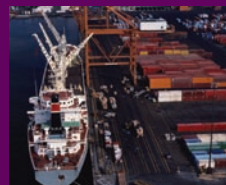


TRANSPORTATION INVEST IN OUR FUTURE



A New Vision for the 21st Century

AMERICAN ASSOCIATION OF
STATE HIGHWAY AND
TRANSPORTATION OFFICIALS

AASHTO
THE VOICE OF TRANSPORTATION

JULY 2007

Introduction

When President Eisenhower signed the Interstate Highways and Defense Act in 1956, it turned out to be a transformational moment in the nation's history. It provided the infrastructure backbone of a *national network* that would sustain the economy for more than half a century. That network included not just the Interstate, but other highways, streets and roads, intercity and urban rail, and bus systems as well. Many believe that was the last time the United States had a unifying national vision for transportation.

The vision behind the Interstate System was focused and succinct: "to connect principal metropolitan areas, cities, and industrial centers, serve national defense, and connect with Canada and Mexico." The success of that vision surpassed all expectations, making the United States a world leader in economic prosperity and quality of life. But sustaining that world position in the changing and complex world we live in today requires a new vision for our transportation system.

That question was the driving force behind AASHTO's initiative that brought together top experts from business, construction, state and local governments, and academia to focus on what is possible, what is probable and what is preferred. The decisions that we as a nation make within the next few years will determine what kind of future our grandchildren will inherit.

The following recommendations are provided for the National Surface Transportation Policy and Revenue Study Commission, and ultimately for Congress and other elected officials in whose hands these decisions lie.

What follows is the description of a "conceptual plan" which ensures that our surface transportation system will meet America's needs, and a transportation "vision" for our future which describes how we can meet those needs in ways that create a newer, freer, stronger, more competitive, safer, and better America. Finally, we outline recommendations on how this can all be funded.

We extend our sincere appreciation to the many organizations and individuals who took part in developing this conceptual plan. May it serve as a guide to solving today's challenges and preparing tomorrow's goals.


John Horsley
Executive Director



ACKNOWLEDGEMENTS

In developing this Conceptual Report for the National Surface Transportation Policy and Revenue Study Commission, AASHTO brought together transportation experts from across the nation, and worked in partnership with other associations who represent the users, builders and providers of our transportation system. The vision and strategies which the report contains have been distilled from research reports, panel discussions, white papers, and a three-day conference held May 21–23, 2007, the Transportation Vision and Strategies for the 21st Century Summit. The broad public and private sector participation represented every aspect of America's surface transportation system.

We would like to acknowledge and thank the many people and organizations who have joined in this consensus effort to assist the Commission and Congress as we look to the future of the U.S. transportation system. Appreciation is also extended for the support of Transportation Research Board's National Cooperative Highway Research Program.

Partner Organizations

AASHTO

AAA

American Council of Engineering Companies

American Public Transportation Association

American Road and Transportation Builders Association

American Trucking Associations

Association of American Railroads

The Associated General Contractors of America

Research

Between 2005 and 2006, AASHTO combined resources from the Transportation Research Board's National Cooperative Highway Research Program, the Transit Cooperative Research Program, and state pooled funds to conduct policy research on the future needs of the nation's surface transportation system

Information on the research reports is available through the following Internet links.

Future Options for the National System of Interstate and Defense Highways, National Cooperative Highway Research (NCHRP) 20-24 (52): By PB Consult (Prime) with Cambridge Systematics; Kevin Heanue and Alan Pisarski. <http://rip.trb.org/browse/dproject.asp?n=11726>

Future Financing Options to Meet Highway and Transit Needs, NCHRP 20-24 (40): By Cambridge Systematics, Mercator Advisors and Trans Tech Management. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_w102.pdf

AASHTO's Freight Bottom Line Report: By Cambridge Systematics Inc.; Boston Logistics Group; Global Insight Inc.; Wilbur Smith Associates; TransSystems Corp; and PB Consult. <http://freight.transportation.org/>

Other reports:

Infrastructure 2007: A Global Perspective, Urban Land Institute and Ernst and Young

America 2050: A Prospectus, New York: September, 2006, Regional Plan Association



THE AMERICAN TRANSPORTATION NETWORK OF TOMORROW



This report sets out the challenges to America's future mobility over the next five decades, and the potential solutions identified through a visioning process of the nation's top transportation experts. A threshold question, however, is "what will this mean to the lives of our children and grandchildren". The following projection shows how America can change for the better if we choose to invest in transportation—invest in our future.

Connecting the USA and the Globe

The American Transportation Network of highways, transit, rail, and ports is poised on the threshold of a period of innovation unprecedented in our history. The benefits from forward-looking investment will be the underpinnings of a thriving national economy, maintaining America as the international leader in technology and wealth creation, with benefits flowing to all citizens.

Envision a future where our personal communications tools enable us to move about with more choices and efficiency than ever before. We can instantly pick routes and modes to our destinations with the shortest travel times, reroute around slowing traffic, and order dinner for pick up enroute from work while letting loved ones know our exact arrival time and what's for dinner.

The digital economy will enable many more of us to work from home, the lobby of our condo towers, local coffee shops, or neighborhood parks. We will still travel to get together to work as teams, but many of us will do our work by exchanging information over the electronic network.

More of us than ever will live in rebuilt cities in dense, vibrant neighborhoods where we can safely walk, ride a bike or transit to work, the store, or library. Home delivery is so efficient and flexible, more of us than ever will get door-to-door delivery for the everyday items we use.

Today's tragic toll of 43,000 people dying on our highways will be a distant memory. Traffic deaths will be rare as we continue to reduce fatalities by more than 1,000 each year. Our insurance rates will plummet as losses from accidents greatly diminish.

New materials, construction techniques and designs will enable us to maintain, repair, and replace the network faster, cheaper, and with longer-lasting life spans made possible by improved life-cycle management. We will recycle an ever increasing percentage of materials in the course of maintaining and expanding the system.

By driving shorter distances, walking and riding transit, and intelligent routing of our travel to better utilize our connected street and highway grid, we will reduce congestion. Strategic investment in new lanes, new corridors, and transit service will remove bottlenecks and add choices for all. Seniors, who will make up a much larger portion of our population, will get where they want to go by affordable public, on-demand transit so they are able to live more engaged and connected lives.

Our cities will be smog-free as we fuel transport with electric, bio-fuel, and other renewable forms of energy which will dramatically reshape our economy. We will no longer be dependent on imported oil and we can reduce carbon emissions to almost zero. We will spend smarter and less on day-to-day transportation giving us more options for housing, travel, shopping and recreation.

Our land-use planning will result in streets and highways that support multiple forms of travel, and take into account housing, neighborhood retail, clean water, and wildlife habitat. We will achieve better-than-before design with improved quality of life, while natural systems are restored and preserved. Trails, bikeways and greenways will provide natural corridors through our cities, connecting to broader agricultural and natural landscapes across the nation where millions of trees planted by school kids, churches, and community groups will flourish and mature.

Our small towns and rural communities will be linked into the national transportation grid and electronic communications systems so residents enjoy access to goods, services, work, and transportation options as never before. Farm products will move with speed and care from producer to consumer ensuring time-to-market freshness as never before.





Freight will move along automated channels, transferring across modes so fluidly that on-time arrival is taken for granted. Automated and secure port facilities load and unload goods with efficiency undreamed of only decades before. Digital tracking and routing is so advanced that every item moving across the network of rails, highways, intermodal transfer centers, and ports ensures that America continues to lead the world in the efficient flow of goods from factory to store shelf and to front door. Rail and truck corridors channel goods through interconnected hubs allowing guaranteed delivery with predefined arrival times scheduled at shipment.

The American Transportation Network will not be taken for granted. A national consensus has grown around the common understanding of the importance of the system to our individual and collective well being. By working together, Federal, state, and local governments, business, and the general public will show a commitment to reliable and consistent investment to support and advance the network. There will be a broad and shared understanding of the value the network delivers in quality of life, economic vitality, and environmental stewardship. The American Transportation Network will be a sustainable system, the envy of the world.

—Gordon Bell, Seattle, Sustainable Transportation Panel Report Writer



Photo courtesy of the Missouri Department of Transportation.

Workers install guardrail on Highway 54 south of Jefferson City, Missouri. An aggressive program of roadway safety improvements has dramatically reduced highway fatalities in the state.

CONTENTS



- Introduction
- Acknowledgements 1
- The American Transportation Network of Tomorrow 3
- Transportation Vision and Strategies for the 21st Century 9
- CHAPTER 1**
- A Vision for a Changing America 21
- CHAPTER 2**
- A Vision for a Congestion-Free America 33
- CHAPTER 3**
- A Vision for a Globally Competitive America
Creating Strategies for the 21st Century 47
- CHAPTER 4**
- A Vision for a Safer America 67
- CHAPTER 5**
- A Vision to Benefit America's Way of Life 73
- CHAPTER 6**
- Investing to Achieve the Vision 81
- Contributors 87



TRANSPORTATION VISION AND STRATEGIES FOR THE 21ST CENTURY



Congress created the National Surface Transportation Policy and Revenue Study Commission and directed it to develop a “conceptual plan” to ensure that the surface transportation system will continue to serve the needs of the United States over at least the next 30 years. During a series of hearings across the country, Commission members themselves have called for the development of a “bold national vision” for transportation. AASHTO, in collaboration with several industry partners, has developed a national transportation vision which seeks to do both.

Calling upon the foremost transportation experts in the country, AASHTO and partner associations convened topic panels and a visioning summit to bring forward key issues and solutions. Jointly they have compiled comprehensive recommendations that will enable the United States to achieve the transportation vision described. The findings contained in this report chart a path to modernize and transform today’s system to meet the challenges of tomorrow.

The Choice—A New Vision or Complacency

The nation figuratively stands at a fork in the road. One path leads to a new vision which, if realized, will help guarantee that our children and grandchildren will have a bright future. In that vision, national leaders muster the political will to provide the quantum increase in investment needed. The best methods and materials are used to build the new capacity needed to ensure that goods and services are readily available to everyone at affordable prices, to efficiently get American agricultural products, manufactured goods, and value-added services to world markets, and to afford every American enjoyable access to the Nation’s incredible array of recreational and cultural opportunities. In that vision, technological frontiers continue to be expanded to make travel safer, and more reliable for everyone, while minimizing energy consumption, impacts on the natural and built environment, and the contribution to global climate change.

The other path is one we might take out of complacency, because we fail to appreciate what is at stake, or because we cannot muster the political will to do what is needed. At the personal level, this is a path of more congestion, more time spent in traffic, less time spent with the family, more missed deliveries, and more frustration. At the national level, this is the path of reduced economic prosperity, greater damage to the environment, and more American jobs lost to countries like China and India, who are investing in the transportation systems and technologies of tomorrow to catch up and surpass us.

The choice is ours.

The System Envisioned

America in 2040 is a thriving country whose transportation system is the envy of the world.

How will this vision be achieved?

Invest in the innovation and the highway, public transportation and rail capacity needed to support a strong economy, maintaining America as the international leader in technology and wealth creation.

Connect all regions of the country, urban and rural, to the global economy, and do so reliably every day.

Expand opportunities for jobs, places to live, time with family, education, health care, and other services.

Integrate the highway, rail and port freight systems of the North American trade bloc to enable the U.S. to remain an economic superpower.

Synchronize transportation policies with policies for housing, land use, energy, the economy, and the environment.

Improve the quality of life for all citizens through a dramatic increase in safety, reduced congestion, and energy independence.

Harness advanced technologies in every aspect of the system.

Preserve America's freedom to travel, where we want, when we want, by whatever means we want, from this generation to the next.

"Delivering on our vision will ensure the continuance of what we all know as the American way of life. It is premised upon our ability to go from where we are to where we want to be, at the time we want, on the route we prefer, on that transportation mode that best serves our needs. For that to occur we have to change the course we are on."

—Robert Darbelnet, President, AAA

Top 10 Steps Needed

When 150 transportation leaders came together at a National Transportation Vision and Strategy for the 21st Century Summit, they were asked to identify the steps that must be taken to transform our transportation system. While 27 recommendations received strong support from the participants, the following steps were seen as most urgent.

- **Increase Core Program Funding.** Protect and enhance existing transportation infrastructure investment by significantly increasing funding for the core highway and transit programs and ensuring the solvency of the Highway Trust Fund.
- **Net New Funding for Strategic National Investments.** Generate net new funding sources outside the Highway Trust Fund to make bold new strategic national investments beyond what can be funded through Federal highway and transit programs. Examples include tax credit bonds to fund expansion of intercity passenger rail service, highway projects of national significance and transit new starts, and investment tax credits for freight rail capacity improvements which benefit the public.
- **Critical Commerce Corridors.** To help ensure U.S. global competitiveness, create a new Critical Commerce Corridors Program, a 25-year initiative to fund projects of national significance. Funded from freight-related user fees from outside the Highway Trust Fund, this would provide resources to fix freight bottlenecks, improve access to ports, distribution centers, and border crossings, and develop a national network of truck-only lanes. The system would be designated through a process where the Federal government provided coordination, and the states and MPOs did the planning, in consultation with trucking, railroads, ports, and shippers, and the involvement of affected communities.
- **Long-Term Transition.** When necessary, make the transition from fuel taxes to a more diversified and reliable funding base.
- **Preserve and Modernize the System.** Priority should be given to preserve and modernize the system of highways, transit, and rail built during the past century. Pavement foundations need to be rebuilt and many bridges rebuilt or replaced. Many structures need to be modernized to carry heavier truck loads, faster design speeds and traffic growth. Preserving and modernizing the system will require enormous additional resources beyond those available in 2007.
- **Improve System Performance.** Improve performance of highways and public transportation through advanced technologies, seamless integration of the multimodal system, and better system management techniques to reduce congestion, improve throughput, and increase system reliability.
- **Public Transportation.** Aggressively invest in making public transportation an attractive choice across America. Within 15 years, a fully functioning, high-quality, high-capacity system should be in place in every metropolitan region.
- **Capacity.** Aggressively invest in transportation capacity that is needed to support population and employment growth, (for example, recognition of mega-region needs as a national priority.)

- **Tougher Laws to Save Lives.** Enact and aggressively enforce legislation to create a culture of zero tolerance for high-risk behavior. This includes addressing:
 - Drinking and driving;
 - Primary seat belt laws;
 - Teen graduated licensing;
 - Motorcycle helmet requirements;
 - Speeding;
 - Stiffening penalties for driving without a license;
 - Closing gaps and weaknesses in the criminal justice system; Implementation of ignition interlocking systems; and
 - Automated enforcement technology.
 - **Safety Improvements.** At all levels of government, promote and deploy, with flexible funding, proven safety-based policies, geometric standards, and countermeasures which maximize safety appropriate for the transportation network, roadway type, and location.
-

New Transportation Strategies

Investment to Keep the United States Globally Competitive

As the Urban Land Institute recently stated, investment in world-class infrastructure has become a competitive imperative. The global economy pressures countries to upgrade infrastructure in order to remain competitive, gain advantage, or keep from falling behind. Moving people and goods internally with efficient access to global pathways—seaports and airports—is essential.

Freight Strategies

There are four key elements to the multimodal freight strategy that must be developed.

- To move the containers coming through our ports, or to move goods generated here in the United States to national and international markets, a viable long-haul capability is needed. This can be provided for trucks on a new national network of dedicated truck lanes, and for rail by adding the new rail system capacity needed.
- Fixing bottlenecks, reducing congestion, and improving overall performance within metropolitan areas is needed to make reliable, on-time delivery possible.
- Connections from ports and distribution centers to the Interstate System and the rail system must be improved.
- The highway, rail, and port systems of the United States, Canada, and Mexico should be integrated to enable North America to compete in the global marketplace with other trading blocks of this scale. A priority program should be launched in 2010 to fix the 100 worst freight bottlenecks in the country by 2015.

Global Climate Change Strategies

Global climate change has become a political, economic, and environmental fact of life. To make a positive contribution on the issue of global climate change, transportation policies are needed to reduce dependence on foreign oil, reduce energy consumption, and reduce travel demand. Actions to reduce transportation CO₂ emissions, from cars, trucks, and air travel, will be especially important:

1. Support the President's goal to reduce oil consumption by 20 percent in 10 years.
2. Double the fuel efficiency of new passenger cars and light trucks by 2020, and the entire fleet by 2030.
3. Double transit ridership by 2030, and significantly expand the market share of passengers and freight moved by rail.
4. Reduce the projected growth in vehicle miles traveled (VMT)—from three trillion in 2006 to five trillion, rather than seven trillion, by 2055.
5. Reduce the percentage of commuters who drive alone to 1980 levels, and increase the percentage of those who ride transit, car pool, walk, bike, or work at home.

"It is not sufficient to simply say we need to increase investment. Like those visionary leaders in the middle of the 20th century, we need to articulate a compelling vision of the value of investment and make that investment a reality."

—Victor Mendez, Director, Arizona Department of Transportation, President, AASHTO

Federal Funding Strategies

If we are to have a national transportation system, it is imperative that the federal government play a role in the financing as well as the direction of the national system.

With a \$2.5 billion cutback in the highway program looming in FY2009, Congress must find ways to assure that revenues sufficient to preserve full funding of SAFETEA-LU authorizations are provided.

By FY2010, the threatened cutback in the highway program will come to over \$18 billion. The Congress and the new President must agree on a highway and transit reauthorization package which avoids this short-term cutback and restores the program's purchasing power. A fuel tax increase plus indexing is one possible source for the increase needed.

Congress and the new Administration should also agree on an important policy principle. To provide the transportation funding needed to keep America competitive and meet national needs, all levels of government must continue to fund their share. Federal and state-local transportation capital funding shares of 45 and 55 percent, respectively, should be continued.

Tolling and Public–Private Partnerships

Tolling and public–private partnerships are important elements of the overall investment picture where they are crafted appropriately to assure protection of the public interest. With

supportive Federal and state policies, their share of highway revenues can increase from 5 percent in 2007 to 7 percent of the total by 2015.

Innovative Finance—State and Local Government Funding

This includes use of finance mechanisms such as municipal bonds, GARVEE bonds, TIFIA, Private Activity Bonds and State Infrastructure Banks, as well as new tools. In later funding cycles, Congress should further increase Highway Trust Fund revenues, to be matched by increases in capital investment at the state and local levels.

“We can’t allow this program to devolve to the states. It’s a national program. One might say it is a matter of national security. As much as we require a strong national program in terms of national defense, our economic security also requires a very strong national program.”

—David Raymond, President, American Council of Engineering Companies

Safety Strategies

Today’s highway death toll of over 43,000 annually can be cut in half through a series of safety actions.

- The decision by U.S. DOT Secretary Mary Peters mandating electronic stability control on all vehicle models from 2012 forward can result in as many as **9,600** lives being saved annually, according to the National Highway Traffic Safety Administration.
- Insisting on a “get tough” policy in highway construction work zones for speeding and impaired drivers, where over 1,000 are being killed annually, including contractor and state DOT employees, could save **500** lives per year.
- Some 16,000 lives are lost annually due to drunk driving. Passing tougher legislation, such as requiring ignition interlocks for anyone convicted of a DUI (Driving Under the Influence), could save **5,000** lives each year, and could eliminate drunk driving in 25 years, according to Mothers Against Drunk Driving.
- Enacting primary seat belt laws to achieve a 90 percent rate of seat belt usage could save **8,000** lives annually, according to NHTSA.
- Lane departure warnings, collision avoidance systems and other advanced technologies such as those made possible through the Vehicle Infrastructure Integration (VII) program, could save **5,000** lives per year based on research funded through the U.S. DOT.
- Creating a national network of separate truck-only lanes and moving traffic to Interstate-quality roadways with lower fatality rates could save as many as **3,000** lives per year.
- Recent research through the National Academy of Science shows that significant increases in investments in roadway safety improvements, such as median cable barriers and rumble strips, could save **4,000** lives per year.

- Senior-friendly signage and lane markings, graduated licensing for teenagers, safer bike paths and sidewalks encouraged by Safe Routes to Schools could combine to save **1,000** lives per year.
- With motorcycle accidents causing 10 percent of today's fatalities, and the rate growing by double digits annually, aggressive countermeasures such as mandatory helmet laws are needed.

The challenge is to find additional steps to advance this goal.

Highway System Strategies

The first two steps to achieving the highway system the nation needs for the future are to preserve and modernize the system built during the past century, and to improve performance through the application of advanced systems management techniques and ITS technologies. Once those steps are taken, and as many trips as possible are shifted to transit and rail, what remains is adding the new highway capacity needed. It is estimated that 50 percent of today's congestion can be attributed to a lack of capacity.

New regions—particularly in the West and South—need new roads, or upgrades to existing roads, to adequately interconnect with other regions, rural areas, and parks and recreational opportunities. A recent study by the national cooperative Highway Research Program found that to accomplish this, 12,400 lane-miles should be added to rural parts of the National Highway System (NHS). In addition, 40,000 lane-miles are needed to expand the existing 135,000 lane-miles of rural Interstates. Another 6,000 lane-miles should be added to existing NHS routes that already exceed capacity or are expected to in the future. Substantial improvement is also required to the vital network of state and local roads below the level of the NHS.

“It’s not getting any easier to generate the funds required for transportation. We need a federal partner who will join us in funding the improvements the country needs.”

—Representative Dan Silva, Chairman, New Mexico House Transportation Committee

Transit Strategies

Another element of the future transportation system is to at least double transit ridership by 2030, and develop a plan to double it again by 2050.

A bold strategy is needed to add capacity, including modernization and expansion of subway systems and commuter rail systems in major markets. New light rail systems should be funded and built. Many communities will look to bus rapid transit to expand service and enhance their bus operations. The aging of America is expected to create a huge demand for both fixed-route and paratransit services, requiring improved paratransit services in cities, suburbs, and rural areas.

Intercity Bus Needs. Additional funds will be needed to expand intercity bus services to rural communities. Demand for over-the-road charter bus services will flourish for tours and tourism as the Baby Boom generation hits retirement.

Supportive Land Use. A key element in achieving significant growth in transit ridership is ensuring that development facilitates transit use.

Metropolitan Mobility Strategies

Between 1955 and 2005, the number of people living in metropolitan areas in this country increased from 85 million to 225 million. Thirty years later it is expected to reach nearly 300 million, making metropolitan areas the center of economic growth.

Meeting metropolitan needs requires a multi-modal approach which preserves what has been built to date, improves system performance, and adds substantial capacity in highways, transit, rail, seaports, and airports. It requires giving freight and regional passenger rail service higher priority. It requires the synchronization of transportation, land use, energy, and environmental policies. Finally, it requires the use of advanced technologies, a quantum increase in investment, accelerating project approvals, and inter-jurisdictional collaboration.

“Steps must be taken to speed up the time required to get things done. That includes getting unnecessary government regulations out of the way when there are ways to achieve the same objectives better and faster.”

—Pete Rahn, Director, Missouri Department of Transportation, Vice President, AASHTO

Urban Highway Capacity Needed. To reduce current congestion and meet future needs, 40,000 lane-miles should be added to the existing 75,000 urban Interstate lane-miles. An additional 50,000 lane-miles should be added to urban segments of the NHS. Finally, 8,000 centerline miles of High Occupancy Vehicle (HOV) lanes will be needed.

Mega-Regions—Connected by High-Speed Rail. Most metropolitan growth and economic expansion is projected to take place in 10 mega-regions like the Northeast from Washington, D.C. to Boston. Recognizing the strategic importance of these regions, actions are needed to maximize what they can do for America’s ability to compete globally. High-speed rail is ideally suited to connect enterprises in these mega-regions across distances of 100 to 400 miles. By 2030, reliable corridor passenger rail service should be built in all 10 mega-regions.

Getting Government Regulations Out of the Way. Some Federal laws and regulations needlessly stand in the way of transportation solutions. They should be modified to achieve the same objectives, only in ways that work better and faster.

Non-Metropolitan Mobility. The non-metropolitan areas of this country also will have an important role in the nation’s future. Growth in these areas over 30 years is projected to reach nearly 20 million people, with mobility needs growing as well. The national highway network which connects America north, south, east, and west, cannot function without the support it receives from these areas.

Railroad Strategies

Although the freight rail market share is forecast to decline, it can instead increase by 2040. At least two things are needed to help make this possible—adding capacity and increasing demand. For example, rail intermodal volume could increase by over 200 percent between 2007 and 2040. Carrying more long-haul loads by rail will help truck-load carriers who face a driver shortage, and will reduce truck traffic on the highways.



“The railroad infrastructure holiday is over. We have lived off excess capacity for a long time, and we don’t have that anymore in many corridors and in many locations.”

—Craig Rockey, Vice President, Policy and Economics, Association of American Railroads

Public–Private Investment in rail improvements should be made by states, cities, and counties in partnership with the railroads when it is justified based on public benefit.

Intercity Passenger Rail Service in North America can provide the traveling public with a genuine transportation alternative. Passenger rail service which is well connected to other transportation modes and systems, including commuter rail and other public transit alternatives, will further enhance its utility. Establishing such a system requires planning processes, systems design and engineering and technology advancement that support the vision of regional and national connectivity. As a first step, Congress should enact a national system of intercity passenger rail, including resolution of Amtrak’s role, and fund pilot projects to demonstrate the feasibility of high-speed passenger rail service. These objectives must recognize the necessity of expanding freight capacity and service while expanding passenger rail service. Research and innovative operational practices can produce safe and reliable services for all customers. Passenger and freight rail must continue to grow and, where necessary to maintain the efficiency of freight movement and expand passenger rail service, public investment should be provided to establish additional and separate infrastructure. A strong federal role is essential in funding expansion of intercity passenger rail service.

Advanced Technology and Innovation Strategies

Advances in technology will be responsible for much of the success achieved in highway, transit, and rail systems. Vehicles equipped with collision avoidance and lane departure systems can eliminate crashes. Delays caused by construction and weather can be managed through advanced notice to travelers. Vehicles can be equipped with safety, business and entertainment features, such as adaptive cruise control, and advanced mapping systems. Roads and bridges can be built with long-lasting, high-performance materials. GPS and laser-guided earthmovers whose work is guided by three-dimensional software programs can accelerate project completion. High Occupancy Toll (HOT) lanes can provide premium service to motorists in congested areas willing to pay for faster service.

Vehicle Infrastructure Integration (VII). A partnership between Federal and state DOTs and the automobile industry to deploy new vehicle-to-vehicle and vehicle-to-roadside communication capabilities can improve both safety and system performance.

Sustainable Transportation Strategies

To meet the transportation needs of the present and pass on a better world to our children and grandchildren, it is necessary to expand the transportation network's capacity while simultaneously reducing the environmental footprint of the system.



Three steps are recommended to succeed at this approach:

1. Embrace environmental stewardship as a preeminent approach to delivering transportation services that result in a zero carbon footprint and a “better than before” environment;
2. Deliver a sustainable, high-performance transportation system in support of a robust economy by first optimizing existing infrastructure, then reshaping demand, and lastly, expanding judiciously; and
3. Enhance quality of life by integrating transportation with the built environment by using the full tool kit, including, context sensitive solutions, land use policy, and diversified mode choice.

The transportation decision-makers of the future should adopt the triple bottom line as a yardstick to evaluate the sustainability of surface transportation system policies and performance in order to ensure that transportation strategies and investments will result in

- Robust economic growth;
- Better-than-before health of the environment; and
- Improved quality of life for all citizens.



CHAPTER 1

A Vision for a Changing America



Imagine a transportation system with the capacity to serve Sunbelt growth and metropolitan expansion, connect all regions to the global economy, and do so reliably every day.

How We Have Changed

In the late 1950s, there were 65 million vehicles creating 600 billion annual vehicle miles of travel. Vehicle ownership had just begun to take off and long-distance trucking was still in its infancy. Fifty years later, there are over 230 million vehicles creating 3 trillion vehicle miles of travel on a highway system that grew by only 15 percent in that period. (Figure 1.) Forecasts indicate that the U.S. population will grow from 300 million today to 435 million by 2055. (Figure 2.) Highway travel measured in vehicle miles traveled may increase from 3 trillion today to as much as 7 trillion by 2055. Truck-borne freight is expected to double by 2035, and rail freight to increase by over 60 percent.

The Challenges We Face

Providing mobility for this country is getting tougher. Congestion in metropolitan areas is bad and getting worse because we have not kept pace with the highway, transit, and rail capacity needed. Travel demand in non-metro areas is growing fast as well. Gas prices are at record levels and construction costs are rising. After two decades where national politics have been dominated by resistance to raising taxes, today's challenge is how to generate enough revenues to meet the country's needs. How to rebuild and modernize aging infrastructure so it continues to

Figure 1.

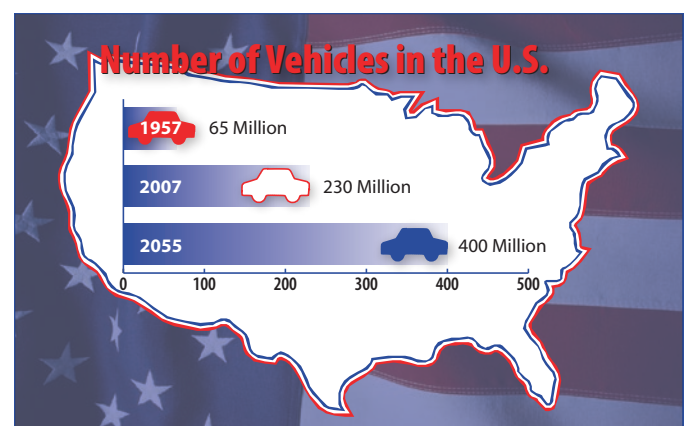
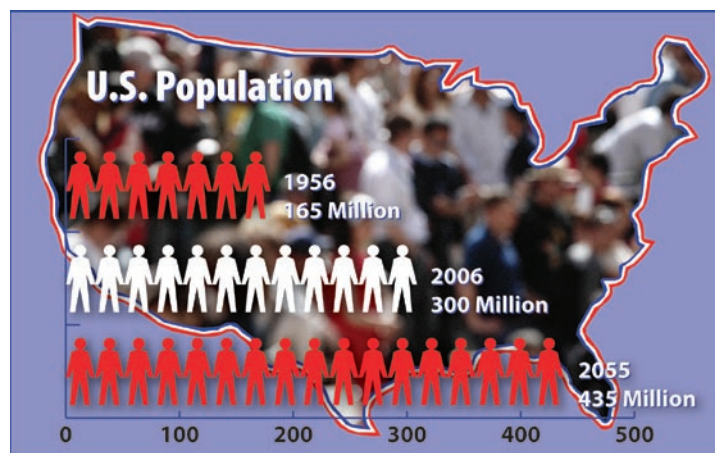


Figure 2.



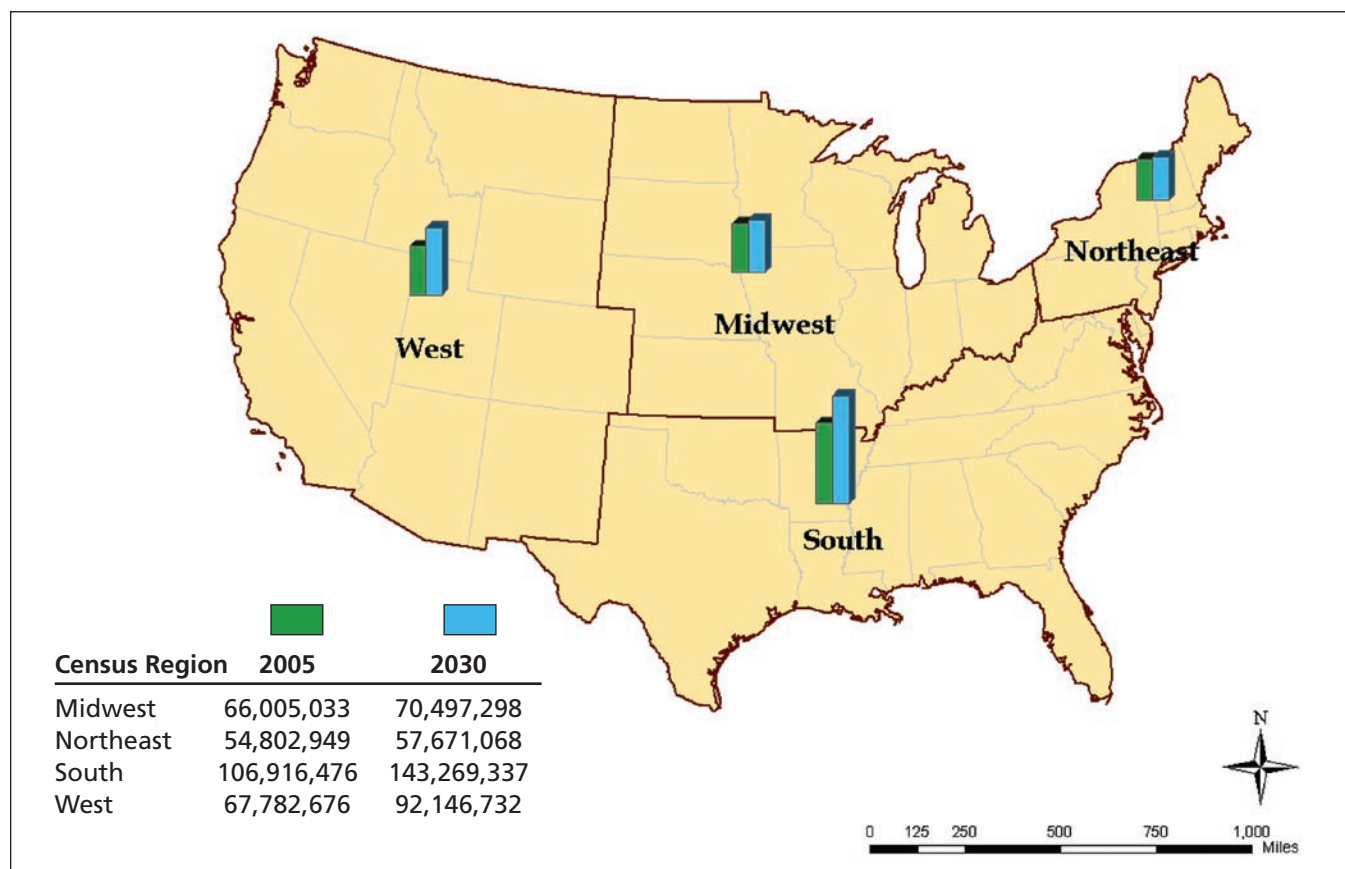
serve future generations? How to add the highway, transit and rail capacity needed to serve a growing nation? And how to build the national freight network needed to keep America competitive in the global economy?

Mounting concern over global climate change and the realization that we must reduce our dependence on foreign oil will also require changes in the approach taken.

Future Demand for Travel

A major National Cooperative Research Program Study on the Future of the Interstate System was recently completed at the request of AASHTO. Its findings go well beyond just the needs of the Interstate Highway System and are helpful in outlining for the entire transportation system the many challenges we face. According to that study, there are three new areas where a vision of what needs to be done is required: the Post-Interstate Geography, Metropolitan Congestion, and Global Economic Integration.

Figure 3. Census Region Population Forecast, 2005–2030



“We must really think ahead—this isn’t about what is needed this year, what is needed this decade. This is about what the nation needs for the next 20 to 40 years.”

—Robert Darbelnet, President, AAA

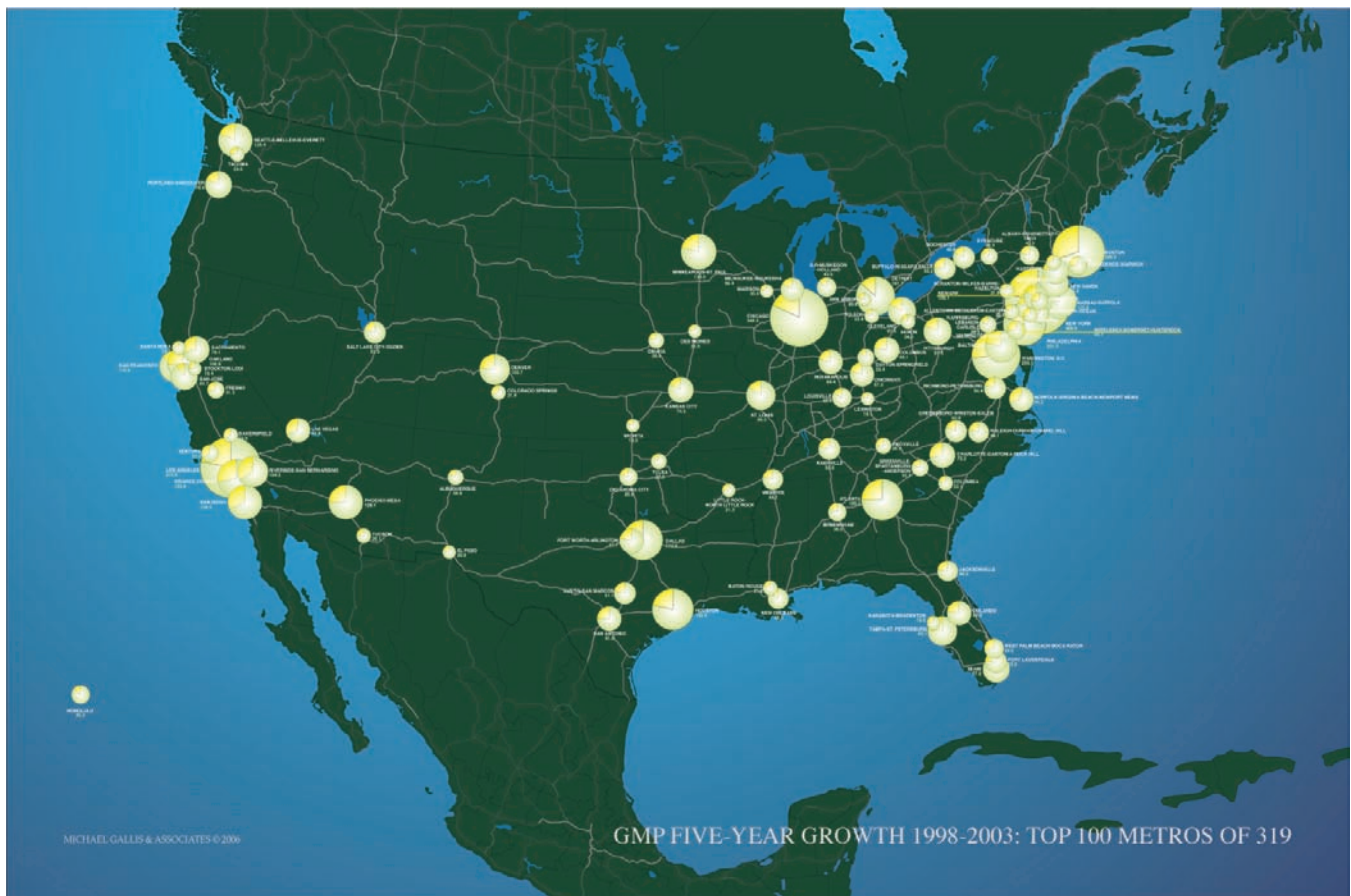
The Post-Interstate Geography

The pattern of development and population in the country has shifted dramatically. Sunbelt growth, sprawling suburbs and edge cities are all post-Interstate developments. Nationwide, there are now 70 urbanized areas of 50,000 or more population which are *not connected to the Interstate system*. Who is to say which of those will be the Las Vegas or Phoenix of the next 50 years? The next 50 years will see further regional dispersion of growth and the addition of 150 million people, including major increases in several states. (Figure 3.) Tourism has expanded dramatically, attracting very large volumes of both domestic and international travelers to our widely dispersed natural and cultural resources. Maintaining rural access is essential not only to serve rural communities, but also to support the shifting agricultural and energy extraction and production needs of a growing population and economy.

Metropolitan Congestion

Urban mobility is challenged by congestion and lack of reliability. In the top 70 urbanized areas, the cost of congestion is over \$65 billion per year. The dispersal of eco-

Figure 4. Top 100 Metropolitan Regions in the United States



conomic activities and residential opportunities in all major metropolitan regions has led to demands for a more complete network that can serve both urban and interregional needs. (Figure 4.) The expansion of metropolitan areas with their edge cities and ex-urban sprawl and the emergence of multi-state “mega regions” where much of our economic productivity is generated, pose a complex challenge for urban transportation. In these contexts—that are often highly constrained by community and environmental issues—new mixes of modes and management schemes are required to support the metropolitan economies and maintain an attractive quality of life.

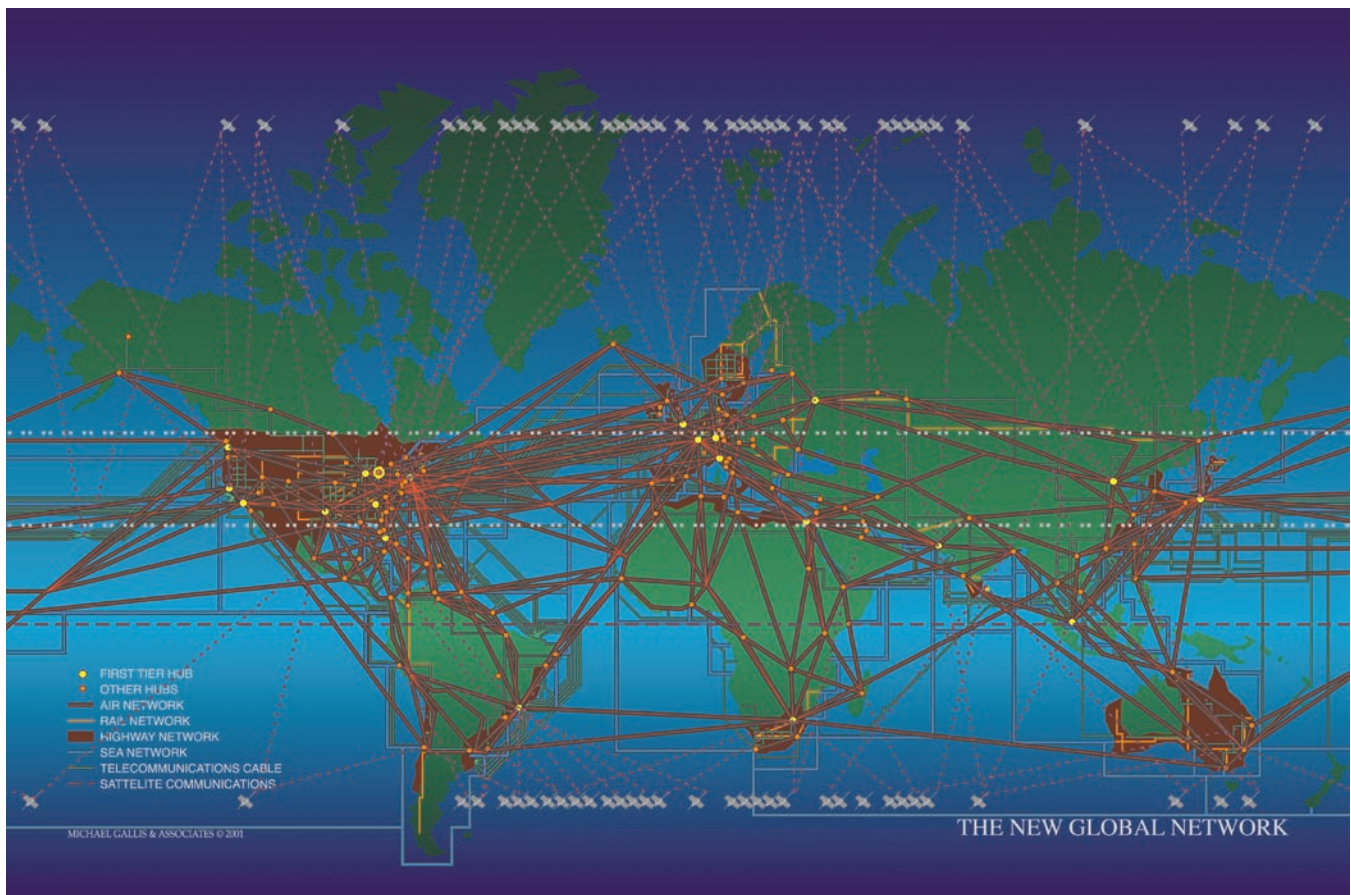
“We believe in a strong federal partnership, but in saying that we also believe it is an inter-governmental partnership. As local governments assume a share of the financial burden, much of it from the local property tax, we need to be part of the decision-making process.”

—The Honorable Marcia Marcoux, National League of Cities

Global Economic Integration

The national economic dependency on global trade continues to increase. Since the Interstate era was launched in 1956, the value of imports has increased to an equivalent

Figure 5. Global Trade Networks



Drawing courtesy of Michael Gallis & Associates.

of over 25 percent of GDP. This rapid increase in trade value and volume—including NAFTA commerce—is expected to increase to an equivalent of 60 percent of GDP in 2030. This will intensify the flow of imports and exports—especially intermodal container movements by truck—moving through the ports and border trade gateways to major areas of consumption hundreds of miles away. (Figure 5.)

Reliable service is critical in a “just-in-time” era of higher value commerce and competitive lean production. Yet both global and domestic supply chains are hampered by key gaps in the highway network and by bottlenecks and low levels of service in key Interstate corridors.

Making the Case for Capacity

Whether to add capacity to meet these changing needs, what kind of capacity, and how much to add, continue to be matters of great debate. When the Interstate Study determined that “over the next 50 years approximately 80 percent in capacity would need to be added to the Interstate System,” it immediately launched a debate over whether its estimates were too high, too low, or just right.

Consider the following. Travel measured as vehicle miles traveled in the United States increased from around 600 billion in the mid-1950s to 3 trillion by 2006. While FHWA trend lines show that it could rise to 7 trillion by 2055, this report proposes that policies be pursued which would cut the levels of projected VMT growth by half to between 4.5 trillion and 5 trillion by 2055. (Figure 6.) This strategy is proposed, in part, because of the fiscal and physical constraints to expanding system capacity in the future, but also in recognition of the need for future strategies to be responsive on the issue of global climate change.

The goal of cutting projected VMT growth by 50 percent would be achieved by using advanced technologies and operations management techniques to maximize performance, shifting as many person trips as possible to transit, shifting as much freight as possible from trucking to rail, encouraging land-use patterns friendly to walking and biking, and encouraging telecommuting.

Even after cutting the rate of projected VMT growth in half to between 4.5 and 5.0 trillion as this report proposes, it will still have increased by over 800 percent in the 100 years between 1955 and 2055. In this light, the proposition of the May 2007 NCHRP Interstate study that Interstate capacity be increased over the next 50 years by one-tenth of that amount, or 80 percent, appears, if anything, to be conservative.

Figure 6.

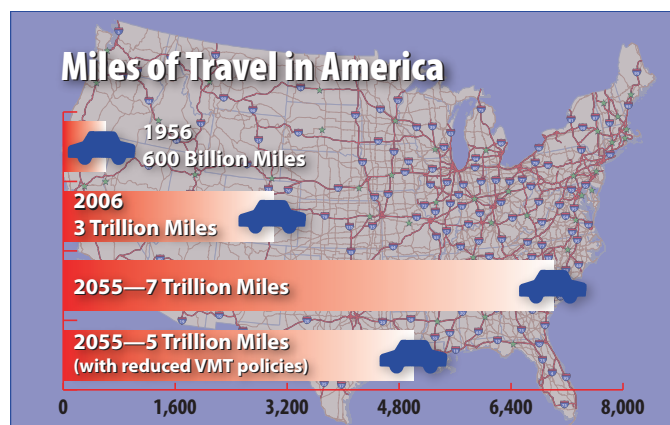


Figure 7.

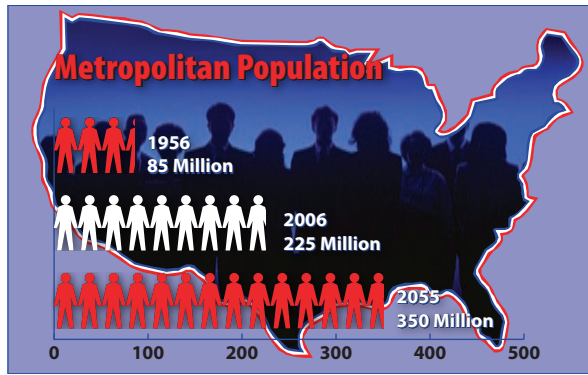


Figure 8.



Connecting America's Metropolitan Regions Inside and Out

Metropolitan areas will continue to be the center of population and economic growth in the United States. Over the past 50 years, the number of people living in metropolitan areas in this country increased from 85 million to 225 million. Over the next 50 years, it is expected to grow to nearly 350 million. (Figure 7.) Because over 80 percent of the country's Gross Domestic Product (GDP) is generated in metropolitan areas, giving these areas priority for transportation investments makes sense.

The 2007 NCHRP Study on the *Future of the Interstate* shows that to reduce current congestion and meet future needs, the equivalent of 40,000 lane-miles needs to be added to the existing 75,000 urban Interstate lane-miles. To do the same on urban segments of the National Highway System (NHS), an additional 50,000 lane-miles needs to be added. Finally, up to 8,000 centerline miles of HOV lanes needs to be added, which could carry buses, vans, and autos or trucks with two or more occupants. (Figure 8.)

Maximizing the Economic Power of Mega-Regions

In 2006, a report by the Regional Plan Association called *America 2050* forecast that most of the nation's population growth and economic expansion would take place in 10 emerging mega-regions, such as the "Northeast" which includes the metropolitan regions from Washington, D.C. to Boston, or "Cascadia," which includes the metropolitan regions of Portland, Seattle, and Vancouver, B.C. The map which follows outlines what these areas look like. (Figure 9.)

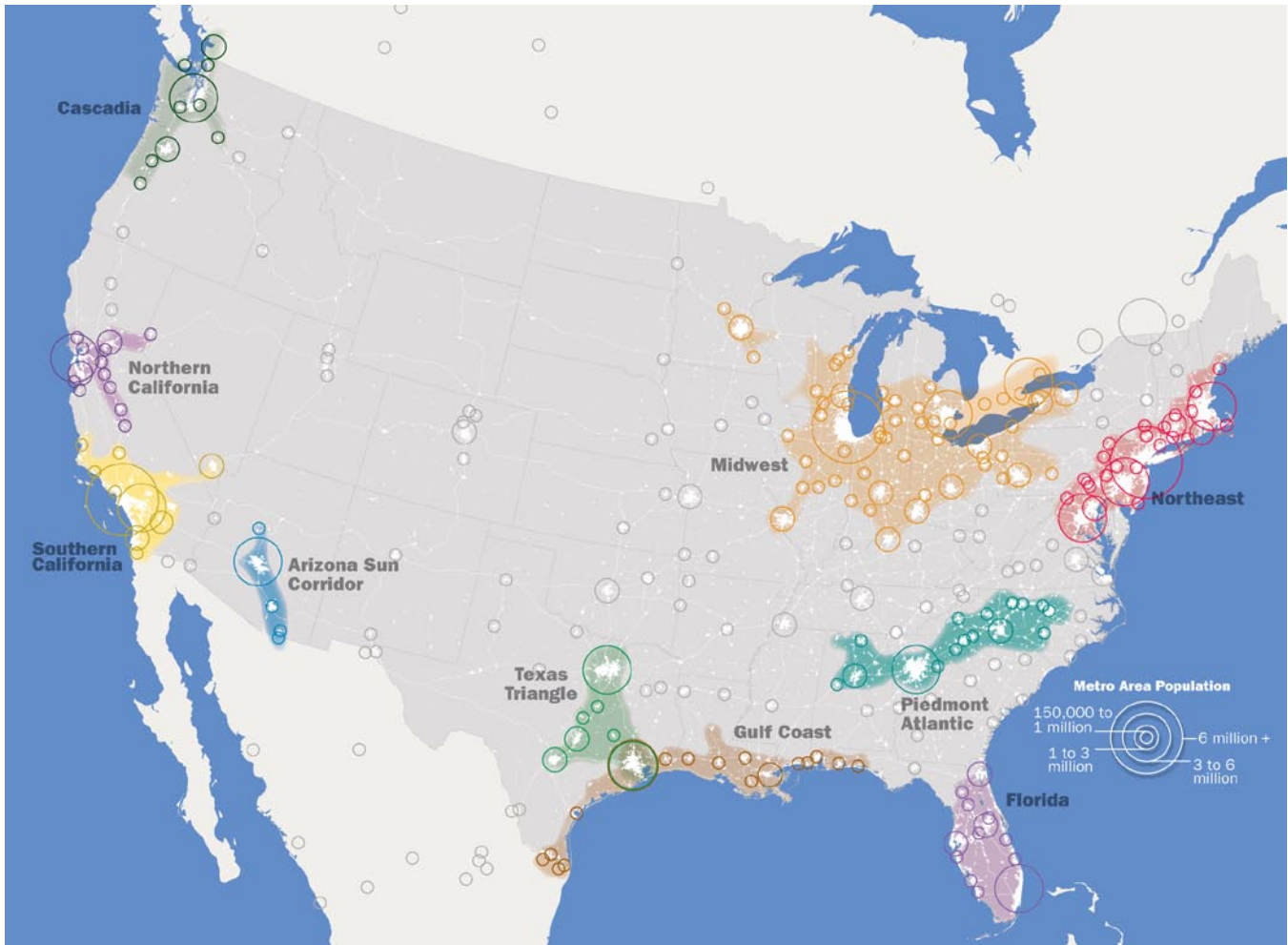
These mega-regions are not something government or industry is trying to bring about. However, recognizing that they do exist and that they offer competitive advantages when dealing with similar economic regions in other world markets, we should take steps to maximize what these mega-regions can do for the national economy.

For goods movement, these mega-regions are connected internally and to the global economy through the national truck and rail network described in the next section. The question remains how people within these mega regions can be efficiently connected across distances of 100 to 400 miles.

According to the *America 2050* report, similar regions in Asia and Europe are using high-speed rail and separated goods movement systems to link enterprises across distances in that range. Increasing the mobility of workers, business travelers, information and goods between the cities of these mega regions enabled greater collaboration and innovation. They found that enhanced mobility is a competitive advantage in the global playing field, where value is created by time savings.

Meanwhile in the United States, the coupling and chaining of industrial activity to take advantage of just-in-time production and delivery has proven increasingly critical to the success

Figure 9.



Map courtesy of Regional Plan Association (2006).

Most of the nation's rapid population growth, and an even larger share of its economic expansion, is expected to occur in 10 or more emerging megaregions: large networks of metropolitan regions, each megaregion covering thousands of square miles and located in every part of the country.

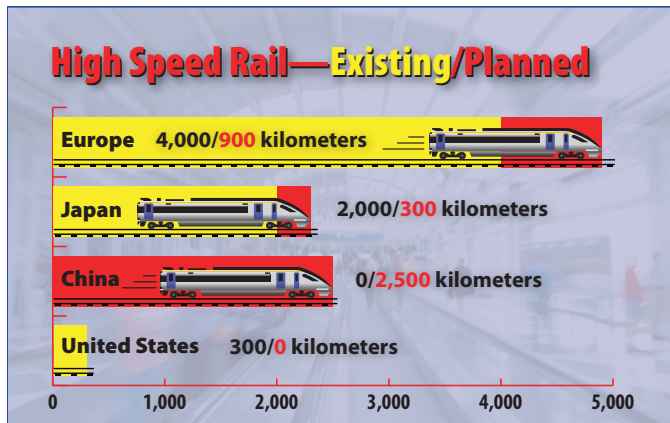
of our economy. Efficiently providing services in a congested transportation system is among the greatest challenges for businesses trying to compete in the global economy. This challenge needs to be met with coordinated new investments in infrastructure development at the mega regional scale.

The Urban Land Institute's *Infrastructure 2007* report gave the United States a bit of a wake-up call. It stated that, "America is more of a follower and no longer a world leader when it comes to infrastructure...Other countries marshal vanguard strategies... In the United States, there is a tendency to invest in the infrastructure we have instead of the infrastructure we will need. Japan has



Japan, China, and Europe are investing in bullet train high-speed rail systems.

Figure 10.



2,000 kilometers of high-speed rail and is building about 300 more kilometers by 2020. China is planning to build more than 2,500 kilometers of high-speed rail by 2020. Europe has over 4,000 kilometers of high-speed rail and is planning to build 900 more by 2020. The United States has about 300 kilometers, but is building none.” (Figure 10.)

Intercity Passenger Rail System a Necessity

It is time for action on intercity passenger rail. (Figure 11.) An intercity passenger rail system in

North America can provide the traveling public with a genuine transportation alternative. Passenger rail service that is well connected to other modes, such as airports, and to commuter rail and other transit services would further enhance its utility. Establishing such

Figure 11. The U.S. Passenger Rail System



Intercity passenger rail can efficiently connect mega-regions.

a system requires planning, technology, and design that supports the vision of regional and national connectivity. As a first step, Congress should enact a national system of intercity passenger rail including resolution of Amtrak's role and fund pilot projects to demonstrate the feasibility of high speed passenger rail service. The nation should move toward these objectives recognizing the necessity of expanding freight capacity and service while expanding passenger rail service. Research needs to be applied and innovative operational practices implemented to produce safe and reliable services for all customers. For passenger and freight rail to continue to grow, it may be necessary to provide public investment to establish additional capacity and separate infrastructure.

A strong Federal role in funding an intercity passenger rail system will be essential. The availability of over \$100 billion in tax credit bonds may prove the catalyst which enables corridor service to be provided in all ten of the mega-regions by 2040. States have agreed to provide matching funds on an 80 percent Federal/20 percent state basis, for intercity passenger rail service which meets their needs.

"There are 3.9 million miles of roads in this nation, 75 percent owned by local governments. So transportation is something we are deeply involved in. As a local official I need to figure out how we engage people so that they are willing to invest in transportation and the future of this country."

—The Honorable Colleen Landkamer, President, National Association of Counties

Connecting Rural America

Even rural states are facing population pressures and growth in travel demand. Out of the 20 states expected to grow the fastest over the next 30 years, several are rural including Nevada, New Mexico, Idaho, Utah, Wyoming, Alaska, and Montana. What these states have in common is large geographic size, and, as a consequence, highway systems which have to span great distances.

The volume of long-haul trucking in the United States moving trade to and from the coasts across rural America is expected to at least double by 2035. Agriculture also continues to be a major part of the economies of many states. Agriculture depends on efficient, low-cost rail, truck and water transportation to keep U.S. products competitive in the global economy. All rural states will face the enormous cost of preserving for future generations the network of roads they have built over the past 80 years. It will be important for them to succeed, not only to meet the needs of their own citizens, but also to maintain their part of the national network the U.S. economy depends on.

There are non-metropolitan areas of the country that need new roads, or upgrades to existing roads, to adequately interconnect with other regions, rural areas and parks, and recreational opportunities.

Figure 12.



The NCHRP Interstate Study estimated that this would require the addition of 12,400 lane-miles to rural parts of the National Highway System (NHS). In addition, 40,000 lane-miles would need to be added to the existing 135,000 lane-miles of rural Interstates. Another 6,000 lane-miles would need to be added to existing NHS routes that already exceed capacity or were expected to in the future. (Figure 12.)

Investments to Support Travel, Tourism, and Recreation

One of the least understood and appreciated industries in the United States is travel, tourism, and recreation. Together they rank as the most important industry in three states, and they rank second, third, or fourth in all the rest. Travel and tourism generated over \$700 billion in revenues in 2007, over \$100 billion of that from international visitors. Leisure trips represented 80 percent of domestic travel. Over 200 million Americans visited U.S. Forest campgrounds. The use of forest service roads increased 15-fold between 1985 and 2005. The number of visitors to National Parks is approaching 300 million.

This industry is directly dependent on the efficiency of the transportation system. But there is more to it than that. Travel should also be enjoyable. Since the first national survey of public recreational activities was conducted in the early 1960s, driving for pleasure has ranked at or near the top of the list of preferred pursuits.



Photo courtesy of America's Byways.

Scene route through Logan County, Utah.

Traffic bottlenecks at major vacation destinations are becoming more prevalent, all too often making the weekend outing with the family anything but enjoyable. Many of the nation's most popular tourist destinations—including seashores, lake regions and national parks—experience significant traffic delays on roads that serve as primary access routes for visitors. In fact, traffic on many of these roads has increased faster than on major urban roads. Similar to what was envisioned for key freight corridors, focused investments are needed to eliminate these bottlenecks.

Most important to improving travel to these destinations is strong investment in the Federal-aid system beyond the Interstate and NHS. Much of the access mileage to national parks and similar destinations is on two-lane, Federal-aid highways. These are highways that also need improvement to facilitate delivery of agricultural, other resource products, and to improve their safety. Also helpful is increasing investment in park roads, forest highways, and scenic byways.

New Strategies Needed

A new strategy which goes beyond what has been done before will be needed to reduce congestion, keep America globally competitive and meet 21st Century metropolitan mobility needs. It will require a multi-modal approach which preserves what has been built to date, improves system performance, and adds substantial capacity in highways, transit, rail, seaports, and airports. It will require giving connections to world markets, and regional passenger rail service higher priority. It will require the synchronization of transportation, land use, housing, and energy policies. Finally, it will require the use of advanced technologies, a quantum increase in investment, getting governmental restrictions out of the way, and inter-jurisdictional collaboration.



Photo courtesy of VA DOT.

CHAPTER 2

A Vision for a Congestion-Free America



Imagine a system where travelers are free of congestion, where travel is predictable, fast and reliable.

Improving Performance

"Congestion is one of the single largest threats to our economic prosperity. Each year, Americans lose 3.7 billion hours and 2.3 billion gallons of fuel sitting in traffic jams. Worse, congestion is affecting the quality of American's lives by robbing them of the time that could be spent with families and friends."

"Congestion is not a fact of life. It is not a scientific mystery, nor is it an uncontrollable force. Congestion results from poor policy choices and a failure to separate solutions that are effective from those that are not."

—Norman Mineta, former U.S. Secretary of Transportation

Traffic congestion is crippling our road network. The average commuter spends one work week each year stuck in traffic. Slowdowns in freight movement on the roads and on the railroads cause billions of dollars in delay. Businesses recognize that getting employees to work on time is important and getting goods to market on time is essential. Congress understands this as well. Reducing congestion should be one of the highest priorities for Congress.

It is estimated that 50 percent of congestion is due to inadequate capacity. The remaining 50 percent is caused by crashes, breakdowns, construction work, weather, and special events. To deal with these issues, the nation must invest in capacity, maximize the performance of the current system and work to reduce demand through use of other modes. The next Federal transportation program should feature the use of advanced technologies and better systems management techniques to reduce congestion, improve throughput, and increase system re-

liability. Highway managers can use the resources they are given to reduce traffic delays through quick clearance of fender benders and breakdowns, better snow and ice control, and advanced public notice of construction work and major events. It is vital for our quality of life and the productivity of our economy to provide a transportation system for the future that is fast and reliable.

Advanced technologies can be used to improve services for transit riders as well. Customers should be able to receive real-time information about when buses or rail cars will arrive or depart, and use smart cards interchangeably on all transit services. Another way to improve transit system performance is to make connections as seamless as possible. Joint use of terminals by intercity passenger bus, rail and local bus services will increase the convenience to customers. Passengers desiring to travel from one city to another could receive trip schedules on the web giving them portal-to-portal instructions on routing and pick-up points.

The dial-in “511” traveler information system, which is available in 28 states today, will be significantly improved and operate in all 50 states by 2015. In the future, travelers will be able to receive real-time estimates of travel times and parking availability. Traveler information will become a commodity, available from national firms competing to gather and sell information to shippers, travelers, and public agencies.

Traditional traffic sensor systems can be replaced with information generated from vehicles communicating their location, speed, roadway condition, and weather information directly to roadside receivers. This information could improve traffic signal control and ramp metering, and enable managers to monitor flow on parallel routes, diverting traffic to roadways with underutilized capacity.

“We need to convince Congress to conduct a war on congestion. We need to do more in multi-state corridor planning, bottleneck removal, and better freight planning. The vision is that residents can enjoy expanded opportunities for jobs, places to live and time with family. It’s mom and apple pie and we need to convince the American public that is what we are going to do.”

—Greg Cohen, President, American Highway Users Alliance

Reduce Demand or Where Possible Shift It to Transit

Demand management strategies can be used to reduce peak period congestion and slow overall growth in vehicle miles of travel (VMT). This would include shifting as many passenger trips as possible to transit, intercity passenger rail, use of congestion pricing, such as variable toll rates, and telecommuting.

States and local government can work together to limit the amounts of additional highway arterials that will have to be built. Community design can be used to maximize local trips being made on local streets, and only provide for trips on arterials when absolutely necessary. Strict access control can be applied to arterials to preserve their capacity to the maximum extent possible.

Preserve and Modernize the System Built Over the Past Century

Imagine that the highway, transit, and rail systems built over the past century, have been rebuilt and modernized so they last for at least the next 100 years.

The first priority for our future transportation network should be to preserve and modernize the system of highways, transit and rail already in place. (Figure 13). For highways, routine maintenance will no longer suffice for facilities which had been in service 40 to 50 years. Pavement foundations need to be rebuilt and many bridges rebuilt or replaced. Many structures need to be modernized to carry heavier truck loads, faster design speeds, and traffic growth. As this reconstruction work proceeds, techniques need to be used to minimize disruption to the traveling public. These include the use of

“Innovation—we’ve got new materials and technologies, we’ve got new innovative design methods, we’ve got new project delivery methods. All of these ensure that we get the most for our money. The increased use of longer lasting, high-performance materials will improve the longevity of structures and reduce maintenance costs. Life cycle performance and sustainability criteria can be used to stimulate innovation. We can’t wait 10 to 20 years to put these good ideas to work. Contracting systems employed by State DOTs should take full advantage of the creativity of the private sector.”

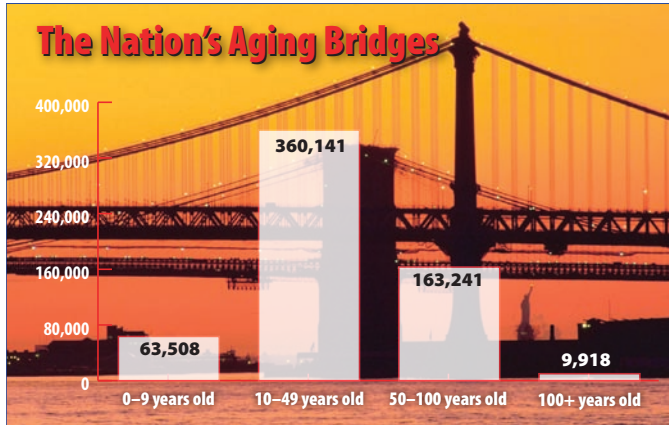
—David Raymond, President, American Council of Engineering Companies



Photo courtesy of the Florida Department of Transportation.

Design-build contracting was used to speed the rebuilding of the Escambia Bay Bridge on Interstate 10, replacing spans damaged by Hurricane Ivan. The estimated life of the new span is 75 years.

Figure 13.



components fabricated off-site, longer lasting materials, work at night, short-term shutdowns to allow intensive work, and incentive contracts to get contractors to finish work faster.

Improved asphalt pavement technologies will be developed that will continue to meet the nation's needs. This will include the increased recycling of Hot Mix Asphalt pavements to conserve resources and reduce costs, development of Warm Mix Asphalt to reduce energy consumption and emissions, construction of Perpetual Pavements for long life and easy maintenance, and Porous Pavements to reduce noise.

Concrete pavement technologies are improving as well. Thin unbonded concrete overlays, four to five inches in depth, have proven to be a rehabilitation option for composite (asphalt over concrete) pavements that exhibit significant deterioration. When properly designed and constructed, unbonded resurfacing has been shown to increase load-carrying capacity and extend pavement life. With current trends toward increasing traffic demand and projects located in congested urban areas, rapid repair is essential. The installation of precast slabs for rapid repair of concrete pavement has shown that the concept is sound. Real life installation of slabs in Minnesota have been successfully completed in closure times between five and eight hours. California



Photo courtesy of World Highways, April 2007.

GPS and laser-guided earthmovers whose work is guided by three-dimensional software programs, can get the job done faster and more accurately.

is exploring whether advances in concrete pavement design, construction, and materials technologies can make it possible to achieve 100-year concrete pavement service life.

New materials such as composites may be part of the solution. Fiber-reinforced polymer composites are lightweight, high-strength, corrosion resistant materials which can be prefabricated off site and rapidly installed, minimizing traffic disruption. Thirty years from now composite technology will have expanded to include nanocomposites which may offer even greater advantages in terms of installation and service life.

For transit, many bus and rail maintenance facilities will need to be updated. Stations, tracks, and bus shelters will need to be refurbished and bus fleets and rail cars replaced. Because of increased demand, many bus, light rail, subway, and commuter-rail systems need to be modernized and their capacity expanded. The costs of funding the preservation and modernization work will require resources well beyond those available in 2007.

The Urban Land Institute report titled, *Infrastructure 2007*, described the situation well. “Mature economies with established but aging infrastructure networks face gargantuan bills for deferred maintenance on roads, water systems, dams, and electric grids. Retooling systems—building rail corridors and incorporating mass transit—will require huge additional capital outlays that many governments are not prepared to pay. Americans only start to recognize a potential crisis and continue to put off the day of reckoning. Caused by two decades of underspending, ‘a yawning budget gap’ swallows initiatives to fund deferred maintenance.”

According to U.S. DOT’s latest *Conditions and Performance Report*, transit infrastructure has an existing backlog of \$27.66 billion: \$13.7 for vehicles, \$2.3 billion for stations, \$6.9 billion for systems, \$3.5 billion for facilities, and \$1.3 billion for guideways. It shows that in 2004, transit capital investment nationally was \$12.6 billion, some \$9.2 billion short of U.S. DOT’s 2006 “cost to improve” estimate for transit of \$21.8 billion.



What level of investment will be required in the future just to preserve the Interstate System? U.S. DOT’s 2004 *Conditions and Performance* report estimated that it would take an annual investment of \$31 billion to fund Interstate preservation. Adjusting that “constant dollar” estimate to “year-of-expenditure dollars,” AASHTO estimates that it will take at least an annual investment of \$49 billion to do what is necessary in 2015, and \$72 billion annually by 2030. If investment fails to keep pace with the preservation needed, the costs will spiral upward to even greater levels.

An analysis of future investment requirements for non-interstate highways, transit, and rail is addressed in the AASHTO report, *Future Needs of the U.S. Surface Transportation System*.



Photo courtesy of the Missouri Department of Transportation.

The transportation system of the future will demand seamless connections for passengers traveling by air, public transportation, rail or highways.

Adding the Capacity Needed



THE CAPACITY CRISIS

Travel on the U.S. highway system has increased five-fold over the past 50 years from 600 billion vehicles miles traveled (VMT) in 1956 to 3 trillion VMT in 2006. The amount of highway mileage built during that period was substantial, but the increase in travel has been so great that most of the capacity and redundancy planned when the system was built has been used up. Even if the current rate of VMT growth could be cut by 50 percent over time, at a minimum VMT by 2055 will have grown to 4.5 trillion. To support the growth that has taken place and the growth expected, additional highway, transit, and rail capacity will all be needed.

EXPANDING TRANSIT CAPACITY

To meet the growing need for public transportation, two things need to happen. Where transit service is already available, it will need to be expanded. Where it is not yet available, it will need to be provided. Forecasts show that the U.S. population will grow from 300 million to 435 million by 2055. Over 80 percent of that growth is expected to take place in our metropolitan areas. A 2005 Bureau of Census survey found that only 54 percent of American households have access to public transportation. One goal recommended is that within 15 years, public transportation service should be in place in every metropolitan region in the country. Recently there has been a dramatic increase in the demand for para-transit services in rural areas as well.

To help reduce congestion and to meet the demand for public transportation, another goal recommended is that transit ridership should at least double by 2030. Between 2030 and 2055, transit ridership should double again. All of this will require additional capacity.

Bold Strategy to Add Transit Capacity. A bold strategy is recommended to add needed capacity.

“The population is aging, and the future transportation system needs to be mindful of that change in demographics. By the year 2020 there will be 40 million people in this country over the age of 65 who will still have a license in their pockets and their hands on the steering wheel. And that number of older drivers is something we need to factor into our vision. It’s not just a matter of allowing them to drive, it’s a matter of offering them alternative transportation solutions.”

—Robert Darbelnet, President, AAA

- *Modernizing Existing Systems.* Subway systems and commuter-rail systems in major markets need to be modernized and expanded. New York, Chicago, Boston, Philadelphia, San Francisco, and Washington, DC, are among the systems which need to be modernized to meet growing travel demands.
- *New Starts.* Of the 264 projects deemed eligible for preliminary engineering in 2007, as many as possible should receive Federal funding and be built.
- *Bus-Rapid Transit.* Many communities will enhance their bus operations through innovative improvements to system design and performance. Low floors and multiple-doors will be used to speed up passenger loading, while dedicated lanes will make it possible for trips to be made by bus, faster than would be possible by private automobile.
- *Paratransit Services for Older Persons and Persons with Disabilities.* The aging of America is creating a huge demand for both fixed-route and paratransit services. Improved paratransit services will be needed in cities, suburbs, and rural areas. Connecting rural America with medical and other services will be especially helpful.
- *Intercity Bus Needs.* Additional funds will be needed to expand intercity bus services to rural communities. Demand for over-the-road charter bus services will flourish



Photo courtesy of Lane Transit District.

EmX traveling through downtown Eugene, Oregon, is an example of the innovative design used in bus rapid transit systems.

for tours and tourism as the Baby Boom generation hits retirement. As airport capacity and airspace become strained, viable alternative service for trips of 300 miles or less will be provided with great success using inter-city buses and intercity passenger rail.

Using Land Use Strategies to Reduce Travel Demand

A major reason transit ridership is expected to grow so significantly over the next 20 years is that a change is taking place in where most development takes place. Because of cheap oil, the housing development pattern of the past 50 years was to “move further out.” With more expensive oil on the horizon, the development pattern of the future for many is expected to become, “move closer in.” Approximately one-third of housing and commercial demand may be met through infill development in central cities and older suburbs. Another one-third may be met through new, mixed-use, transit-oriented development and compact single-family subdivisions. This may come about not because government tries to force change, but because the market is demanding a change. As Shelly Poticha of Reconnecting America pointed out, “All the demographic groups that are increasing in size in this country—older, smaller households, and singles—are the same groups that have historically preferred urban living and that do use transit.” What government does have to do is improve the coordination of transportation, housing and land use policies. Local governments need to adopt supportive policies such as allowing the densities required.



In North Carolina, Charlotte Lynx light rail starts operations in 2007.

The Jersey City Comeback—An Urban Infill Development Success Story

As described in an April 2007 issue of USA Today, in the 1960s Jersey City, New Jersey hit hard times, its railroads went broke and many of its factories closed. In the 1970s alone it lost 14 percent of its population and 10 percent of its jobs.

Today it has come back. It is clean, green, and growing. Urban planners see it as an example of how the nation can accommodate some of the additional 100 million Americans expected by 2040, without paving over farms and open space. Many of its residents live in apartments and attached houses near shops, offices, and mass transit. Smart Growth America ranks Jersey City as the second “least sprawling” city in America. Over the past 25 years, the city has gained 30,000 residents, 27,000 jobs, and 18 million square feet of prime office space. New Jersey officials concluded that a light rail system would do wonders for refurbishing the waterfront commercial district across the Hudson River from Manhattan. The line running along Essex Street in downtown Jersey City alone has spawned 3,000 residential units in five years. According to Ben Jogodnik, a vice president of Toll Brothers, better known for building big houses on large lots in the suburbs, his company formed a division to focus on locales like Jersey City, “because that’s where our customers are going.”



The Hudson-Bergen lightrail transit line helped the rebirth of Jersey City, New Jersey.

HIGHWAY CAPACITY

Highway capacity is needed in three areas: to serve new growth, meet metropolitan needs, and to build a freight network to connect us to the global economy. In part, the need for capacity should be met through additions to major thoroughfares on the Interstate and National Highway Systems. Just as important, however, are additions to the network of state and local arterials and collectors which connect individuals and goods carried on those thoroughfares to their ultimate destinations.

Table 1. Highway Capacity Needs of a Growing America

Urban Highway Capacity Needs	
Interstate Lane Miles	40,000 added to current 75,000 lane miles
Other NHS Lane Miles	50,000 added to the current 33,300 lane miles
HOV Centerline Miles	8,000
Rural Highway Capacity Needs	
Rural Interstate Lane Miles	40,000 added to current 135,000 lane miles
New or Upgrades to Rural NHS	12,400 added to current 82,000 lane miles
Expansion of the Existing NHS	6,000 lane miles
Freight Interstate Highway Capacity Needs	
Trade Corridors	14,000 lane miles
Fort-to-Port Routes	1,000 lane miles
Intermodal Connections	400 lane miles
Truck-only Lanes	8,000 centerline miles

Source: NCHRP Report, *Future Options for the National System of Interstate and Defense Highways*, May 2007

Revenue Alternatives Will Be Needed for New Capacity

Preservation is expected to use up nearly all of the resources that can be generated through increased Federal assistance and the additional revenues generated at the state and local level through traditional forms of taxation and user fees. In order to add new capacity many states and local governments will have to look for alternative sources of revenue. This is expected to be especially true for rapidly growing metropolitan areas.

- **Tolls.** Between 2000 and 2006, 30 percent to 40 percent of the approximately 150 miles of new expressways built nationally each year were financed through tolls. By 2030, the percentage of new arterials in metropolitan areas financed through tolling may increase to nearly 50 percent.
- **Premium Service, High Occupancy Toll (HOT) Lanes.** HOT lanes have proven to be an effective way to add capacity in metropolitan areas, provide congestion relief for the system and superior service to the customer. The concept was pioneered in a variably-priced demonstration project in San Diego in the 1990s. Drivers of single-occupant vehicles were allowed to pay a toll and use an eight-mile stretch of an HOV lane. Thousands of customers from all walks of life and levels of income purchased the transponders needed to use the HOT lanes. San Diego County plans to expand its initial eight-mile segment to a hundred-mile system that will not only pay for the new lane capacity but generate funding for transit as well. It is the concept of “customer choice” which has made this approach to pricing acceptable to the public.

“We have to remind the American public what they get for their investment. If they are willing to pay more in a user fee, what can we deliver to them—a more efficient transportation system, reduced congestion, increased mobility, a better quality of life, safety, environmental protection, all of those things. We’ve got to be in a position to make that case.”

—Stephen Sandherr, CEO, Associated General Contractors



Photo courtesy of the Tampa-Hillsborough County Expressway Authority.

The reversible lane bridge built in Florida by the Tampa-Hillsborough County Expressway Authority illustrates an option for expanding highway capacity.

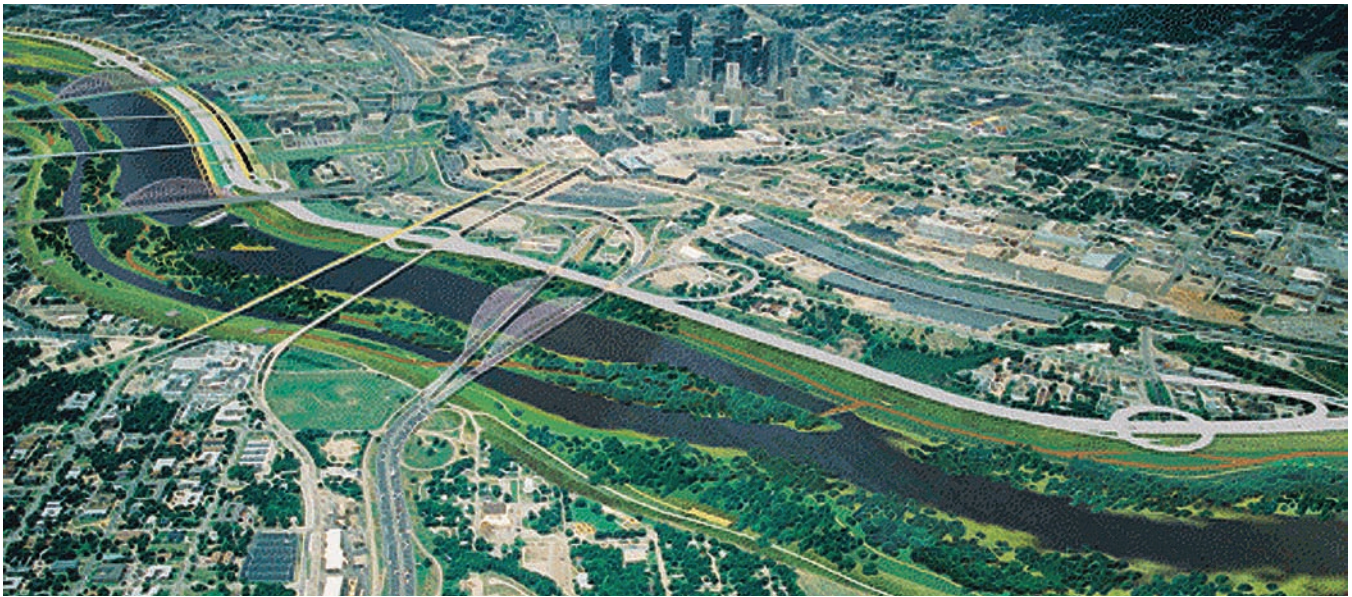
Where to Put New Highway Capacity? Over, Under, Around, and Through

A challenge almost as great as generating the revenues needed to fund additional highway capacity, is where to build it. Acquiring rights-of-way in heavily developed urban areas is extremely difficult. Before attempting to do so, transportation agencies generally exhaust all the alternatives possible—expanding transit capacity, and maximizing throughput through the use of aggressive traffic management techniques and advanced ITS technologies. However, when adding highway capacity still proves necessary, states, cities, counties, and toll authorities have found ways to get the job done. Among the innovative alternatives used have been elevated expressways to go up, entrenched expressways to go under, and the acquisition of rights-of-way using abandoned railroad corridors and along side drainage channels.

- **Elevated Expressways.** One of the most outstanding examples of a modern elevated expressway is the Reversible Lane Bridge built in Florida, by the Tampa-Hillsborough County Expressway Authority. The project provided three lanes inbound and three lanes outbound with a footprint a mere six feet wide.



An example of an entrenched expressway is Fort Washington Way (I-71), a 0.9-mile downtown connector paralleling the riverfront in Cincinnati.



Drawing courtesy of the Reason Foundation.

Trinity River Project plans to use the floodway of the Trinity River alongside Dallas' central business district to locate a new tollway reliever route.

"China spends 9 percent of its gross domestic product on infrastructure. India spends 3.5 percent of its gross domestic product on infrastructure. The U.S. spends 0.93 percent of its gross domestic product on infrastructure. We cannot compete, much less stay out in front, unless we invest."

—Bill Millar, President, American Public Transportation Association

- **Entrenching.** A good example of an entrenched expressway is Fort Washington Way (I-71), a 0.9 mile downtown connector paralleling the riverfront in Cincinnati. A late 1990's rebuild of a 1954-vintage near-surface expressway, the new entrenched roadway has eight travel lanes, modern ramps at the ends, and architect-designed bridges and other aesthetic touches. It was built to allow for later "lidding" or decks to be built over it by the city or developers.
- **Acquiring Rights-of-Way.** Using abandoned railroad corridors and building along the sides of drainage channels are two viable options. The latter was done in downtown Dallas, where the Trinity Parkway toll road was built in the Trinity River flood plain. The six-lane toll road formed flood levee walls on the eastern bank, and the project included new playing fields, walking trails, lakes, and wildlife areas.



CHAPTER 3

A Vision for a Globally Competitive America Creating Strategies for the 21st Century

By Michael Gallis and Associates



An understanding of how the U.S. must interact with world trading patterns is required to guide policy for and investment in the U.S. transportation system. Major changes have taken place in the global economy over the last twenty years. They can be grouped into three broad categories:

A New Economic Geography

As the 21st Century opens, the old economic geography, which had separated the Free World from the Communist Bloc, has given way to a new economic geography defined by trade blocs (e.g., European Union, NAFTA, Russian Federation, South America, Africa, Asia, China, and India as single-nation trade blocs).

A New Economy

Globalization of the marketplace has led to the redistribution of business activity worldwide based on a variety of factors including labor costs, natural resources, access to consumer markets and transportation infrastructure. New technologies have transformed businesses and led to a knowledge economy.

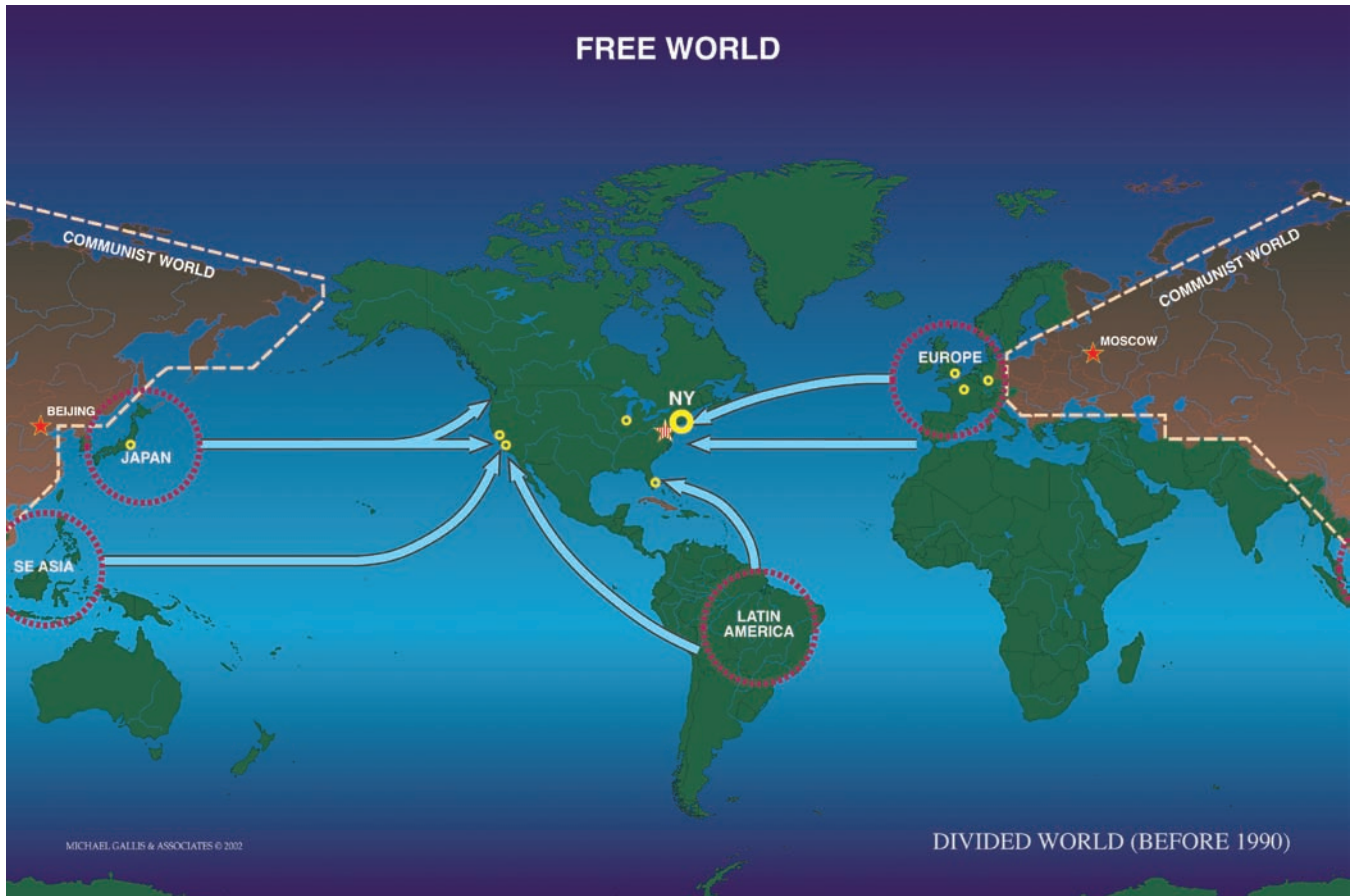
An Integrated Global Network

The global network moves people, goods and information continuously around the world. It is characterized by new trade patterns, new flow patterns, and hubs playing new roles. The U.S. transportation system is a subsystem within the global network.

Positioning the United States for the Future

To develop national policies that will keep the United States competitive in the global economy we need to ask, “Is America positioning itself as a 20th Century nation or a 21st Century nation?” The information which follows should help answer that question.

Figure 14. Free World Trade Routes



Divided World Before 1990

The 20th Century was the “American Century” as all Free World trade routes converged on the U.S. (Figure 14.)

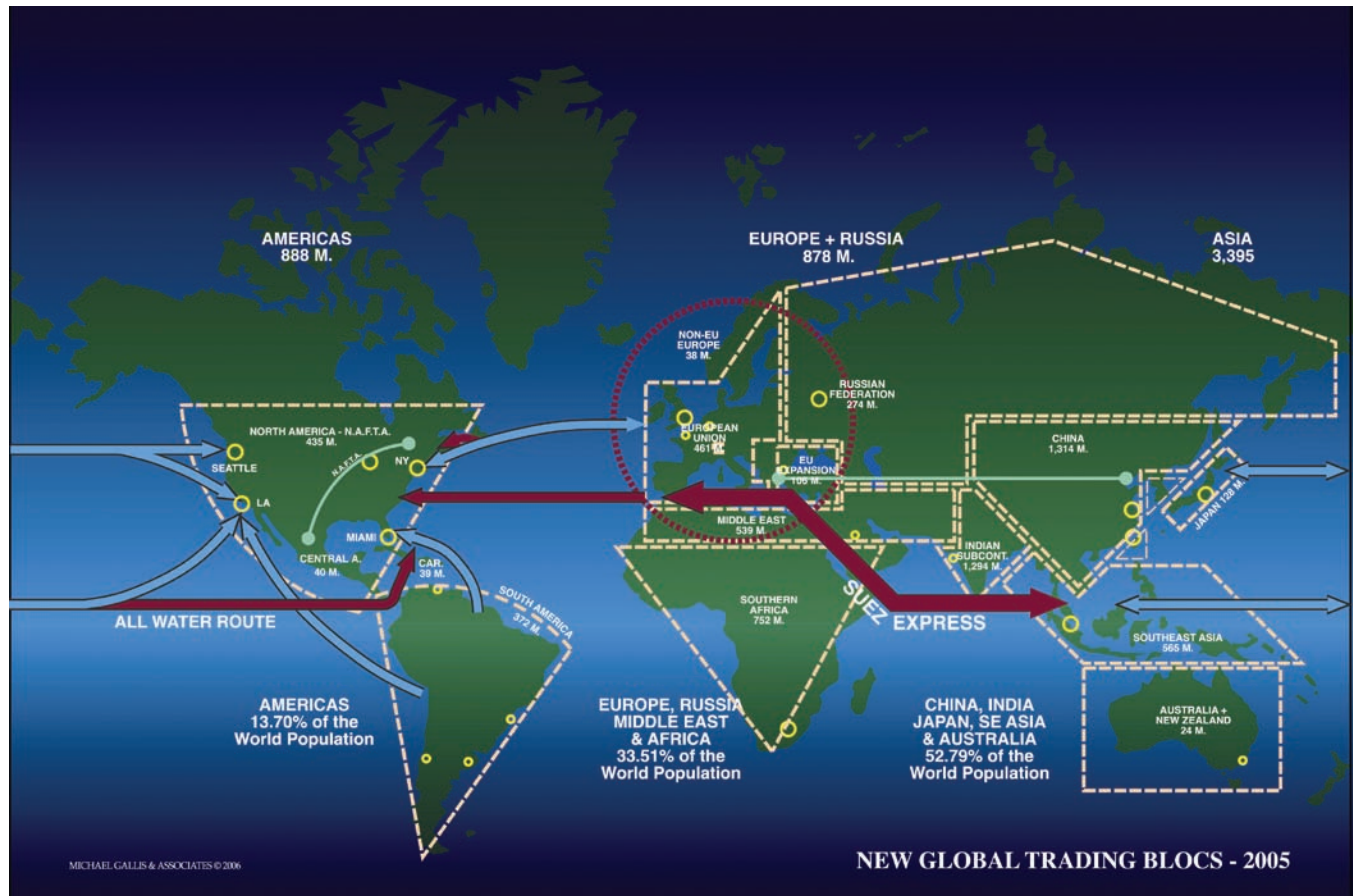
For most of the 20th Century the world was divided by two competing ideologies and separated by the Iron Curtain.

The trade patterns and hubs that marked this period were established to Europe, Latin America, Southeast Asia and Japan connecting with U.S. hubs including L.A. and San Francisco on the Pacific Rim, Miami in the south Atlantic, and into the port of New York on the north Atlantic.

New York was the major financial center, and Washington, D.C. the political capital of the Free World.

The U.S. surface transportation system was largely created, evolved and was reshaped during this period. Foreign trade accounted for less than 10 percent of U.S. economic activity and the principle international trade patterns were Midwest outbound.

Figure 15. Emerging Trade Blocs Will Generate a New Freight Dynamic



Trade Blocs in the Global Network

Since the fall of Communism, a single continuous and integrated global network composed of air, sea, road, rails and communications that moves people, goods and information around the world has taken shape.

Within that network, a new system of trade blocs has developed based on the need for larger competitive units to compete with the emerging single-nation trade blocs of China and India. These blocs include North America (as a result of the NAFTA treaties), the European Union and the Russian Federation. (Figure 15.)

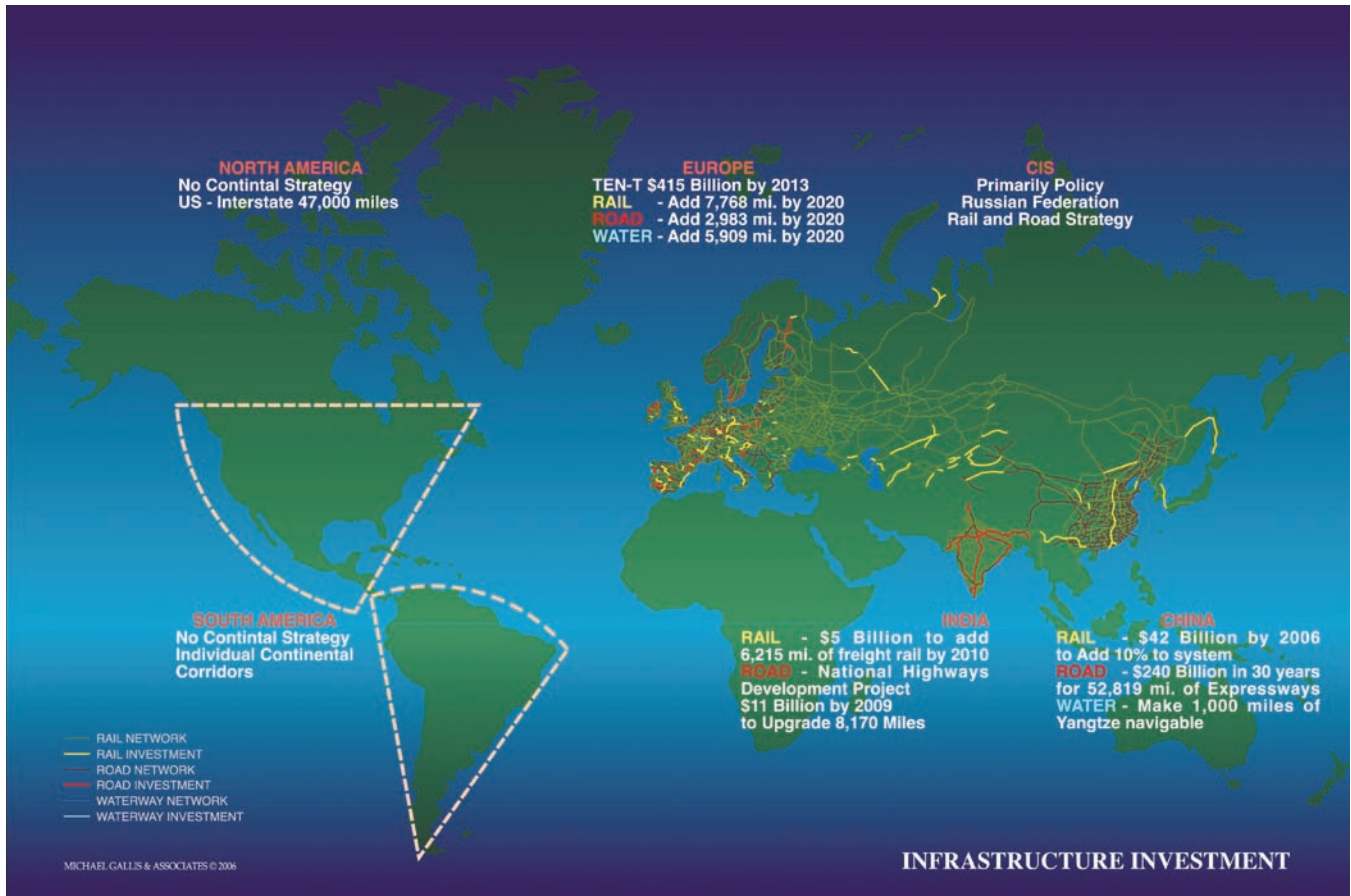
Trade now accounts for 30 percent of the U.S. economy. This has increased the importance of developing an efficient surface transportation system that can link the U.S. economy to the seaports and airports that connect the continent to the other trade blocs.

The U.S. is an “island nation,” that can only reach the world marketplace by air or sea.

Europe and Asia are connected by highways and railroads as well as by air and sea.

In 2000, the U.S. economy represented 31 percent of the World Gross Product, the European Union 27 percent and Asia 24 percent. By 2030, it is anticipated that China will have passed the U.S. as the single largest national economy.

Figure 16. Trade Bloc Infrastructure Investment



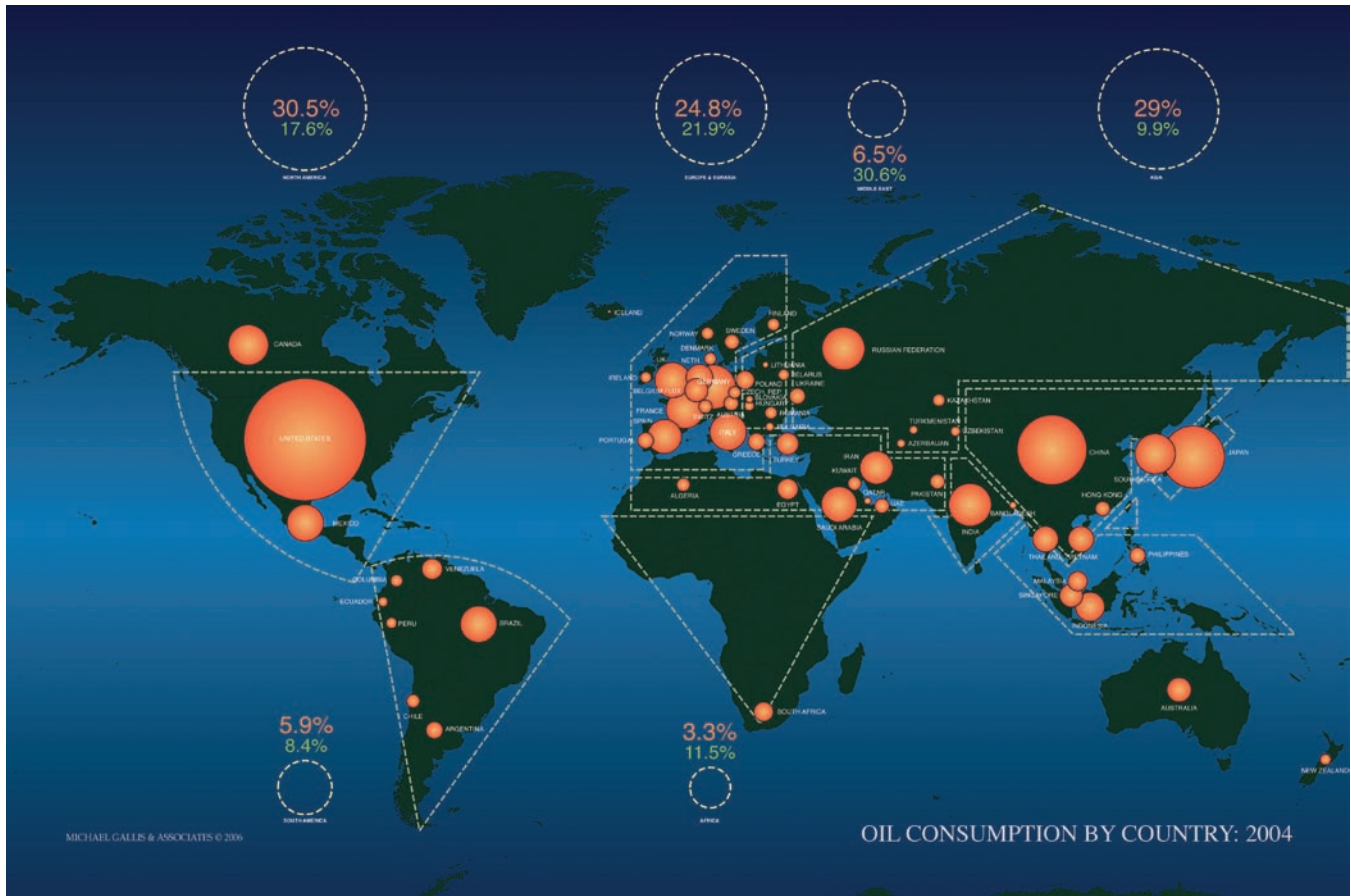
Trade Bloc Infrastructure Investment

Across the world, the different trade blocs have created continental scale infrastructure plans to help form the basis for their economic growth. (Figure 16.)

- The most ambitious, multi-modal and integrated planning is being done in Asia—especially China and Korea.
- The European Union has an ambitious infrastructure plan to facilitate European economic integration and accommodate the new trade patterns that now include the rising Mediterranean trade, which had languished for centuries.

North America and the U.S. would appear to be at a competitive disadvantage without a national or continental policy, planning and investment framework to guide their future.

Figure 17. Oil Consumption



Oil Consumption

The size of the solid colored circles indicates the amount of oil consumption by the major oil consuming nations. The dashed circles at the top and bottom indicate the combined trade bloc totals. (Figure 17.)

The U.S. is the single largest consumer of oil. North America, consuming 30.5 percent of global oil, and Asia at 29 percent are almost the same. While the U.S. produces only half of its energy needs, Asia produces only one third.

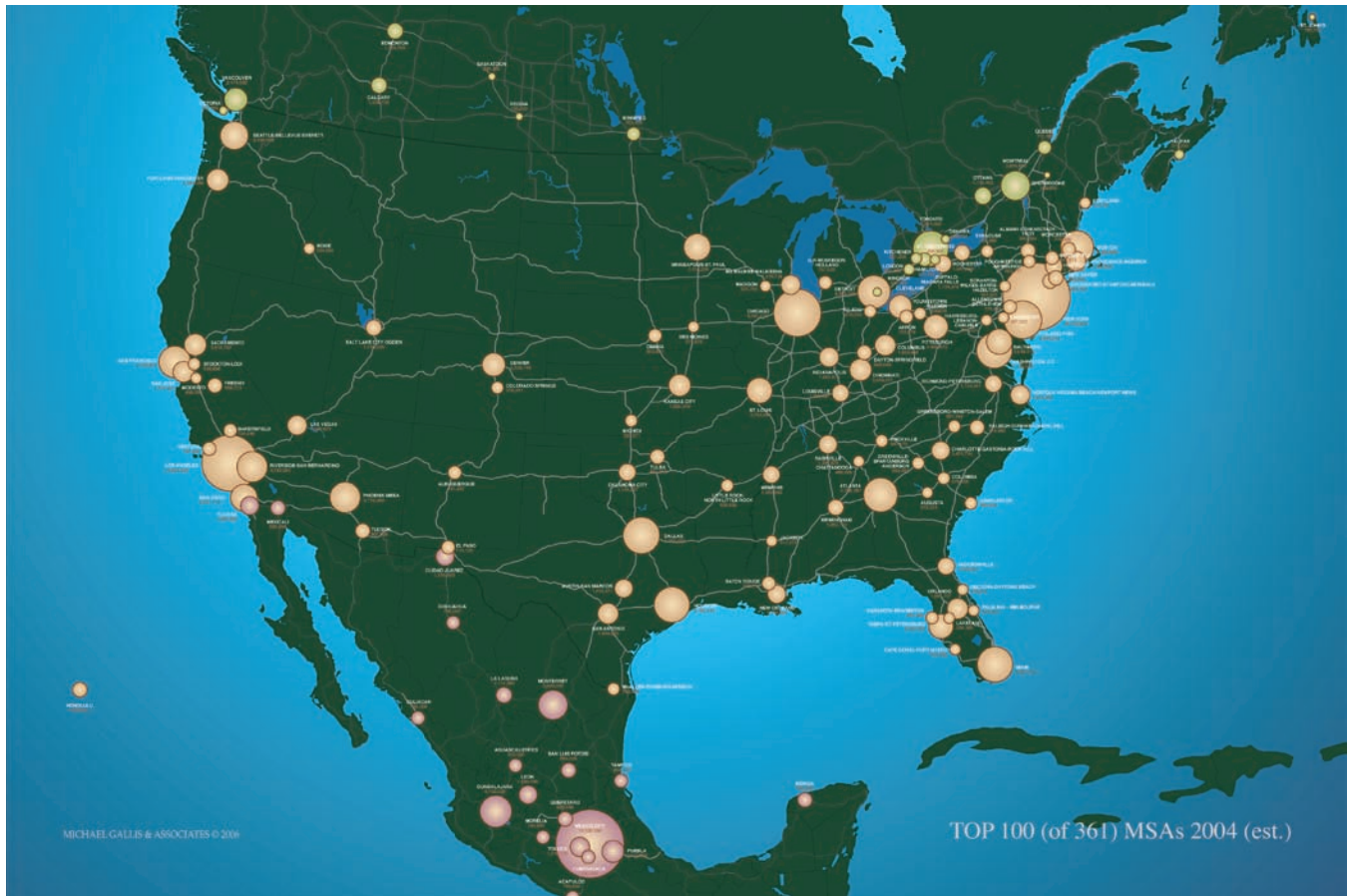
China and India represent the largest growing demand for energy as their economies expand. In China, energy demands will be further increased by the completion of its massive transportation infrastructure plan by 2020.

Consumption and production are almost balanced in the European Union.

As Asia consumes more energy, the ratio of consumption to production could easily rise from 3:1 to 5:1 and possibly 10:1.

Energy will become an increasingly expensive commodity, with greater impact on transportation policies, planning and investment.

Figure 18. Top 100 Metropolitan Regions



Drawing courtesy of Michael Gallis & Associates.

Top 100 Metropolitan Economies in North America

This diagram indicates the size and distribution of metropolitan population in North America. (Figure 18.) By 2005, U.S. population had reached 300 million. Canada had reached 32 million, and Mexico 106 million, resulting in a combined total of nearly 440 million.

83 percent of U.S. population lives in the 100 largest metropolitan areas which are shown on this map. 61 percent of the total is east of the Mississippi River.

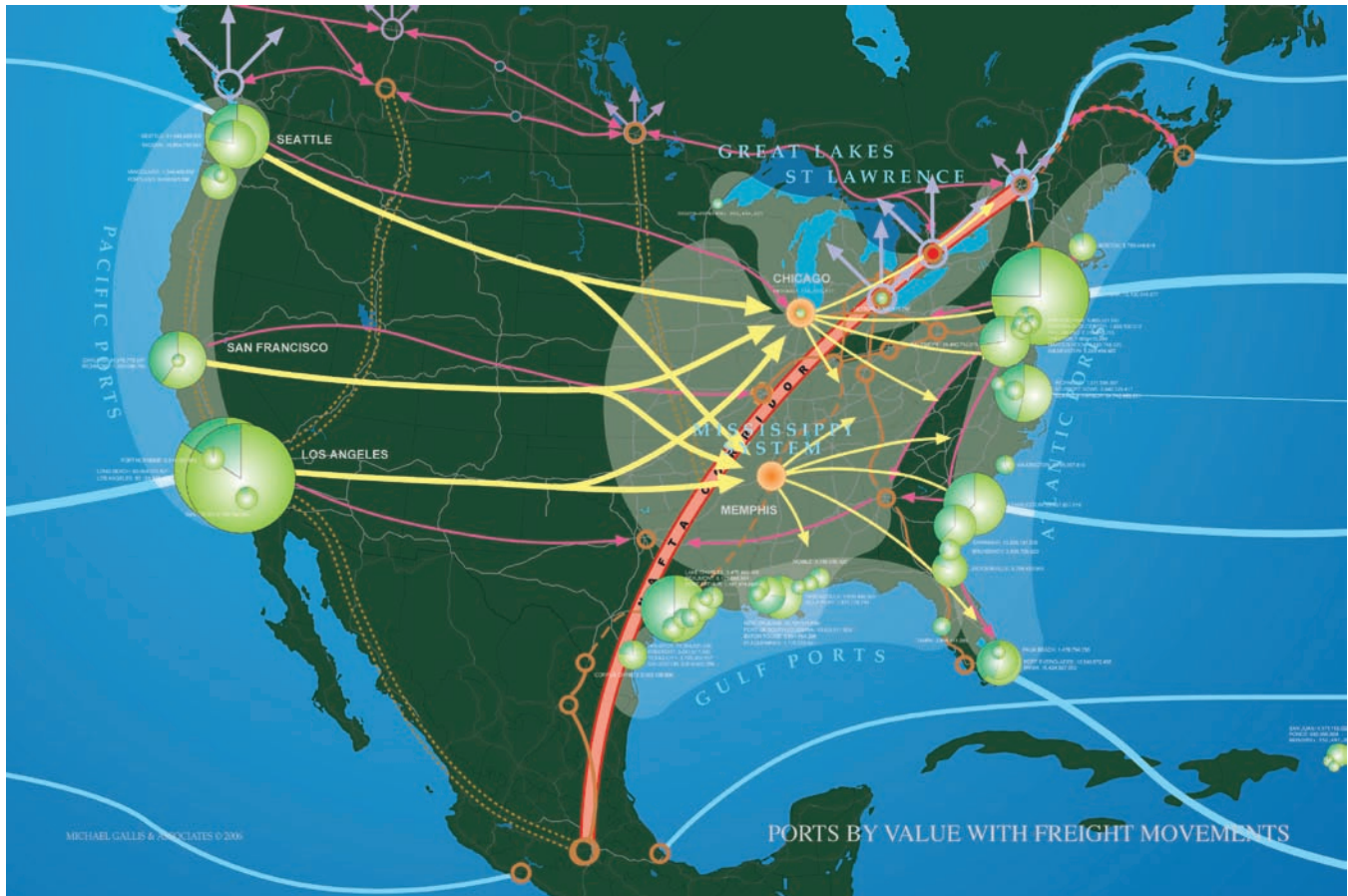
53 percent of the North American population lives west of the Mississippi River. This includes 100 percent of Mexico's population.

The Northeast and upper Midwest remain the largest and densest concentration of economic activity in the U.S. today. However, the South and West are growing more rapidly.

Between 2005 and 2030, the Midwest is forecast to grow from 66 million to 70.5 million, the Northeast from 55 million to 58 million, the South from 107 million to 143 million, and the West from 68 million to 92 million.

Each metropolitan economy depends on access to the five scales of the marketplace: global, continental, super-regional, regional and local.

Figure 19. Parts by Value with Freight Movements



North American Freight Movement

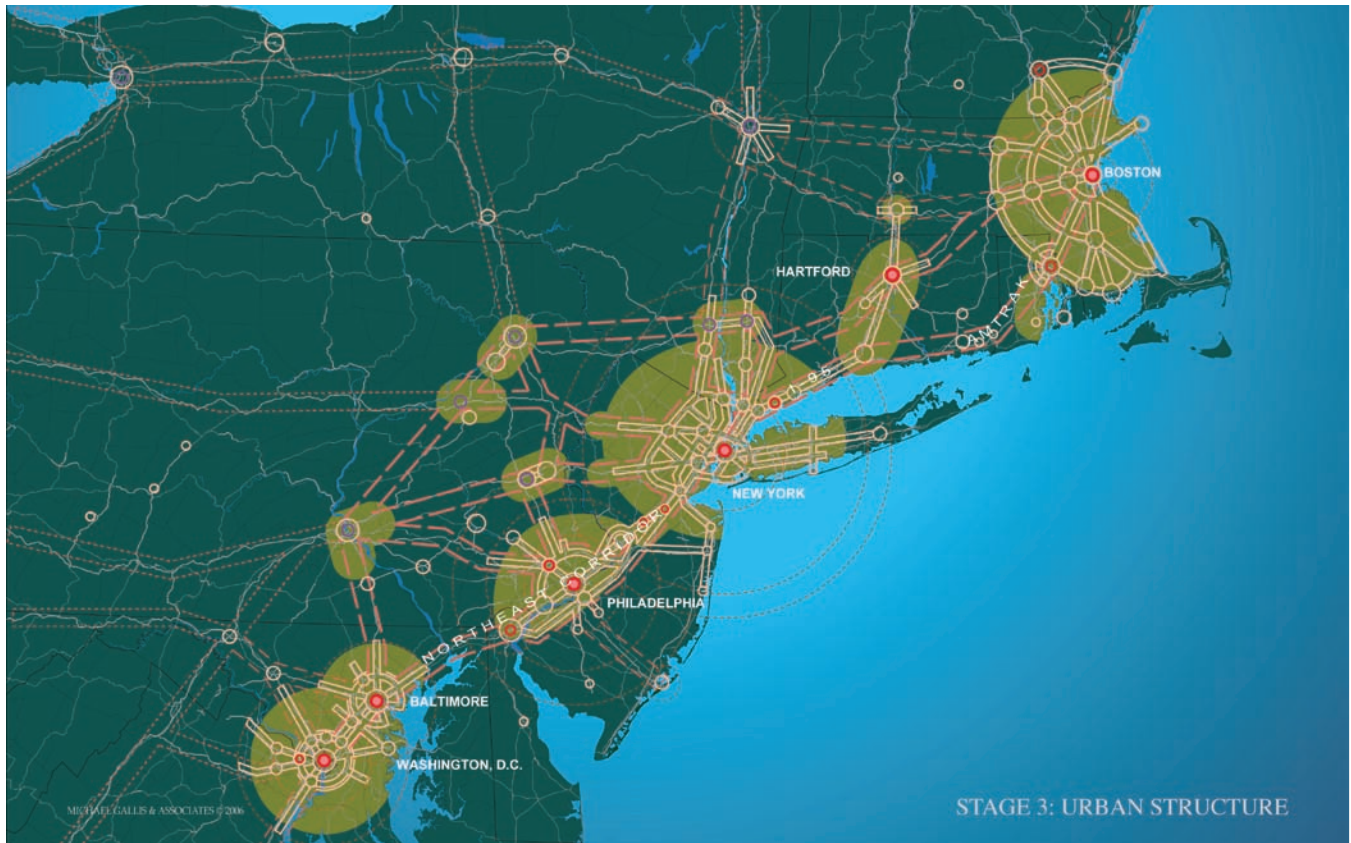
A NAFTA corridor has been created along the industrial backbone of North America, extending south from Montreal and Toronto through the heartland of the U.S. to Monterey and Mexico City. (Figure 19.)

The port system extends from the ports of Halifax and Vancouver in the north to major U.S. ports such as Los Angeles and Long Beach, California and Elizabeth, New Jersey, to the ports of Lazaro Cardenas and Vera Cruz in the south.

During the 20th century, the U.S. transportation system was built to move manufactured and agricultural products from the Midwest through East and West coast ports to world markets. Over the last 30 years, U.S. manufacturing has been declining and moving off-shore. Meanwhile, the amount of imported goods has risen dramatically. This has resulted in a reverse in the traditional flow pattern.

The reorganization of the U.S. and continental grid is being driven by the private sector in response to global economic demands with no public policy framework. There is no U.S. national policy, and no apparent coordination with Canada and Mexico, to guide its direction. This includes preparation for the widening of the Panama Canal.

Figure 20. Changing Northeast Freight Distribution Pattern



New Northeast Patterns Illustrate Changes Taking Place Nationwide

New Northeast patterns illustrate changes taking place nationwide. In the previous pattern, the Northeast Corridor linked the large Northeastern metros. The new transportation network may be grouped into hubs and corridors. The hub structure may be divided into global hubs serving international destinations, and NAFTA hubs (primarily rail and truck) serving continental markets. (Figure 20.)

Beginning in the mid-1990's, new transportation patterns emerged in the Northeast.

The global hubs are New York, Washington-Baltimore, Philadelphia and Boston, and the NAFTA hubs are Harrisburg, Scranton/Wilkes-Barre, Albany, and Allentown-Bethlehem. The emergence of the NAFTA hubs has been a result of the economic integration of the continent, the breakup of Conrail into NS and CSX, and the introduction of e-commerce. Globalization has not only changed the national patterns of economic activity and trade flows, but also metropolitan and super-regional patterns of urbanization and transportation.



Conclusion: Developing strategies for the 21st century will require a deeper understanding of the trends and changes driving the future of metropolitan regions.

America's competitiveness will ultimately depend on the efficiency and seamlessness of the transportation system that supports the economy.

Developing a vision for the next generation surface transportation system involves moving from projects to strategy, and from reactive policies to proactive.

—Michael Gallis, Principal, Michael Gallis and Associates



Photo of the Alton cable-stay bridge courtesy of the Missouri Department of Transportation.

Investment to Keep the U.S. Globally Competitive



Imagine a freight network which enables America to remain an economic superpower.

As shown in the prior analysis by Michael Gallis, investment in world-class infrastructure has become a competitive imperative. The global economy is pressuring countries to upgrade infrastructure in order to remain competitive, gain advantage, or keep from falling behind. U.S. freight trends have changed. International trade increased from 13 percent of the economy in 1990 to 30 percent by 2007. The volume of international containers coming into our ports is forecast to increase from 40 million in 2005 to 110 million by 2020. Truck volumes are expected to double by 2035, and rail freight to increase by over 60 percent. (Figure 21.)

"I can't stress enough the strategic importance that needs to be placed on the movement of freight. In the short term, it's fixing the bottlenecks that are impediments to us in meeting the just-in-time delivery that our customers require. In the long term, it's the chance to talk about the additional capacity of truck only lanes, or the idea that someday we may have truck only highways running across this country."

—The Honorable Bill Graves, President, American Trucking Associations

Freight—The Challenge

By 2007, business has entered the 21st Century, but the U.S. freight transportation system has not. America cannot compete in the 21st Century global economy with a freight transportation system built in and for the 19th and 20th Centuries. Compared with its major competitors, the United States still has the most fully developed, efficient, and productive transportation system. However, it is losing ground rapidly and needs to be improved.

Figure 21.



Changing business practices have integrated shipping into the production process increasing the demand for on-time delivery. Conducting business on a global scale strains the freight system because needed resources and economic activity are so dispersed. The delivery of a computer to the buyer's front door is likely to have included multiple trips in Asia to move and assemble parts for final assembly in the United States before delivery to the final destination. More trips, longer distances, and tighter time tolerances require a system that is more efficient.

"We are facing a capacity crisis in this country in virtually all modes of transportation. Our members are some of the most creative people I know. They have a problem and they find a way around it. They pull rabbits out of a hat. But I tell you, there are not a lot of rabbits left."

—John Ficker, President, National Industrial Transportation League

The Freight Capacity Crisis

The nation is entering the early stages of a freight transportation capacity crisis. All systems are aging and stretched to capacity. Highways, railroads, ports, waterways, and airports all require investment well beyond current levels to maintain, much less improve, their performance. Projections of freight volume increases reveal that the nation is unprepared and is not preparing fast enough for the freight increase. A recent report forecasts a four-fold increase of container volumes in Los Angeles, Houston, and Savannah, near tripling of volumes at the ports of New York/New Jersey, Charleston, and Virginia, and greater than doubling at the ports of Miami, Tacoma, and Oakland. These volumes will overwhelm the ports and the surface freight system in each of these metropolitan areas.

"Developing a freight system for the 21st Century is key to moving the economy. The base of this is the federal role in ensuring we have a really strong national system."

—Bob Bergman, Vice President, Public Affairs, UPS; Chairman, U.S. Chamber of Commerce; Transportation Committee

Achieving a Multimodal Freight Strategy

There are four key elements to the multimodal freight strategy needed. To move the containers coming through our ports, or to move goods generated here in the United States to national and international markets, a viable long-haul capability is needed. To provide this for trucks a new national network of dedicated truck lanes is needed, and for rail, new system capacity is needed. Fixing bottlenecks, reducing congestion, and improving overall performance within metropolitan areas are needed to make reliable, on-time delivery possible. Connections from ports and distribution centers to the Interstate System and the rail system need to be improved.

- **National Highway Freight Network.** Capacity needs to be added to the Interstate Highway System to meet the huge increase in freight demand forecast. The following increases are what the NCHRP Interstate study has recommended: 400 lane miles to improve intermodal connections; 14,000 lanes-miles on trade corridors; 1,000 lane-miles for fort-to-port routes to expedite military deployment; and 8,000 centerline miles of high-volume, truck-only lanes. (Figure 22.)

- **Critical Commerce Corridors.** Congress needs to provide new funding dedicated to this purpose. They should create a program called Critical Commerce Corridors, a 25-year initiative to fund projects of national significance. To be funded from freight-related user fees from outside the Highway Trust Fund, it can enable states to fix highway truck bottlenecks, improve intermodal access to ports and distribution centers, fund international gateways, and add capacity to priority trade corridors. The system is to be designated through a process where the Federal government provides coordination; the states and MPOs have the responsibility for planning; with the consultation of trucking, railroads, ports, and shippers; and the involvement of affected communities.

- **Dedicated Truck Lanes.** Handling the dramatic increases in truck traffic forecast, will require more lane capacity, but to make it tolerable to the driving public, it will also require the separation of truck traffic onto truck-only lanes in many corridors. The trucking industry

Figure 22.



Drawing courtesy of the Reason Foundation.

Illustration of dedicated truck lanes.

recommends that these facilities should be funded through higher fuel taxes, or through the user fees supporting the Critical Commerce Corridor program rather than through tolls.

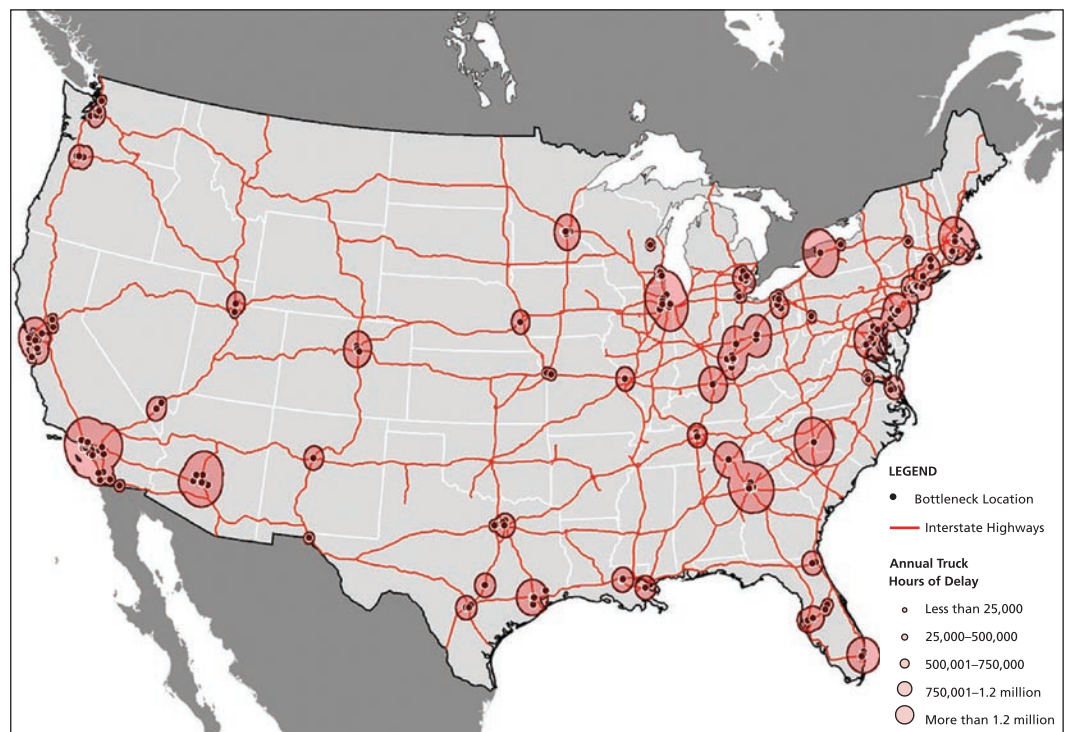
“Critical Commerce Corridors is an idea whose time has arrived, given the challenges facing our economy. This program will deal with the three C’s everyone is talking about—Congestion, Capacity, Competitiveness.”

—Pete Ruane, President, American Road and Transportation Builders Association

- **Improving Trucking Productivity.** Creating a national network of truck-only highways, will allow for the use of longer and heavier trucks to provide long distance inter-city trips, although the loads (for example triples) will have to be broken down into smaller units to traverse the regular network in metropolitan areas. This change will finally allow the trucking industry to gain from the productivity these changes can make possible. Separating trucks from regular automobile traffic can achieve a major increase in safety; and the heavier trucks will travel only on roads and bridges specially designed to handle the greater loads.
- **Fixing Bottlenecks.** A priority program should be launched in 2010 to target investment in solving the 100 worst truck freight bottlenecks in the country by 2015.

This diagram shows the location of the highway interchange bottlenecks for trucks. The bottleneck locations are indicated by a solid dot. The size of circle accompanying each dot indicates the annual truck-hours of delay associated with the bottleneck. Each of the top 10 highway interchange bottlenecks cause over a million truck-hours of delay per year. (Figure 23.)

Figure 23. Major Freight-Truck Bottlenecks



“We’re asked every day to be more fuel efficient. We can do that if we are more productive. We are asked every day to do a better job of protecting the environment. We can do that if we are more productive. We have an exponentially increasing amount of freight that needs to be moved by all modes. We can be part of that if we can be more productive. We have to minimize congestion. We can do that if we can be more productive. We have a driver shortage problem that we’re trying to mitigate. We can do that by being more productive. And we can actually be safer by being more productive.”

—The Honorable Bill Graves, President, American Trucking Associations

Needed—Governmental and Institutional Change

There is a need for governmental and institutional change without which the new vision for freight cannot be realized. These changes must address the following: the lack of national leadership and a weak Federal role; a fragmented Congressional committee structure; stove-pipes within U.S. DOT’s modal structure; a business–government disconnect; the need for multi-state collaboration; the disconnect between cost occurring locally, but benefits accruing nationally; and local fragmentation and parochialism. While the United States is stymied for lack of a coherent national strategy, our major competitors are investing aggressively.

“We absolutely need to maintain a strong federal role in the transportation program. It should be an overarching vision where people deploy assets to the areas of need to ensure we have a truly national transportation program that focuses on international trade, economic development, national security, safety and motorists’ mobility.”

—Stephen Sandherr, CEO, Associated General Contractors

Federal Leadership

The Federal government needs to play a strong funding and policy role with regard to the national freight system. In consultation with states and the freight industry, U.S. DOT needs to develop a national policy that includes at least seven elements:

- Improve the operations of the existing freight transportation system.
- Add physical capacity in places where investment makes economic sense.
- Use pricing to better align all costs and benefits between users and owners.
- Reduce or remove regulatory and institutional barriers to improved performance.
- Proactively identify and address emerging transportation needs.
- Maximize the safety and security of the freight transportation system.
- Mitigate the environmental, health, and energy impacts of freight transportation.

A top-down, regulatory approach is not what is needed. Rather, what is needed is a multi-tiered approach which recognizes the important roles many must play. At the national level, the Federal government needs to work in partnership with the private sector, and with

other Federal agencies, organized through a National Freight Coordinating Council, to help achieve what is needed. At the multi-state/regional level, states need to collaborate with shippers, carriers, and others. At the local level, state, and local governments, MPOs and the private sector need to work together to make the freight system improvements needed.

EXPANDING RAILROAD CAPACITY

With highways more congested and costly to build, railroads can help manage the increases in freight and passenger traffic expected in the years ahead. Capacity will be key. Freight and passenger railroads will need a significant amount of new infrastructure capacity just to maintain their share of the domestic transportation market. Increasing the rail share will require even more capacity. Here are some of the positive changes which need to take place.

“Encouraging infrastructure investment is the rail industry’s top priority—creating an environment in which there is an incentive to expand capacity. That is the railroads’ biggest need. It’s the first time in our history that we have ever had that need. Our railroad investments are rising rapidly and a bigger and bigger percentage of that investment goes to expansion, not just maintaining what we have, but actually expanding it.”

—Craig Rockey, Vice President, Policy and Economics, Association of American Railroads

Increase Freight Rail’s Market Share from 14 to 15 Percent by 2035, Rather Than the 13 Percent Share Forecasted

In 2007, many analysts forecast that because of structural changes in the economy, freight rail’s share of the market would drop from 14 percent to 13 percent over the next 30 years. They point out that the economy is producing and shipping more higher-value, lighter weight products, and less heavy manufactured goods. Railroads are also struggling to add the capacity needed to enable rail intermodal to expand. What could make it possible for freight rail to increase its market share in this period despite these forecasts, is for rail intermodal shipments to grow by over 200 percent between 2007 and 2035. Carrying more long-haul loads by rail will prove helpful to truck-load carriers who continue to face a driver shortage. Shifting those trips to rail also can relieve pressure on highways which are already congested. According to the Association of American Railroads, moving more freight by rail rather than by truck, as just mentioned, would also have the benefit of reducing the net fuel consumed, and reducing greenhouse gas emissions. Funding to add the rail capacity needed is the ingredient essential to make these outcomes possible.

Investment Tax Credits

Congressional adoption of the investment tax credits proposed by the rail industry for improvements which add rail capacity could be very helpful. The investment made possible through this tax incentive will enable railroads to address capacity constraints across their systems.

Public–Private Investment in Rail Improvements

States, cities, and counties may enter into joint ventures to invest in rail improvements in partnership with the railroads. Such joint public–private ventures would make possible projects which otherwise would not have been undertaken by either the public or private interests alone. The ReTRAC project through Reno, Nevada, is a classic example. The Union Pacific track was depressed in a 2.25-mile trench which eliminated at-grade crossings in the busy downtown gaming district. Trains were allowed to move through town faster, and vehicle delays and vehicle and pedestrian accidents at the street level were eliminated.

Intermodal Connections Need to Be Improved

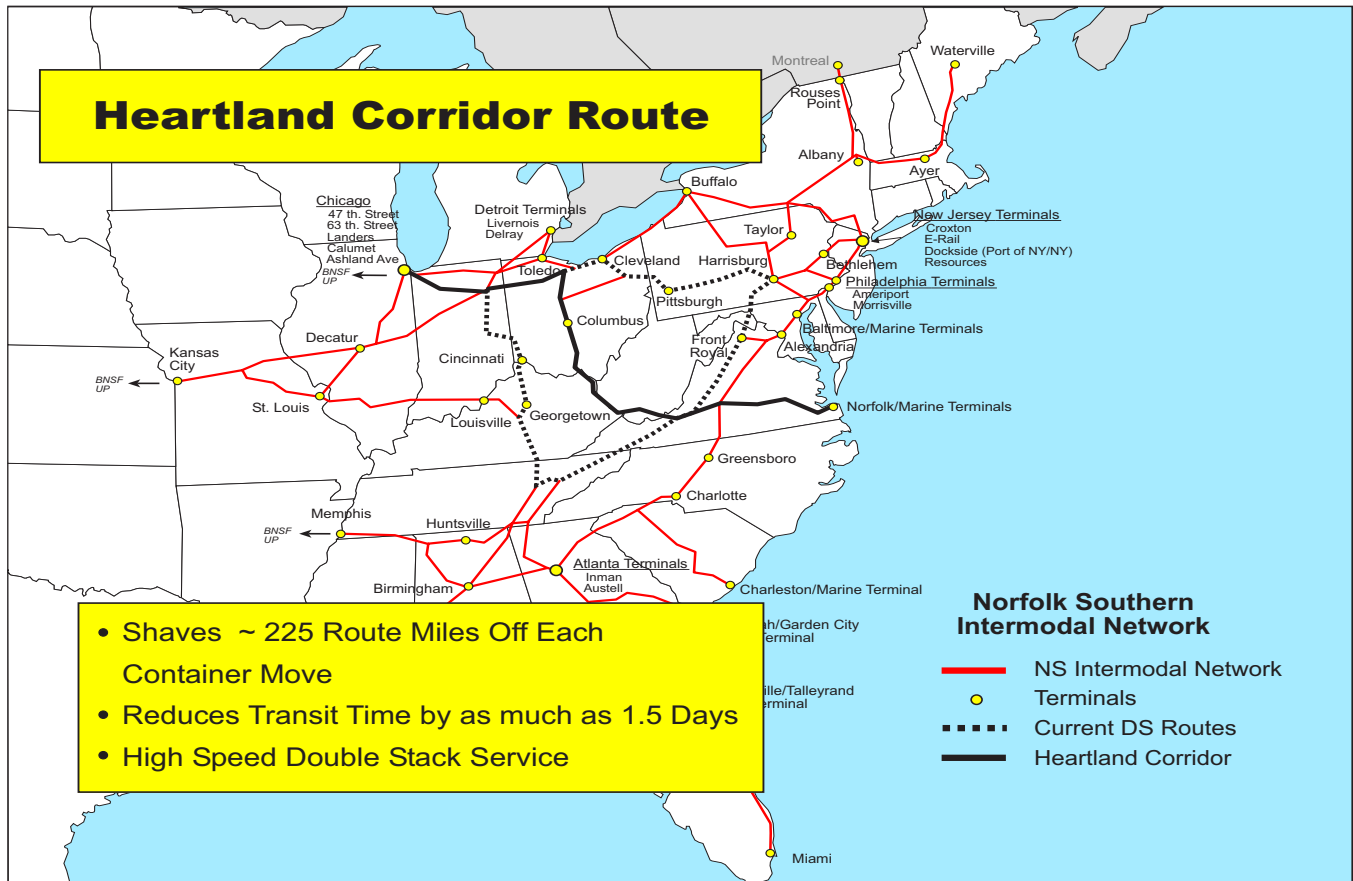
Intermodal connections to ports and distribution centers need to be made in many parts of the country providing seamless, more efficient connections involving rail, highways, and water transportation. The FAST Corridor in the Seattle–Tacoma region is a prime example. The Puget Sound maritime freight gateway has leveraged hundreds of million of dollars of public and private funding so far, with hundreds of million more expected. Train volumes between Seattle and Tacoma are expected to double over the next 20 years.



Photo courtesy of Brian DalBacon.

The Port of Tacoma Road Overpass project, a 2001 FAST Corridor project, today expedites truck movements into and out of the Port of Tacoma in Washington State. It grade separates the Port's main highway access from an on-dock rail facility, and enhances rail yard capacity and switching operations.

Figure 24.



Railroad System for the 21st Century

In 2007, AASHTO published a report titled *America's Freight Challenge*. It stated that America needs a new railroad system, which “will expand capacity and eliminate the critical bottlenecks which plague the old system today...It will stretch to the limits of America’s new frontiers, reach directly to port docks, and span chokepoints in Chicago, Los Angeles, and Texas, and throughout the East Coast. As with the 19th Century system, public-sector assistance will be needed, new funds, and new regulatory flexibility.”

A project under way in 2007 is such an effort. It is the Heartland Corridor, a partnership between the Virginia Port Authority, the Norfolk Southern Railroad and the states of Virginia, West Virginia, and Ohio. It will create a double-stack container route from the port of Norfolk to the Midwest, cutting the distance by 250 miles and shaving 36 hours off the trip. It will build new rail line where needed, raise tunnel and bridge heights to accommodate containers stacked two high. The project cost is funded by a combination of interests, including Federal funds. (Figure 24.)

Norfolk Southern Corp. recently also announced plans to build a 1,400 mile rail line paralleling Interstate 81 from New Jersey to New Orleans. The proposed \$2 billion Crescent Corridor will reduce highway congestion, and speed cargo shipments between the Northeast and the Southeast, while increasing intermodal capabilities. It is estimated that the corridor could divert more than 1 million truckloads off the highways. Public partnerships will also be sought to help fund the rail project.



Photo courtesy of Tennessee Department of Transportation.

Freight capacity investment will be vital to meeting the nation's growing intermodal transportation needs.



CHAPTER 4

A Vision for a Safer America



Imagine a highway system without crashes.

With the nation's highway fatalities continuing at 43,000 annually, the toll of deaths and injuries on our roadways is among the most compelling public health issues of our time. Each day over 120 people die and over 7,400 are seriously hurt. Car crashes are the leading cause of death for persons between the ages of 3 and 33. For the elderly, they represent among the greatest risk factors. Yet progress in reducing highway crashes has stalled. It is time for action that will bring about the changes needed to save lives.

Adopt a National Goal

National, state, and local elected leaders must join forces to set a national goal to reduce total annual highway fatalities by 50 percent by the year 2030, toward the ultimate goal of zero deaths.

Adopt and Enforce Tougher Laws

National, state and local elected officials must enact and aggressively enforce legislation to create a culture of zero tolerance for high-risk behavior. This includes addressing:

- Drinking and driving;
- Primary seat belt laws;
- Teen graduated licensing;
- Motorcycle helmet requirements;
- Speeding;
- Stiffening penalties for driving without a license;
- Closing gaps and weaknesses in the criminal justice system;

- Implementation of ignition interlocking systems; and
- Automated enforcement technology.

The Challenges to Overcome

- **Change social behavior.** A major challenge in reducing highway fatalities is a culture that tolerates risk-taking behavior such as drinking and driving, speeding, distracted driving (driving while talking on cell phones, text messaging, eating, etc.) and driving without a valid license.
- **Major causes of crashes.** The big three behavioral factors in highway fatalities are: seat belts—55 percent of fatal crash victims are not belted; alcohol—39 percent of fatalities involve alcohol; and speed—30 percent of fatalities involve excessive speed. In addition, about 20 percent of fatalities are tied to unlicensed, or revoked or suspended license drivers. (Figure 25.)
- **Roadway characteristics of greatest concern.** Road and lane departure—60 percent of highway fatalities involve a vehicle leaving the roadway or lane; intersections—45 percent of crashes with 21 percent of the fatalities occurring at intersections; and close to half of all fatalities occur on rural two-lane roads.

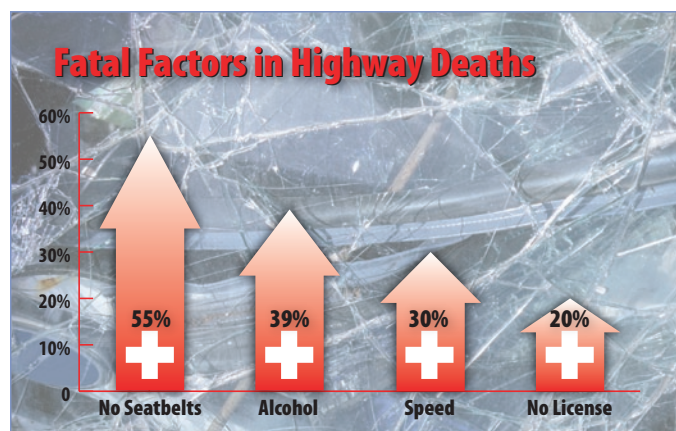
“Making substantial progress in reducing fatalities and injuries will require tapping the best available science on behavior modification from various disciplines, and the evaluation of programs to ensure effectiveness.”

—Robert Darbelnet, President, AAA

Behavioral Strategies for Reducing Deaths

Alcohol. Even though every state has adopted 0.08 as the level of Blood Alcohol Content (BAC) which determines intoxication, over 10,000 fatalities in 2005 involved drivers with BAC levels of over 0.15. If states decide not to tolerate this behavior any longer they may require that ignition interlocks be installed in the vehicle of anyone convicted of a DUI. This means that if persons are drinking they could no longer start their cars.

Figure 25.



Seat Belts. Seat-belt usage has risen from less than 70 percent in the mid-1990s to 81 percent in 2006, and in 11 states the rate exceeds 90 percent. Yet, 27 states do not have primary seat belt laws, and over half of the fatal victims were unbelted. Enactment of primary seat belt laws to achieve a 90 percent rate of seat belt usage could save 8,000 lives per year, according to the National Highway Traffic Safety Administration.

Speeding and Aggressive Driving. Tougher speed enforcement laws and enforcement and adjudication can have enable the state and local governments to reduce fatalities by 5,000 per year.

Motorcycle Helmets. Motorcycle fatalities have doubled in the past 10 years with double digit annual growth rates. While motorcycles represent only 2.4 percent of registered vehicles, they account for 1 in 10 fatalities. Considering the costs of long-term care for motorcycle riders who receive serious brain injuries in crashes in which they were not wearing helmets, even conservative legislators may decide that mandatory helmet laws make sense.

Pedestrians and Bicycle Riders. Pedestrians and bicyclists comprise 11 percent of fatalities per year. As we encourage more people to walk and ride bikes, their safety has to be improved as well.

Older Drivers, Minority Youth. Demographics are changing. In 2007, one in eight people in the United States is 65 years or older. By 2030, this number will be one in five. The elderly generally have slower reaction times, do not see as well, and are more fragile when involved in crashes. Steps need to be taken to improve pavement markings and signage to improve their visibility. Licensing reviews are necessary. The number of younger drivers are also expected to increase. Their lack of driving experience and maturity are factors to be addressed. Traffic fatalities and serious injuries impact a larger share of the younger population of Hispanics and African Americans, than for the population at large.



Photo courtesy of American Byways.

Pedestrian and bicyclist safety must be a priority.

Highway Safety Funding and Improvements

As Congress acts to increase Federal funding for transportation, a significant increase will be needed in funding for safety: infrastructure, behavioral activities, research and development, and data management programs. Several things will make a real difference:

- States and local governments must be given the freedom to use highway funds to their best advantage, including for behavioral programs;
- Expansion of the Interstate System means that more people can travel on roads which are twice as safe as the average elsewhere.
- Building a national network of truck-only highways will allow truck traffic to be separated from car traffic. That can save lives.
- States must move aggressively to implement roadway safety improvements such as freeway median cable barrier placement, rumble strips and stripes on two-lane roads, and major intersection upgrades.
- States and local government should use bigger, more visible signs, more visible lane markings and other improvements which aid the growing ranks of older drivers.

Vehicle Safety Technology Can Make a Huge Safety Difference

Imagine a highway system without crashes, except for those unavoidable situations involving unanticipated obstacles or mechanical failures. The transportation system of

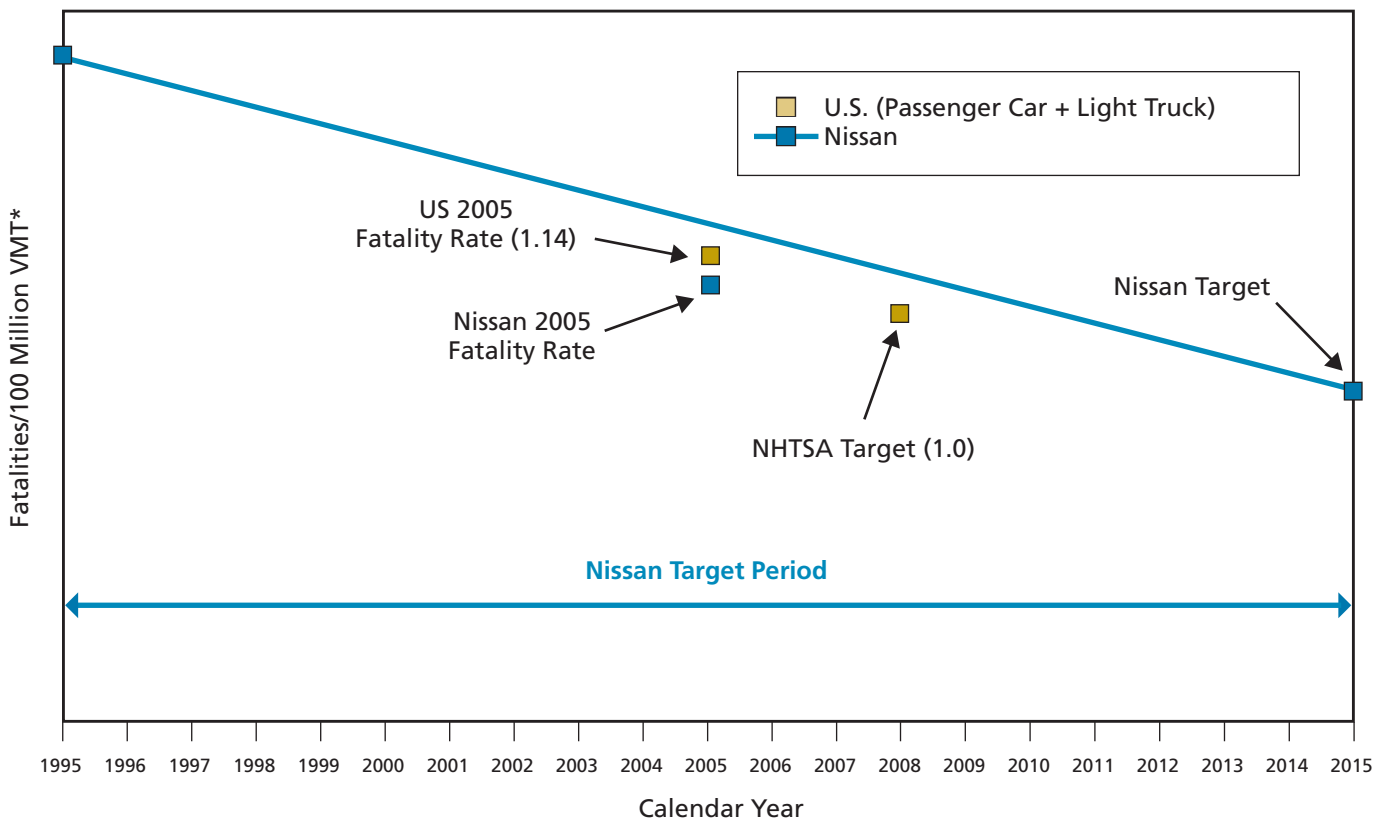
2040 will meet this goal through the use of vehicles with on-board intelligence and communications to prevent collisions with other vehicles and roadside obstacles.

- Vehicles will be equipped with automatic speed control and braking that override the actions of the driver if safe speeds are being exceeded or there are obstacles ahead or on either side. They will also alert drivers departing from their intended lane in an unsafe manner.
- The vehicle of 2040 will also assess the driver's capabilities to operate a motor vehicle by sensing blood alcohol levels and identifying inattentive drivers who may sleepy or ill.
- If predetermined driver impairment thresholds are exceeded, the vehicle will be disabled.
- Installation of Electronic Stability Control technology as mandated by U.S. DOT Secretary of Transportation Mary Peters in all new cars will save as many as 9,600 lives per year when fully implemented.

Many of these capabilities already exist. Those that do not, are in the final stages of research. The combined impact of these capabilities will be the reduction or elimination of crashes due to speed, drunk driving, inattention, unsafe operation, or unsafe external conditions. When combined, these features offer the ability to reduce or eliminate the majority of crashes along with the resulting pain, suffering and financial losses incurred.

Automobile manufacturers are making a corporate commitment to do their part to improve vehicle safety. For example, the Ford Motor Company reports that 18 of its vehicle lines received five-star ratings for frontal and side impact from NHTSA in its 2007 U.S. New Car Assessment Program. Ford reports that it also continues to lead the industry in promoting safety belt use

Figure 26. Vision 2015 Target



*VMT is based off of Passenger and LTV VMT.

Source: Nissan.

through its Beltminder™ system. Both Ford and Nissan are working on new advanced safety features such as lane departure warnings and assisted braking. When Nissan officials came to AASHTO to demonstrate their new lane keeping technology, they showed us their corporate “Vision 2015 Target” to reduce the incidence of highway fatalities involving Nissan vehicles substantially below the NHTSA goal of one fatality per 100 million vehicle miles driven.

Roadway Safety Technologies

Roadway safety technologies can also help reduce fatalities. Almost 60 percent of fatalities involve road departure, with the majority of these on rural two-lane highways. Shoulder rumble strips have been proven to be effective in reducing departure crashes. This measure alone has the potential to save 600 lives per year. Many states have experienced significant increases in cross median crashes. Low cost cable barrier systems placed in medians of freeways, can reduce cross median fatalities by 95 percent. For example, in 1999–2000, more than 70 people in South Carolina lost their lives in Interstate median crashes. After installing 315 miles of three-strand median cable in three years total median fatalities were reduced to eight. Other measures include the use of retro-reflective materials to increase the visibility of traffic control signs at night, and using roundabouts to replace intersections.

“Imagine a highway system without crashes. The vehicle of the future and the roadways of the future have the capability to get us there. Right now we are looking at electronic stability control, collision avoidance systems, and technologies for lane keeping—ultimately 100 percent accident avoidance. These are the kinds of “man on the moon” directions in which we should be going.”

—Greg Cohen, President, American Highway Users Alliance

The Potential of Vehicle Infrastructure Integration (VII)

The Vehicle Infrastructure Integration Initiative is a partnership between Federal and State DOTs and the automobile industry to deploy new vehicle-to-vehicle and vehicle-to-roadside communication capabilities. Many feel that the VII system has tremendous potential. It can be used to avoid collisions, receive early warning of hazards, and to ensure more accurate lane keeping by drivers. Mobility is enhanced through the transmission of traffic, roadway, and weather conditions measured by the on-board vehicle sensors.

The success of VII depends on three things: developing applications which can be shown to significantly benefit the public, securing adequate funding, and maintaining a viable partnership between the government and the auto industry as the system is deployed.

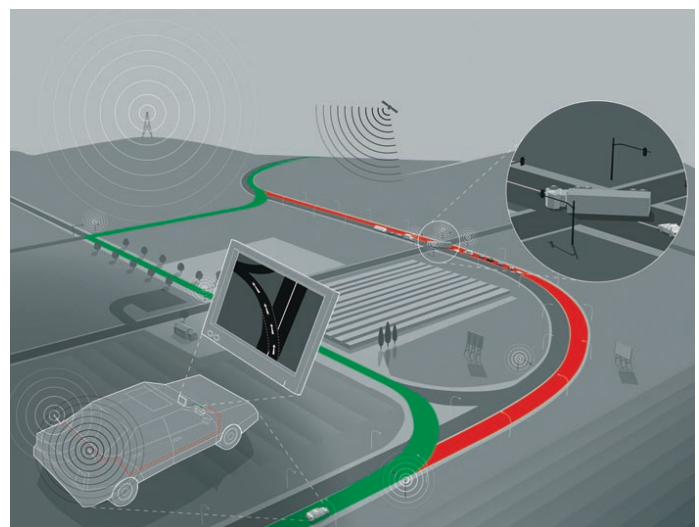


Photo courtesy Popular Mechanics.

Applications of advanced technology, such as this early warning intersection system, hold great potential for increasing highway safety.



CHAPTER 5

A Vision to Benefit America's Way of Life



Imagine a system that supports robust economic growth, better-than-before health of the environment, and improved quality of life for all citizens.

GLOBAL DYNAMICS REQUIRE NEW TRANSPORTATION STRATEGIES

Two additional dynamics demand that the United States pursue new transportation strategies: global climate change, and oil availability.

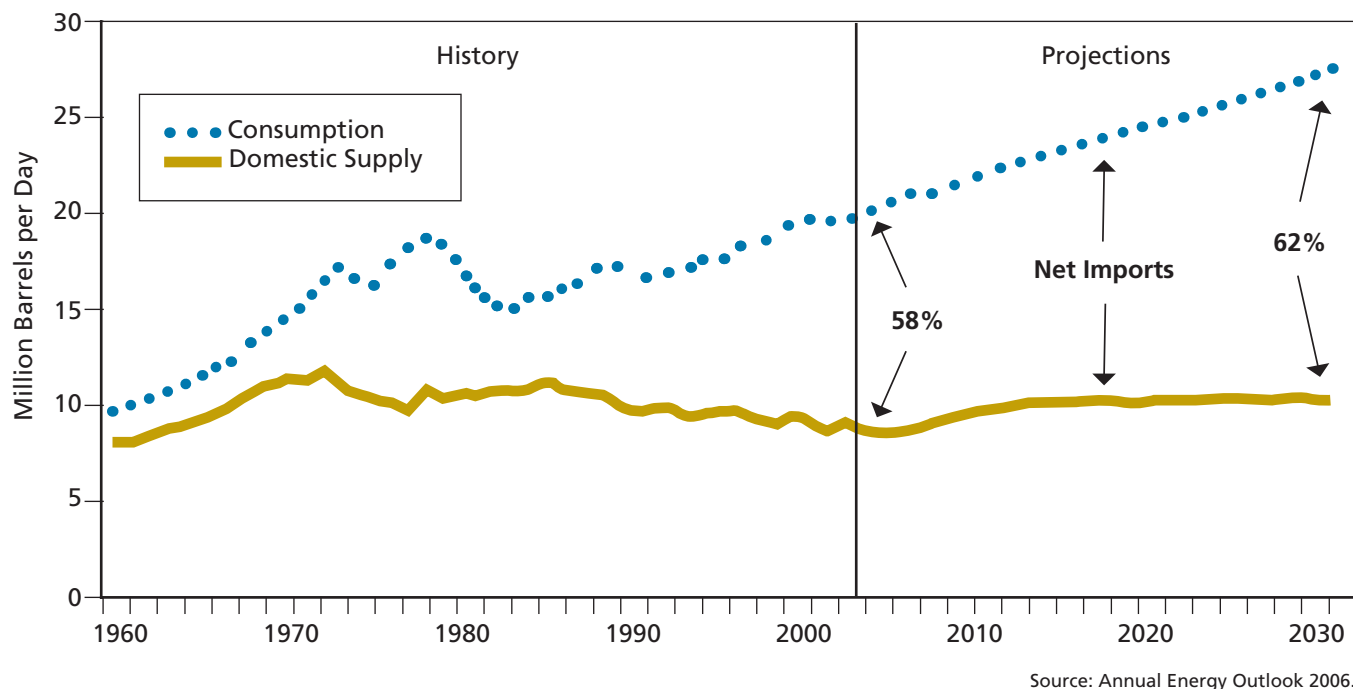
Global Climate Change

Global climate change has become a political, economic and environmental fact of life. As stated by Wall Street strategist Edward Kerschner, “Climate change is a market force as profound as the changes ushered in by the baby boom, globalization, the aging of populations, and the digital age.” To make a positive contribution on the issue of global climate change, transportation policies needed to reduce dependence on foreign oil, reduce energy consumption, and reduce travel demand.

Our transportation system runs on oil. It consumes over 12 million barrels a day. In 1972, we imported 35 percent of the oil consumed. In 2007 we imported 60 percent. Of the known oil reserves in world, 69 percent were under the control of OPEC nations. It has proven costly to be so dependent on them. Transportation represents 32 percent of domestic carbon emissions and is the fastest growing source of these emissions. Our surface transportation system emits more carbon dioxide than the total for any nation in the world from all sources (except China). Highway vehicles generate 72 percent of these emissions.

Transportation must lead in finding solutions. Inevitably, global warming will change the way we live, work, and travel. Actions to reduce transportation CO₂ emissions, especially cars, trucks and air travel, are especially important. The following goals are both bold yet achievable.

Figure 27. U.S. Petroleum Supply, Consumption, and Net Imports, 1960–2030



“There are new realities here that old ideas are not going to cover, and one of them is energy security. You can have lots of energy, but if it isn’t within your borders or under your control it doesn’t really matter how much energy there is. Energy security is going to guide whatever transportation does. Transportation currently uses two-thirds of the petroleum that this nation uses. If we continue to hang our hat on modes and financing mechanisms that rely on that, we are being short-sighted.”

—Bill Millar, President, American Public Transportation Association

Goals:

- Support the President’s goal to reduce oil consumption by 20 percent in 10 years.
- Double the fuel efficiency of new passenger cars and light trucks by 2020, and the entire fleet by 2030.
- Double transit ridership by 2030, and significantly expand the market share of passengers and freight moved by rail.
- Reduce the growth in vehicle miles traveled (VMT)—from three trillion in 2006 to five trillion, rather than the projected seven trillion, by 2055.
- Reduce the percentage of commuters who drive alone to 1980 levels, and increase the percentage of those who ride transit, car pool, walk, bike, or work at home.

Transportation Sector Already Improving Air Quality

Data from the Environmental Protection Agency (EPA) and the Federal Highway Administration (FHWA) show substantial progress towards emissions reductions.

Despite substantial gains in population, the economy, the number of vehicles and vehicle miles traveled (VMT), since 1970 the nation's air quality has improved. Specifically between 1970 and 2002, through technological improvements, emissions associated with motor vehicles have decreased substantially. Reductions include: volatile organic compounds (VOCs) declined by 73 percent, nitrous oxides (NOx) by 41 percent, and ozone by 62 percent.

Reducing congestion on the highways can also reduce carbon dioxide emissions because less fuel is burned.

Dynamics of Oil Supply and Demand

By May 2007, the price of U.S. gasoline nationwide was \$3.25 per gallon and over \$4.00 per gallon on the West Coast. The growth of the automobile fleets in China, India, and the developing world dramatically increased the demand for oil at a period in history where the discovery of new oil fields had slowed and production was approaching its upper limits. The 20th century was the century of cheap oil. By all accounts it appears that the 21st Century will be a period when the price of oil will rise.

In a report titled *Peak Oil* prepared in 2005 by SAIC for the U.S. Department of Defense, analysts stated, "The peaking of world oil production presents the United States and the world with an unprecedented risk management problem. As peaking is approached, liquid fuel prices and price volatility will increase dramatically, and, without timely mitigation, the economic, social, and political costs will be unprecedented. Viable mitigation options exist on both the supply and demand sides, but to have substantial impact, they must be initiated more than a decade in advance of peaking."

Table 2. Auto Ownership

Increasing Auto Ownership Worldwide Will Increase Fuel Demand				
Year	World	China	India	United States
1980				
People	4.4 billion	1 billion	690 million	230 million
Cars	225 million	1.7 million	2.4 million	180 million
2007				
People	6.5 billion	1.4 billion	1.1 billion	300 million
Cars	600 million	26 million	20 million	230 million
2040				
People	8.5 billion	1.5 billion	1.5 billion	340 million
Cars	2.0 billion	200 million	150 million	260 million

As oil prices climbed to \$70 per barrel in 2005, attention returned to the question of when the peak in world oil production would occur. A 1950s prediction said it would hit in 1972. The U.S. Department of Geological Services insisted in 2006, that reserves were sufficient to get us to nearly 2030 before the peak. Most studies estimate that oil production will peak sometime between now and 2040. As Futurist Glen Hiemstra stated, "There is not much time to prepare. When the peak in supply is reached, demand will also be at a peak and rising."

Higher priced gasoline will change travel and transportation in many ways. When oil production hits its peak and the world is required to begin a transition to alternative sources of energy, this will require even more far reaching changes in transportation, our economy and society.

Two changes are already taking place as a result of increased fuel costs, in terms of what we drive and where we live.

Fuel Efficiency

Many car buyers are turning their backs on gas guzzlers and purchasing more fuel efficient vehicles. The average fuel efficiency in the United States was 21 miles per gallon in 2007, in part as a carry over from gas prices which until then had averaged \$2 or less. The fleet average in Europe was 45 miles per gallon where gas prices have averaged from \$7 to \$8 per gallon.

While many U.S. buyers have opted for sedan hybrid models which get between 50 and 60 miles per gallon, they do not have to give up SUVs entirely. SUV manufacturers have introduced more fuel-efficient, hybrid models.

Infill Development

Many households are moving closer in to downtowns and inner suburbs to reduce their commutes.

According to the Urban Land Institute, U.S. cities are growing again. Of the 20 largest cities, 16 gained population from 1990 to 2000. New York City grew by almost 700,000 and major Sun-belt cities posted double-digit gains. Smaller cities like Seattle, Denver, Charlotte, and Nashville grew as well. The back-to-the-city movement is now a clear trend. More people living in cities has led to a construction boom for urban infill housing. Urban infill housing also makes sense from the perspective of smart growth. It tends to be of a higher density than suburban housing, thus making better use of increasingly limited urban land. Infill development supports mass transit, as well as walking and biking. To public officials, urban infill makes a lot of sense. Developers have discovered that it makes sense for them as well.

Lakewood, Colorado—A Suburban Infill Development Success Story

Lakewood, Colorado is a suburban community of 150,000 west of Denver. In 1966, the 1.4 million-square-foot Villa Italia, the largest shopping mall in the region opened to great fanfare. Thirty years later it had become 70 percent vacant and in 2001 it closed. The City of Lakewood together with Denver-based Continuum Partners launched a plan to redevelop the site. What they have planned is a mixed-use project called "Belmar," a 22 block downtown in the making, which exemplifies the potential for transforming post World War II suburbs into more diverse, compact, sustainable, pedestrian-oriented and transit-oriented communities. Phase I opened in May, 2004. At the end of 2005, Belmar had 650,000 square feet of retail/restaurant/entertainment space, 212,000 square feet of office space, and 109 apartment rental units. Trammel Crow Residential has 310 apartment units and 75 loft-style condominiums under construction. The 70 row houses built so far are selling at

an average price of \$360,000. Complete build-out of the project is scheduled for 2012.

When this project won recognition in 2007 by the Urban Land Institute, the Jury wrote the following: “A public-private partnership envisioned a dying 104 acre suburban mall as the city’s new downtown and now is transforming that vision into reality. As it nears completion, Belmar is justifying the developer’s tenacity in pioneering a new urban lifestyle and neighborhood.” As Anthony Flint, author of *This Land: The Battle over Sprawl and the Future of America*, recently wrote, “The shift from the conventional suburban development pattern to more concentrated urban, walkable environments is happening... The proof of this shift is the big home builders themselves. These guys don’t get into things unless they have a reasonable chance of making money. I think they realize the future is more dense, more mixed use, more urban. They’re looking at urban infill and redevelopment.”

SUSTAINABLE TRANSPORTATION FOR A BETTER FUTURE

America’s transportation system has served us well, but now faces the challenges of congestion, energy supply, environmental impacts, climate change, and sprawl that threaten to undermine the economic, social, and environmental future of the nation. With 140 million more people expected over the next 50 years, past practices and current trends are not sustainable.

To meet the transportation needs of the present and pass on a better world to our children and grandchildren, we must accomplish the difficult task of expanding the transportation network’s capacity to serve growing population and communities and an expanding economy while simultaneously reducing the environmental footprint of the system.

The Triple Bottom Line

The transportation decision-makers of the future should adopt the triple bottom line as a yardstick to evaluate the sustainability of surface transportation system policies and performance in order to ensure that transportation strategies and investments will result in

- Robust economic growth;
- Better-than-before health of the environment; and
- Improved quality of life for all citizens.

“The triple bottom line” is a term coined to encourage sustainable development by evaluating performance on the basis of social, economic, and environmental impacts. Applying it to assess projects, programs, and policies sends a message that financial, cost-benefit, and economic considerations are not the sole drivers of transportation projects. Under this approach, economic, social, and environmental factors are to be given equal consideration.

Support Robust Economic Growth

Our population is growing, more cars will be traveling more miles, and truck freight is expected to double by 2035. One question is whether this demand can be met in part through

alternatives which can reduce the overall amount of new highway capacity that will have to be built? The answer is yes. Operational strategies that draw upon advanced ITS traffic management technologies can improve system performance. Congestion pricing offers significant possibilities. Variably priced high-occupancy toll lanes have been accepted here in the United States and are working in places like California and Minnesota. Policy advocates, such as the U.S. DOT Policy Office, have been encouraging congestion pricing, where higher fees are charged during peak travel periods, at times on roads which are currently free of charge, to encourage drivers to drive at different times of day or to shift to transit. They point to the cordon pricing imposed in London, Stockholm, and Singapore as a potential model for U.S. cities.

Goals

1. Manage, operate, and improve system performance of existing transportation facilities and services by adopting advanced operations and ITS technologies.
2. Use asset management to preserve, extend life, restore, and enhance the existing system.
3. Improve network connectivity within and between modes for passenger and freight traffic.
4. Leverage existing capacity with better highway and street grid integration.
5. Use pricing strategies that improve efficiency in travel time, utilization of existing capacity, and reliability consistent with environmental, social, and economic goals.
6. Expand transportation system capacity judiciously using sustainability principles and context sensitive solution practices in order to achieve program and project outcomes that fit into and enhance their settings while fulfilling transportation objectives.

Leave a Better-Than-Before Environment

To deal with the impacts which transportation projects can have on communities and the environment, state and local transportation agencies are applying new approaches, in particular, Context Sensitive Solutions, and Environmental Stewardship. These approaches achieve a significant change in direction from just avoiding negatives to creating positives.

“Active transportation makes other modes work better. Transit and biking allow people to opt out of congestion. We can provide cost-effective mobility solutions, handling short trips of three miles or less, those that are of easy walking or biking distance.”

—Kevin Mills, Vice President, Rails to Trails Conservancy

For example, today's highways are the number one recycler in America, reusing recycled asphalt pavement, slag, fly ash, tires, glass, and roofing shingles in our pavement mixes. Highways through mitigation are creating a net gain in wetlands. Between 1996 and 2002, \$5 billion was invested in over 15,000 community projects ranging from the preservation of historic train stations to the creation of thousands of miles of bike and walking trails through the transportation enhancements program.

Goals

1. Go beyond mitigation to enhancement of our natural systems—air, water, and wildlife habitats.
2. Increase the acreage of wetland reserves and wildlife habitats that is annually set aside and preserved; and increase the number of community transportation enhancement projects that are annually funded and constructed.
3. Measure end results so that the natural environment is better than before project-by-project.
4. Expand the reuse and recycling of materials.
5. Create long-lasting materials to conserve resources.

Improve the Quality of Life for All Citizens

A Brookings Institution study estimates that by 2030, half of the buildings in which Americans live, work, and shop will have been built after 2000. In the past, the quest for affordable housing and lower-cost commercial space has dispersed suburban development ever outward. Transportation, housing, and land-use policy makers should collaborate on policies that create more sustainable patterns of development.

A study of 28 existing urban areas conducted by Reid Ewing of the Center for Smart Growth at the University of Maryland demonstrated that the average vehicle miles traveled by individuals living in the 10 most sprawling areas was 25 percent higher than those who lived in the least sprawling areas.

Closer cooperation is needed to coordinate land use and transportation at all levels of government. Local communities often have neither the tools nor the resources to manage the growth they are experiencing, let alone integrate transportation and land-use planning. State and Federal levels of government have more substantial resources, but historically have not had the sense of ownership in the outcomes of land-use planning and development decisions. This is particularly true for the transportation agencies, which usually represent the biggest single public works investor in any community or region.

Goals

1. Changing demographics could make it possible to satisfy a third of new housing and commercial development demand through infill of central cities and close in suburbs, and an additional third through new mixed-use commercial and multi-family development, and compact new, single-family development friendly to walking, biking, and transit.
2. Encourage community road design which encourages local trips to be made on a well-connected network of local streets and reduces trips made on arterials.
3. Preserve and strengthen rural areas and small towns through coordinated transportation and land-use strategies intended to preserve fragile natural and human environments.



Photo courtesy of the California Department of Transportation.

Innovative financing solutions will be needed to meet the capacity needs forecast for the nation's major metropolitan areas.

CHAPTER 6

Investing to Achieve the Vision



Imagine a transportation system based upon “what America can achieve,” rather than the minimum we can afford.

In 2007, America finds itself at a crossroads. Funding needs have been consistently outstripping resources. Meanwhile, our competitors in the global economy, Europe, Japan, and emerging economies like China and India, are committing massive resources to modernize their transportation systems to strengthen their economic competitiveness. At the Federal level, we have reached a point where the Highway Account of the Highway Trust Fund will be bankrupt in FY2009 and the Transit Account will follow within a few years if nothing is done.

If we are to have a national transportation system, it is imperative that the Federal government play a strong role in the financing as well as the direction of the system.

“We need to focus on the long term, but let’s not forget what’s right in front of our feet. That’s the issue of dealing with the Highway Trust Fund gap in the next 18 months.”

—Pete Ruane, President, American Road and Transportation Builders Association

In the near term, action will be required to preserve the solvency of the Highway Trust Fund. Unless corrective action is taken by Congress, the federal highway program faces a cutback of \$2.5 billion in FY2009. A short-term solution to deal with this problem can be achieved by limiting exemptions, capturing Highway Trust Fund interest earnings, and other measures. The following year, however, the program will face a cutback of approximately \$18 billion unless sufficient revenues can be generated. The equivalent of a three-cent increase in fuel taxes will be needed to stem the collapse of the Highway Trust Fund in FY2010.

In 2009, another problem will also need to be addressed. By 2015, the purchasing power of the current 18.4 cent gas tax will be 30 percent of what it was in 1993. The equivalent of an additional seven cent increase in fuel taxes will be required to raise enough funds to sustain the current highway and transit programs.

“ATA is very much prepared to pay increased diesel fuel taxes in support of a new transportation plan. But the taxes we pay must be tied to strategic investment beneficial to people in our industry and more importantly the users of our industry, the shipping community.”

— The Honorable Bill Graves, President, ATA

Of all the interest groups who would be called on to pay higher user fees, it has been the American Trucking Associations who have been the first to talk the most sense. In 2005, despite the fact that diesel prices that year surged from \$2.00 to \$3.00 per gallon, truckers achieved the best profit levels in the history of the industry. They know that for them to succeed in the future, highway capacity will have to expand. Through their national association they have come to the conclusion that they would gain more by agreeing to pay their share of what it takes to expand system capacity, than they would lose by paying higher taxes.

Governors, state legislators, city and county officials, the business community and the construction industry, organized labor and citizens groups must unite to convince Congress to provide the revenues needed by offering a compelling vision of the value the country will receive. To achieve this vision, Congress must increase the highway program from \$43 billion to over \$73 billion by 2015, and the transit program from \$10 billion to over \$17 billion.

A fundamental approach Congress and the new Administration must continue in 2009, is for the Federal government, in partnership with state and local governments, to provide the funding necessary for highways and transit. Over the last 25 years that partnership had succeeded in increasing highway and transit capital investment by close to 300 percent. Looking forward to the increases needed for the future, the only way to succeed is for all levels of government to continue to fund their share—the Federal government at around 45 percent, and state and local governments, the remaining 55 percent.

New Resources to Meet Growing Needs

In order to provide the quantum increase in transportation investment needed, net new resources from outside the Highway Trust Fund will be required. To keep America competitive in the world economy three new sources of funding should be authorized.

- 1. Critical Commerce Corridors.** To help ensure U.S. global competitiveness, a national freight and logistics program funded with new resources is needed that is complementary to the existing Federal-aid highway and transit programs. The Critical Commerce Corridors Program is a 25-year initiative to develop and fund a national surface transportation freight system. Funded from freight-related user fees from outside the Highway Trust Fund, it will enable states to fix freight bottlenecks, improve intermodal access to ports and distribution centers, fund international gateways (i.e., ports, airports, and border crossings), add capacity to priority trade corridors, and develop truck-only lanes to allow for increases in truck size and weight and improve freight productivity. The system is to be designated through a process where the Federal government, in consultation with trucking, railroads, ports, and shippers, and the involvement of affected communities, provided coordination to achieve specific national performance targets. States, localities, and MPOs have the responsibility for planning and extension of the network throughout the region.



2. **Tax Credit Bonds.** Another funding resource is tax credit bonds, long-term debt issued by a Federally-chartered, non-profit Transportation Finance Corporation (TFC). Instead of interest payments, investors would receive an annual tax credit which they could use to offset their Federal tax liabilities. Over a 20-year period, \$220 billion in bonds could be issued for transportation projects of national significance such as intercity passenger rail service, transit new starts, and major highway projects. What is required is a source of revenue to pay off the cost of the annual tax credits to the Treasury. With the flow of international goods through our ports increasing at between 5 and 8 percent annually, placing a significant burden on the transportation system, Congress should agree to dedicate 10 percent of annual Customs fees to support the Tax Credit Bond program. This would be a sufficient level of support to enable the \$220 billion program to go forward.
3. **Investment Tax Credits.** The railroads are seeking enactment of Federal investment tax credits for rail improvements which improve capacity. This legislation provides incentives for investments in capacity enhancing freight rail infrastructure through both tax credits and tax deductions. States have indicated support for the concept, providing that a satisfactory mechanism for determining public benefit could be mutually determined with the railroads. It is estimated that this measure could generate new private investment capital of \$6 billion over a five-year period, or the equivalent of \$1.2 billion per year.



Photo courtesy of Florida Turnpike.

Tolling and public-private partnerships are important tools in meeting future transportation investment needs.

Additional Revenue Solutions

There are several additional steps that can be taken to fund transportation needs over time.

- **Increase highway trust fund revenues toward the costs to improve goals.** In 2015 and beyond, Congress should increase revenues for the Highway Trust Fund toward the “cost to improve” goals documented by U.S. DOT in its *Conditions and Performance Reports* and AASHTO in its *Bottom Line Reports*. For example the U.S. DOT 2004 *Conditions and Performance Report* cost to improve estimate for highways was \$119 billion and for transit was \$24 billion. Adjusting these “constant dollar” estimates to “year of expenditure dollars” would show a cost to improve estimate by 2020 of \$214 billion for highways and \$44 billion for transit.

Assuming that the federal program continues to provide its 45 percent share of highway and transit capital investment, the “cost to improve” goal for the federal program by 2020 would be \$96 billion for highways and \$20 billion for transit. The options for increasing Highway Trust Fund revenues toward meeting those goals include simply raising fuel tax rates periodically, indexing the fuel tax to measures such as the Consumer Price Index, so they ride up with inflation, or changing the form of the tax from one based on fixed cents per gallon to a sales tax on gasoline.

- **Tolling and public-private partnerships.** Tolling and public-private partnerships have proven to be key niche elements of the overall investment picture and both are needed to be

used where they were appropriate and effective. In executing long-term leases *of existing assets*, the use of the funds generated need to be limited to reinvestment in transportation. With supportive Federal and state policies, the percentage of highway revenues produced through tolls can increase from 5 percent in 2005 to over 7 percent by 2015.

- **Funding innovation at the state and local level.** Currently available mechanisms such as municipal bonds, GARVEE bonds, TIFIA, Private Activity Bonds, and State Infrastructure Banks continue to be needed, as well as new tools. The states have continued to innovate with respect to new funding approaches and such leadership should be fostered wherever possible. For transit this should include transit joint development and tax increment financing which involves the capture of increased real estate value.
- **A Commission to Adjust Rates. While the need for adjusting federal fuel tax rates is technically quite clear, the political challenge remains.** We should also bear in mind that the past two times federal fuel tax rates were adjusted, it was done for deficit reduction rather than explicitly to increase transportation funding or restore the program's purchasing power.

There is a mechanism which seems to work well in the field of military base closing which might be a model for what is needed for the Highway Trust Fund. The Base Realignment and Closure Commission (BRAC) is convened periodically to review the needs of the Department of Defense and to recommend base closures where facilities are no longer needed. An appeal period is provided. However, once the final list is submitted to Congress it is considered on an up or down vote. No amendments are allowed.

If Congress chooses not to index rates or impose a sales tax, there is an alternative which might help. Congress could create an impartial board called the Transportation Revenue Advisory Commission (TRAC). Its mission would be to periodically review whether the rates of federal fuel taxes and other fees supporting the Highway Trust Fund are set at levels sufficient to sustain the program at the levels needed. Once the Commission's recommendation is made, and after an established review period, the recommendation would take effect unless Congress voted during the review period to reject it. The Postal Regulatory Commission process for setting postal rates is another possible model.

"We have to maintain the user pay principle especially as we confront new vehicles and means of propulsion. Whatever power form it takes, we've got to make sure it is charged an appropriate fee for maintenance of the system."

—David Raymond, President, American Council of Engineering Companies

Funding for Development of Alternatives to the Fuel Tax

Even in the short-term it is critical to begin preparing for the long-anticipated decline in the effectiveness of the fuel tax as a user-based mechanism of generating revenue for transportation. While recent studies show that the decline associated with alternative fuels and fuel efficiency is still some time off, it is imperative to begin the work now in the form of research efforts to prepare for the future.



Photo courtesy of Idaho Department of Transportation.

CONTRIBUTORS TO THE TRANSPORTATION VISION AND STRATEGY FOR THE 21ST CENTURY SUMMIT



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Panel Leaders and Participants

In preparation for the Visioning Summit, AASHTO convened nine panel committees of transportation experts, who met to produce recommendations for consideration at the Summit. The products of those nine panel sessions are available on the AASHTO website and at www.transportationvision.org. Panel participants include the following.

The Big Picture Panel

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