless it is indexed to some measure of inflation as is done in several States. While highway construction costs are not expected to increase as quickly in the future as they did between 2004 and 2006, unless cost increases are taken into account when forecasting needed revenues, funding shortfalls will persist. Second, transportation funds are being used for a broader range of purposes than previously was the case. Some of these new expenditures have been required to mitigate adverse environmental impacts of transportation investments. Others are associated with the broad range of projects that can be funded as transportation enhancements that were not eligible for Federal aid in the past. Many of these new uses do not contribute directly to enhancing the condition and performance of the surface transportation system, although they may be justified for other purposes.

Perhaps the principal reason why revenues have fallen short of meeting investment requirements, however, has been the lack of a demonstrated will at all levels of government to raise taxes and fees to the levels required to maintain transportation condition and performance. As noted above, the Federal fuel tax rate has not been increased since 1993. About 20 States have increased their fuel tax rates since 2000, but legislative or voter approval for such rate increases is difficult to obtain. Motorist resistance to tolls is also high, but several polls have found that highway users may be more willing to pay for specific projects through tolls rather than fuel tax increases. A number of States have also turned to increases in sales and other specialized taxes rather than fuel tax increases to fund highway improvements.

### Highway and Transit Revenue Projections

Exhibit 5-14 shows projections of HTF revenues from 2007 to 2020. During this period, total revenues are projected to grow from \$38.5 billion to \$47.0 billion, a 1.5 percent annual growth rate that is less than the expected increase in highway construction costs over this period. Growth in

**Exhibit 5-14. Projections of Highway Trust Fund revenue, 2007–2020**



**This exhibit shows projections of revenues to the Highway Account and Transit Account of the Highway Trust Fund from 2007 to 2020.**

Source: U.S. Department of the Treasury projections and Commission Staff analysis.



revenues for the Highway Account will be slightly faster (1.6 percent a year) than overall HTF growth because truck taxes, which are growing faster than fuel taxes, go only to the Highway Account. Growth in revenues for the Transit Account, which receives only fuel tax receipts, is projected to be 0.9 percent a year. Growth in HTF revenues beyond 2020 is more conjectural because of the many uncertainties concerning vehicle fuel efficiency and potential new transportation fuels that may be in use after 2020.

Extrapolating Energy Information Agency projections of the fuel efficiency of the vehicle fleet out to 2035, assuming that alternative fuels would be taxed at an energy-equivalent rate to gasoline and diesel fuel, and assuming that current relationships between the truck taxes deposited in the HTF and the stock of trucks continue through 2035, it is estimated that 2035 HTF revenues will be approximately \$60 billion, 62 percent greater than 2005 HTF revenues.

A recent National Cooperative Highway Research Program (NCHRP) Report, *Future Financing Options to Meet Highway and Transit Needs*, has projections of highway and transit revenues through 2017. Exhibit 5-15 shows baseline forecasts for highway and transit revenues for four types of revenues—direct user fees, indirect user

fees, specialized taxes, and direct taxes. Direct user fees include highway tolls and transit fares. Indirect user fees include fuel, motor vehicle, and other fees imposed on users that are not tied directly to specific trips. Specialized taxes include property taxes, sales taxes, and other local option taxes that are dedicated for highway and transit purposes. General taxes are appropriations from the general fund and other miscellaneous taxes that are not dedicated to transportation purposes.

Projections in Exhibit 5-15 assume continuation of existing trends—motor fuel taxes are assumed to grow in proportion to growth in vehicle miles

“The federal motor fuels tax should be increased to restore lost purchasing power and generate revenues necessary to begin addressing the nation’s highway and transit infrastructure needs. We also believe that the federal motor fuels tax should be linked to a consumer price index to maintain future purchasing power.”

– Dr. Michael Walton, chairman of the American Road and Transportation Builders Association and a Professor at the University of Texas, at the New York field hearing.

**Exhibit 5-15. Projections of highway and transit revenues, 2007–2017**

| <b>Highway Revenues (\$ billions)</b> |              |              |              |              |              |
|---------------------------------------|--------------|--------------|--------------|--------------|--------------|
| 2007                                  | 7.6          | 84.7         | 17.5         | 34.5         | 144.3        |
| 2017                                  | 12.4         | 104.2        | 26.7         | 48.7         | 192.0        |
| <b>Annual Change 2007 – 2017</b>      | <b>5.0 %</b> | <b>2.1 %</b> | <b>4.3 %</b> | <b>3.5 %</b> | <b>2.9 %</b> |
| <b>Transit Revenues (\$ billions)</b> |              |              |              |              |              |
| 2007                                  | 12.4         | 6.6          | 10.9         | 13.5         | 43.4         |
| 2017                                  | 17.8         | 7.8          | 16.7         | 18.9         | 61.2         |
| <b>Annual Change 2007– 2017</b>       | <b>3.7 %</b> | <b>1.7 %</b> | <b>4.4 %</b> | <b>3.4 %</b> | <b>3.5 %</b> |

**This exhibit shows projections of total highway and transit revenues through 2017.**

Source: *Future Financing Options to Meet Highway and Transit Needs*, NCHRP 2006.



of travel (VMT) adjusted for projected changes in vehicle fuel efficiency, tolls are assumed to increase at their historical rate of 5 percent a year, specialized taxes are projected to grow at the same rate as long-term GDP, and general taxes are assumed to grow at their historical rates. In the aggregate, highway revenues during this period are projected to increase by 2.9 percent annually, and transit revenues by 3.5 percent annually. Using these growth rates to project revenues out to 2020, total highway and transit revenues are projected to be \$209 billion and \$68 billion, respectively, in 2020. When adjusted for inflation using the Consumer Price Index (CPI), real highway revenues are projected to increase by less than 0.5 percent annually and transit revenues by just 1 percent annually. If construction costs were to outpace the CPI over this period, as they have in recent years, the real purchasing power of highway and transit revenues could actually decline.

Transit generally has more balanced funding than highways, with fares, general funds, sales taxes, and other public funds all representing significant revenue sources. Impact fees currently are not as large a source of transit revenues, but they could become more important, especially where transit improvements are linked with broader land use development programs.

Projections of highway and transit revenues beyond 2017 are more conjectural. Factors that could affect surface transportation revenues beyond 2017 include more stringent fuel economy standards, potentially higher fuel prices, shifts to alternative energy sources for personal and commercial vehicles, and greater use of tolls and pricing.

As noted in Chapter 2, passenger travel is projected to increase at an annual rate of 1.8 percent through 2035 and 1.7 percent through 2055. Truck travel is projected to grow by 2.5 percent a year through 2035. If Federal fuel tax rates remain at their current levels and fuel efficiency continues to improve at the rates

projected by the Energy Information Agency, fuel tax revenues would increase by about 1.3 percent a year through 2035. If Federal truck taxes continue their historical growth rate, their growth from 2005 to 2035 would be about 5.6 percent a year. Overall growth in HTF revenues under these assumptions is estimated to be 2 percent a year between 2005 and 2035. This is slightly greater than the overall growth in VMT. The percentage of Federal HTF revenues from the fuel tax would decline from about 87 percent in 2007 to 67 percent in 2035. Taxes on trucks would make up an increasing share of total highway and transit revenues at the Federal level.

Many factors could affect the level of existing highway and transit revenues over the next 10 to 15 years; but, without changes in the current patterns of highway and transit finance, the capital investment required to meet performance goals recommended by the Commission cannot be met.

### **Freight Rail**

The freight rail system is, for the most part, self-financing, with returns on investment improving from 4 percent in 1980 to 8 percent today. This level of return is not sufficient, however, to stimulate significant investment in new capacity, in part because rail is an extraordinarily capital-intensive industry. However, Class I railroads do invest in capital improvements when there is adequate return on investment. These types of projects enable the railroads to increase efficiency in the movement of their trains throughout their system as well as increase their bottom-line financial returns. Maintaining a balanced and stable system of economic regulation that allows railroads to realize adequate revenues is important to continued growth in railroad investment.

In general, Class I railroad capital expenditures have tracked income, as shown in Exhibit 5-16, increasing consistently in current dollars, since the economic deregulation of the railroads in 1980. One concern with this method of



financing is that it does not allow for long term planning since revenue cannot be predicted far in advance. Class I capital expenditures for infrastructure expansion totaled \$1.1 billion in 2005 and \$1.4 billion in 2006. The Association of American Railroads estimates that Class I capital expenditures for infrastructure expansion will total \$1.9 billion in 2007.

The Class I railroads anticipate that future revenues will grow proportionally to rail tonnage, currently forecast to increase by 88 percent by 2035. Assuming that revenues increase with tonnage and that railroads maintain their current level of effort for capital expansion, the Class I railroads will invest cumulatively about \$70 billion from 2007 to 2035. However, the AAR estimates that this level of capital investment will fall short of investment needed to accommodate growth in rail traffic by about \$1.4 billion per year through 2035. This could increase to \$1.8 billion per year for the period 2035 to 2055. Options for funding all or part of this shortfall include investment tax credits, PPPs, Customs duties, and container fees, depending on the specific characteristics of the project.

### Alternative Federal Transportation Revenue Sources

As discussed in Chapter 4, revenues from existing sources clearly are insufficient to prevent the condition and performance of the Nation's highway and transit systems from deteriorating. Even with aggressive deployment of operational strategies, pricing, and advanced technologies, considerable new highway and transit capacity will have to be added to provide the transportation services required to sustain economic growth and meet the needs of a growing population. Additional revenues can come from a variety of sources.

Federal fuel and truck taxes currently support investment in the highway and public transit modes. Because the Commission believes there is a Federal interest in investing in other modes such as freight and passenger rail, it is appropriate to consider additional Federal financing mechanisms beyond traditional highway user fees. The 2006 NCHRP report, *Future Financing Options to Meet Highway and Transit*

**Exhibit 5-16. Capital investment and income Class I Railroads, 1981 to 2006**



**This exhibit shows capital outlay and income for Class 1 railroads between 1981 and 2006. Dotted lines represent trend lines.**

Source: American Association of Railroads data



*Needs*, identified a broad range of options for increasing surface transportation revenues and estimated the additional funds that each option might provide through 2017. Those estimates are shown in Exhibit 5-17. Several of the most promising options for increasing Federal surface transportation revenues are discussed below.

- **Increase the fuel tax and existing truck taxes.** As noted above, user charges on fuel, motor vehicles, and other elements of the transportation system have been the backbone of highway finance for the past 80 years. The Commission strongly supports the principle of user financing. Personal and commercial travelers should pay for the transportation systems and services they use in proportion to the costs associated with that use. Historically the fuel tax has been a particularly important component of the highway user financing system. At the Federal level fuel taxes represent almost 90 percent of total HTF revenues. While there is a growing consensus that alternatives to the fuel tax may be necessary in about 20 years, the fuel tax should remain an essential component of surface transportation finance until viable alternatives are found. Among the attributes that make fuel taxes particularly attractive sources of surface transportation revenues are their (1) low administrative and compliance costs, (2) ability to generate substantial amounts of revenue (each penny of fuel tax raises almost \$2 billion), (3) relative stability and predictability, and (4) ease of implementation. While the direct relationship between the amount of travel and the amount of fuel taxes paid has diminished somewhat in recent years as disparities in vehicle fuel efficiencies have grown, the fuel tax still bears a reasonable relationship to the amount of travel.

One limitation of the fuel tax is that, when levied on a per-gallon basis, it is not responsive to increasing construction costs. That weakness can be remedied by indexing the tax to a measure of inflation such as the CPI or the Producer Price Index for Highway and Street Construction. The NCHRP report suggests several ways that the fuel tax could be indexed, the main difference being how much money would be generated. Indexing back to 1993 when the tax was last raised would produce considerably more money than beginning the indexing at a later year, but raising the fuel tax before starting to index would have the same effect. Converting all or part of the current per-gallon fuel tax to a fuel sales tax would allow receipts to vary with the price of fuel, but the price of fuel fluctuates widely and has little to do with factors affecting surface transportation investment requirements.

- **Levy a Federal ticket tax on all transit trips.** No direct user fee is levied on transit trips at the Federal level. The Commission believes that the user pay principle should be applied as widely as possible. One option for transit would be to levy a Federal ticket tax on all transit fares, similar to the tax imposed on airline fares.
- **Dedicate a portion of Customs duties for freight-related improvements.** Transportation requirements are among the major costs associated with imported commodities. One option for financing port-related improvements and other facilities used to transport imports would be to dedicate a portion of Customs duties for such improvements. Since imports ultimately are transported on virtually all major highways a case could be made for using the Customs



duties on all major highways; but a stronger case could be made for dedicating those revenues for transportation improvements that are uniquely necessitated by the imports. If 5 percent of Customs duties were dedicated to freight transportation improvements, revenues would be approximately \$1.8 billion per year, or the equivalent of about 1 cent per gallon of fuel tax. This dedication would result in an equivalent loss of Federal funds to the General Fund.

- **Levy new freight fees to finance freight-related improvements.** Another potential revenue source to fund freight transportation improvements would be fees levied on each container being transported through ports or other international gateways. Container fees currently are levied on containers flowing through the ports of Los Angeles/Long Beach to help finance freight rail improvements in the Alameda Corridor. A \$30 fee per container levied at each U.S. port could raise about \$2 billion a year.
- **Improve financial assistance to the railroads to support capacity enhancement.** The railroads have indicated that anticipated future revenues will be inadequate to allow them to privately finance all capacity improvements required to maintain their current market share of freight traffic. To help them make the capital investments that will be required to move the increasing volumes of goods, freight railroads have proposed a 25 percent Federal tax credit for expansion investments. They also have proposed that they be allowed to expense capital expenditures since other modes can expense their trust fund payments. Although such tax incentives for freight rail capacity expansion would be credited against the General Fund, they would help bridge the funding gap between demand and available

private funding in the coming years in a way that could offset the cost of the tax incentive. The railroads estimate that the expansion tax credit, together with immediate expensing of the remaining 75 percent of capital investment, would reduce expansion project costs by approximately 30 percent. The net effect is that project return would increase by 3 percent to 4 percent, making the expansion investment more likely.

Federal credit assistance programs are available to assist railroads in financing some needed improvements. These programs can be improved. For example, small changes in the Private Activity Bond (PAB) program, such as removing the requirement for other Federal funding and for the Federal Highway Administration (FHWA) to be the lead agency, would increase the utilization of PAB financing of railroad capacity projects. In addition, the RRIF program, which has not been widely utilized by Class I rail carriers, can be enhanced if it better mirrored private sector financing.

- **Potential sources of Federal funding for intercity passenger rail service.** Three potential sources of funding for intercity passenger rail service are worth particular mention: (1) a Federal ticket tax; (2) highway user revenues; and (3) Federal general fund revenues as are used for some transit programs. Federal investment in the aviation system is financed in part through taxes on airline tickets. Similar fees could be levied on tickets purchased by urban public transit users or intercity rail passengers. Based on total urban transit and Amtrak fare revenues of about \$13 billion in 2005, a 1 percent ticket tax could generate approximately \$130 million per year.

**Exhibit 5-17. Revenue generating estimates for different funding mechanisms**

| Short Term Funding Mechanisms   | Estimated Revenue Generation 2010                         | Estimated Revenue Generation 2017                         |  |
|---|---|---|--|
| <b>Federal Revenue Options to Increase Highway Trust Fund Revenues</b>  |   |   |  |
| Index Federal fuel taxes retroactive to 1993 to capture full loss due to inflation  | \$19.4 billion  | \$31.7 billion  |  |
| Capture half of the loss due to inflation since 1993  | \$9.6 billion   | \$19 billion  |  |
| Index Federal fuel taxes starting in 2010   | \$0.8 billion   | \$7.6 billion   |  |
| Implement motor fuel sales taxes at the Federal level   | \$10.8 billion  | \$14.0 billion  |  |
| Reinstitute Federal light duty vehicle sales tax on new vehicles  | \$15 billion  | \$20.4 billion  |  |
| Index Heavy Vehicle Use Tax (HVUT) retroactive to 1997  | \$2.1 billion   | \$3.7 billion   |  |
| Index HVUT starting in 2010   | \$30 million  | \$374.3 million   |  |
| Eliminate exemptions to HTF starting in 2008  | \$1.2 billion   | \$1.3 billion   |  |
| Recapture interest on HTF balances starting in 2008   | \$0.5 billion   | \$0.5 billion   |  |
| <b>Other Federal Revenue Options</b>  |   |   |  |
| Authorize tax credit bonds (modeled after the Senate-proposed "Build America Bonds" - assumes \$5 billion in net proceeds per year)     | \$5 billion, General Fund supported                       | \$5 billion   |  |
| Utilize 5 to 10 percent of current Customs duties for port and intermodal improvements  | \$1.7 billion at 5 percent<br>\$3.3 billion at 10 percent | \$2.2 billion at 5 percent<br>\$4.5 billion at 10 percent |  |
| Authorize freight/ intermodal investment tax credits (assumes \$500 million annual limit on monetization of 20-year tax credit streams) | \$1.2 billion   | \$1.2 billion   |  |
| Container fees  | \$1.7 billion   | \$2.7 billion   |  |
| <b>State Revenue Options</b>  |   |   |  |
| Index state motor fuel taxes  | \$1.4 billion   | \$6.5 billion   |  |
| Increase state motor fuel taxes to catch up for inflation losses since 2000   | \$6.6 billion   | \$8.6 billion   |  |
| Implement motor fuel sales taxes  | \$8.9 billion   | \$11.6 billion  |  |
| Raise motor vehicle registration fees to keep up with inflation   | \$1.8 billion   | \$6.4 billion   |  |
| Use vehicle sales tax for transportation  | \$6.2 billion   | \$8.4 billion   |  |
| Portion of state sales tax dedicated to transportation  | \$9.0 billion   | \$12.0 billion  |  |
| Increase tolling/pricing revenues (above current 5 percent per year increase)   | \$0.2 billion   | \$2.4 billion   |  |
| VM'I' fees (future); transition from short-term toll/pricing innovation   |   |   |  |
| <b>Local Revenue Options</b>  |   |   |  |
| Increase use of specialized dedicated local taxes, e.g., local option taxes, impact fees - Highway                                      | \$3.5 billion   | \$11.6 billion  |  |
| Increase use of specialized dedicated local taxes, e.g., local option taxes, impact fees, miscellaneous transit fees - Transit          | \$1.8 billion   | \$6.0 billion   |  |

**This table identifies the additional revenues that could be generated from a set of alternative funding mechanisms.**

Source: 2006 NCHRP Report, Future Financing Options to Meet Highway and Transit Needs.

|  | Average Annual Revenue 2010 to 2017                       | Revenue Generation Cumulative 2007 to 2017                  | Comments  |
|--|---|---|---|
|  | \$25.3 billion  | \$202.6 billion   | Would result in 10 cent gas tax increase in 2010 with indexing to CPI thereafter.   |
|  | \$14.1 billion  | \$113 billion   | Would result in 5 cent gas tax increase in 2010 with indexing to CPI thereafter.  |
|  | \$4.0 billion   | \$32.3 billion  | Index fuel tax rates to CPI starting in 2010; first year of next reauthorization cycle.   |
|  | \$12.3 billion  | \$98.4 billion  | Assume 3 percent sales tax on motor fuels, starting in 2010.  |
|  | \$17.6 billion  | \$140.8 billion   | Seven percent rate phased out in 1971. Assume tax is reinstated in 2010 at 3 percent.   |
|  | \$2.9 billion   | \$21.3 billion  | Has been fixed at maximum of \$550 since 1984; assume indexing retroactive to 1997 to capture one-half loss due to inflation.                   |
|  | \$200 million   | \$1.5 billion   | Assume indexing to CPI implemented in 2010.   |
|  | \$1.2 billion   | \$12.3 billion  | As proposed in President's 2006 budget, shift exemptions to general fund.   |
|  | \$0.5 billion   | \$5.0 billion   | Depends on HTF balances; estimates assume minimal balances through next reauthorization cycle.  |
|  | \$5 billion   | \$55 billion  | Debt-oriented financing technique that leverages a Federal tax subsidy to generate new transportation funding.                                  |
|  | \$1.9 billion at 5 percent<br>\$3.9 billion at 10 percent | \$20.0 billion at 5 percent<br>\$40.1 billion at 10 percent | These funds would be set aside for port and intermodal purposes; 30 percent assumed to offset highway needs, such as intermodal connectors.     |
|  | \$1.2 billion   | \$13.2 billion  | Modeled after the Graves proposal. Only 15 percent of ITCs are estimated to fund highway or transit needs such as highway-rail grade crossings. |
|  | \$2.2 billion   | \$17.5 billion  | Start in 2010; applied on all import and export containers.   |
|  | \$3.8 billion   | \$31.9 billion  | If all states indexed fuel taxes by 2010.   |
|  | \$7.6 billion   | \$70.0 billion  | If all states were to catch up for inflation losses by 2010, results in average 5.2 cent increase.  |
|  | \$10.1 billion  | \$94.3 billion  | Three percent assumed dedicated to transportation.  |
|  | \$4.0 billion   | \$33.4 billion  | If all states were to raise in concert with inflation starting in 2007.   |
|  | \$7.2 billion   | \$66.6 billion  | If all states who have sales tax dedicate at least 3 percent of vehicle sales tax to transportation.  |
|  | \$10.5 billion  | \$108.8 billion   | Assume one-half percent dedication to highway and/or transit.   |
|  | \$1.1 billion   | \$8.9 billion   | Estimate based on aggressive use of tolling and pricing opportunities in SAFETEA-LU.  |
|  |   |   | High potential but widespread deployment assumed after 2015.  |
|  | \$7.2 billion   | \$63.4 billion  | Assume more aggressive growth rate of last 10 years continues.  |
|  | \$3.7 billion   | \$32.8 billion  | Assume more aggressive growth rate of last 10 years continues.  |



## Recommendations for Increasing Federal Revenues

At the Federal level, simply resolving the immediate HTF cash flow issue will not provide the funding required to meet vital long-term surface transportation needs. The gap between spending that can be supported from existing revenues and the investment required to improve the condition and performance of the surface transportation system shown in Exhibit 4-22 makes it clear that public and private investment must increase substantially. The annual Federal share of total transportation spending has varied over time, and tends to fluctuate from year to year. Over the last 10 years, the annual Federal share of total highway capital investment has ranged from 37 to 46 percent, while the annual Federal share of transit capital investment has ranged from 39 percent to 54 percent. The Commission believes the Federal Government must continue to play a strong role along with State and local agencies and the private sector in revitalizing the Nation's key surface transportation systems. While the level of Federal funding ultimately should be tied to what is necessary to achieve Federal goals, the Commission believes the Federal share of future capital investment should be approximately the same as it has been in recent years.

The 2035 investment gap range shown in Exhibit 4-22, expressed in terms of equivalent cents per gallon of fuel tax, is \$0.64 to \$1.01 per gallon of fuel. If it is assumed that the Federal share of this total should be approximately 40 percent, Federal funding would have to increase by the equivalent of approximately 25 to 40 cents per gallon of fuel. **The Commission recommends that the Federal fuel tax rate be increased by 5 to 8 cents per gallon per year over the next 5 years and indexed to inflation thereafter.** Once the National Surface

Transportation Commission recommended in Chapter 6 has been established, the exact amount of this rate increase and future adjustments to the fuel tax and other Federal tax rates would be based on recommendations by that Commission.

One tenet of highway taxation dating back to the creation of the HTF is that different vehicle classes should be charged in proportion to their contribution to highway investment requirements. The Federal Government and many State governments have conducted highway cost allocation studies to assess the cost responsibility of different vehicle classes. Increasing the fuel tax without commensurate changes in truck taxes could exacerbate the current situation where heavy trucks pay less than their share of highway costs. When adjusting Federal fuel tax rates, **the Commission recommends that tax rates on existing Federal truck taxes be adjusted proportionally to maintain the current allocation of highway cost responsibility.**

## Federal Funding for Transit

Eighty percent of Federal funding for transit currently comes from the HTF, and the remaining 20 percent comes from the Federal General Fund. The portion from the General Fund reflects transit's role in providing basic mobility for those who do not have other travel options. The Commission believes this same split between Trust Fund and General Fund revenues should continue in the future. The maximum Federal share of transit project costs under any of the new programs also should be 80 percent. The Commission believes that the "user pays" philosophy should extend to the transit program. **Therefore, the Commission recommends that a Federal ticket tax be levied on all transit trips to supplement revenues from the Federal fuel tax and General Fund.**



## Funding Dedicated for Freight-Related Transportation Improvements

Given the strong Federal interest in freight movement, Congress will need to make available a variety of funding sources to meet the needs of the Freight Transportation program. At the Federal level these include increased gas tax revenues, General Funds, and potentially a portion of Customs duties revenues and a Federal freight fee. It is also anticipated that tolling and PPPs would play an important role. A full range of financing options will be needed.

Freight fees have been used previously to fund key projects that benefit freight users. For example, fees on all containers passing through the ports of Los Angeles and Long Beach are levied to help finance Alameda Corridor improvements. Congress should consider whether to implement a freight fee (e.g., a container charge, freight waybill surcharge, or other equitable fee) to fund projects that remediate chokepoints and increase throughput. Such a fee should be designed to ensure that commerce is not burdened by local and state proliferation of such fees; no mode of transportation or port of entry is disadvantaged; and the ultimate consumer bears the cost.

Congress will need to create an accountable and transparent programmatic linkage between an assessed freight fee and the selection and funding of projects that facilitate increasing volumes of primarily trade-driven freight. The payers of such a fee must realize the benefit of improved freight flows resulting from projects funded by the freight program.

Another potential revenue source for funding freight-related improvements is a share of the Customs duties paid on all imports. Most Customs duties are deposited in the General Fund. If 5 percent of Customs duties were dedicated to freight transportation improvements,

revenues would be approximately \$1.8 billion per year, which is equivalent to a fuel tax increase of about 1 cent per gallon. Because of the large transportation requirements associated with imported commodities, **the Commission recommends that a portion of Customs duties be dedicated to help pay the costs of freight-related improvements.** As with the new freight fees, Customs fees dedicated for freight transportation improvements would be deposited in the STTF.

The railroads have indicated that anticipated future revenues will be inadequate to allow them to privately finance all capacity improvements required to maintain their current market share of freight traffic. Rail capacity expansion improvements may include intermodal facilities, terminals, ports, and freight gateways. To help them make the capital investments that will be required to move the increasing volumes of goods, freight railroads have proposed that a 25 percent Federal tax credit be granted for investments to expand capacity. They have also proposed that they be allowed to expense capital expenditures since other modes can expense their Trust Fund payments. Although such tax incentives for freight rail capacity expansion would be credited against the General Fund, they would help bridge the funding gap between demand and available private funding in the coming years in a way that could offset the cost of the tax incentive. **The Commission recommends that a Federal Investment Tax Credit be granted to transportation facility owners for capital improvements.**

## Funding Dedicated to Passenger Rail

The Commission proposes three sources of Federal funding for intercity passenger rail service: (1) ticket surcharges, (2) highway user revenues, and (3) Federal general fund revenues as are used



for some transit programs. To implement the new Intercity Passenger Rail Program, the Commission recommends initial Federal funding of \$5 billion per year for grants to States, Amtrak, and/or other competitive service providers. **The Commission recommends that a new Federal ticket tax be levied on users of the system to supplement funding from fuel taxes and general funds.** This ticket tax should not be imposed until new service begins in a corridor. As previously noted, funding should be provided on a cost-to-complete basis for intercity rail corridors that are shown to be cost-beneficial. The Federal share of capital costs should be up to 80 percent of capital. As with transit funding, 80 percent of funding should come from the STTF and 20 percent from general funds.

**Carbon Taxes or Trading.** In the near term, Congress may enact a tax on carbon or a “cap and trade” system to reduce greenhouse gas emissions. To the extent that such a taxation or trading system encompasses transportation-related sources, Congress should ensure that transportation activities that reduce greenhouse gas emissions receive a proportionate share of any revenue generated by these new schemes.

### **Alternative State and Local Revenue Sources**

Based on the investment gap discussed in Chapter 4, the State and local share of additional investment requirements could range between the equivalent of 36 and 62 cents per gallon of fuel tax. This range could vary considerably among individual States depending on several factors, including their share of overall investment requirements and the extent to which they have the ability to use and choose to use other revenue sources. Overall, fuel taxes represent about 47 percent of total current highway revenues (excluding bond sales) for State transportation

agencies, so States already rely on funding from sources other than the fuel tax to finance their highway programs.

**As mentioned previously, a significant increase in funding from all sources will be needed to upgrade our existing surface transportation system to a state of good repair and begin creating a more advanced system. This means that significantly more investment will be needed from State and local governments, as well as from the private sector.**

**Increase State fuel taxes and other highway user fees.** As noted above, the gas tax has been a staple of highway finance at both the Federal and State levels for 80 years. Public acceptance of this mechanism, its ability to raise considerable revenues, and its low administrative cost have been significant positive attributes. Raising the fuel tax could generate about \$1.9 billion nationally for each 1-cent increase. Indexing the fuel tax or converting to a gasoline sales tax would allow revenues to increase with rising highway construction costs. The Commission expects that States and local governments will have to raise additional revenues as part of the effort to increase investment in our surface transportation system.

**Provide new flexibility for tolling and pricing.** **The Commission recommends that Congress remove certain barriers to tolling and pricing. States and local governments should be given the flexibility to toll and/or implement congestion pricing. This will give States and local governments that wish to make greater use of tolls and congestion pricing the flexibility to do so.** While the use of these tools is discretionary with State and local governments, the Commission believes that increased tolling and pricing must be part of the overall solution if we are to indeed create and sustain the pre-eminent surface transportation system in the world.



“Road user charging is one of the tools that will help solve our mobility challenges.

It’s not the only tool; but it’s a very important one. Tolling is important because it establishes a direct connection between the use of the road and the payment for that use.”

– Patrick D. Jones, Executive Director, the International Bridge, Tunnel, and Turnpike Association, at the Commission’s Washington, DC, field hearing.

Tolls currently account for about 5 percent of total highway-related revenues and 9 percent of current State highway revenues. These percentages have remained relatively stable for many years. They understate, however, the importance of tolls in funding highway capacity expansion. A recent FHWA study reports that “during the last 10 years, an average of 50 to 75 miles a year of new access-controlled expressways has been constructed as toll roads out of an overall average of 150 to 175 miles of urban expressways opened annually. Toll roads, therefore, have been responsible for 30 to 40 percent of new “high end” road mileage over the past decade.”<sup>3</sup> With some exceptions toll revenues historically have been used almost exclusively on the tolled facilities themselves. The direct connection between use of the facility and the toll charge has been one reason that economists have tended to favor tolls over the gas tax. If toll rates produce more revenues than are needed for the facility itself and the excess revenues are used for other purposes, the connection between facility use and toll charges is weakened and the toll takes on some characteristics of a tax rather than a direct user charge. It should be noted that administrative costs of tolling are higher than the costs of administering the fuel tax, but the move toward

greater use of electronic toll collection should reduce those costs.

In the Commission’s analyses of gaps in future investment levels, the lower estimates of highway investment in 2035 and 2055 assume widespread implementation of congestion pricing. While widespread pricing reduced additional investment requirements by 30 percent, considerable investment in new capacity would still be required. In estimating the investment gap, no assumption was made that pricing revenues would be used to offset requirements for revenues from other sources. To the extent that pricing revenues were used for highway and transit purposes they would reduce requirements for revenues from other sources.

Most of the advantages and disadvantages of tolling in general also apply to congestion pricing. Pricing has been controversial, and there are many unanswered questions about how it might be implemented. The major additional advantages of congestion pricing compared with tolls are that pricing manages demand on congested facilities thereby reducing congestion, and it can generate additional revenues that could be used to expand highway and transit capacity in the corridor to reduce congestion. An additional advantage is that congestion pricing encourages the use of other routes and other modes of travel, such as public transportation. The major disadvantage of pricing is that during peak periods, tolls are higher for those who cannot change their destination or time of travel. For some travelers this could impose a hardship.

It should be recognized that commercial trucks usually do not have the discretion to change either their routes or the times when they must travel in response to tolls or congestion fees. Shippers determine pick-up and delivery times, and trucking operators have little or no influence over these decisions. Because tolls are not easily





**capacity on the Interstate System, as well as the flexibility to price the new capacity to manage its performance.**

**And second, the Commission recommends that flexibility be given to implement congestion pricing on the Interstate System, on both new and existing capacity, in metropolitan areas with populations greater than 1 million.** As noted above, congestion pricing likely will be used more widely in coming years as metropolitan areas explore strategies to manage their ever-increasing congestion problems. Congestion pricing could come in the form of high-occupancy toll (HOT) lanes, express toll lanes, full facility pricing, or area-wide pricing. The amount of revenues that can be generated by pricing will vary depending on how widely it is applied and the severity of the congestion. It is expected that this strategy will be limited to heavily congested corridors in the Nation's major metropolitan areas. The Commission believes that demand management in the form of pricing will be necessary as part of the solution to addressing congestion in major metropolitan areas.

■ **In implementing the tolling or congestion pricing recommendations, the Commission believes that Congress should put into place an approval process with strict criteria for tolling or pricing routes that are on the Interstate System:**

- Revenues should not be used for non-transportation purposes or to subsidize transportation improvements in other parts of a State or metropolitan area, but rather should be used to improve and expand the tolled facilities and to expand capacity on transportation alternatives within the same corridor.
- The use of tolls or pricing should be consistent with, and reflected in, freight,

metropolitan mobility, and other plans developed in connection with the new surface transportation programs. The use of toll or pricing revenues should be transparent so that all know where the funds will be expended.

- Adequate facilities for the trucking industry, including access to food, fuel, and safe parking accommodations for long-term rest, should be ensured.
- Rates should be set so as to avoid discrimination against Interstate travelers or any other group of users. Restrictions, conditions, or fees that discourage use of the facility by classes of vehicles (e.g., motor carriers) or commodities (e.g., hazardous materials) should be prohibited.
- Tolls should be collected with technologies that do not interfere with traffic flow, are compatible across regions, and are transparent to users so that they can make informed choices as they are choosing travel routes.
- Decisions on whether to toll particular facilities or to increase tolls on existing toll roads and bridges should explicitly consider the potential diversion of motor carriers onto adjacent routes that could lead to congestion, safety problems, and infrastructure damage.

**The Commission also recommends that Congress promote the use of a nationwide, uniform system of electronic tolling so that toll collection does not become a burden on interstate travel and commerce.**

Tolls already are being collected electronically on HOT lanes in California, Colorado, Minnesota, Texas, and Utah, as well as the recently completed Westpark toll road in Houston and the new



elevated express toll lanes on Tampa's cross-town expressway. Electronic toll collection is planned for several new toll roads in Texas; HOT lanes in northern Virginia, Miami, and Dallas; and existing toll roads operated by the North Texas Tollway Authority and the Miami-Dade Expressway Authority.

In the future, electronic toll collection is likely to replace tollbooths on most, if not all, toll roads. The advantages of electronic toll collection are the virtual elimination of delays, crashes, and pollution caused by long lines of vehicles waiting at tollbooths; reduced right-of-way requirements for tollbooths; lower administrative and operations costs; and increased convenience for the user. In addition to transponders, other technologies also are being used for electronic toll collection systems including automatic license plate recognition systems.

An alternative to tollbooths, during the transition to full deployment of electronic payment, could be redirection of cash-paying drivers to tollbooths off the main traveled lanes that would not impede the flow of traffic but provide a cash option. Early variations of this option are provided on many toll roads that have separate lanes for those with transponders who do not have to stop to pay a cash toll. The delays for drivers without transponders ultimately would be an incentive for

them to purchase single-use transponder devices if not multiple-use devices.

**Encourage the use of PPPs, including concessions, for highways and other surface modes.** A wide variety of PPP arrangements have been used in connection with surface transportation improvements. Private sector participation is not simply about supplying revenues. PPPs also can (1) prioritize projects that generate the highest returns, (2) improve life cycle investing, and (3) provide incentives for more efficient operations and maintenance. Private sector financing has been widely used in Europe, South America, and Australia.

As public sector revenue sources have been stretched in the United States, there has been increasing interest by some States in the private sector directly contributing to project financing. This has taken two general paths. One involves private sector participation in "greenfield" projects that involve the construction of new highways or the addition of new capacity to existing highways. The other major type of private sector financing involves the long-term leasing of existing toll facilities, so-called "brownfield" transactions. About 40 percent of the States have statutory authority to enter into PPPs. Several of those States have only recently passed enabling legislation, and several others have modified their





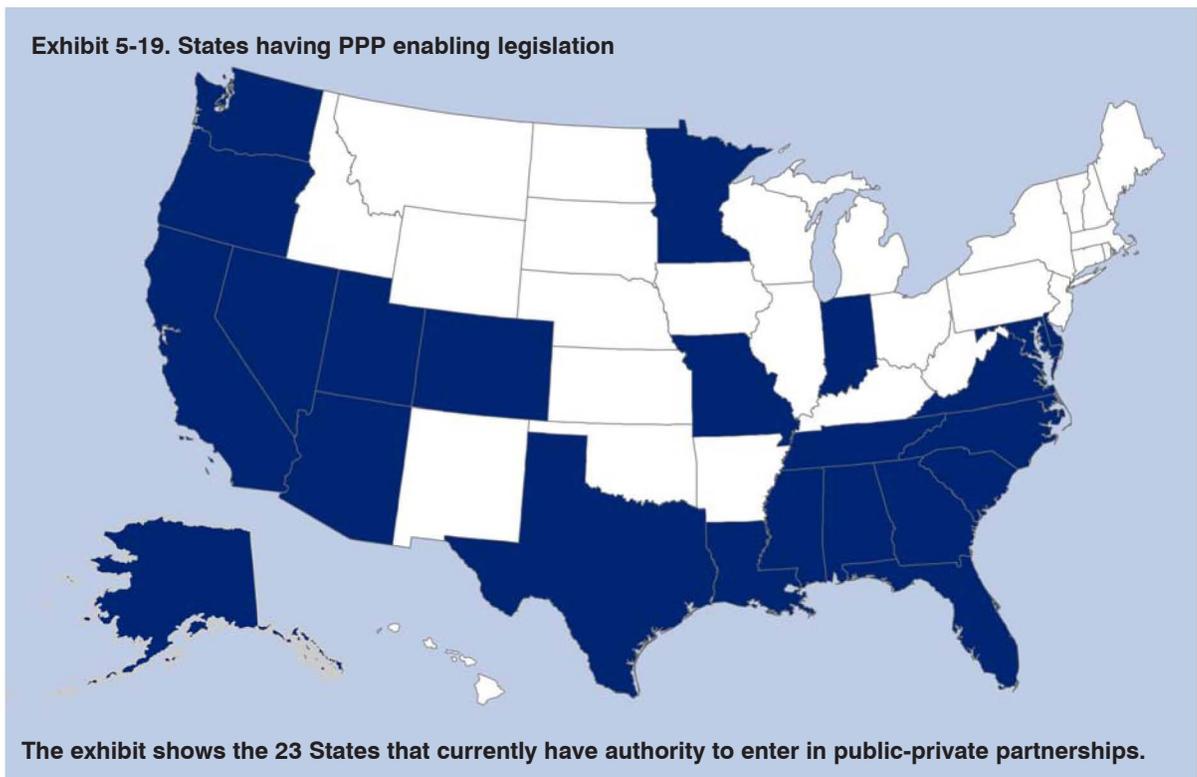
legislation to expand their ability to enter into partnership agreements. Exhibit 5-19 shows those States that have PPP enabling legislation.

**The Commission believes that PPPs should play an important role in financing and managing our national surface transportation system. It can be another important financing tool for State and local governments. Therefore, the Commission recommends that Congress encourage the use of PPPs.**

- **With respect to the Interstate System, PPP arrangements that involve tolling or congestion pricing should be subject to the same limitations and conditions discussed in the previous section. In addition, in order to ensure that the public interest is protected, the Commission recommends**

**that the following conditions also be met when States use PPPs (including concession arrangements) on the Interstate System:**

- Transparency should be a key element in all aspects of the process and the arrangement, including any tax incentives given to private sector partners. There should be adequate public participation, and all applicable planning and environmental requirements should be met. Confidentiality should be limited to only those instances where it is legally required.
- The terms of the agreement should include the following:
  - The condition and performance of the facility are adequately maintained over



Source: U.S. DOT Public Private Partnership Website: <http://www.fhwa.dot.gov/ppp/legislation.htm>.



the life of the concession agreement and, at the end of the agreement, the facility is returned to the State in good condition.

- There are no non-compete clauses that prohibit the construction or improvement of adjacent facilities; however, provisions that require the public entity to compensate private operators for lost revenues when improvements are made to adjacent facilities would be acceptable.
- Should the private partner enter into bankruptcy during the term of the agreement, the facility will revert to the State.
- Customers' interests are protected by capping the rate of increase in tolls at the level of the CPI minus an adjustment factor for productivity improvements.

Note: The Commission has explicitly rejected the use of rate-of-return regulation for PPPs. The learning in regulatory economics has proven that rate-of-return regulation blunts incentives for efficiency, and that a price cap approach is superior. This is also true in transportation. Private sector entities should be allowed to keep any added profits they obtain due to enhanced efficiencies, subject to the price cap.

- Revenue sharing provisions should be included in the lease agreement to ensure the public sector shares in the rewards if toll revenues are higher than projected during the valuation process. Alternatively, the lease agreement could include rebalancing provisions to bring the agreement terms back into

the financial balance achieved in the original negotiation.

- Concession agreements should not exceed a reasonable term. Following the termination of a concession agreement, public input and review must be undertaken before any renewal of the agreement.
- Concessions or other payments to public entities should not be used for non-transportation purposes or to subsidize transportation improvements in other parts of the State or metropolitan area, but rather should be used to improve and expand the tolled facilities and to expand capacity on transportation alternatives within the same corridor.
- No conflicts of interest exist involving any parties to the agreement.
- The private sector financing provides better value for money than if the concession were financed using public funds (similar to the public sector comparator used in several European countries). This assessment must take into account the loss of Federal tax revenue from tax-exempt municipal bonds, as well as the tax consequences of depreciation and other features of the private sector alternative.

## Transit

As noted above, transit systems depend on local funding, including fare revenues, to a much greater degree than does highway construction and maintenance. In the future this trend is expected to continue, especially for rail transit systems, as local governments turn to more innovative finance techniques such as transit-oriented development and tax increment financing. Both of these strategies capture part of the increased real estate



values generated by the transit system. Transit joint development has been used successfully in New York City, San Francisco, and the Washington D.C. area to increase development adjacent to rail stations and capture some of the economic value of that development to help cover costs of the transit systems. Tax increment financing can be used to fund transit system improvements directly or to provide amenities that make areas adjacent to the transit system more attractive to development. In addition to raising revenues directly, development associated with these and related innovative finance techniques may also help to increase transit ridership and fare revenues.

In major metropolitan areas that implement pricing to relieve highway congestion, significant shares of the pricing revenues may go to transit systems to provide viable alternatives for those who choose not to pay the congestion toll. Both London and Stockholm use portions of the revenues from their areawide pricing systems for transit enhancement. In the United States there are no areawide pricing programs; but, about half of the total toll revenue from San Diego's I-15 HOT lanes funds transit service in the corridor. Also, 50 percent of any excess revenues from the I-394 HOT lanes in Minnesota are required by law to be spent on transit; but, there is little or no excess revenue at this early stage of the project.

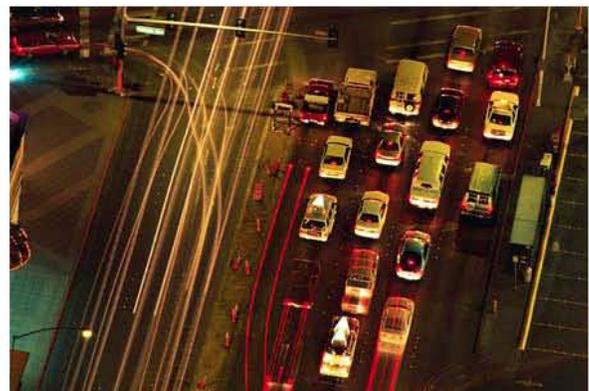
As noted above, improving transit service will be a critical component in efforts to reduce congestion and greenhouse gas emissions. All levels of government and the private sector will have to play a role in financing transit system improvements. Since 1982 Federal fuel taxes have been used to finance both highways and transit programs, and a number of States also use fuel tax revenues for transit system improvements. As alternatives to the fuel tax are identified, consideration should be

given to whether those options are also suitable for transit funding.

### ***Evaluation of Alternative Transportation Revenue Sources***

Advantages and disadvantages of alternative revenue sources can be evaluated against a number of criteria including yield, revenue stability, efficiency, equity, the applicability to different types of improvements, public acceptance, and other potential barriers to implementation.

Several studies recently have examined alternatives to the fuel tax, including studies sponsored by the National Chamber Foundation of the U.S. Chamber of Commerce, the Transportation Research Board (TRB), and the NCHRP. Exhibits 5-20 and 5-21 at the end of this chapter summarize advantages and disadvantages of alternative revenue sources in terms of six sets of criteria: (1) yield, adequacy, and stability; (2) cost efficiency and equity; (3) economic efficiency, (4) potential applicability at the program or project level and by level of government; (5) potential acceptability; and (6) implementation issues and potential strategies to overcome barriers. Exhibit 5-21 draws from the December 2006 NCHRP study, *Future Financing Options to Meet Highway and Transit Needs*.



## Long-Term Revenue Sources

This section discusses long-term alternatives to current surface transportation revenue sources with a special focus on alternatives to the fuel tax that may be required in the next 20 years. Several studies are either completed or underway to examine potential alternatives to the fuel tax. These studies have been driven by a recognition that supplies of conventional petroleum-based fuels will get tighter in the future, leading to the possibility of higher fuel prices, greater disparities in vehicle fuel economy, increasing use of alternative fuels, and greater concern about energy security.

The TRB recently completed a study titled, *The Fuel Tax and Alternatives for Transportation Funding*, that examined these and other issues in detail. That report concluded:

“a reduction of 20 percent in average fuel consumption per vehicle mile is possible by 2025 if fuel economy improvement is driven by regulation or sustained fuel price increases . . . The willingness of legislatures to enact increases (in fuel tax rates to compensate for reductions in fuel consumption) may be in question, but the existing revenue sources will retain the capacity to fund transportation programs at historical levels . . . Although the present highway finance system can remain viable for some time, travelers and the public would benefit greatly from a transition to a fee structure that more directly charged vehicle operators for their actual use of roads . . . Ultimately, in the fee system that would provide the greatest public benefit, charges would depend on mileage, road and vehicle characteristics, and traffic conditions, and they would be set to reflect the cost of each trip to the highway agency and the public.”



It is important to note that the TRB report reaffirmed the viability of the fuel tax to serve as the cornerstone of the Nation's transportation financing system through 2025, provided that political resistance to adjusting the rate can be overcome. With respect to the long-term transition to another revenue mechanism after 2025, the report recommended that governments adhere to the following principles that the Commission generally endorses:

- Maintain the practice of user fee finance, a system in which users of facilities are charged fees or special taxes, rates reflect the costs to serve each user, and the expenditures equal the fee revenue.



- Seek opportunities where possible to apply pricing; that is, allow fees to ration access to facilities.
- Align responsibilities so that local governments provide facilities that serve mainly local travel, States serve regional traffic, and the Federal government retains only functions that it can perform more effectively than State and local governments. Governments must control the resources required to carry out these functions; therefore, a goal of reform should be to allow each jurisdiction to collect fees from all users of its facilities.
- Give full consideration to the environmental and equity consequences of reform. Fundamental finance reform that aligned fees more closely with costs would eventually have profound effects on the locations of households and industries. The overall economic and environmental impacts of reform would be positive, but some individuals and communities would suffer harm if no provisions were made for compensation.

The TRB Policy Committee that produced the report considered several potential alternatives to the fuel tax and concluded, “Road use metering and mileage charging appear to be the most promising approach to this reform within a comprehensive fee scheme that will generate revenues to cover the cost of an efficient highway program in a fair and practical manner.” Others who have looked at this issue have come to basically the same conclusion. A Road User Fee Task Force in Oregon examined 28 alternative highway financing mechanisms and concluded, “The only broad revenue source that the task force believes could ultimately replace the fuel tax is a mileage fee.”<sup>4</sup> A pooled fund study involving 15 States and the FHWA examined potential



alternatives to the current system for financing highways. The study identified attributes of an ideal road user finance system and concluded “The best approach to assessing road user charges . . . is one that is based on the actual mileage traveled . . . With a vehicle-miles-traveled (VMT) user charge, an individual state can tailor the per-mile rates to pursue equity and efficiency objectives as well as to encourage environmentally friendly vehicles and travel on appropriate roads.”<sup>5</sup>

### ***Mileage-Based User Fees***

The fact that each of these three major studies identified forms of a VMT fee as the preferred alternative from among a number of other options suggests that such a mechanism should be strongly considered as a long-term replacement for the current fuel tax. Many technical and institutional questions remain to be answered concerning a mileage-based fee, but some of those questions are being addressed in pilot projects being conducted by Oregon, Washington State, and the University of Iowa. Those projects are described in more detail in Volume III.

One of the potential strengths of a mileage-based fee is that it could readily be converted to a congestion pricing charge or a weight-distance fee that would better reflect the impact of the



vehicle on road wear and tear. Pilot projects in Washington State and Oregon demonstrated the ability to apply mileage-based charges to congestion pricing, and factoring in a vehicle’s weight would also be possible. Thus, in addition to being a broad-based general fee that reflects overall highway use, it also can reflect the added costs associated with travel during congested conditions or the costs of travel at different weights in the case of trucks. Whether or not to enable these additional types of charges would be up to each jurisdiction.

A compelling advantage of a mileage-based fee compared to the fuel tax is that the revenues directly reflect the amount of travel, which is a key factor affecting the costs of supplying, operating, and maintaining highway services. While some argue that the fuel tax rewards those who choose to drive more fuel-efficient vehicles, there are other ways to offer such rewards without reducing the highway funds needed to accommodate travel by those fuel-efficient vehicles.

Another advantage of a mileage-based fee is that revenues can be collected from vehicles regardless of the type of fuel they use. While liquid fuels will likely be the main surface transportation fuel for many years, other technologies like plug-in electric vehicles and hydrogen fuel cell vehicles are being developed that could account for a growing segment of the vehicle fleet in the future. Taxing those fuels might be possible, but a concern would be whether that could be done in as equitable a manner as the fuel tax or a mileage-based fee.

### **Technological Challenges**

There are a number of technological issues that must be resolved before a VMT fee could be implemented. Among those are the method for calculating the mileage traveled in each taxing jurisdiction, the way this mileage information would be transmitted to the tax collection agency,



and the way that the system would deal with equipment failures due either to malfunctions or tampering. Various approaches have been used to record miles traveled in pilot projects in this country and in actual mileage-based fee systems in use in other countries. The scope and purpose of the mileage-based fee strongly influences the type of equipment that can be used. Equipment used in some European countries to record mileage traveled on specific highways would not meet the needs of a system to record mileage traveled on all highways in many different jurisdictions.

Transmitting information from each vehicle on the mileage traveled in each taxing jurisdiction raises other technological issues. Options include dedicated short-range communications, cellular communications, and “chip cards,” but there are issues that must be addressed with each of these technologies. In the Oregon pilot project, information on mileage traveled was transmitted at fueling stations, making maximum use of existing tax collection mechanisms. More work remains to be done on this issue to ensure that communicating the data on mileage traveled is as seamless as possible and does not become a show-stopper for mileage-based fees.

Evasion of a VMT fee is another concern. Evasion problems for a VMT fee are different from those for the current fuel tax, and may be more serious. Whereas the fuel tax is paid by only about 1,400 taxpayers, every vehicle owner potentially becomes a taxpayer under a VMT fee. Furthermore, there are several ways a VMT fee potentially could be avoided unless contingency plans were in place. For instance, devices are available that can block global positioning system (GPS) signals, making that technology vulnerable to evasion unless alternative methods for calculating mileage are available when GPS signals are not being received.

Privacy is perhaps the biggest concern with a VMT fee. Many motorists fear that information

on when and where they drive would be transmitted to government authorities. Such detailed information is not needed to implement a VMT fee, however, and pilot projects in this country have been careful not to collect that type of information. Motorists will have to be convinced that detailed information on their travel patterns will not be accessible to others.

### **Institutional Challenges**

Implementing a VMT fee has a number of institutional issues as well as technological challenges. Ideally, the fee should be paid frequently, both for cash flow purposes and to reinforce its user fee characteristics. Receiving frequent payments from operators of every registered vehicle would be a large increase in the tax burden for Federal and State tax collection agencies. In fact, many concepts for the operation of a VMT fee assume that a third-party collection agency would actually receive information on mileage traveled in each jurisdiction, bill the motorist, and then distribute funds among the jurisdictions based on miles traveled and the appropriate tax rate. Much more work remains to be done to develop mechanisms for administering a VMT fee, both in the short run when only a few States have such systems and in the long run when all States may be expected to have such systems.

Another institutional challenge relates to the question of system phase-in. The cost of the

“I would envision a shift away from the gas tax... to a per-mile basis of taxation...in which every vehicle is equipped for mileage-based road user charging in lieu of the gas tax, not in addition to it.”

– *Ed Regan, Senior Vice President of Wilbur Smith Associates, at the Commission's Dallas field hearing.*



in-vehicle technology required for a VMT fee—including an onboard computer, a GPS receiver, wireless communications, and the like—is non-trivial, and it is likely to be more expensive to retrofit existing vehicles than to install the equipment in new vehicles.<sup>6</sup> For this reason, most VMT charging proposals envision that the charging system would be phased in over time. From the inception of the program, new cars would come equipped with the required onboard technology and begin paying road use charges on a per-mile basis. Older vehicles, in contrast, would continue to pay traditional fuel taxes until they were retired from the fleet. For this reason, it would be necessary to operate two revenue instruments in parallel for a period of perhaps 20 years before the entire fleet was equipped with the required onboard technology.<sup>5,6</sup> Operating dual transportation revenue mechanisms is not necessarily problematic—for instance, some toll road users pay manually while others use transponders and are billed on a monthly basis—but it does increase administrative complexity.

The TRB study, *The Fuel Tax and Alternatives for Transportation Funding*, discussed issues involved in transitioning to a new user fee mechanism in some detail. One conclusion was that additional technical trials will be required to assess “the reliability, flexibility, cost, security, and enforceability of alternative designs and to gain



information about institutional requirements for administering such systems, user acceptance, and costs.” The ongoing pilot projects in this country and the mileage-based fees being implemented in Europe will provide valuable information on many of these technological and institutional issues.

The Commission agrees with others who have looked at long-term alternatives to the fuel tax that a VMT fee has many promising features; but, until more is known about collection and administrative costs, ways to minimize evasion, and the acceptability of such a mechanism to the taxpayers, it is premature to rule out other types of taxes and fees to supplement traditional fuel tax revenues.

As noted above, several demonstration projects are underway or have recently been completed that will help overcome some of these barriers. Pilot studies in both Oregon and Washington State were recently completed. Preliminary findings from both studies are encouraging in terms of the technology for mileage-based charging, but both concluded that more work is necessary before the fees could actually be implemented. A larger-scale demonstration called for in SAFETEA-LU is just getting underway through the University of Iowa. That study will assess technological, institutional, and public acceptance issues with VMT taxes in six locations across the country.

These several initiatives will provide valuable information on key issues that must be considered in developing a VMT fee to replace or supplement the fuel tax at both the Federal and State levels. They will not, however, resolve all of the issues that must be addressed before such a fee could actually be implemented.

### ***Development of Transition Strategy***

If the Nation is to transition to a VMT fee or some other alternative to the fuel tax by 2025,



it is crucial to go beyond the very limited pilot projects that have been undertaken to date. A broader consensus must be developed on the basic architecture of a VMT fee. To the maximum extent possible the technology should build upon technologies that will be implemented in connection with VII and other initiatives. Strategies must be explored to reduce risks of evasion, protect privacy, and keep administrative costs as low as possible. Potential ways must also be developed to garner public understanding and support for the new revenue mechanism and to make it clear that the new user fee is intended to replace current fees, not be a charge on top of existing fees. **The Commission recommends that the next surface transportation authorization act should fund a major national study to develop a strategy for transitioning to an alternative to the fuel tax to fund highway and transit programs:**

- A Phase I study should be conducted through the National Academy of Sciences in coordination with the FHWA, the Internal Revenue Service of the U.S. Department of the Treasury, State highway and revenue agencies, and affected stakeholder groups to address the technological and institutional barriers that would need to be overcome to implement a VMT fee. These would include evasion, privacy, the relationship to wear and tear of the highways, and administrative costs. The study should draw upon findings from VMT fee demonstration projects in this country and mileage-based user charge systems that are in place in other countries. The role of VII infrastructure and services in implementing a VMT fee should be assessed. An important goal of this study would be to confirm that a VMT fee is feasible and, if so, to agree upon a system architecture for implementing such a fee.
- While the issues related to implementing a VMT fee are being addressed, the Phase I study should also examine other potential long-term surface transportation revenue options. This analysis should build on the work that has already been done in this area and focus on alternatives to a VMT fee, including ways to equitably tax alternative fuels that cannot be taxed in the same way as current motor fuels, annual registration fees for motor vehicles, and other options that were judged to be promising. Results of the Phase I study should be provided within 2 years of project initiation and should include recommendations concerning which alternative(s) should be explored in greater detail in Phase II.
- If a VMT fee is judged to be feasible in Phase I, a Phase II study involving the same organizations should be conducted to develop a specific plan and timetable for implementing a Federal VMT fee and for coordinating that fee with VMT fees levied at the State and local levels. An important part of this Phase II study will be to conduct several large-scale pilot programs to test alternative mechanisms for levying a VMT fee. These pilot programs should include both passenger and freight vehicles and should evaluate the full range of potential issues that might arise in the implementation of a VMT fee. The study should also assess necessary standards that must be set, the roles of public and private sector organizations in implementing the tax, transitional techniques such as incentives for rental and leased fleets, and other key elements of a transition strategy. Results should be mandated within 3 years. If questions still remain about the feasibility of a VMT fee, the Phase II study should develop transition strategies for implementing other recommended alternatives.

**Exhibit 5-20. Evaluation of potential transportation revenue sources against generally accepted evaluation criteria**

|                              | Revenue Adequacy | Stability/Predictability | Responsiveness to Inflation | Flexibility | Appropriateness of Dedication | Compliance Costs | Administrative Costs | Equity by Vehicle Class | Equity by Income Group | Equity by Geography | Relationship to Economic Efficiency | Point of Taxation and Incidence | Evasion Potential | Ease of Implementation | Average |
|------------------------------|------------------|--------------------------|-----------------------------|-------------|-------------------------------|------------------|----------------------|-------------------------|------------------------|---------------------|-------------------------------------|---------------------------------|-------------------|------------------------|---------|
| Fuel Tax                     |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Indexed Fuel Tax             |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Motor Fuel Sales Tax         |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Value Added Tax              |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Registration Fee             |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Personal Property Tax        |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Vehicle Sales Tax            |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Traditional Tolls            |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Tolling New Lanes            |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Tolling Existing Lanes       |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| VMT Fees                     |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Indexed VMT Fees             |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Congestion Pricing           |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Local Option Sales Tax       |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Impact Fees                  |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Innovative Finance*          |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Public-Private Partnerships* |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Container Fees               |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |
| Customs Duties               |                  |                          |                             |             |                               |                  |                      |                         |                        |                     |                                     |                                 |                   |                        |         |

\* Assumes repayment from tolls

**Legend:** Excellent Very Good Good Not Good Poor Very Poor

**This chart provides a subjective evaluation of a series of alternative revenue sources against a set of criteria.**

Source: Commission Staff analysis.

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources**

| <b>Motor Fuel Taxes, Excise Tax (per Gallon)</b>   |  |
|--|--|
| <b>Source and History</b>  | <p>Motor fuel taxes have been the most important revenue mechanism for highway programs at the Federal and state levels.</p> <p>Most states have traditional “cents per gallon” excise taxes on the highway use of motor fuel. Some also have variable rates based on an inflation adjustment or a fuel price. Several alternative fuels currently are taxed on an energy equivalent basis to gasoline or diesel.</p> <p>Fuel taxes also support transit programs at the Federal level and in some states.</p>   |
| <b>Yield, Adequacy and Stability</b>   | <p>Historically motor fuel taxes have been attractive because of their high yield (currently about \$1.9 billion per penny of tax at the Federal level), their adequacy to support highway construction programs, and their stability. In recent years the adequacy of the fuel tax has come into question because it does not increase with inflation and because voters at all levels of government have been less willing to approve fuel tax increases</p>   |
| <b>Cost-Efficiency and Equity</b>  | <p>Motor fuel taxes are inexpensive to administer and have low compliance costs. Evasion has been a major issue, especially for diesel fuel, but states and the FHWA have reduced evasion levels.</p> <p>Motor fuel taxes at rates sufficient to fund all needs would not add enough to fuel prices to significantly impact travel volumes.</p> <p>Fuel taxes vary with highway use, but this relationship will become less direct as we move toward more fuel efficient vehicles and greater use of alternative fuels.</p> <p>Raising fuel taxes without at the same time raising truck taxes reduces the equity of the overall highway user fee structure because trucks would pay a lower share of their overall highway cost responsibility.</p> |
| <b>Economic Efficiency</b>   | <p>Motor fuel taxes are not economically efficient because they do not vary as the cost of travel increases. They do vary with vehicle fuel efficiency, but the decline in fuel efficiency when vehicles operate in congested traffic does not reflect the full costs of travel in congested conditions.</p>   |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | <p>Motor fuel taxes are applicable to financing programs of improvements, but not individual projects. All levels of government can and do impose motor fuel taxes.</p> <p>Recent studies suggest the fuel tax will be a viable revenue source for highway and transit programs for at least 15 to 20 years, but after that moves to alternative fuels and more fuel efficient vehicles will increasingly erode the ability of the fuel tax to serve its current role as the major revenue source for Federal and State highway programs.</p>  |
| <b>Potential Acceptability</b>   | <p>About 20 States have increased their fuel taxes since 2000, but the general aversion to tax increases has made it difficult to increase fuel taxes. The Federal tax has not been increased since 1993. High fuel prices make it even more difficult to raise fuel taxes, even though the tax represents a smaller share of the total price of fuel when prices are high.</p>  |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | <p>Based on history, adjustments through legislation to the motor fuel excise tax have been the method of choice in most states for major new funding resources to fill funding gaps for state highways.</p> <p>Flat rate fees per gallon have not been adjusted fast enough to keep pace with needs.</p> <p>Motor fuel taxes may be higher per gallon in some States than in neighboring states. Opponents of fuel taxes generally raise the issue of diversion of purchases to neighboring states with lower tax rates.</p>  |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

| <b>Motor Fuel Taxes Indexing of Fuel Taxes</b>   |   |
|--|---|
| <b>Source and History</b>  | About 5 States currently index their fuel tax to some measure of inflation.   |
| <b>Yield, Adequacy and Stability</b>   | The yield and adequacy of motor fuel taxes could be enhanced by indexing to inflation or, in some cases to fuel prices. They could also be indexed to needs estimates or to construction prices, making it responsive to anticipated program costs. |
| <b>Cost-Efficiency and Equity</b>  | Motor fuel taxes by themselves are not equitable among vehicle classes, since the largest vehicles pay less in fuel taxes relative to the costs imposed on highways   |
| <b>Economic Efficiency</b>   | Indexing the fuel tax does not make the tax more economically efficient.  |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Indexing the fuel tax does not affect its applicability.  |
| <b>Potential Acceptability</b>   | Many argue that simply indexing the fuel tax to some measure of inflation does not constitute a tax increase and thus is more acceptable than a tax increase. Others disagree and say that changes due to indexing are tax increases.               |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | A ceiling and floor on the change in the indexed rate may be desirable to prevent large changes in tax rates.<br>Many see indexing as just a backdoor way of increasing the fuel tax.   |
| <b>Motor Fuel Taxes Sales Tax on Fuel</b>  |   |
| <b>Source and History</b>  | Several States impose a tax on the sales price of fuel.   |
| <b>Yield, Adequacy and Stability</b>   | A sales tax on fuel is likely to be more volatile, but could be subject to limits in terms of the maximum or minimum or the rate of change each year.   |
| <b>Cost-Efficiency and Equity</b>  | Motor fuel taxes are mildly regressive among income groups. Basing the rate on the sales price of fuel would make them more regressive.   |
| <b>Economic Efficiency</b>   | Basing the fuel tax on the price of fuel rather than on a gallonage basis would not improve the efficiency of the tax.  |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Basing the fuel tax on the price of fuel rather than on a gallonage basis would not affect its applicability.   |
| <b>Potential Acceptability</b>   | The volatility of fuel prices would adversely affect the public acceptability, especially when fuel prices are rising.  |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | Sales taxes on fuel have recently been of greater interest due to the increase in fuel prices   |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

| <b>Other Types of Petroleum Taxes</b>  |  |
|--|--|
| <b>Source and History</b>  |  |
| <b>Yield, Adequacy and Stability</b>   | Other types of motor fuel taxes could be utilized.   |
| <b>Cost-Efficiency and Equity</b>  |  |
| <b>Economic Efficiency</b>   | Other types of petroleum taxes would be no more efficient than the current tax.  |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Fuel taxes by their nature are applicable only at the program level.   |
| <b>Potential Acceptability</b>   | Pennsylvania has an oil company franchise tax to collect fees on petroleum fuels.  |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | Some believe that petroleum taxes have more voter appeal because of a perception that they are imposed on petroleum companies rather than on individual drivers; however, such taxes are normally passed through to drivers the same as other types of motor fuel taxes. |
| <b>Value Added Tax</b>   |  |
| <b>Source and History</b>  | The U.S. is one of the few countries that does not have a value added tax. The tax is similar to a sales tax, but is levied at every stage in the production process, not just on final consumption as the traditional sales tax.  |
| <b>Yield, Adequacy and Stability</b>   | The yield could be high and would be fairly stable, fluctuating with changes in the national economy.  |
| <b>Cost-Efficiency and Equity</b>  | Administrative costs would be higher than for the fuel tax since there are many taxpayers and considerable documentation involved. This potentially could also make it subject to evasion.   |
| <b>Economic Efficiency</b>   | The economic efficiency would not be as great as the fuel tax since a VAT would not directly reflect transportation requirements or use.   |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | The VAT could be applicable to general transportation purposes. It would be applicable to financing programs of transportation improvements, but not individual projects. It almost certainly would be limited to the national level.                                    |
| <b>Potential Acceptability</b>   | Like any new tax it would face opposition from taxpayers and from businesses.  |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | A general VAT has been discussed for many years, but rejected. Estimating just the value added by transportation could be difficult.   |
| <b>Registration and Other Vehicle Fees</b>   |  |
| <b>Source and History</b>  | All states have traditional types of registration fees for light vehicles and somewhat higher and graduated fees for heavy vehicles.<br><br>At the Federal level the Heavy Vehicle Use Tax is similar to a registration fee but it applies only to the heaviest trucks.  |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

**Registration and Other Vehicle Fees, continued**

|  |   |
|--|---|
| <b>Yield, Adequacy and Stability</b>   | Registration fees provide major revenue sources for states and local governments (through state allocations) and must be adjusted through legislation. In addition to adjusting rates, other options include revising the type of registration fee.   |
| <b>Cost-Efficiency and Equity</b>  | Registration fees are relatively inexpensive to administer in relation to potential yield, but not as inexpensive as fuel taxes. The fact that registration fees do not vary by miles traveled is a major source of inequity and inefficiency. Registration fees allow for collections from vehicles using alternative fuels without establishing new mechanisms for collection.                        |
| <b>Economic Efficiency</b>   | Registration fees can be varied by vehicle size and can be set in rough relation to highway cost responsibility, except for the impacts of different mileage by similar sized vehicles. Thus for trucks they may be somewhat more efficient than fuel taxes, but for passenger vehicles they likely are less efficient because they do not vary by mileage and they do not capture costs of congestion. |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Like fuel taxes registration fees are applicable at the program level, but not the project level. The federal Heavy Vehicle Use Tax is similar to a registration fee and all States have registration fees.   |
| <b>Potential Acceptability</b>   | Registration fee adjustments are promising as both a short- and long-term option for funding highways.  |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | Equity among vehicle classes would indicate that parallel adjustments in registration fees should be made applicable to all vehicles.   |

**Registration Fees Based on Value Personal Property Taxes**

|  |   |
|--|---|
| <b>Source and History</b>  | A registration fee based on value can be structured as a personal property tax and be deductible from Federal income.   |
| <b>Yield, Adequacy and Stability</b>   | A fee on the value of a vehicle could raise substantial revenue, and could be structured to be deductible for Federal income tax purposes, thus increasing the state's revenue yield without an equal increase in net total tax payments. |
| <b>Cost-Efficiency and Equity</b>  | Registration fees for light vehicles, if collected on a flat basis, are somewhat regressive by income class. Registration fees for light vehicles on the basis of value are progressive.  |
| <b>Economic Efficiency</b>   | Basing registration fees on value could improve their efficiency somewhat since newer vehicles tend to be driven more than older vehicles.  |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Levying fee on the basis of a vehicle's value would not change the overall applicability of registration fees.  |
| <b>Potential Acceptability</b>   | Registration fees (in actuality, personal property taxes on vehicles) based on value have the best revenue generating potential and are less costly to taxpayers in the state.  |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | Some states have recently eliminated or reduced such fees despite their advantages in comparison to collecting other state taxes that are not deductible for federal income tax purposes.   |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

| <b>Sales Taxes on Vehicles</b>   |   |
|--|---|
| <b>Source and History</b>  | The Federal Government and many States have sales taxes on vehicles. The Federal tax applies only to heavy trucks, but formerly had been applied to all vehicle sales.  |
| <b>Yield, Adequacy and Stability</b>   | Sales taxes on vehicles can be useful revenue sources. They can bring in relatively large amounts of money but their stability is threatened by trends toward the purchase of smaller, more fuel efficient vehicles that cost less than large cars and SUVs.  |
| <b>Cost-Efficiency and Equity</b>  | Sales taxes on vehicles will be fairly progressive. Administrative costs are relatively low, but especially with trucks there are issues concerning what specialized equipment should be exempt from taxation.  |
| <b>Economic Efficiency</b>   | Sales taxes do not vary with the amount of travel or other factors that affect the costs of travel and thus have poor efficiency.   |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Sales taxes are much more applicable to the program level than the project level. They are particularly applicable at the local level, but could be used at the State level as well.  |
| <b>Potential Acceptability</b>   | Sales taxes on vehicles have substantial revenue raising potential.   |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | All sales taxes already may be deposited into general revenue accounts.   |
| <b>Traditional Tolls</b>   |   |
| <b>Source and History</b>  | Selected highways and selected bridges have historically been toll facilities.  |
| <b>Yield, Adequacy and Stability</b>   | Existing toll facilities have been proven to be reliable and stable generators of revenue. The bonds of toll agencies are highly marketable.  |
| <b>Cost-Efficiency and Equity</b>  | Administration and compliance costs for tolling are greater than for motor fuel taxes, although these costs are reduced greatly through electronic toll collection.   |
| <b>Economic Efficiency</b>   | Traditional tolls vary by miles traveled and the size of trucks so are more efficient than fuel taxes, but traditional tolls do not vary with congestion levels.  |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Traditionally tolls have been used to finance individual projects. Several States allow tolls from one project to be used to provide front-end financing for other toll roads and thus tolls can be applicable to systems of toll roads or to transit facilities as well. Tolls are applicable at the State and local level, but have not been used at the Federal level. |
| <b>Potential Acceptability</b>   | Tolls may be considered to be highly promising options for application to new highway capacity in the longer term with perhaps some limited short-term opportunities.   |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | A few existing toll facilities have been leased to international companies, substituting short-term revenue gains by public agencies for lesser longer-term revenues.   |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

| <b>Tolling New Lanes</b>   |  |
|--|--|
| <b>Source and History</b>  | In the past 10 years, 30-40 percent of new limited access highway mileage has been financed at least in part through tolls.  |
| <b>Yield, Adequacy and Stability</b>   | Legislation may be necessary to enable new types of tolls or pricing initiatives. Electronic pricing could significantly expand future opportunities. Toll revenues have been relatively stable at from 5-7 percent of total revenues for highways. If tolls are indexed to inflation revenues could increase substantially. Variable pricing would also increase toll revenues. |
| <b>Cost-Efficiency and Equity</b>  | Tolls collected at traditional toll booths are expensive to administer, but electronic tolling is much less costly. Tolls can be set to achieve equity among vehicle classes. Concerns about the impacts of tolling on equity among income groups continue, but HOT lanes have been supported by all income groups.  |
| <b>Economic Efficiency</b>   | Variable tolls are much more economically efficient than fuel taxes.   |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Tolls are predominantly facility-based revenue sources used to finance individual projects. Tolls are applicable at the State and local level, but have not been used at the Federal level.  |
| <b>Potential Acceptability</b>   | Major positive opportunities exist to toll new future capacity. Sometimes this could be accomplished with tolls covering only a portion of needed revenues, which provides more total revenue and capacity than no tolling new facilities. Special types of toll facilities such as for truck lanes or HOT lanes could be promising.   |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | Acts allowing Regional Mobility Authorities (RMA) and a PPP act could expand future possibilities for tolling. Some states do not yet have a PPP act parallel to that of other states, which would enable private parties to initiate proposals to develop new facilities or to add toll lanes to existing facilities.   |
| <b>Tolling Existing Lanes</b>  |  |
| <b>Source and History</b>  | There currently are restrictions on tolling existing Interstate Highways but that can be done under several pilot programs for either pricing purposes or reconstruction of existing Interstate Highways.  |
| <b>Yield, Adequacy and Stability</b>   | Tolling existing lanes could provide very substantial additional revenues.   |
| <b>Cost-Efficiency and Equity</b>  | Tolling existing lanes could provide for greater equity than other sources of new revenues, but is widely perceived as inequitable (“paying twice”). This perception is false, however, since funds are needed for the continued maintenance and operation of the facilities.  |
| <b>Economic Efficiency</b>   | Variable tolls are much more economically efficient than fuel taxes.   |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Tolls are predominantly facility-based revenue sources used to finance individual projects. Tolls are applicable at the State and local level, but have not been used at the Federal level.  |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

**Tolling Existing Lanes, continued**

|  |   |
|--|---|
| <b>Potential Acceptability</b>   | Opposition to tolling existing lanes is greater than to tolling new lanes. The greatest opportunity for tolling existing lanes may come with tolling Interstate facilities when they must be reconstructed. |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b> | Sentiment is against tolling any currently free highway lanes. Likewise, little opportunity exists for tolling existing free bridges.   |

**VMT Fees**

|  |   |
|--|---|
| <b>Source and History</b>  | Fees on VMT could be longer-term options that could supply revenues without being directly tied to fuel consumption. VMT fees could be weighted by fuel economy, weight, emissions, or other factors to support other policy goals.   |
| <b>Yield, Adequacy and Stability</b>   | VMT fees could be set to yield any level of desired revenues, but unless indexed to inflation their purchasing power would erode over time as does the fuel tax currently. VMT fees do not conflict with the need to reduce energy costs, reduce the balance of payments, or reduce fossil fuel consumption.  |
| <b>Cost-Efficiency and Equity</b>  | VMT fees would be more costly to collect and administer than fuel taxes, but long term costs are uncertain.   |
| <b>Economic Efficiency</b>   | VMT fees are more directly related to vehicle use than fuel taxes or registration fees. VMT fees, especially if applied as congestion pricing fees or weight-distance taxes can send strong pricing signals to users.   |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | VMT fees are primarily for program financing rather than project financing – the counterpart at the project level is the toll. VMT fees could be used at the Federal, State, or local levels.   |
| <b>Potential Acceptability</b>   | A 2005 study of highway and transit revenue options for the U.S. Chamber of Commerce’s National Chamber Foundation identified VMT fees and congestion pricing fees as promising options in the long term (15 years or more).<br>VMT fees do not reward use of fuel efficient vehicles as does the fuel tax, but incentives for fuel efficient vehicles could come through registration fees |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | VMT fees or congestion pricing fees require the technology to collect those fees reliably and also the political will to implement a new approach. There are privacy concerns associated with VMT fees but concerns are not substantiated. Transitioning away from fuel tax and to a VMT tax will require substantial coordination and consensus building.                                  |

**Congestion Pricing**

|                                      |  |
|--------------------------------------|--|
| <b>Source and History</b>            | Could be applied as a special kind of VMT fee, with fees varying based on the level of congestion on the road. Pricing can also be implemented on an area-wide basis or a cordon basis. While the primary goal of congestion pricing is demand management rather than revenue generation, pricing can generate substantial revenues as well. Pricing can be either facility-based or area-wide. Oregon is demonstrating the technologies for collecting VMT fees at the fuel pump. |
| <b>Yield, Adequacy and Stability</b> | To maintain purchasing power congestion-related fees would have to be indexed to respond to inflation, but such indexing might not result in the level of congestion tolls desirable to efficiently manage demand.<br>The yield and adequacy of congestion pricing revenues depend on where and how they are implemented. In some cases facility-based charges may cover facility construction and operations costs, but in other cases they may not.                              |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

| <b>Congestion Pricing, continued</b>   |   |
|--|---|
| <b>Cost-Efficiency and Equity</b>  | Congestion pricing is more expensive to administer and enforce than motor fuel taxes. Concerns have been raised about the equity of congestion pricing. Equity is strongly influenced by the availability of good alternatives to driving on the priced highways. Rebate programs have been suggested as one way to reduce adverse impacts on lower income groups.  |
| <b>Economic Efficiency</b>   | Congestion pricing is more economically efficient than fuel taxes or most other revenue sources because users directly pay all or part of the costs their driving imposes on others. Congestion pricing could be combined with a weight-distance tax to capture the costs associated with operations of heavy trucks.   |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | In the long run, VMT fees and congestion pricing could replace all or a portion of current user fees.<br>Congestion pricing is applicable at either the project level or an area-wide level, but it generally would not be applicable to financing entire statewide transportation improvement programs.  |
| <b>Potential Acceptability</b>   | In the U.S. pricing generally has been limited to individual bridges and to HOT lanes and express lanes. The HOT lane and express lane applications have generally been well accepted since they provide drivers the choice of whether to pay to avoid congestion or not. Acceptance of pricing entire facilities or entire areas of a city is more controversial.  |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | The ability to apply pricing on the Interstate System is limited by federal law.<br>Good transit alternatives also must be available for those who cannot afford the congestion toll and cannot change their trip destination or time of day.   |
| <b>Local Option Taxes</b>  |   |
| <b>Source and History</b>  | Have been widely used in many states to support highway and transit investments. Local governments in most states have implemented some type of local option tax, which must be specifically allowed by state enabling legislation.<br>Local option taxes for transportation investments include motor fuel, vehicle, property, sales, and income taxes.  |
| <b>Yield, Adequacy and Stability</b>   | Sales taxes tend to have the highest yield compared to other local option taxes. Motor fuel and vehicle taxes tend to generate less revenue compared to other local option taxes.<br>Except for motor fuel and vehicle taxes, other local option taxes tend to be indexed with inflation. Sales taxes respond to economic growth.<br>Fluctuations in economic conditions tend to affect sales tax yield. Gasoline taxes and income taxes also could be impacted to some level by fluctuations in the economy. |
| <b>Cost-Efficiency and Equity</b>  | Collection mechanisms already are in place to levy these taxes at the state or local level.<br>Most local option taxes are regressive (except for income taxes). However, sales taxes tend to receive stronger support than other local option taxes. People consider that sales taxes are more "fair," since everyone pays, whether they are vehicle or transit users.   |
| <b>Economic Efficiency</b>   | Most local option taxes do not reflect the costs associated with highway use and thus are not economically efficient.   |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Local option taxes may be applicable to a major project, but are more applicable to a program of transportation improvements. By definition these fees are applicable only at the local level.  |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

| <b>Local Option Taxes, continued</b>   |  |
|--|--|
| <b>Potential Acceptability</b>   | <p>State legislation must be in place that allows local option taxes.</p> <p>Sales taxes have been widely used by transit agencies to support operations and capital investments.</p> <p>Rates of success with ballot measures to fund transportation have been increasing, as documented by the Center for Transportation Excellence.</p>   |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | <p>Commonly, local option taxes require voters' approval. While an expenditure plan that specifies projects and/or programs to be funded with the new local option tax levies is not always required, local option taxes have better chances of success for implementation where expenditures and uses are clearly defined.</p> <p>Implementation plans that are well designed have resulted in very high success rates for ballot measures to enhance transportation revenues.</p>  |
| <b>Beneficiary Charges: Impact Fees</b>  |  |
| <b>Source and History</b>  | <p>Impact fee legislation exists in 26 states (excluding Florida). Impact fees for transportation improvements are widely used in California and Florida.</p>  |
| <b>Yield, Adequacy and Stability</b>   | <p>Revenues from impact fees are typically dedicated for certain road and transit improvements that would serve the new development. In addition, revenues from impact fees will be highly dependent on development opportunities in the area where implemented.</p> <p>Value capture tools are subject to increases in property value realized by infrastructure improvements.</p>  |
| <b>Cost-Efficiency and Equity</b>  | <p>These charges can be relatively equitable if properly structured. Benefit districts can target the specific beneficiaries.</p> <p>While impact fees are directly charged to developers, they pass those charges to buyers, increasing the cost of real estate.</p> <p>TIF allocates a portion of the additional property taxes resulting from the increase in property values.</p> <p>Communities and local agencies could argue that implementation of TIF would take away revenues that otherwise would be used to meet other public needs.</p> |
| <b>Economic Efficiency</b>   | <p>Beneficiary charges send modest pricing signals to encourage better transportation and land use integration.</p>  |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | <p>Beneficiary charges may be applicable to a major project, or to a program of transportation improvements in a local area. These fees are applicable only at the local level.</p>  |
| <b>Potential Acceptability</b>   | <p>Implementation is subject to enabling legislation that allows the collection of impact fees and the formation of assessment districts.</p> <p>These tools tend to be most applicable in higher growth state or localities.</p>  |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | <p>Impact fees are only applicable to new development. TIF and other property assessments may require the formation of districts, where property tax levies are dedicated for transportation improvement. This may require voters' approval from district residents and business owners.</p> <p>Beneficiary charges have been the subject of numerous lawsuits in many areas.</p>  |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

| <b>Innovative Finance</b>  |  |
|--|--|
| <b>Source and History</b>  | Most states have used one or more forms of the IF financing tools. Innovative finance is not a source of new revenues, but rather a method of financing projects or programs of projects. It usually involves borrowing that must be repaid from other sources of funds such as fuel taxes, tolls, or other revenue sources.   |
| <b>Yield, Adequacy and Stability</b>   | IF financing tools are used to leverage capital in the form of debt or equity. They rely on existing or new revenue sources to pay the indebtedness.   |
| <b>Cost-Efficiency and Equity</b>  | Incurring longer-term debt helps advance programs and projects that would otherwise take years to develop if at all. Innovative finance may be more equitable than financing high-cost projects out of current revenues because it spreads the cost to future users who will also benefit from the investment.   |
| <b>Economic Efficiency</b>   | The economic efficiency will depend on the source of revenues from which indebtedness is repaid.   |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Innovative finance is more often used at the project level, but it also is applicable to the program level as well. It is most applicable to the State and local levels of government.   |
| <b>Potential Acceptability</b>   | Innovative finance is usually well accepted since it spreads the cost of projects over time.   |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | States may require enabling legislation to issue GARVEE bonds. Most innovative finance grant management tools are codified under Title 23 U.S.C. and require no special action from states to be used. To test new grant management tools, states may apply to U.S. DOT under the SEP-15 or TE-045 programs.<br><br>Debt mechanisms must be balanced against long-term revenue sources. Many states cap the amount of debt that can be issued. |
| <b>Public Private Partnerships</b>   |  |
| <b>Source and History</b>  | PPPs are commonly used in Europe to reduce public-sector costs to construct, operate, and maintain highway facilities but are not yet widely used to support similar projects in the United States. PPPs are primarily financing and project delivery mechanisms, but like innovative finance they may help accelerate project delivery. Highway improvements are now eligible for financing with private activity bonds.                      |
| <b>Yield, Adequacy and Stability</b>   | States and other public sponsors increasingly consider private-sector involvement as a way to spur implementation of large projects. Since these projects typically are supported by tolls, the yield, adequacy, and stability will depend on characteristics of the specific project.   |
| <b>Cost-Efficiency and Equity</b>  | PPPs can facilitate access to private capital and bring innovative cost-saving projects delivery methods. Cost-efficiency and equity will be similar to other types of tolls. Since the private sector often handles toll collection and must deal with enforcement, public agency costs for those items are low.  |
| <b>Economic Efficiency</b>   | The economic efficiency of PPPs as a financing mechanism is similar to other toll facilities, although PPPs are more likely to use electronic toll collection and other methods for improving operational efficiency. Other efficiencies unrelated to financing may also be realized through the use of PPPs.  |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

| <b>Public-Private Partnerships, continued</b>  |  |
|--|--|
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | PPPs that involve private sector capital generally are implemented at the project level. Several states are using PPPs to operate and maintain portions of their highway systems, but those do not all involve tolling. PPPs are applicable at either the State or local level.  |
| <b>Potential Acceptability</b>   | PPPs have become quite controversial. Several States routinely consider PPPs for certain types of projects while uncertain public acceptance has prevented other States from doing so.   |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | Specific project proposals need to be evaluated to determine if it will be cost-effective. May require enabling legislation. More than 20 states have explicit PPP acts that provide means to bring the private sector into funding and management of highways. Virginia's act has fostered a wide range of proposals.   |
| <b>Container Fees</b>  |  |
| <b>Source and History</b>  | A number of current and emerging trends are driving the exploration of container charges and other direct user fees as a transportation revenue source. These include the rapid growth in international and domestic freight volumes and recognition that new revenue sources will be needed to fund freight-specific transportation improvements.   |
| <b>Yield, Adequacy and Stability</b>   | Container fees represent a potentially large source of revenue. A recent NCHRP report estimated that a \$30/TEU fee applied at all U.S. ports, would generate average annual revenues of \$2.2 billion through 2017. A study performed in 2005 for the Southern California Association of Governments (SCAG) found that a container fee of \$192 per TEU assessed on every inbound loaded container at the San Pedro Bay ports could fund about \$20 billion in access infrastructure improvements.        |
| <b>Cost-Efficiency and Equity</b>  | Container fees offer a way to tie freight system users more directly to the resources and infrastructure they use. These fees are seen by many as a more equitable method to raise revenue that can be dedicated specifically to freight system improvements.  |
| <b>Economic Efficiency</b>   | Economic efficiency will depend on the extent to which the container fees reflect the costs associated with the freight facility. If congestion costs are not significant and container traffic represents the preponderance of traffic on the facility, container fees may be relatively efficient, although they would not capture differences in the container weights.   |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | There are limited options to fund or finance non-highway freight improvement projects. Current federal programs may be applicable to small, localized freight system improvements, but are not well suited to larger regional intermodal freight improvements. Container fees could provide substantial revenues for such large-scale projects and would be appropriate for both rail and highway components of intermodal projects. Container fees could be applicable to either State or local projects. |
| <b>Potential Acceptability</b>   | It will be challenging to develop consensus among competing jurisdictions and other stakeholders on the types and locations of projects to be developed.   |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | Implementing a container fee that equitably links costs and potential benefits for the mix of freight traffic using any given gateway may be difficult.  |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

| <b>Customs Duties</b>  |  |
|--|--|
| <b>Source and History</b>  | The majority of customs duties currently are deposited into the U.S. General Fund, although a portion is used to support costs of Customs and Border Patrol operations.  |
| <b>Yield, Adequacy and Stability</b>   | In FY 2002 customs duties amounted to \$23.8 billion in gross revenue, three quarters of which was collected from marine sources. This would be a very stable source of revenues.  |
| <b>Cost-Efficiency and Equity</b>  | Fees based on the value of cargo are not as equitable as those on the volume because they do not reflect the transportation requirements as well.  |
| <b>Economic Efficiency</b>   | The economic efficiency of customs duties is poor since the value of cargo has little bearing on costs associated with moving the cargo. The efficiency of customs duties would also depend on the type of facilities financed from those fees.  |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | Customs duties would be most appropriately used for improvements to waterside or landside port or airport facilities, to improve the connections between these facilities and the highway and freight rail systems, or to improve freight facilities serving large volumes of international shipments. They would be applicable to the Federal level only. |
| <b>Potential Acceptability</b>   | One key disadvantage is the likely resistance by the Congress and federal agencies to the diversion of Customs duties to offset freight transportation investments.  |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | Some will argue that gateway improvement programs already exist and point to SAFETEA-LU's Coordinated Border Infrastructure Program (Section 1303), but finding from that program currently is inadequate.   |
| <b>Tax Credit Bonds</b>  |  |
| <b>Source and History</b>  | Like innovative finance, tax credit bonds are a financing mechanism and not a new source of revenue. Tax credits would represent reductions of income taxes owed by bond holders.  |
| <b>Yield, Adequacy and Stability</b>   | Tax credit bonds could provide a large and stable source of funds to finance transportation improvements for a fixed period of time.   |
| <b>Cost-Efficiency and Equity</b>  | Tax credit bonds would have low administrative and enforcement costs since those costs would be small increments of costs associated with processing Federal income tax returns. Bonds would be relatively progressive with income since bond interest would be paid from general tax revenues.  |
| <b>Economic Efficiency</b>   | Income tax from which bond interest would be "paid" has no relationship to costs of transportation system use.   |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | This financing mechanism would be applicable at the program level and would apply to the Federal Government.   |
| <b>Potential Acceptability</b>   | Implementing such a financing mechanism would be difficult since it could represent a loss of General Fund revenues.   |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | Several tax credit bond proposals for surface transportation have been introduced in recent years (e.g., Build America Bonds, Amtrak, other rail infrastructure), but none has yet been enacted.   |

**Exhibit 5-21. Advantages and disadvantages of alternative revenue sources, continued**

| <b>Infrastructure Bank</b>   |  |
|--|--|
| <b>Source and History</b>  | Over the years various forms of infrastructure bank have been proposed as mechanisms to provide funds for infrastructure investment. These banks are not necessarily limited to transportation investment. Like other financing mechanisms, funds borrowed from the infrastructure bank would have to be repaid from some other general or project-related revenue source. |
| <b>Yield, Adequacy and Stability</b>   | Infrastructure banks can provide large and stable sources of funds for a limited period of time.   |
| <b>Cost-Efficiency and Equity</b>  | Administrative costs generally would depend on the revenue source from which borrowed funds were repaid.   |
| <b>Economic Efficiency</b>   | The relative economic efficiency would depend on the source of revenues from which borrowed funds were repaid. Tolls would tend to be more efficient than fuel taxes or other general revenues.  |
| <b>Potential Applicability at Program or Project Level and by Different Levels of Government</b> | This financing mechanism would be applicable to either the program or project level. Revenues to repay loans would come from the State or local level of government.   |
| <b>Potential Acceptability</b>   | Borrowed funds would likely come from the Federal General Fund. Getting agreement to allocate General Funds for this purpose could be difficult.   |
| <b>Implementation Issues and Potential Strategies to Overcome Barriers</b>                       | As noted, there have been several proposals for infrastructure banks over the years, but it is not believed any have been enacted.   |

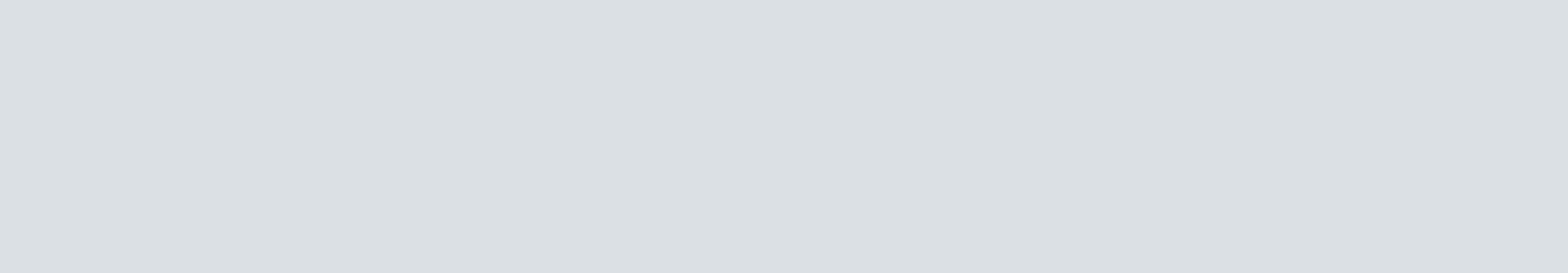
This table provides details supporting the summary evaluation of alternative revenue sources presented in Exhibit 5-20.

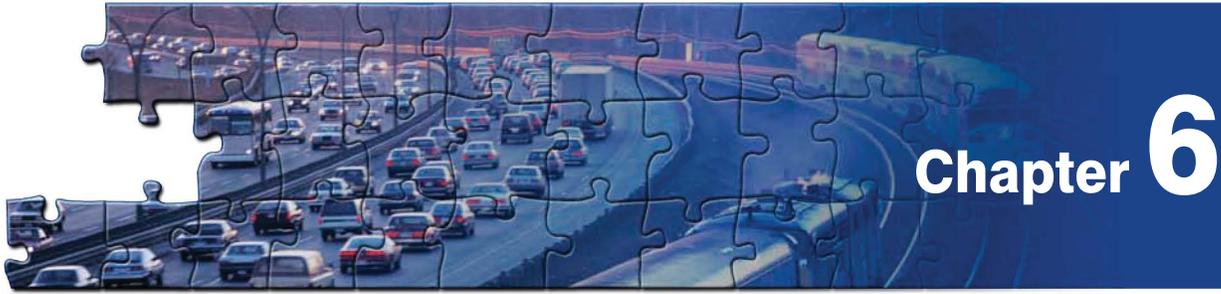
Source: December 2006 NCHRP study, *Future Financing Options to Meet Highway and Transit Needs* and Commission Staff analysis.

**Endnotes**

- <sup>1</sup> Association of American Railroads (AAR)/ Cambridge Systematics, *National Rail Freight Infrastructure Capacity and Investment Study*, 2007.
- <sup>2</sup> U.S. Department of Transportation, Maritime Administration, *U.S. Public Port Development Expenditure Report (FYs 2005 & 2006-2010)*, July 2007.
- <sup>3</sup> *Current Toll Road Activity in the U.S. A Survey and Analysis*, [http://www.fhwa.dot.gov/ppp/toll\\_survey0906.pdf](http://www.fhwa.dot.gov/ppp/toll_survey0906.pdf).
- <sup>4</sup> Road User Fee Task Force, *Report to the 72nd Oregon Legislative Assembly on the Possible Alternatives to the Current System of Taxing Highway Use through Motor Vehicle Fuel Taxes*, March 2003, p. 2.
- <sup>5</sup> Forkenbrock, David J., and Kuhl, Jon G., *A New Approach to Assessing Road User Charges*, Public Policy Center, University of Iowa, 2002.
- <sup>6</sup> Whitty, James, *Oregon's Mileage Fee Concept and Road User Fee Pilot Program*, Final Report, November 2007, ([http://www.oregon.gov/ODOT/HWY/RUFPP/docs/RUFPP\\_finalreport.pdf](http://www.oregon.gov/ODOT/HWY/RUFPP/docs/RUFPP_finalreport.pdf)).







# Chapter 6

## Are Program and Institutional Reforms Instrumental to Achieving Our National Vision?

### What Are the Barriers to Quality Transportation Facilities and Effective System Operation?

An important part of the charge by the Congress to the Commission was to develop a conceptual plan to ensure that the Nation's surface transportation needs are served, including specific recommendations regarding Federal policies and legislative changes. The Commission determined that a robust plan must go beyond platitudes and deal with specific issues of role and governance. The Commission heard testimony about serious deficiencies in the ability of current Federal surface transportation programs to deal with emerging issues that will face public and

private sector providers of transportation. While these programs may once have been effective, their deficiencies are now barriers to addressing the challenges facing the system. As explained in the preceding chapters, the Commission studied the performance of the Nation's transportation system and the future demands that will be placed on that system and concluded that a complete re-examination of the means by which the system is operated and improvements funded was an important element of this study.

Therefore, the Commission has studied the structure of Federal programs, the institutions that have developed in association with intergovernmental grant relationships, and programmatic requirements. In doing so, the Commission has sought to identify specific options to address shortcomings. The findings focus on two classes of issues: those associated with



program design and those associated with project delivery processes. As a result, the Commission believes that future funding and regulatory relationships essentially must be developed on a “clean slate” and there must be radical reform to Federal programs, processes, and requirements.

In evaluating the options, the following questions reflect the approach that guided the Commission’s thinking:

- Are some classes of national priorities (as reflected in the Commission’s themes) best suited to State/local implementation? Are others best suited to National-scale/Federal implementation?
- Are some classes of national priorities suited to a performance management orientation at the National, State, or local levels?
- Can some classes of national priorities be implemented successfully through joint stewardship?
- Are private sector and the public sector interests sufficiently compatible to be applied to transportation needs under a common program construct?
- Are the “good practices” and policy “protections” built into existing Federal processes sufficiently adopted by the public sector to allow State and local governments more process latitude, potentially eliminating a “one size fits all” set of requirements that results in waste? Or must certain public interest protections be retained and/or streamlined at the Federal level?
- Are current programs and institutional arrangements appropriate for the multi-State and regional issues that will become more important as megaregions continue to develop?



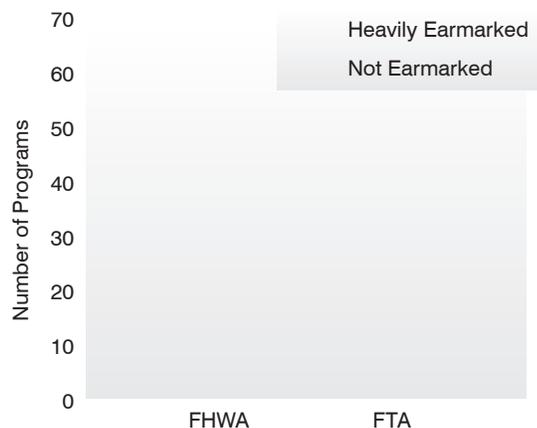
The Commission has concluded that the Federal surface transportation program

The Commission has identified a number of critical policy issues that should be addressed in program reforms.

### **Lack of National Program Focus**

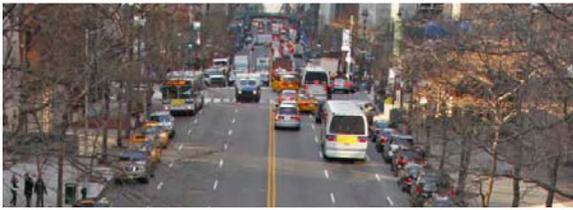
The absence of national investment priorities under our current surface transportation programs has been frequently raised, illustrated by long lists of highway and transit programs authorized in SAFETEA-LU, many of which are heavily earmarked (see Exhibit 6-1). Many such categorical programs address narrow issue areas, arguably with meritorious intent, but with little or no overarching national interest. The Commission believes that surface transportation programs

**Exhibit 6-1. Highway and transit programs in SAFETEA-LU**



**This exhibit shows categorical highway and transit programs authorized in SAFETEA-LU, and indicates the number that were heavily earmarked.**

Source: Commission Staff analysis



should be reconstructed from a “clean slate” to allow for radical program reforms. Elements considered in assessing the lack of program focus include the following.

**National Surface Transportation Interests.**

As described in Volume I of this report, Commission has identified several priority surface transportation issues. Those issues generally cut across modes and, with the exception of safety, they are not specifically addressed by existing Federal programs. Transit and certain highway programs deal with metropolitan mobility, but not in a comprehensive way. Likewise, several highway programs address freight investment needs, but not in a way that targets potential multimodal freight improvements in the national interest.

**Relative Authority and Responsibility.**

Commissioners believe that Federal funding should be directed to those program areas with the greatest national interest. In general, each level of government should contribute financial support for various surface transportation improvements in proportion to their relative interest compared with other levels of government. The private sector also has a greater interest in some program elements than others, especially those for which there is a revenue stream from which it can earn a return on its investment.

Not all investments within any program area are equally important. For instance, bridges on the Interstate System have a greater national interest than bridges on low-volume local roads, some parts of the National Highway System (NHS) have a greater national interest than others, and certain intercity passenger rail projects will be more cost effective than others. The scope of Federal programs should be narrowed and alternatives examined for distributing funds to those program areas with the greatest national interest.



**Functional Orientation.** The Commission generally supports refocusing Federal programs around functional areas (e.g., freight, metropolitan mobility, etc.) rather than modes. This proposed realignment would be most effective if State and local programs similarly were focused on functional areas rather than individual modes. Changes in this direction at the Federal level certainly could help move State and local transportation agencies to make similar changes; but, especially at the State level, significant institutional barriers would have to be overcome before transportation programs could be truly multimodal.

**National Strategic Plan.** Another factor contributing to the lack of program focus is the fact that there is no overarching national plan for surface transportation. Much testimony to the Commission expressed the desirability of having a “national plan,” either for a single function such as freight or an overarching national strategic transportation plan. Over the years several national transportation policy statements have been developed as well as more focused freight policy statements, but these have not included specific improvement plans. The Interstate System is perhaps the only example of a national plan to construct a specific system of facilities. Once the Interstate System was completed, however, there was no national plan for maintaining its condition and performance.





The NHS designated in 1993 was quite different from the Interstate System. The NHS was simply a network of existing high-volume highways for which no design or performance standards were established. It was a way to focus Federal investment on a broader system of highways than the Interstate System; but, without design or performance standards, the general public is hardly aware the NHS exists. And, like the Interstate System, there is no national plan for maintaining the condition and performance of the NHS. There currently are no nationally designated facilities or plans for the public transit, freight rail, or passenger rail modes.

The Commission believes that surface transportation programs cannot fully contribute to economic growth, international competitiveness, or other national goals without a national investment strategy. Furthermore, the Commission believes this investment strategy can serve as a basis for allocating funds among States and metropolitan areas to maximize the return on Federal investment and achieve the greatest overall improvement in surface transportation conditions and performance.

**Reducing the Focus on Redistribution Across States.** The trend in the last several highway bills has been to address the redistribution of Federal funding across States by assuring certain levels of “returns” to the States, bringing each State’s share of the overall funding closer to its total relative contribution of user fees to the Highway Trust Fund (HTF). This return-to-source approach is contrary to focusing Federal funding on national

priorities. Indeed the Equity Bonus program under SAFETEA-LU, whose sole purpose is to ensure that all States receive a minimum share of Federal-aid highway funds, is the largest Federal highway program in terms of funding, larger than even the Interstate Maintenance and NHS programs. In recent reauthorizations, a number of States have pushed to get back even larger shares of their HTF contribution.

Surface transportation investment requirements to meet national interests are not spread evenly across the States. Each State has Interstate and NHS highways that serve national interests, and each State has improvements that could be made to improve safety; but, many other improvements with a national priority are not distributed across all States, such as urban transit investments and intermodal freight facilities. National productivity and economic efficiency are enhanced when Federal monies are invested in those improvements with the greatest national return, not when large amounts are redistributed to States by some formula that bears no connection to national transportation system performance.

### ***Ineffective Investment Decisions***

A common theme expressed to the Commission was that inefficiency in the surface transportation investment decisionmaking process has caused a significant misallocation of resources. Elements that contribute to less-than-optimal investment decisions include the following:

**(1) Lack of performance standards.** The system performance measures that have been adopted by the U.S. Department of Transportation (USDOT) for strategic planning purposes are disconnected from the structure and function of the individual grant programs to which they theoretically are linked. The disconnect between





program structures and desired outcomes makes it difficult to hold the recipients of Federal funds accountable for improving key aspects of transportation system performance. As the old saying goes, “If it doesn’t get measured it doesn’t get done.” Federal programs have evolved into what is now essentially a block grant model, with little accountability for specific outcomes. While considerable work has been done on techniques to measure performance, there are relatively few examples of using performance standards to build into grant relationships accountability for achieving improved levels of performance at the overall program level.

**(2) Congressional earmarking.** Earmarking undermines the efficient use of transportation resources on several levels. In the most basic sense, the earmarking of funds reduces the resources available to the owners and managers of transportation assets who are best positioned to assess investment priorities. Since earmarks frequently cover only a fraction of the total cost

of a project, State and local recipients of earmarks frequently must divert other available Federal, State, and local funds to fully fund the project. Earmarks thus wind up leveraging other resources in a manner that is often detrimental to the overall transportation system.

Widespread earmarking tends to undermine the confidence of system users in how infrastructure investment decisions are made. Furthermore, bypassing the State and local planning process by inserting new projects or advancing lower-priority projects onto publicly vetted long-range plans inspires a certain level of cynicism among transportation stakeholders, suggesting that politics is the ultimate driver of funding decisions. Such an approach at the Federal level fosters similar behavior at the State and local levels, further undermining the credibility of the decisionmaking process. Exhibit 6-2 shows the growth in earmarks for highway projects in surface transportation authorization acts dating from the Surface Transportation Assistance Act of 1982.

**Exhibit 6-2. Evolving history of highway earmark projects\***

|                      |       |       |          |      |           |     |
|----------------------|-------|-------|----------|------|-----------|-----|
| STAA (1983–86)       | 10    | N/A   | \$410    | N/A  | \$47,933  | 1%  |
| STURRA (1987–91)     | 152   | 1420% | \$890    | 117% | \$68,821  | 1%  |
| ISTEA (1992–97)      | 538   | 254%  | \$6,229  | 600% | \$121,647 | 5%  |
| TEA-21 (1998–2003)   | 1,850 | 244%  | \$9,360  | 50%  | \$173,881 | 5%  |
| SAFETEA-LU (2005–09) | 5,634 | 205%  | \$21,636 | 131% | \$193,218 | 11% |

\* Figures in this table reflect highway earmarks only

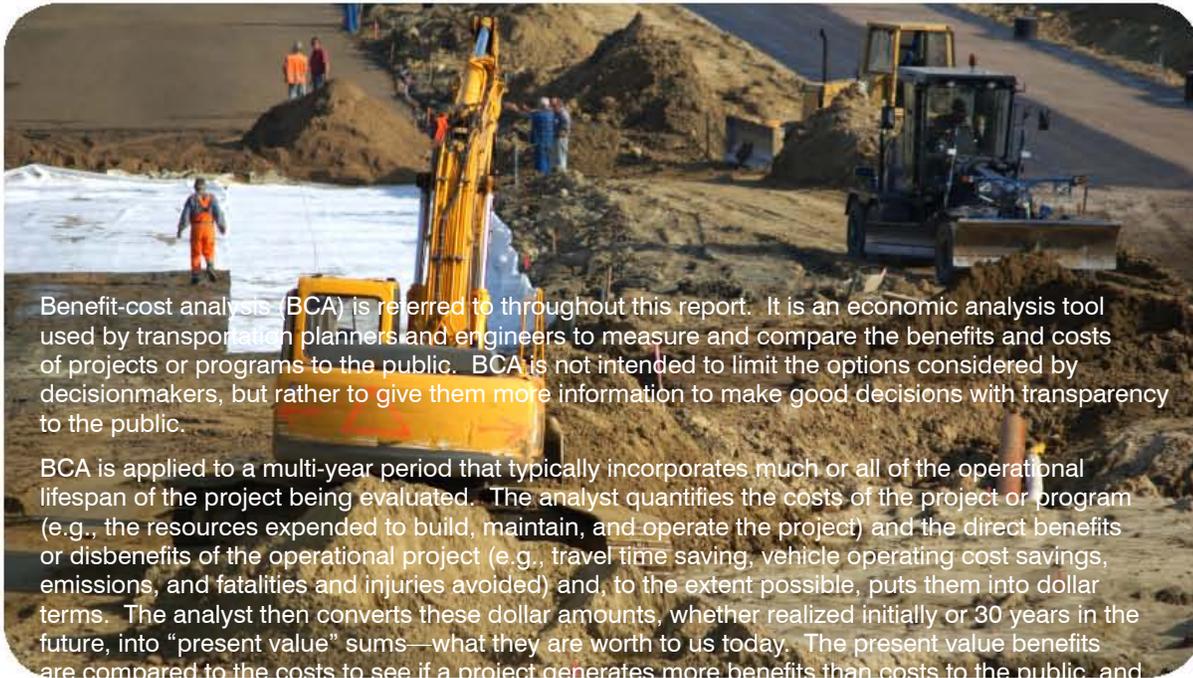
STAA—Surface Transportation Assistance Act of 1982

STURAA—Surface Transportation and Uniform Relocation Assistance Act of 1987

ISTEA—Intermodal Surface Transportation Efficiency Act of 1991

TEA-21—Transportation Equity Act for the 21st Century

SAFETEA-LU—Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users



Benefit-cost analysis (BCA) is referred to throughout this report. It is an economic analysis tool used by transportation planners and engineers to measure and compare the benefits and costs of projects or programs to the public. BCA is not intended to limit the options considered by decisionmakers, but rather to give them more information to make good decisions with transparency to the public.

BCA is applied to a multi-year period that typically incorporates much or all of the operational lifespan of the project being evaluated. The analyst quantifies the costs of the project or program (e.g., the resources expended to build, maintain, and operate the project) and the direct benefits or disbenefits of the operational project (e.g., travel time saving, vehicle operating cost savings, emissions, and fatalities and injuries avoided) and, to the extent possible, puts them into dollar terms. The analyst then converts these dollar amounts, whether realized initially or 30 years in the future, into “present value” sums—what they are worth to us today. The present value benefits are compared to the costs to see if a project generates more benefits than costs to the public, and

The proliferation of earmarking is one of the primary reasons the Commission recommends the development of a national strategic plan and the creation of an independent national commission to recommend Federal funding levels tied to that plan.

**(3) Lack of requirements for investment analyses such as benefit-cost analysis.** Applying standard rules of thumb or the judgment of experienced transportation professionals can provide a good starting point for identifying potential infrastructure improvements. However, implementing a broad asset management strategy

or making intelligent tradeoffs among investments in different kinds of infrastructure assets requires a sound analytical process that is consistently applied. All too often, investment decisions for Different Asset categories are made within agency “stovepipes,” with a focus on minimizing near term agency costs as opposed to maximizing the long-term benefits to system users and society at large.

Formal project assessments in general, and benefit-cost analyses in particular, have gotten a bad rap by some, since there are examples of such assessments being distorted to achieve a desired



outcome. However, this is more a reflection of an overly politicized process than an indictment of the analytical tools themselves. Where rigorous analyses are applied in a consistent, systematic fashion, such issues arise much less frequently.

**(4) Inflexibilities in the current funding arrangement that prevent State and local transportation agencies from implementing the most effective mix of improvements.** Different types of transportation system assets have fundamentally different characteristics, making it logical to concentrate experts and system management oversight activities into different organizational units. However, one weakness in this approach is that it tends to encourage “stovepiping” which makes tradeoffs across different modes very difficult. The proliferation of Federal program categories exacerbates this situation by fostering a climate in which the constituencies for various program niches develop a sense of entitlement for certain program funds and fail to consider the big picture in terms of achieving the best outcomes for the transportation system as a whole. Thus, even though there is already considerable flexibility to shift funds among programs, State and local recipients of Federal funds frequently find it difficult to exercise this flexibility within their own organizational structures.

**(5) Distribution of highway funding exclusively through State highway agencies that may have different priorities than local transportation agencies.** Recognizing that the owners of specific transportation assets are frequently in the best position to make decisions concerning how these assets should be managed, the Federal government has sought in the past to provide State governments with a degree of flexibility in how they utilize Federal funds to help address their transportation needs. Yet, the same type of delegation occurs less frequently between the State and local level. Local transportation

agencies may be better in tune with the needs and desires of regional and local constituents than a State agency that is further removed. To the extent that regional and local governments with the technical capabilities to make informed investment decisions are overridden by State (or Federal) dictates, the potential effectiveness of infrastructure investments can be reduced.

**(6) Federal regulations that limit tolling of Interstate Highways.** Blanket restrictions of any kind that limit the manner in which owners of system components can manage their assets have the potential to lead to inefficient decisions. While it is important to ensure that the national interest in the Interstate system is protected, and that owners of individual Interstate Highways do not act capriciously, Federal regulations that prohibit tolling of Interstate Highways limit State and local agencies’ options for optimizing their investment and financing decisions. Such restrictions are inconsistent with other aspects of the Federal program that seek to maximize flexibility.

**(7) Institutional arrangements that constrain effective intermodal planning, linkages between transportation and land-use decisions, and the effective use of operational strategies.** The stove-piping phenomenon described above that impedes the effective allocation of resources among different types of transportation assets also interferes with planning and land-use decisions. Intermodal plans by their nature tend to cut across different modal areas and frequently suffer from the lack of an internal champion to advance them within those different areas. While operational strategies clearly may be beneficial within a broad transportation corridor or multimodal system, decisions on the amount of funding allocated to such activities as opposed to traditional construction activities frequently do not consider such system-wide benefits.



As transportation decision making tends to be fragmented, transportation planning and land-use decisions are also frequently disconnected. Changes in zoning can have significant impacts on future transportation system performance that are not fully considered at the time they are made.

### **Streamlining Project Development Processes**

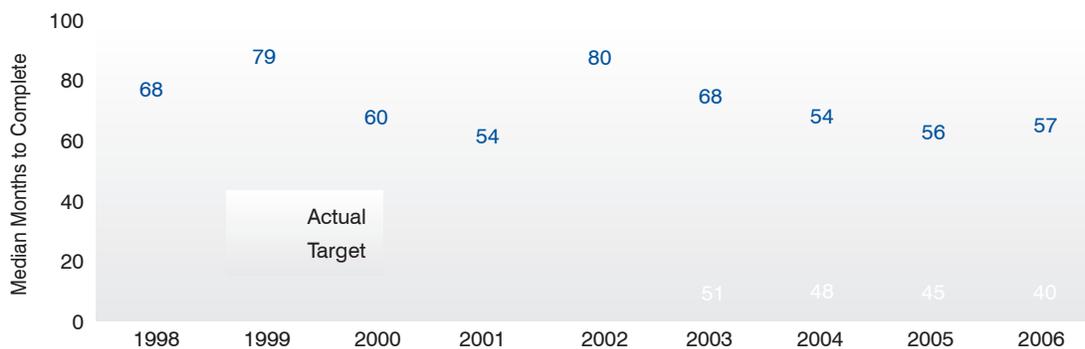
Simply put, it takes too long and costs too much to deliver transportation projects. Information compiled by the Federal Highway Administration (FHWA) reveals that major highway projects take about 13 years to get from project initiation to completion. A large part of this time is associated with the environmental review process. Exhibit 6-3 shows trends from 1998 to 2006 in the median time to complete environmental impact statements (EISs) for highway projects. The exhibit also compares actual processing times with target completion times recently developed by FHWA. The shortest median completion time over the period was 4 ½ years, more than a year longer than FHWA’s 2006 target of 40 months and even further above what ultimately is

desirable. Project development activities under the Federal Transit Administration’s (FTA’s) New Starts program experience similar delays as shown in Exhibit 6-4. From 2002 to 2005 the average project development time was more than 10 years although it fell somewhat in 2006. In light of the rapid increase in construction costs over the past several years, such delays have become ruinously expensive (see Exhibit 6-5).

Inflation is a fact of life when making investment decisions in any business or industry. In recent years, however, the effects of inflation have been particularly severe for the transportation construction industry. Between 2004 and 2006, the cost of building highways and streets as measured by the FHWA’s Price Trends for Federal-Aid Highway Construction (or Bid Price Index [BPI]) increased by approximately 43 percent. During the same period, general inflation as measured by the Consumer Price Index for All Urban Consumers (CPI-U) rose by only 7 percent.

The rapidly eroding purchasing power of the dollar for transportation construction in recent years has called particular attention to the costs of what many experts consider to be the excessively

**Exhibit 6-3. Environmental impact statement processing time**

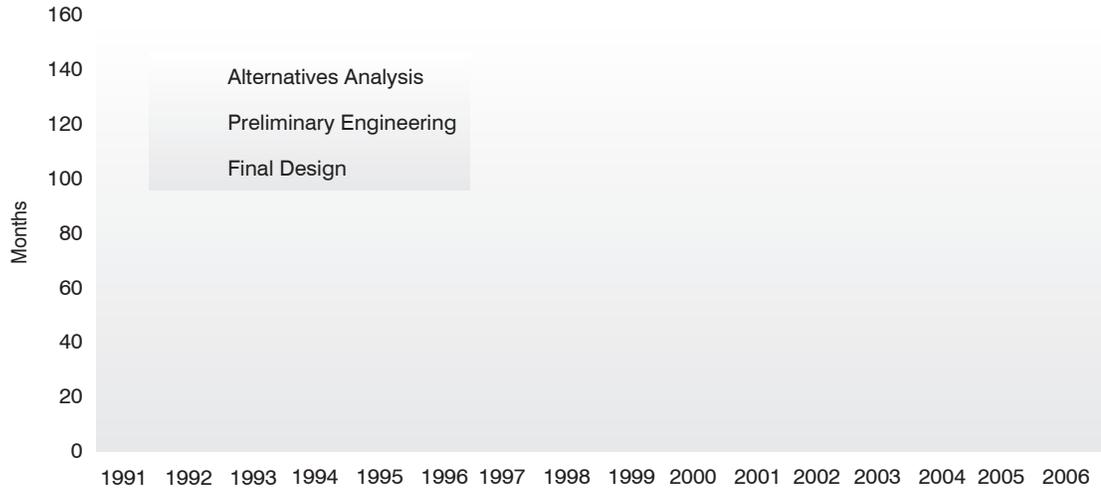


**This exhibit shows the median time to complete EISs from 1998 to 2006 along with target completion times set for the last 4 years of that period.**

Source: FHWA.



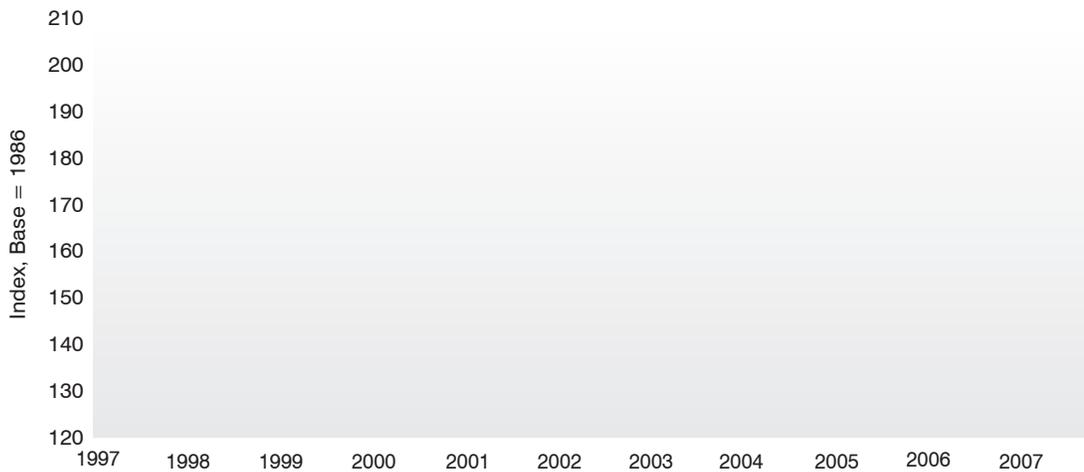
**Exhibit 6-4. Time to complete the New Starts process**



**This exhibit shows trends in the length of time to complete alternatives analysis, preliminary engineering, and final design.**

Source: FTA.

**Exhibit 6-5. Highway and street construction costs, 1997–2007**



**This exhibit shows trends in highway and street construction since 1997.**

Source: Bureau of Labor Statistics.



long time that it takes to bring a transportation project from concept to reality. For some major projects, the time needed to complete planning, environmental, and construction activities can be 14 years or longer. During this period, a project initially estimated to cost one amount can increase sharply in cost, undermining finance plans and construction schedules.

Exhibit 6-6 illustrates the impact of delay and inflation on a transportation project initially estimated to cost \$500 million if construction begins at the start of 2008. The project is estimated to take 4 years to construct. Three cases are considered: construction begins immediately in 2008 and ends in 2011; construction begins in 2011 and ends in 2014; and construction begins in 2018 and ends in 2021. The rate of inflation in highway construction costs in this illustration is assumed to be 7.2 percent a year (representing the average rate of cost increase for highway projects from 2000 to 2006 as measured by the BPI).

**Exhibit 6-6. Impacts of project delays on construction costs**

|      |                 |
|------|-----------------|
| 2011 | \$500,000,000   |
| 2014 | \$616,000,000   |
| 2021 | \$1,002,000,000 |

**This table illustrates the potential financial impact of project delays.**

Source: Commission Staff analysis.

As is evident, the high rate of escalation in construction costs would cause the completed cost of the project at the end of 2021 to cost half a billion dollars more than it would had it been completed 10 years earlier. Allowing for 3 years of planning and environmental review beginning in 2008, the project would cost \$616 million

if construction starts in 2011 and completes in 2014. This latter case represents a 23 percent cost increase over the 2011 project completion date, but is still almost \$400 million less than were its completion delayed until the end of 2021.

This illustration does not attempt to adjust for the differential between the rates of construction inflation measured by the BPI and general inflation measured by the CPI-U, although this adjustment would still show a doubling in real costs between 2011 and 2021. The analysis also does not factor in the costs to system users of delaying project implementation and completion. For example, for a capacity improvement on a congested roadway, each year's delay results in foregone benefits to users, who must continue to face growing levels of traffic congestion.

When bidding on multiyear projects, contractors must incorporate expected inflation in labor, equipment rental, and materials costs into their bids. If these costs were to increase unexpectedly, contractors could end up losing money on a project. Accordingly, when inflation rises suddenly, so do the risks faced by contractors, which will be factored into future bids. Thus, even temporary periods of high inflation in input prices can have lingering effects on construction costs.

It is worth noting that transportation projects with price tags of \$500 million or more are becoming increasingly common. According to FHWA and FTA, there are currently 45 Federal-aid highway projects and 24 transit New Starts projects in the development process with price tags above that threshold. Even with lower-cost projects, the cumulative effects of inflation and delay on agency budgets when a multitude of projects are affected can approach the magnitudes illustrated above. Delay in the planning and review of transportation projects can thus be very expensive to the public, particularly given the Nation's recent experience where the costs of construction have risen much more rapidly than general inflation.



Exhibit 6-7 illustrates the various steps involved in the typical transportation development process, based on the experience of the Nevada DOT. While the estimated time for each phase of the process is not fully consistent with the national averages described earlier, this graphic provides a good overall summary of the many steps involved in the process.

Itemized below are some of the key factors that contribute to the lengthy and costly project development process.

**Uniformity in Requirements.** While it is necessary to assure that investments are being made wisely, there is a risk that the time and resources needed to assess project merits can

“Time is money, and our customers deserve the courtesy of us moving forward and making decisions...we consider federal agencies to be our partners.

We want them to be in the roles of interpreting regulations to help us meet our goals with project delivery. But we also want them to interpret the laws to facilitate, to help us and not to hinder.”

– Susan Martinovich, Director,  
Nevada Department of Transportation,  
at the Commission’s Las Vegas field hearing.

**Exhibit 6-7. Typical transportation project development process**

|                               |                          | Approximate Timeline (in years) |   |                                |   |                  |   |                              |   |                             |    |
|-------------------------------|--------------------------|---------------------------------|---|--------------------------------|---|------------------|---|------------------------------|---|-----------------------------|----|
|                               |                          | 1                               | 2 | 3                              | 4 | 5                | 6 | 7                            | 8 | 9                           | 10 |
| Determine Existing Conditions | Purpose and Need         |                                 |   | Floodplain/ Hydrologic         |   |                  |   |                              |   |                             |    |
| Traffic Forecasts             | Traffic Analysis         |                                 |   | Energy                         |   | Geometric Design |   | 60% Plans                    |   |                             |    |
| Analysis Needs                | Preliminary Alternatives |                                 |   | Land Use                       |   | Typical Sections |   | 90% Plans                    |   |                             |    |
| Conceptual Solutions          | Public Outreach          |                                 |   | Economic                       |   | Grading          |   | Specifications and Estimates |   | Right-of-Way Setting        |    |
| Preliminary Cost Estimates    | Technical Studies        |                                 |   | Wetlands                       |   | Drainage         |   | Final Plans                  |   | Right-of-Way Engineering    |    |
| Cost Estimation               | Air Quality              |                                 |   | Visual Effects                 |   | Structural       |   |                              |   | Appraisals                  |    |
| Validation Process (CEVP)     | Noise Analysis           |                                 |   | Environmental Justice          |   | Traffic/ITS      |   |                              |   | Purchase Offers             |    |
|                               | Traffic Analysis         |                                 |   | Cumulative & Secondary Impacts |   | Signing/Striping |   |                              |   | Counter Offers              |    |
|                               | Socio/Economic           |                                 |   | Cost-Benefit Analysis          |   | Lighting         |   |                              |   | Relocation                  |    |
|                               | Cultural Resources       |                                 |   | Refine Alternatives            |   | Utilities        |   |                              |   | Asbestos Clearing           |    |
|                               | Biological Resources     |                                 |   | Alternative Selection          |   | 30% Plans        |   |                              |   | Demolition                  |    |
|                               | Hazardous Materials      |                                 |   | Section 4(f) Evaluation        |   |                  |   |                              |   | Condemnation (if necessary) |    |
|                               | Water Quality            |                                 |   | Record of Decision             |   |                  |   |                              |   | Federal Regulations         |    |

Source: Nevada DOT.



outweigh the benefits of making valid decisions. The tendency is to prescribe a one-size-fits-all approach, but what is appropriate for the largest and most complex projects, may be inappropriate for smaller, less complex proposals. To reduce overall project delivery times for major transportation projects, the time to complete environmental reviews must be shortened, in conjunction with other measures that address conventional strategies for implementing projects once they clear environmental review.

**Redundancies in the NEPA Process.** A substantial portion of the project delivery process, historically about 3 years and currently about 5 years, is consumed by EIS preparation. Reducing this time, in conjunction with other measures, has the potential to substantially reduce the overall project delivery time.

Practical experience with the National Environmental Policy Act (NEPA) process and the outcome of project decisions challenged in court proceedings have resulted in the following expectations:

- A minimum level of analysis is necessary in all environmental areas regardless of project issue areas
- Robust documentation is expected for all resource areas
- Significant time must be allowed to develop the required documentation

- Regulations can require an analysis of some alternatives that may not be realistic
- Fear of litigation has resulted in over-documentation
- Currently, extensive editing of the Final EIS occurs to address litigation vulnerability.

Draft EISs represent the culmination of several years of planning, public involvement, and coordination and collaboration with resource agencies, some of which could be done prior to NEPA formally beginning to ensure it is fully recognized in the NEPA process. The current process can create numerous redundancies, including the need to backtrack to revisit previously rejected alternatives or to duplicate environmental analyses that were previously endorsed during planning or scoping but not formally recognized by other agencies when performed outside the formal NEPA process. Another frequent byproduct is that repetitive additional analyses and studies for issues that have already been adequately addressed prior to the start of the NEPA process are again prepared.

**Permit Process Can Add Significant Time.** In addition to the delays associated with NEPA compliance, projects often are held up pending permit approvals from Federal agencies such as the U.S. Fish and Wildlife Service and the Army Corps of Engineers. Permits often languish for months on the desks of Federal officials, and it is not uncommon for Federal agencies to disagree with one another in exercising their independent oversight responsibilities.





## What Reforms Could Address Problems in the Project Development Processes?

Correcting these issues can be done either through statutory or regulatory approaches. Changes would be needed in the current legal and regulatory framework for environmental reviews before any significant time-savings could be realized. Specifically, the Congress and USDOT should consider changes in the following areas:

- Provide through legislation for a simplified NEPA process that offers the equivalent of a 1040 EZ tax return for projects with few significant impacts.
- Revise Council of Environmental Quality (CEQ) regulations to allow additional factors to narrow the number of alternatives considered as “reasonable alternatives”:
  - Alternatives should be appropriate for project-level (rather than planning-level) decisions
  - Alternatives should reflect community values
  - Alternatives should reflect funding realities
- Revise CEQ regulations for implementing NEPA to allow for a single EIS rather than the current requirement for a draft and final EIS.
- In parallel with revisions to CEQ regulations, FHWA would set minimum conditions for what must occur during a “robust scoping” period before publishing the Notice of Intent and formally beginning NEPA. Some requirements could include:

- Determination on general project location
- Determination of mode choice
- Development of a risk management plan
- Handle impacts identification and mitigation issues early by considering them in an integrated fashion, looking at overall resources rather than in a sequential, project-by-project basis. This might involve addressing these issues at the programmatic level earlier in the planning process.
- Standardize the “risk design” approach under federal regulations so that project sponsors can proceed with design activities at risk during EIS process. The USDOT just issued similar guidance for bridge projects in wake of the Minneapolis bridge collapse.
- Require greater coordination among Federal agencies reviewing transportation project permits, including:
  - Setting time limits for review
  - Using Federal transportation funds to pay for regulatory staff to speed reviews and comply with time limits
  - Establishing a Cabinet-level appeal process where USDOT can seek redress for adverse decisions.





## Program Redesign and a National Commission

We now turn from the subject of speeding project delivery to the challenge of improving how we select and finance those projects in the first place.

The 10 programs described below represent the key areas identified by the Commission for Federal participation and funding. Each description explains why a Federal role is appropriate, how performance measures and standards would be set, potential strategies for meeting performance standards, and proposed Federal funding shares for qualifying projects. These 10 new programs are intended to replace the dozens of separate highway

and transit funding categories in SAFETEA-LU (see Exhibit 6-8).

An important element of many programs would be the development of national plans to accomplish key national program goals. These plans would also serve as the basis for apportioning funds to the States on a cost-to-complete basis, much as was done for initial construction of the Interstate System. National plans would be developed for the Rebuilding America; Freight Transportation; Metropolitan Mobility; Safe Mobility; Connecting America; Intercity Passenger Rail; Federal Lands; and Research, Development, and Technology programs. These plans would then be consolidated into a national strategic plan by the USDOT.

### Exhibit 6-8. Refocusing the Federal Program structure

|  |                     |
|--|---------------------|
| Federal Highway Administration                 | 62 Programs         |
| Federal Transit Administration                 | 20 Programs         |
| Federal Railroad Administration                | 6 Programs          |
| National Highway Traffic Safety Administration | 12 Programs         |
| Federal Motor Carrier Safety Administration    | 8 Programs          |
| <b>Total</b>                                   | <b>108 Programs</b> |

1. Rebuilding America: A National Asset Management Program
2. Freight Transportation: A Program to Enhance U.S. Global Competitiveness
3. Congestion Relief: A Program to Improve Metropolitan Mobility
4. Saving Lives: A National Safe Mobility Program
5. Connecting America: A National Access Program for Smaller Cities and Rural Areas
6. Intercity Passenger Rail: A Program to Serve High-Growth Corridors by Rail
7. Environmental Stewardship: A Transportation Investment Program to Support a Healthy Environment
8. Energy Security: A Program to Accelerate the Development of Environmentally-Friendly Replacement Fuels
9. Federal Lands: A Program for Providing Public Access
10. Research, Development, and Technology: A Coherent Transportation Research Program for the Nation



Except for the Federal Lands and Research, Development, and Technology programs, national program plans would be based on individual plans developed by each State and major metropolitan area. The USDOT, in cooperation with State and local governments, multi-State coalitions, transportation system users, and the full range of public and private stakeholders, would develop national performance standards for each applicable program area. Those standards would be closely coordinated with State environmental and energy objectives. The time frames for meeting national standards could vary for individual areas depending on local circumstances, but eventually each State and metropolitan area would be expected to meet national standards.

State and local performance standards would form the basis for State and metropolitan plans. These plans would replace the long-range and short-range plans that currently are required, but would be expected to include many of the same elements. Major differences between current plans and the plans under the new program are that major projects under the new plans would have to be shown to be cost-beneficial and plans would have to be developed to meet specific performance standards. Progress toward meeting performance standards would be measured.

The Federal government should be a full partner with the State and local governments and the private sector in meeting the significant investment requirements of this new approach. Since the plans would be the basis for apportioning funds among the States, a high degree of uniformity would be required. Only projects in the plans would be eligible for Federal funds, so plans would have to be comprehensive, especially for the near term. Since transportation needs are dynamic, plans would have to be updated, especially prior to each surface transportation reauthorization. Also,

because there are overlaps among programs, plans developed for one program must be consistent with plans developed for other programs.

**(1) REBUILDING AMERICA: A National Asset Management Program.** Our economic and social wellbeing depends on the multi-trillion dollar investment we have made over the course of our Nation's history on transportation infrastructure and services. All levels of government and the private sector have contributed to this inheritance. Accordingly, it is clearly in the interest of all parties, starting with the Federal government and its own immense investment in this system, that we not squander this legacy through underinvestment in its preservation and maintenance. **Therefore, the first of the 10 programs proposed by the Commission would put and keep the Nation's infrastructure in a state of good repair in the most efficient and cost-effective manner possible.** In that sense, this program, "Rebuilding America," underlies and would need to be coordinated with all of the other plans proposed developed under the recommended programs. More specifically, this program would address the portions of the surface transportation network in which there is a strong Federal interest: Federal-aid Highways, including the Eisenhower System of Interstate and Defense Highways and the NHS,





major transit assets, intercity passenger and freight rail lines, and network connectors between our modes that complete the overall system.

This program cuts across several other programs, including the Freight Transportation, Metropolitan Mobility, and Connecting America programs, and would have to be closely coordinated with those programs. The USDOT, in conjunction with State and local transportation agencies, would define appropriate performance measures to assess the condition of key types of transportation facilities and equipment. The full range of stakeholders (including system owners, operators, and users) would be convened by each State Department of Transportation and public transportation agency to develop overall asset management plans. This group would use its participants' data to develop estimates of the cost to restore these facilities, putting into place best practices of capital budgeting with full consideration of life-cycle costs. These estimates would include the costs of technological and safety upgrades to be made in conjunction with these rebuilding and preservation projects, to improve the operational and safety performance of existing facilities. The USDOT would "roll-up" the individual State plans to develop a consolidated National Asset Management Plan. The investment costs developed in these plans would become the basis for future authorization requests to Congress. Once the capital budget is determined, the Federal contribution to funding each of the projects and actions of the plan would be established at 80 percent of the project costs.

To assure the maximum effectiveness of Federal capital investment support, States, local governments, and other entities accepting Federal capital support must develop, fund, and implement a program of asset maintenance and support over the useful life of the asset that



conforms to nationally accepted standards and is frequently and independently audited.

Apart from demonstrating that proposed projects under this plan are cost-effective and justified, additional Federal requirements would be kept to a minimum. In most cases, environmental and other planning requirements for rehabilitating existing facilities can be met without too much burden under current law, although reconstruction activities should be executed in a manner that also conforms to the goals of other plans (e.g., Safe Mobility goals).

## **(2) FREIGHT TRANSPORTATION:**

### **A Program to Enhance U.S. Global**

**Competitiveness.** Interstate commerce is the historic cornerstone defining the Federal role in transportation. The Federal interest in promoting efficient interstate and international flows of goods and services has motivated it to support road, canal, and railroad building since the earliest days of the Nation; indeed, the development of the United States cannot be understood without knowledge of the Federal role in promoting and funding freight transportation infrastructure. Over the last several decades, however, this Federal role has greatly diminished, with the result that the vast amounts of freight that now move along our roads, rails, and waterways are increasingly choked by a lack of adequate capacity. Economic forecasts indicate that by 2020, freight volumes will be 70 percent greater than they were in 1998. Transportation chokepoints at our major ports, gateways, and trade corridors represent not just congestion and environmental hot spots, they also are a potential trade barrier as threatening as tariffs. Without improvements to the surface transportation network (especially key freight transportation corridors), freight transportation will become less efficient and reliable, hampering the ability of American businesses to compete in the global marketplace.



**The Commission believes that the Federal government must return to its historic role of ensuring that the transportation needs of interstate commerce are met. The Commission supports the creation and funding of a national freight transportation program that would, in conjunction with States and metropolitan areas and consistent with a National Freight Transportation Plan, implement highway, rail, and other improvements that eliminate chokepoints and increase throughput.**

“The actions of individual States and regional coalitions are not enough to solve the Nation’s freight problems. We need strong leadership from the Federal government in the form of strategies, tools, and revenue, and we must make changes to our institutional arrangements.”

—*Teresa M. Adams, Ph.D., Director of the National Center for Freight and Infrastructure Research and Education at the University of Wisconsin–Madison, at the Commission’s Minneapolis field hearing.*

A national freight transportation program would afford broad flexibility for States and metropolitan areas to implement highway, rail, and other improvements that are beyond the traditional modal and governmental orientations, consistent with a national freight transportation plan. This new freight program should target efforts to eliminate freight chokepoints and inefficiencies. System-wide improvements targeted to trucking productivity should address incident management, innovative off-peak freight delivery systems, and technology and equipment improvements, in addition to targeted capacity improvement projects. Freight railroad investments are the

responsibility of the private sector, but in cases where the social benefits of projects would warrant it, public assistance could be justified. Rail projects could include assistance for strategic national rail bridges where cost of construction exceeds return on private invested capital, assistance with projects that expand the freight rail network (including implementation of train control technology), assistance in freight corridor development, and providing incentives to connect with intermodal centers. As with public highway and transit projects, unnecessary process-related delays affecting the approval of private sector freight rail projects should be eliminated.

Eligible projects would also include development of “green” rail facilities and operations (such as clean dray fleets) and electrification or other technology upgrades (such as biofuel/low emissions locomotives) to replace local dray movements or improve emissions related to rail transportation.

The USDOT would have a major role in developing a National Freight Transportation Plan. The Department would work closely with the full range of public and private stakeholders (including system owners, operators, shippers, logistics firms, and other users), including those involved in establishing national trade policies, and collaborate with State and multi-State authorities to establish performance goals for specific States or multi-State regions. States would, in turn, develop plans to meet the specific performance goals they agreed to accomplish. Freight plans should be closely coordinated with key environmental and energy policies to ensure compatibility.

The development and accomplishment of the State plans would in most cases require multi-State cooperation. Multi-State and State freight planning groups would use stakeholder-provided information to develop a consensus on future investments in major highways, freight railroads, waterways, ports, and intermodal facilities. States



would evaluate the projects in their plans using benefit-cost analysis, looking at the full range of potential solutions to freight improvements. Project funding would be merit-based and grantees would be accountable for meeting freight mobility performance goals, consistent with national environmental and energy goals.

It will be important to standardize public benefit methodology for evaluating and negotiating partnerships involving railroads, States, and local and Federal interests. This will ensure that private entities are not subsidized and, concomitantly, that they are not required to pay for public benefits. Government support for infrastructure projects could actually result in a net reduction of overall needed capacity expansion if private investment is diverted to projects with primarily public benefits. Similarly, publicly funded projects should not require non-economic private investment or service, or supplant or diminish private investment.

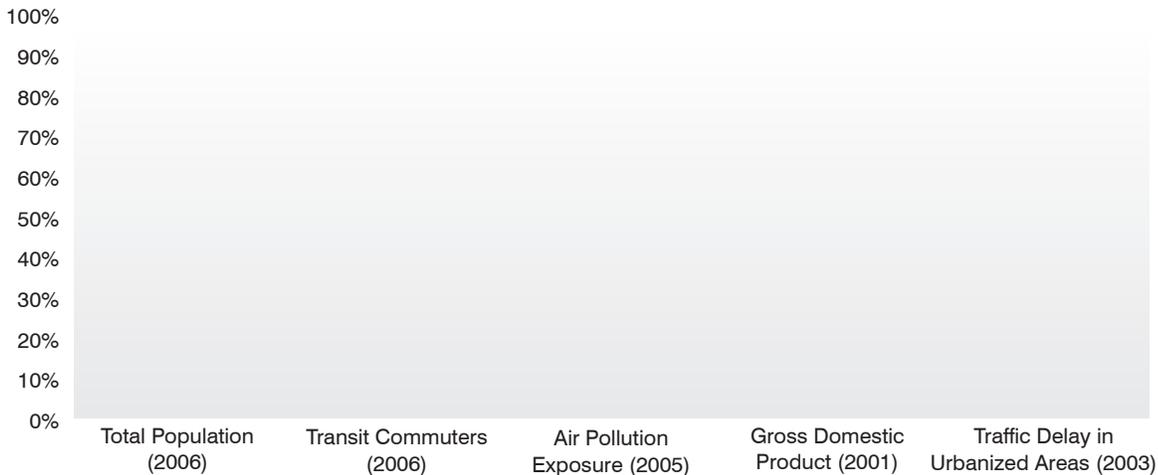
Federal policy should comprehensively support improved freight transportation not only through

the proposed Federal Freight Transportation Program, but also through eligibility in the Metropolitan Mobility, Intercity Passenger Rail, Environmental, Safe Mobility, and Connecting America programs. There should be broad eligibility across programs for activities that support the aims of each respective program, toward achieving our vision.

Federal participation in individual projects would be 80 percent, with higher participation levels justified based on their national benefits, particularly when benefits fall primarily outside of the region. Apart from demonstrating that proposed projects under this plan are cost-beneficial and justified, additional Federal requirements would be kept to a minimum.

**(3) CONGESTION RELIEF: A Program for Improved Metropolitan Mobility.** The Nation's largest urban areas generate about 60 percent of the value of U.S. goods and services (see Exhibit 6-9). The Federal government has a significant interest in promoting efficient

**Exhibit 6-9. Metropolitan areas over 1 million in population share of U.S. totals for selected characteristics**



**Large metropolitan areas account for a large share of the total population, economic output, transit commuters, air pollution exposure to people, and traffic delay in the United States.**

Source: Metropolitan Transportation Commission



metropolitan mobility that is vital to the productivity of each individual metropolitan area and to the overall productivity of the Nation. **Therefore, the Commission recommends that a distinct program be established to fund projects that reduce congestion in our largest metropolitan areas (of 1 million or more in population).**

Analyses conducted by the Commission indicate that a 20 percent reduction in per-vehicle delay on major urban highways is possible by 2025. The analyses show, however, that this goal cannot be met without a comprehensive set of strategies to manage demand, improve operations, significantly increase transit capacity and ridership, and significantly expand highway capacity. Many of these strategies, especially expanded transit systems and additional highway capacity, will involve substantial capital investment.

Meeting this goal will require broad coordination among agencies at multiple levels of government. The USDOT would set mobility goals for large metropolitan areas by first establishing standardized measures of mobility (e.g., hours of delay per 1000 vehicle miles traveled [VMT]). It would then specify national mobility standards for metropolitan areas. The full range of public and private stakeholders (including system owners, operators, and users) involved in the planning, construction, and operation of regional transportation in such metropolitan areas would be convened to assure consideration of the urban interests in defining national standards. This would help integrate transportation planning into other urban planning activities.

The Commission expects that the Metropolitan Mobility plans in most metropolitan areas will include an increasing emphasis on public transportation, especially electrified railways. Federal transportation policy must more effectively support and encourage the use of public

transportation as part of a balanced approach to metropolitan mobility. Traditional bus and rail transit and, where appropriate, intercity passenger rail must be an increasingly important component of metropolitan mobility strategies due to their ability to move large volumes of people into and out of areas that cannot handle more automobiles. Not only is transit an important element of congestion relief strategies, it supports policies to reduce transportation energy consumption, greenhouse gas emissions, and air pollution if sufficient use is demonstrated. The Commission believes that public transportation is essential to meeting our future mobility needs in metropolitan areas. But even with transit playing a much bigger role in the future, the Commission believes that many of the plans will also include significant increases in highway capacity as part of a robust nationwide surface transportation system.

The Commission recognizes that road pricing has great potential to reduce congestion and improve system efficiency because of its ability to better utilize the Nation's existing infrastructure. Congestion pricing provides an incentive for personal travelers to drive during off-peak hours, or to change their mode of transportation for time-sensitive journeys. Such fees are higher in times or places with heavy traffic, and lower in other times and places with light traffic. They are already used at a variety of highways, bridges, and tunnels throughout the United States. Such fees promote the efficient use of existing infrastructure. To the extent that some drivers choose other modes or routes or to travel at less congested times of day rather than pay the fee, congestion is reduced. Congestion fees have a further critical benefit in that they send price signals about the need to add capacity, thus promoting the efficient use of investment dollars in the long run. Mobility goals also should reflect the fact that high traffic urban highways can generate significant revenues from

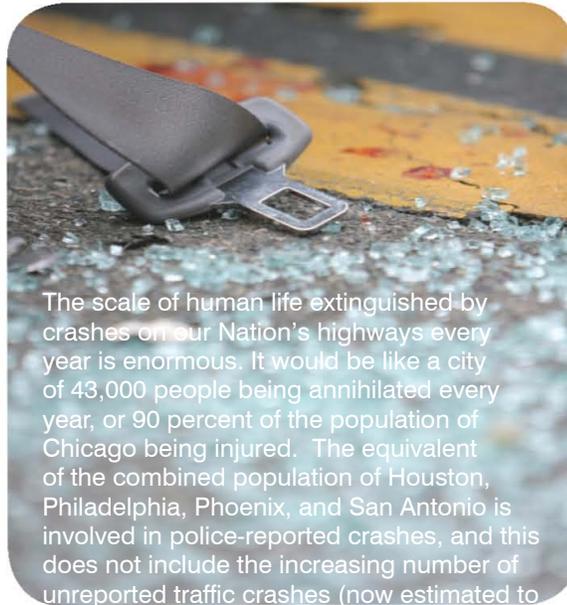
congestion pricing, requiring less tax-based funding. Metropolitan areas of 1 million or more in population would use these performance standards and national goals to develop their own performance standards, developing Metropolitan Mobility plans to meet these standards in a cost-beneficial manner. The Commission also expects that the major metropolitan areas will be guided by these standards in their accommodation of new economic and population growth.

Funds authorized under the Metropolitan Mobility program would be reserved for urban areas of 1 million or more in population. Although these major metropolitan areas comprise about 60 percent of total U.S. population, they capture over 85 percent of national market share for three critical transportation indicators: traffic congestion, transit ridership, and population exposure to auto-related air pollution (see Exhibit 6-9).

Planning and project selection authority in the Metropolitan Mobility program would be vested in a transportation agency designated by the Governor and leading local elected officials from the metropolitan area. This could be the metropolitan planning organization (MPO), another regional transportation agency, or the state department of transportation. In multi-State metropolitan areas, authority could be vested in a consortium of agencies through interstate compact. The Federal funding share of Metropolitan Mobility projects would be 80 percent of project cost.

We urge the Congress to broadly define “metropolitan area” for the purposes of this program, such as employing the concept of consolidated statistical areas developed by the Office of Management and Budget.

**(4) SAVING LIVES: A National Safe Mobility Program.** Travelers on the Nation’s surface transportation system have a right to expect safe and uniform transportation conditions from coast



The scale of human life extinguished by crashes on our Nation’s highways every year is enormous. It would be like a city of 43,000 people being annihilated every year, or 90 percent of the population of Chicago being injured. The equivalent of the combined population of Houston, Philadelphia, Phoenix, and San Antonio is involved in police-reported crashes, and this does not include the increasing number of unreported traffic crashes (now estimated to

to coast. The Federal role in establishing safe conditions for travel is well established through agencies such as the Federal Motor Carrier Safety Administration and the National Highway Traffic Safety Administration, and through Federal safety regulation of air, land, and sea travel. It is therefore the Commission’s recommendation that a national plan for safety be developed that both informs investments in all other transportation plans and leads to transportation investments and programs undertaken purely for safety purposes.

Currently, highway travel accounts for 94 percent of the fatalities and 99 percent of the injuries on the Nation’s surface transportation system. In 2006 42,642 persons were killed and 2,575,000 injured in highway crashes. Significant progress has been made over the last 50 years in improving highway safety. Fatalities rates dropped from 5.3 fatalities per 100 million vehicle miles traveled (VMT) in 1965 to 1.4 fatalities per 100 million VMT as of 2006. But, compared to some other developed countries, a few of which have fatality rates at or below 1.0 fatalities per 100 million VMT, it is clear that the United States still has much room to improve its highway safety. Were the United States presently at a rate of 1.0 fatalities per 100 million VMT, total highway fatalities would be at just over 30,000 per year—still much too high but some 12,600 fewer than we currently sustain as a Nation, year after year.



The USDOT would define safety performance metrics (e.g., fatalities and serious injuries per 100 million VMT) to be used by all Federal, State, and local agencies to measure progress. **The Commission recommends that USDOT establish national safety goals, beginning with an ambitious but reachable goal to cut surface transportation fatalities in half from current levels by 2025.** Specific goals for individual States and metropolitan areas would be established through consultations with safety interests including State and local departments of transportation and other governmental units. States and metropolitan areas would then develop strategies for reaching their specific safety goals, both by incorporating safety projects within the Safe Mobility plan and by including safety features into projects listed in the various Freight Transportation, Metropolitan Mobility, and Rebuilding America plans proposed by the Commission. Projects developed under the Safe Mobility plan would be evaluated to make sure they are cost-beneficial (a practice that already takes place for many safety projects at the State level). Reflecting the importance the Commission assigns to improved safety, it recommends that the Federal share of the funding of qualifying safety projects be 90 percent of the project cost.

Because the users of every transportation mode are affected by injuries and fatalities, the solutions to improving the overall level of transportation safety must be broad and multifaceted. Safety advocates and public officials believe the “three Es” are critical to reducing the number of crashes on the Nation’s surface transportation network: engineering, enforcement, and education. The following strategies should be considered in State and local plans:

- Highway improvements to reduce roadway departures, create a safer environment for

pedestrians and bicyclists, reduce intersection crashes;

- Stronger enforcement of safety laws including speed limits, seat belt laws, impaired driving, making the maximum use of technology to do so;
- Enhanced adjudication of highway safety laws to impose penalties commensurate with the seriousness of the offenses;
- Enhanced motor carrier safety programs to reduce crashes caused by driver fatigue, unsafe operators, and automobile drivers who do not know how to share the road with large trucks;
- Stronger licensing requirements that take into account age and experience;
- Highly visible public education campaigns to make everyone aware of the severity of highway safety problems;
- Enhanced efforts to deploy technology, equipment and grade separate rights of way to reduce rail-highway grade crossing accidents and reduce trespass incidents, which are the fastest-growing aspect of rail-related accidents and incidents; and
- Research and deployment of new technologies that hold the promise of substantially reducing highway fatalities such as improvements in vehicle safety features, ignition interlocks to prevent persons whose blood alcohol content is too high from starting vehicles, and Vehicle Infrastructure Integration (VII) that could help avoid unsafe movements in traffic while improving traffic flow. For example, as surface transportation networks are embedded with new sensors, they could interact with technologies increasingly built into new automobiles and trucks.



It should be noted that there are some areas of commonality across the national plans that will require coordination. For example, the National Freight Transportation Plan could include opportunities for better tracking and regulating truck traffic, thereby improving the overall level of safety throughout the entire network. The National Freight Transportation Plan could also address deployment of train control technology relevant to safety and capacity on critical corridors which carry passengers and hazardous materials.

**(5) CONNECTING AMERICA: A National Access Plan for Smaller Cities and Rural Areas.**

Virtually all of the Nation's natural wealth and basic food production—the abundance found in its farms, forests, mines, and other resources—is located in rural areas outside of the major metropolitan areas. The Nation has an enormous interest in providing efficient transportation connections to these industries, allowing capital and labor to reach them and products to flow out from them to U.S. and foreign markets and consumers. Over time, vast economic and demographic changes have occurred throughout the Nation that have led to the emergence of new cities, suburbs, and exurban centers.

**Updating the basic backbone of the surface transportation system must take into account those urban and rural communities that were**

**not incorporated when the initial rail and highway infrastructure networks were created.**

High performing connections for the movement of freight and people are necessary to link the Nation's population and economic centers that currently do not have such connections. Efficient transportation is important for those industries and for people who depend on those industries as well as for the many Americans who live in these areas or travel through them.

The Commission concludes that there are inadequate highway connections to fully develop the Nation's heartland communities. The Commission also concludes that public transportation in rural and small urban areas provides vital access to essential services for individuals who do not have access to automobiles. More than 1,200 transit operators provide service in rural areas and these systems are often the only means of transportation available to older and disabled citizens by which to access critical medical and social services. Many rural areas lack public transportation services entirely. This leaves individuals without access to automobiles with very limited mobility options. It also creates hardships for those unable to drive, such as older adults and persons with disabilities.

In establishing criteria for plans under this program, the USDOT should develop population thresholds that would be suitable for various forms of public transportation. The USDOT would establish standardized measures of access (e.g., all weather access to agricultural and industrial sites by large trucks; mobility by at least one transportation mode available to all citizens) and national accessibility goals. The full range of public and private stakeholders (including system owners, operators, and users) involved in the planning, construction, and operation of regional transportation in rural areas would be convened





to develop these goals and measures. There will be many small metropolitan areas within the heartland areas that will already have benefited from the metropolitan planning done under the provisions of previous Federal transportation legislation. The Commission recommends that the metropolitan planning requirements be retained and that these smaller areas continuously measure themselves against the national mobility standards and accommodate their economic and demographic growth with those performance standards in mind.

Each State would develop State-specific performance goals in terms of these performance measures and develop plans to meet these objectives in an economically justified manner. The Commission recommends that Federal funding of projects in approved plans cover 80 percent of project cost.

**(6) INTERCITY PASSENGER RAIL: A Program to Serve High-Growth Corridors by Rail.** The growing congestion and unreliability of the air and highway transportation systems have become issues of major concern to the Federal government and the Nation. The USDOT has responded with a Congestion Initiative for highway travel and is funding major improvements in the air traffic control and airport system. Along the Northeast Corridor and in some West Coast markets, however, Amtrak has demonstrated that fast, frequent, and reliable rail service can offer competitive efficiencies in congested passenger travel markets that can significantly reduce pressure on the other modes.

**Passenger rail transportation is a key component of the Commission's vision for the future, and the Nation should pursue the development of a fast and reliable rail passenger network.** The Commission believes that Intercity Passenger Rail is a critical missing link in the

Nation's surface transportation system. Over the past 50 years, passenger rail lines have shrunk dramatically and what has been retained is in need of improvement. Exhibit 4-21 shows a potential 2050 intercity passenger rail network. Investment in intercity passenger rail could also help meet important national energy and environmental goals by shifting travel to trains, which consume 17 percent less energy per passenger mile than air carriers and 21 percent less energy per passenger mile than automobiles.

The Commission envisions the establishment of an intercity passenger rail network to provide reliable and frequent passenger service, comparable to world-class systems in other countries. This network would focus on regional and high-speed corridors connecting dense, congested cities within 500 miles of each other. The USDOT would coordinate the development of State and regional Intercity Passenger Rail plans. These plans would be based on benefit-cost analyses that include both the user and non-user benefits of passenger rail. Track access for passenger rail service, and the cost of present and future capacity requirements, would be negotiated between freight and passenger rail interests.

The key performance measures for the system would be reliable on-time performance, congestion





mitigation, safety and environmental benefits, and reduced energy use. Specific regional goals would be established through consultations between State and local authorities, Amtrak, and, critically, the freight railroads who own almost all of the rail system.

The Commission supports policy options that permit passenger trains to achieve their full potential concerning speed, frequency of service, and on-time performance and that assures that the freight rail industry can provide service required to meet its own growth in demand. Outside the Northeast Corridor, passenger rail depends on the freight system for access to track capacity, but freight rail capacity is limited and freight rail capacity needs are growing. Investment in a robust passenger rail system in the United States will need to be appropriately scoped to ensure that performance criteria on joint-use lines can be achieved, that passenger rail service providers pay for their capacity on freight rail lines, that investments to support capacity and performance requirements are made for both passenger and freight service, and that rights-of-way can be developed or expanded to allow for separate passenger and freight operations as passenger and freight demands grow.

The first step in resolving the rail infrastructure capacity crunch is to address problems occurring in specific corridors. The public and private sectors must come together to create these solutions. The USDOT should assure that State and regional plans are coordinated and complement each other. The Intercity Passenger Rail Program should be funded on a cost-to-complete basis with an 80 percent Federal share, primarily for capital costs.

**(7) ENVIRONMENTAL STEWARDSHIP: A Transportation Investment Program to Support a Healthy Environment.** The relationship of

transportation to the environment has been a source of national concern for more than half a century. Roads and the vehicles that use them can have adverse effects on air and water quality, noise, undeveloped land, community structures, and many other natural and human resources that influence our quality of life. These impacts usually fall on people and places that are beyond the boundaries of the transportation facility, and can even have national or global implications. It is important for the transportation sector to minimize its impacts on the natural environment.

**The Commission believes that an Environmental Stewardship Program should be established and authorized at a level equivalent to 7 percent of the total funding for the Federal surface transportation program.**

This percentage constitutes approximately a 2 percentage point increase over the current share of Federal funding devoted to these types of purposes, and is recommended because of the broader scope of activities that would be included in this program, as described below. This consolidated program would replace several existing environmental programs, providing more flexibility to States in their efforts to mitigate the environmental impacts of transportation.

These program funds would be distributed to the States on a per-capita basis and would be eligible for the following purposes, with a Federal share of up to 80 percent of project costs. At least 10 percent of the program funding by State would be required to be spent on each of the following four sets of purposes, leaving the remaining 60 percent for flexible State investment:

- **Air Quality:** Eligible projects would smooth traffic flow, mitigate vehicular congestion related to rail crossing, encourage use of intermodal freight options, encourage alternative commute options such as



carpooling and transit, scrap older vehicles, and encourage more energy-efficient construction and lighting materials in the transportation system, to reduce carbon dioxide and other greenhouse gas emissions.

- **Vehicle Retrofit:** Stimulate retrofitting of existing diesel vehicles and equipment (trucks, buses, and locomotives) as a means of reducing pollutants caused by older equipment, e.g., pre-1998 vehicles. Incentive models include the \$1 billion trade corridor mitigation program enacted as part of California's 2006 transportation bond measure.
- **Transportation Enhancements:** Continue dedication of funding for actions that would mitigate the impact of transportation activities on communities. This would build on the existing Transportation Enhancement Program, with a tighter focus on transportation features.
- **Programmatic Mitigation:** In addition to specific enhancement projects, the Commission also recommends consideration of more programmatic approaches, such as banking both money and land to preserve endangered habitat and other open space. Models include an \$850 million program in San Diego County's 2004 transportation sales tax measure.

The Commission also supports Federal tax incentives for early deployment of next-generation, cleaner-burning and more fuel-efficient vehicles.

**(8) ENERGY SECURITY: A Program to Accelerate the Development of Environmentally-Friendly Replacement Fuels.**

Energy has become a critical transportation issue. The Nation's mobility is largely dependent on gasoline and diesel fuel, with transportation accounting for two-thirds of U.S. petroleum

use. Price increases in gasoline and diesel over the last several years have had major impacts on the budgets of American industries and families, inflation, and economic growth. Projections indicate that growing world demand for fuel and dwindling petroleum reserves will only exacerbate these problems. The U.S. dependence on unstable areas of the world for some of our petroleum supplies also introduces the risk of economically disruptive oil price shocks and constrains our ability to respond appropriately to national security concerns. The production and consumption of petroleum for transportation purposes is also a leading source of the Nation's output of greenhouse gas emissions. For these reasons, the Federal government has a vital interest in supporting initiatives that cost-effectively reduce the Nation's dependence on petroleum for transportation.

**The Commission recommends that a distinct transportation energy research and development program be authorized in conjunction with ongoing research programs of the U.S.**

**Department of Energy to address these goals, at a level of \$200 million annually over the next decade.** For transportation to make a significant contribution to reducing energy consumption, policies to that end cannot be marginal, but instead must be basic to mobility. Therefore, the Commission recommends the development of a



national research program and commitment to accomplish this end.

In its 2004 report, the National Commission on Energy Policy recommended a doubling of Federal funding for energy research and development between 2005 and 2010. According to that Commission, Federal spending on transportation-related energy research was \$178 million in 2004. In evaluating long-term alternatives to gasoline, the panel identified hydrogen as a replacement by the year 2050, but cautioned that “efforts to speed deployment of a hydrogen transportation system should not displace other activities that can deliver significant results in the next twenty years.”

The Commission recognizes that the evolution of energy security for the U.S. transportation industry will require a true public-private partnership, one that provides incentives for the private sector to accelerate the development of widely distributed infrastructure for alternative fuels and for the incorporation of multi-use elements in new developments and land use planning. The Commission recommends that Congress establish an accelerated tax credit program and a revolving loan program to encourage early investment in such facilities and opportunities. Accelerated tax credits could also be made available to encourage the early transition of fleets and motor power away from dependence on petroleum-based fuels.

**(9) FEDERAL LANDS: A Program for Providing Public Access.** Of the 2.3 billion acres in the United States, the Federal government has title to about 650 million acres (or about 30 percent of the total area of the United States). **The Commission believes the Federal government should continue to be responsible for transportation access to this Federal property.**

Although Federal lands are largely located in rural areas, urban growth is constantly expanding



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closer to these areas. This growth is placing new pressures on natural landscapes, including but not limited to increased demand for recreational activities and energy/alternative energy sources. The growth of domestic and international tourism is also contributing significantly to increased visitation rates on Federal lands. These demands place increasing emphasis on the need for adequate public transportation access. Providing such access requires cross-jurisdictional collaboration and integrated planning with adjoining State and locally owned transportation infrastructure.

The existing Federal Lands Highway Program (FLHP) is administered through partnerships and interagency agreements between FHWA's Office of Federal Lands Highway and Federal Land Management Agencies and Native American Tribal customers. FTA's Alternative Transportation in Parks and Public Lands Program funds transit and non-motorized transportation serving Federal lands. Federal Land Management Agencies include the Bureau of Indian Affairs, U.S. Forest Service, National Park Service, Federal Wildlife Service, Bureau of Public Lands, Military Surface Deployment and Distribution Command, U.S. Army, U.S. Army Corps of Engineers, U.S. Navy, Tennessee Valley Authority, and the Bureau of Reclamation. USDOT would work closely with the Federal Land Management Agencies to develop appropriate performance standards and goals for transportation facilities on Federal lands.

Funding of improvements on Federal lands would be the responsibility of the Federal government and, as such, would be funded with no matching share. To bring the same degree of accountability and transparency to this new program, the USDOT would establish standardized measures of performance, bringing into the process the full range of public and private stakeholders (including system owners, operators, and users) to develop these goals and measures.

#### **(10) RESEARCH, DEVELOPMENT, & TECHNOLOGY: A Coherent Transportation Research Program for the Nation.**

Research plays an essential role in the development of technology and science. It has made possible much of the progress in transportation over the last century through the development of new materials, production methods, design and planning tools, and data management techniques. The Federal role in transportation research, development, and technology (RD&T) is particularly vital because the Federal government has the resources to undertake and sustain large-scale, high-risk, long-term research that is cost-prohibitive for small private and public sector organizations.

**The Federal government is best suited to monitor the vast scope of research activities underway across the Nation and the world, targeting funds to research gaps.** As Congress noted in Title 23 of the U.S. Code, "research and development are critical to developing and maintaining a transportation system that meets the goals of safety, mobility, economic vitality, efficiency, equity, and environmental protection." As of the present, however, too much Federally sponsored surface transportation research is undertaken without clearly defined anticipated payoffs. The research efforts that are funded are sometimes redundant with other efforts and the research quality is inconsistent. In many cases, Federal research funds are distributed by political earmarking.

The Commission recommends that dedicated Federal funding of RD&T be provided and that this funding be subject to careful planning and review by the transportation industry. The USDOT should work with the modes, industries, and stakeholders in the Nation's research community, such as the Transportation Research Board and institutions of higher learning, to establish performance measures and goals for a



National RD&T plan. Given the fundamental importance of good performance data and modeling to all of the plans discussed in this report, the Commission recommends that an important goal for research under the National RD&T plan should be to improve the Nation's ability to measure project performance data, including research into improved traffic, safety, environmental, and energy modeling. Improved tools for benefit-cost analysis and other forms of economic analysis for projects would also be another priority.

Data collection is necessary to support good transportation decision-making at all levels of government, and the Commission believes that there must be robust, predictable Federal investment in this area. In particular, developing the national strategic plan proposed by the Commission will require extensive data and analytical resources. Data on household travel behavior, freight movement, vehicle use, infrastructure condition, and operational performance will be particularly critical to identifying emerging trends, supporting transportation research, and evaluating the effectiveness of transportation programs, while assuring that future decision makers have the information they need to respond and adapt to changing conditions.

As in the Federal Lands Program, these research activities are a Federal responsibility and would be funded with no matching share.

### ***Interaction Among the Programs***

While the 10 programs identified above represent 10 distinct areas of Federal interest, individual projects may contribute to achieving goals in multiple areas, and thus the programs cannot be considered completely independent. The Commission believes that coordination among the planning activities required for each of the

programs will be essential. Coordination should begin as plans are developed at the local, State, and regional level, but the USDOT will need to take an active role in consolidating these separate plans into a national strategic plan. Examples of interactions among programs would include the following:

- Federal policy should comprehensively support freight mitigation efforts not only through the proposed Federal freight program, but also through eligibility in the Metropolitan Mobility, Connecting America, Intercity Passenger Rail, Environmental Stewardship, and other programs. There should be broad eligibility across programs for activities that support the aims of each respective program, toward achieving the vision of the most efficient and sustainable transportation system possible.
- Robust State and metropolitan planning will be essential to the success of the national strategic planning process we envision. Accordingly, the Commission recommends continuing the practice of funding these planning activities as a percentage of the total authorized funding for the Federal surface transportation program.
- While the Metropolitan Mobility program focuses on the largest metropolitan areas with populations greater than 1 million, it is expected that States would develop comparable mobility plans for smaller urbanized areas in cooperation with the MPOs of these areas. Funding for improving connectivity within smaller urbanized areas would be available through the Connecting America Program. States with metropolitan areas over 200,000 that are not encompassed within the definition of major metropolitan areas would be required to annually measure and report on the extent to which these areas



comply with the performance standards developed for the major metropolitan areas. This would allow emerging patterns of congestion to be detected well before the areas grow beyond a population of 1 million.

- Improving safety performance would be an overarching goal for all the programs and would not be limited to the National Safe Mobility program. For example, the Metropolitan Mobility and Connecting America programs could improve the overall level of safety in different-sized communities. The National Freight Transportation Plan could address deployment of train control technology relevant to safety and capacity on critical corridors that carry passengers and hazardous materials.
- The projects identified under the Intercity Passenger Rail program would likely be a component of the Metropolitan Mobility plans for the areas they connect; they would also have a strong nexus to the Connecting America, Freight Transportation, and Safe Mobility Plans.
- Although the Federal government will play a more direct role in the development of plans for the Federal Lands and RD&T programs,

it is critical that State and local partners and other stakeholders be actively consulted in the projects identified under these programs.

### **Role of an Independent Commission**

The Commission's recommendations for reform of the Federal surface transportation program constitute three legs of a stool. The first leg is accelerating the lengthy process by which transportation projects are delivered, saving both time and money. The second leg is consolidating the numerous investment categories of current law into a more focused, performance-based set of transportation programs related to objectives of genuine national interest. **The third leg involves creating an independent National Surface Transportation Commission (or NASTRAC) to oversee development of a national strategic plan for transportation investment and to recommend appropriate revenue adjustments to the Congress to implement that plan (see Exhibit 6-10).**

There are several models for such an independent commission at both Federal and State levels of government. At the Federal level, two notable examples are the Base Closure and Realignment Commission (BRAC) and the Postal Regulatory Commission. These two commissions were

**Exhibit 6-10. Process Overview: Implementation of a new strategic direction for transportation**





created by Congress to de-politicize difficult policy actions—closing military bases and raising postal rates. The Commission heard compelling testimony from representatives of both bodies that these objectives have largely been achieved. At the State level, many States have created transportation commissions independent of the Legislature to oversee statewide transportation planning and project selection. A related State model is the public utility commission, which is typically empowered to regulate rates for electricity, heating, and telephone service independent of direct legislative action.

NASTRAC would build on the success of these other models. Its purpose would be to de-politicize how we make Federal transportation investment decisions, as well as how we choose to pay for them. For example, one explanation for the long periods of inaction in raising the Federal fuel tax during the past few decades is that Congress has not been presented with a clear mission for the Federal transportation program since completion of the Interstate Highway System. The Commission’s recommendation for NASTRAC to oversee development of a national strategic plan to guide future Federal investment is intended to cure that deficiency. It is also intended to strengthen public confidence that our tax dollars are being wisely invested, and that those investments will produce not just good projects—but better performance—for our transportation network.

The proposed NASTRAC would have the following structure:

1. **Composition**—Ten members appointed by the President and confirmed by the Senate. Appointments should be based on technical qualifications, professional standing, and geographical representation. No more than six members should be from the same political party. Commissioners would serve on a part-time basis, meeting periodically, and would be compensated for their time and expenses. The

Secretary of Transportation should serve as one of the ten members.

2. **Term**—Six years, two-term limit, staggered terms.
3. **Staff**—This Commission would retain its own independent, full-time staff and would be able to hire outside consultants to discharge its duties.
4. **Funding**—This Commission would be funded from its own charge to system users. This charge, which could be adjusted periodically based on its operational needs, would be incorporated into its overall user fee recommendation to Congress. Congress could not adjust this charge except in so far as Congress would accept or reject the overall user fee rate recommendation. Congress would establish this Commission with an initial appropriation until charges could be implemented and self-sustaining funds could be collected.
5. **Congressional Veto**—This Commission’s revenue recommendations would be sent directly to Congress. The recommendations would then be subject to congressional veto by 2/3-recorded vote of both houses within 60 days of receiving them. If no actions were taken, the recommendations would become law. No amendments would be allowed.

The USDOT would lead the strategic planning process with policy oversight provided by NASTRAC. USDOT would consult with multiple stakeholders in this effort, including state departments of transportation, MPOs, and key private sector interests such as the freight railroads. The role of the NASTRAC in implementing the 10 performance-based investment programs described in the preceding section is as follows:

- Oversight of the USDOT-led process by which performance standards would be set on a national basis for reducing traffic congestion, improving highway safety, and other



performance indicators. The standards would be incorporated into Federal grants to require progress toward achieving those goals.

- Oversight of the USDOT-led process to adopt standards for demonstrating that only economically justified projects that accomplish plan objectives would be eligible for Federal funding.
- Approval of the USDOT-led effort to integrate the various programmatic plans for asset management, freight movement, and other functions into a national strategic plan for surface transportation.
- Recommendation to Congress of the user fee rates and adjustments necessary to fund the Federal share of the national strategic plan.
- Authority to adjust the Federal share for particular activities as an incentive, rewarding States and MPOs that demonstrate creativity and innovation. If States and MPOs exceeded performance objectives, Federal participation rates for future funding would be increased. Conversely, Federal participation rates would be reduced for grantees that fail to meet agreed-upon objectives.
- Adoption of maintenance of effort requirements. Even with increases in Federal funding, a commensurate increase in funding from other levels of government and sources is required and expected. Therefore, maintenance of effort checks would be built into the grants to mitigate the tendency to substitute Federal funds for State and local resources.

This Commission acknowledges that creation of the NASTRAC is one of the most far-reaching of its recommended reforms to the Federal surface transportation program. This Commission is convinced, however, that the crisis confronting the customers of the Nation's transportation system demands a bold departure from past practice.

Businesses are frustrated at their inability to move goods efficiently. Commuters feel trapped by growing levels of traffic congestion. Many stakeholders are alarmed about transportation's impact on the environment and community character. Congress itself is undoubtedly troubled by the impression that the Federal program has been overwhelmed by earmarking. The NASTRAC is intended—in addition to its explicit duties described above—to give a voice to these customers in improving the national transportation network on which they so heavily rely.

### ***Relationship to Performance and Accountability***

The Commission acknowledges that recommendations that entail performance standards represent a major departure from the current public project delivery processes. Federal programs have evolved into what is now essentially a block grant model, with little accountability for specific outcomes. While considerable work has been done on techniques to measure performance, there are relatively few examples of using performance standards to build into grant relationships accountability for achieving pre-determined levels of performance at the overall program level. **Developing performance standards and integrating them into a performance-driven regimen that would be applicable to all States and metropolitan areas will be a challenge since local conditions are so different, but the rewards will be worth the effort.**

Current programs rarely link project performance to funding, and the economic justification for projects is seldom fully evaluated either before or after projects are implemented. State and local agencies prepare metropolitan area transportation plans, and projects receiving Federal funds go through environmental and design reviews, but



there is little or no accountability for meeting specific performance standards. Transparency in performance targets and achievement can be seen as threatening to governmental units who fear the inevitable ranking of various jurisdictions and believe that rating success by common benchmarks is simplistic and unfair. In addition to making better use of public monies to accomplish critical national objectives, and thus obtain better value for the Nation from existing transportation spending levels, the Commission's recommended approach of performance standards and economic justification would do much to restore public confidence in the transportation decision-making process. In such an environment, Congress and the public would be more amenable to agreeing to invest, whether through taxes or other user fees, to meet the Nation's transportation investment needs.

**Federal organizational and grant administration changes.** Federal transportation programs have historically focused around modes (FHWA, FTA, FRA, etc.) rather than functional areas (e.g., freight, metropolitan mobility, etc.). Such structures have strength because the agencies build upon the necessary technical competencies but present barriers to the problem-solving that should occur during both the system planning and implementation phases. Implementing agencies, when oriented along functional lines, are more likely to be outcome-oriented. The Commission endorses changes in the structure of the USDOT that would reinforce the functional orientation of the 10 new recommended programs rather than the current modal orientation.

### ***Transition to the New Programs***

This report proposes a major restructuring of the Federal surface transportation program. The institutional reforms that the Commission recommends will take some time to be realized, especially the reorganization of the USDOT. The

Commission recognizes that performance-based planning would represent a significant departure from current planning processes. However, the Commission envisions the new processes as a substitute for current processes, rather than as an overlay on top of them. The Commission also expects that the design for the new process will build upon lessons learned under the current programs. In the long run, these reforms should greatly improve the delivery process and reduce the time it takes to complete projects, while still respecting the need for thorough planning and public involvement. These programmatic reforms also involve consolidating the highway and transit titles in the U.S. Code, which have been separate for their entire existence.

**Given the scope and scale of these changes, the Commission urges Congress to pay particular attention to several transition issues that will need to be addressed in the early phases of implementing its recommendations.** These transition issues include:

- Dealing with projects in the development pipeline so these projects can continue to advance in a timely manner.
- Carrying out existing or pending Federal financial commitments under full funding grant agreements in the New Starts transit major capital investments program.
- Authorizing USDOT to obligate Federal funds to a limited number of new projects and activities that are clearly in the national interest, prior to completion of the performance-based planning process to be overseen by NASTRAC.



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