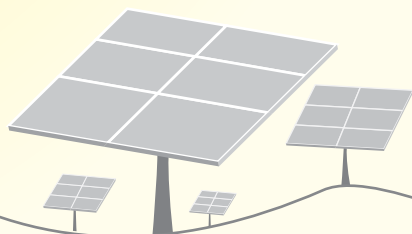


A water tower and several wind turbines of varying sizes are positioned above a yellow, cloud-like shape. The water tower is on the left, and the wind turbines are clustered on the right.

# America 2050

An Infrastructure Vision  
*for*  
21<sup>st</sup> Century America



# Tunneling Under New York

*Construction of the Metropolitan Transportation Authority's East Side Access project connecting the Long Island Railroad to Grand Central Terminal in New York City. When complete, this \$7.2 billion project will shorten commutes for 160,000 passengers a day.*



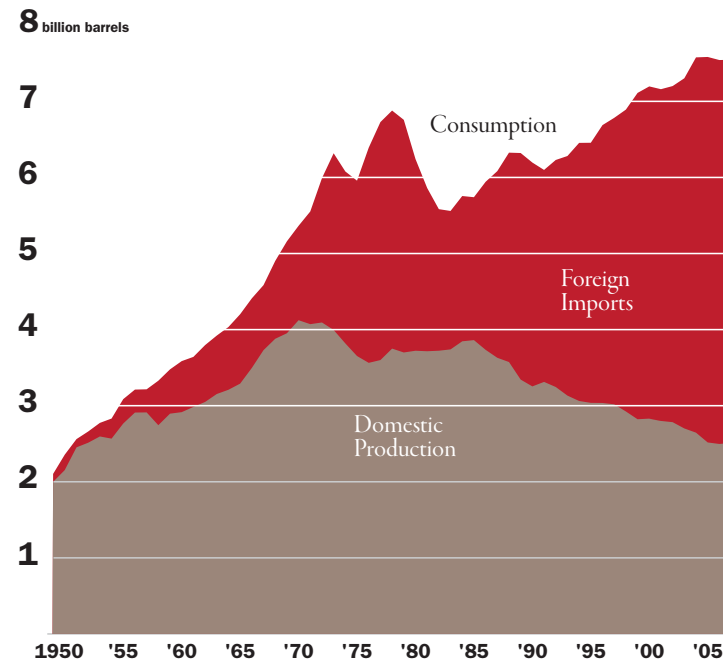
# Introduction

## *A Growing Appetite for Oil*

America faces a host of challenges in the coming century, all of which will have profound impacts on the nation's future growth and development. The global financial crisis, rising fuel and household costs, climate change, deteriorating infrastructure, all require strategies to maximize the nation's continued prosperity, opportunity and quality of life.

In the face of these challenges, though, America is flying blind. No national strategy exists to build and manage the infrastructure systems needed to sustain inclusive economic growth and our competitive position in the global economy, and to secure a healthy environment for our children and grandchildren.

Our global competitors are now racing ahead to build the infrastructure to ensure their full participation in a 21st century economy. While America spends about 2.4 percent of its Gross Domestic Product (GDP) on infrastructure, China and India are spending 9 percent and 4.6 percent of their GDPs, respectively.<sup>1</sup> Every American lives with the consequences of decades of underinvestment, including congested and deteriorating highways, unsafe bridges, inadequate transit and inter-city rail systems,



delayed flights and bottle-necked seaports. Delayed shipments and the costs of congestion place every business in the country at a disadvantage compared with overseas competitors.

This was not always the case. The growth of this nation is due in part to far-sighted investments that built the nation's canals, railroads, power generation projects, bridges and roads, and protected the nation's environmental heritage, including its forests, wetlands, coastlines, parks, drinking water and clean air. America has a history of national plans that shaped development: the Gallatin Plan in 1808; Theodore Roosevelt's conservation plans in

*America's petroleum consumption is rising while we rely increasingly on foreign imports. Source: U.S. Energy Information Administration, 2007*

1908; and the work of the New Deal-era National Resources Planning Board, which led to the Interstate System in 1956.

It's time to do it again.

The America 2050 initiative is dedicated to advancing a new vision for the future of America's infrastructure. Just as the Interstate Highway system provided a road map for the country's growth fifty years ago, we now need a similarly ambitious vision, but one that responds to the challenge of increased foreign competition while cutting greenhouse gases and reducing our reliance on imported oil. The United States continues to have great potential to compete and lead in the 21st century economy because of its vast human, natural, and technological resources, but to do so effectively and efficiently, it must respond to five central challenges.

America needs an ambitious vision that responds to the challenges of global competition, climate change, and our reliance on foreign oil.

# The Challenges We Face

I

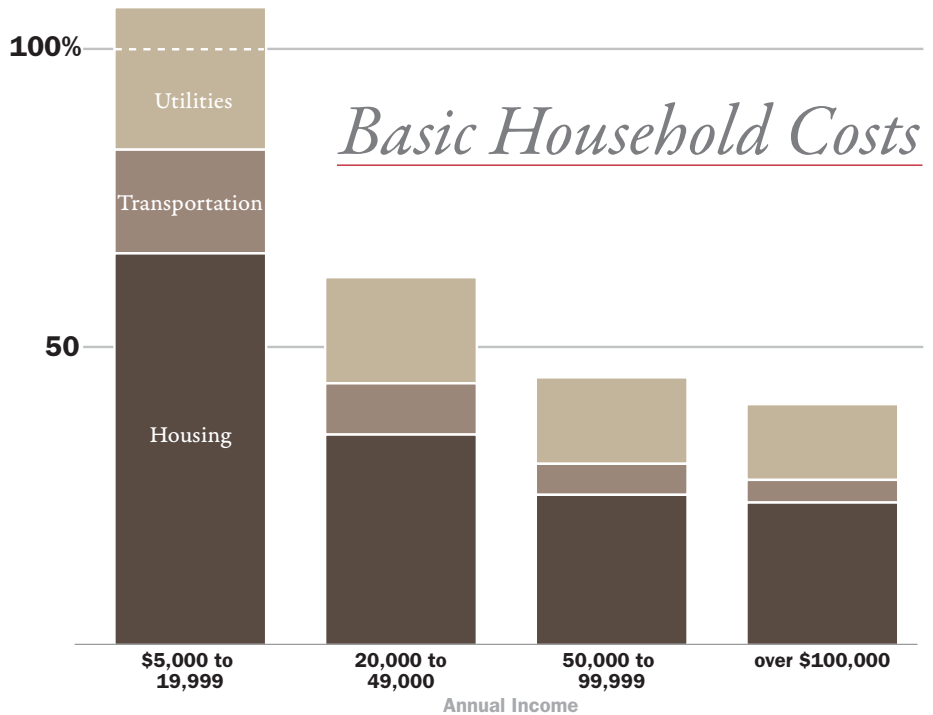
## Global Competitiveness

**Challenge** The United States' global economic dominance is beginning to erode in the face of rapid industrial growth by countries like China and India. The nation's vast infrastructure systems created in the 20th century require repair, reconstruction, or are overcrowded and congested, undercutting America's ability to compete in both its traditional fields of dominance and in emerging arenas of importance. The recognition of the problem is not the challenge; rather it is the lack of imagination, creativity, and most of all, political will and leadership to re-think the fundamental principles and institutional design of our policy-making and governing processes of the nation.

**Response** To compete in the 21st century will require harnessing the resources and capacities of both the public and private sectors to fashion 21st century strategies for sustained and sustainable growth. We must reform outdated federal policies, remove subsidies for fossil fuels, and provide a level playing field for new industries, energy sources, and technologies to take hold.

## Infrastructure

**Challenge** Over the past two centuries we built systems of transportation, water supply and protection, and energy production and transmission that supported our growth and were the envy of the world. Recently we have not created the new capacity needed to underpin the next generation of economic development, let alone maintain what we have built. An astonishing series of bridge collapses and levee failures have underscored America's dangerous infrastructure deficit, estimated by the American Society of Civil Engineers (ASCE) at \$1.6 trillion. In the nation's transportation system alone, the National Surface Transportation Commission estimated that \$225 billion a year is needed over 50 years to bring the transportation system to a state of good repair and make needed improvements for economic growth.



*Basic household costs are most burdensome for low-income families. Total average household expenditures. Source: BLS, 2006*

**Response** From transportation to water and energy systems, we need investment and innovation to develop a more sustainable framework to reduce our reliance on fossil fuels, create capacity for economic growth, and make better use of our natural resources.

## Fairness and Opportunity

**Challenge** The global economic transformation is deepening economic and social stratification as working- and middle-families find it increasingly difficult to cover rapidly rising transportation, housing and fuel expenses. At the regional level, access to economic opportunity is often segmented by geography. In many places, the best jobs have moved out from central cities, accessible only by car, while poverty remains concentrated in inner cities and inner suburbs. At the national level, the transformation is also leaving vast re-

gions of the nation lagging in job growth and income levels. Manufacturing and resource-based economies, including the older industrial cities of the Northeast and Midwest and rural farming communities in the Great Plains and Deep South, have seen decades of declining population and income.

**Response** Public infrastructure decisions should be evaluated against principles of equity to ensure outcomes that are fair, beneficial to all, and do not disproportionately burden people of color or low incomes. Federal investments should prioritize maintaining existing infrastructure assets in existing, urbanized areas over policies that promote new development in farmland or wilderness areas.



## Climate Change & Energy Security

**Challenge** With the price of oil reaching \$140 a barrel, it is safe to say the era of cheap gasoline has passed. Meanwhile, the evidence of human impact on global climate change is becoming increasingly apparent and the likely impacts will significantly change our lives. Climate change will impose huge costs on local communities across America, affecting agriculture, tourism, insurance rates, safety, and homeowners' investments. It will have a significant impact on hydrological cycles, producing more frequent droughts, flooding, and severe storms. At the national and global scale, climate change will disproportionately impact developing countries, including vulnerable coastal regions in the Global South, contributing to competition for resources and instability in already volatile regions. The Intergovernmental Panel on Climate Change estimates that the United States must reduce its greenhouse gas emissions by 60 – 80 percent of current levels by 2050 to avert the worst impacts of climate change, with every year of delay driving up the cost of making change.

**Response** America requires immediate and aggressive investments in new energy technologies, dramatic shifts to greater energy efficiency, and structural changes to a post-carbon national economy. This structural shift presents research and development opportunities for climate-friendly technologies that can be marketed to nations around the world.

### Rapid Population Growth

**Challenge** In the face of these challenges, American population is anticipated to grow rapidly. According to the U.S. Census Bureau, from 2000 – 2050, America will grow by about 158 million additional people to 439 million—almost 30 million more people than were added from 1950 – 2000, during which time America's GDP increased almost six fold.



**Response** By making new investments in the physical fabric of the nation we can create needed capacity for growth, in the same way that the Interstate Highway System fueled two generations of development in the last half of the 20th century, and a system of canals, roads and railroads supported growth in the nation's first 150 years. The challenge for our generation of Americans is to make these investments in the nation's physical infrastructure, in a way that promotes a shift to a low-carbon economy and adapts to the impacts of climate change. With equally bold strategies for investing in people skills, these investments will provide the foundation for a new generation of fair and sustainable development.

*Climate change will bring about more frequent, severe storms and flooding. Above: Des Moines, Iowa in June 2008.*



## The Rising Price of Gas

*The price of gasoline in the United States 1990-2008*

Source: Energy Information Administration

2000 2001 2002 2003 2004 2005 2006 2007 2008

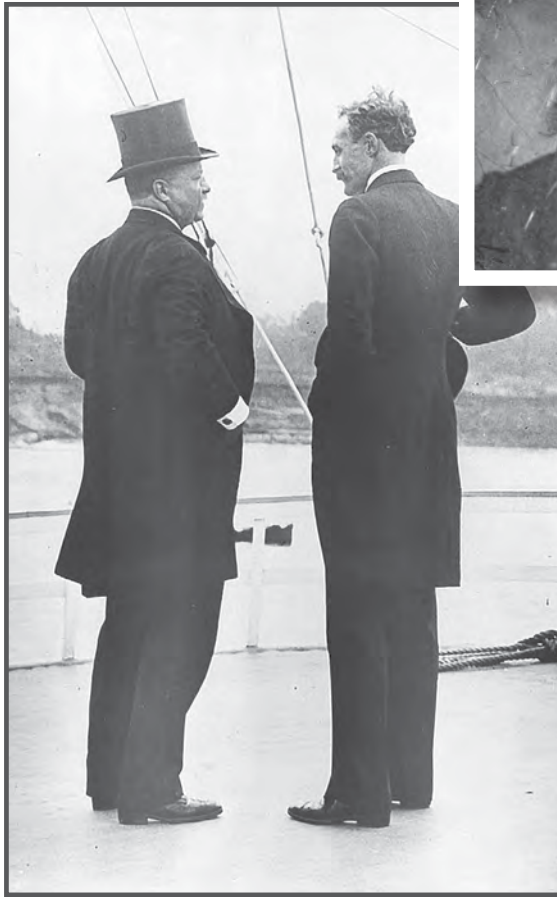
# A History of National Plans

II

In every era since the founding of the Republic, Americans have developed and implemented national infrastructure investment plans that have had a profound impact on the nation's growth and development. Historian Robert Fishman has documented three important national plans, which profoundly influenced the shape of national development, often via indirect means. A brief history is in order to set the context for the ambitious proposals that are needed for the century before us.

**1808:** At the request of President Thomas Jefferson, Treasury Secretary Albert Gallatin created a national plan of ports, roads, and inland waterways to encourage settlement of the nation and facilitate trade among independent farmers scattered across the land. This plan was inspired by visions of George Washington and Thomas Jefferson of an egalitarian society – the “homestead vision” first made possible by the Land Ordinance of 1785. While the plan's implementation was slowed by growing north-south divisions between slave and free states, several states moved aggressively to implement Gallatin's vision. New York State, for example, built the Erie Canal, changing the geography of commerce in the nation. Other key elements of the Gallatin plan were realized under Abraham Lincoln's leadership in 1862 when Congress enacted the Homestead Act, granting 160 free acres to each family that could farm them; and the Pacific Railway Act, which launched the first transcontinental railroad. Through this alliance with private interests – the railways and the homesteaders – a national transportation system was realized in rapid pace, at enormous scale, and resulting in dramatic (but uneven) generation of wealth. The same year, inspired by the land grant principle underpinning the Gallatin Plan, Congress adopted the Morrill Land Grant Colleges Act, creating the nation-wide system of state universities, which dramatically expanded and democratized the nation's higher education system.

**1908:** Theodore Roosevelt convened a Conference of Governors at the White House to launch a series of conservation



## 1930s & '40s:

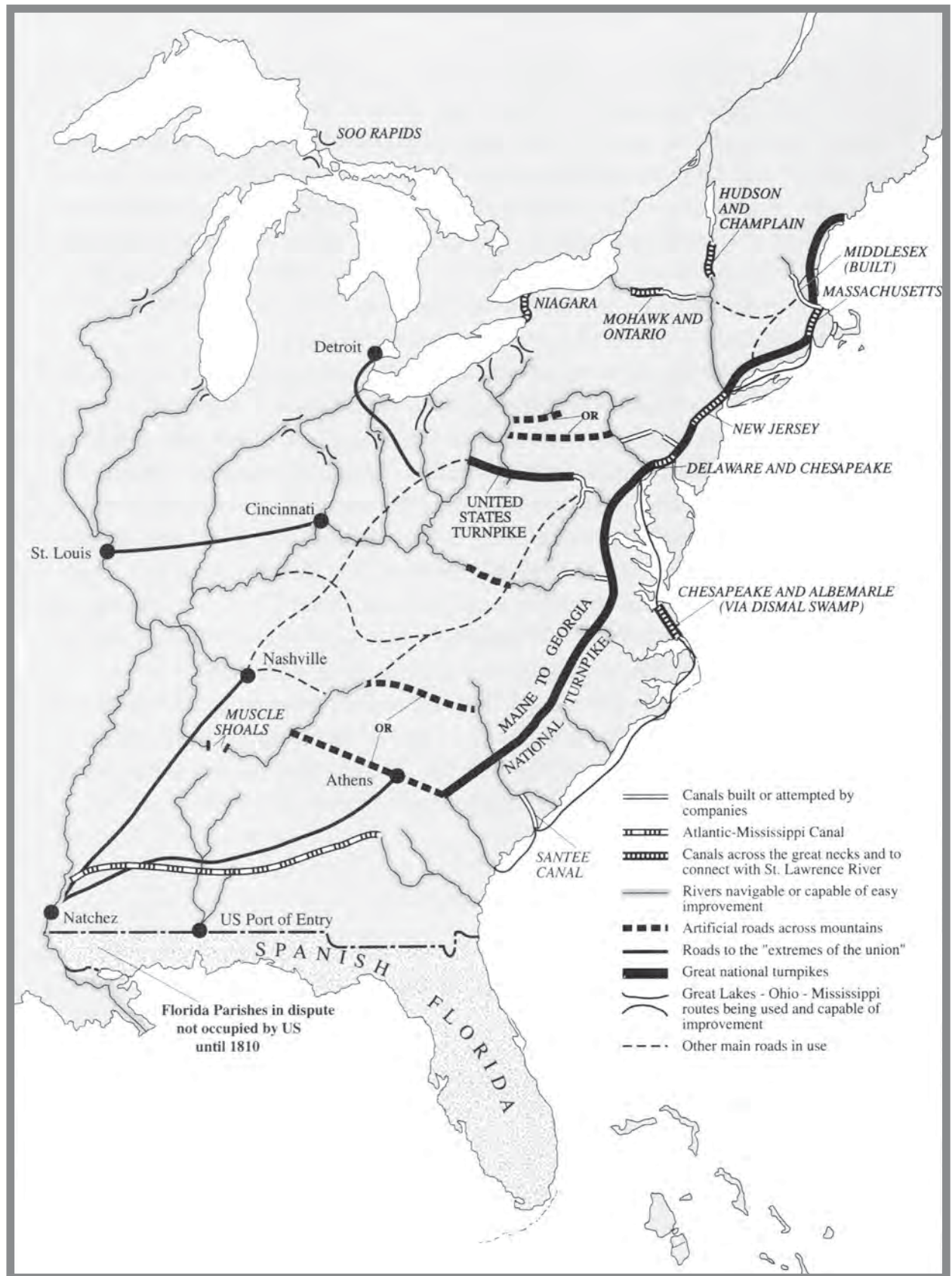
The National Resources Board (later renamed The National Resources Planning Board) was established by President Franklin Roosevelt in 1933 to guide infrastructure investments promoted by the economic stimulus programs of his Depression-era New Deal. Led by a distinguished board chaired by Roosevelt's uncle, Frederick Delano, the Board's assignment was to take full account of “the distribution and trends of population, land uses, industry, housing, and natural resources” across regions, river basins, and entire ecosystems, to assure that federal expenditures would deliver “comprehensive and coordinated” consequences. The Board performed crucial services throughout the 1930s in coordinating public works and forming policy for land use, forests, parks, hydrology, and government-sponsored defense-plant location. Perhaps the Board's most important contribution to the nation's infrastructure system was its plans for a National Toll Road and Free Road System, which became the basis for the post-War development of the Interstate Highway system advanced by President Dwight Eisenhower.

*Top: Albert Gallatin, the fourth U.S. Secretary of the Treasury and author of the 1808 plan on opposite page. Above: President Theodore Roosevelt and then Chief of the Forestry Service Gifford Pinchot aboard the U.S.S. Mississippi on the historic 1907 cruise down the lower Mississippi undertaken by the Inland Waterways Commission that led to the 1908 Governors Conference.*

plans drafted by the Inland Waterways Commission that would target underperforming regions of the South and West with irrigation, river restoration and dam projects. The plans responded to a generation of railroad development that had consolidated power and wealth in the hands of private interests concentrated in the Northeast and Midwest cities. The conservation programs sought to restore ravished farmland and clogged river corridors and create cheap power with hydroelectric dams, resulting in successful projects and agreements including the Roosevelt Dam near Phoenix (1911), the Colorado Compact (1922) and the Hoover Dam (1931). Twenty-five years later, the ideas of the Inland Waterways Commission were taken up under the New Deal by the Tennessee Valley Authority, Bonneville Power Administration and other conservation and economic development programs under President Franklin Roosevelt.

The impact of the Interstate System was immense. Coinciding with the return of WWII veterans and federal programs that encouraged home ownership, it spawned patterns of suburban development that define the nation's character today. As in the railroad era, the convergence of federal incentives and private investment resulted in the completion of an astonishing transportation network, the unification of the country, and uneven costs and benefits, in this case between urban and suburban areas.

Adapted from Robert Fishman. 2007. “1808 – 1908 – 2008: National Planning for America.” Working Papers for America 2050: Innovations for an Urban World: A Global Urban Summit. New York: Regional Plan Association and correspondence with Roger Kennedy, historian.



*The Gallatin Plan, 1808, as reconstructed in D.W. Meinig, The Shaping of America, vol. II (1993).*

# Rebuilding and R

The transformative infrastructure investments of the last two centuries shared a number of key characteristics. They offered bold, compelling visions for the nation's future growth and development. They enabled private citizens to better access economic opportunity. They were built in cooperation with the private sector. They were national in scale. They relied on state and local actions to implement. They responded to the most urgent challenges of their time.

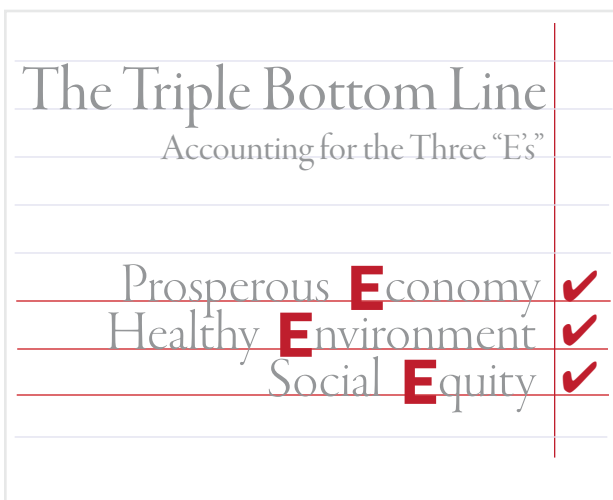
In this new century of great challenges, the nation is in need of a bold vision that can guide infrastructure investments and development toward a sustainable and prosperous future. This vision should take the form of an infrastructure investment plan that includes key transportation networks, energy generation and transmission systems, land preservation and drinking water protection, and plans for extending broadband technology to rural areas. The federal government may develop this plan in consultation with states and regions. It could set broad goals and objectives and provide tools and incentives for states, local governments, and the private sector to act.

Most importantly, a national vision should respond to the key challenges that face our nation. To do so, it should aim to achieve the following goals:

- **Boost America's competitiveness** in the global economy;
- **Provide capacity** for population and economic growth;
- **Wean the nation** off its dependence on foreign oil and reduce our impact on climate change;
- **Restore aging and deteriorating** transportation, water, and energy infrastructure assets; and
- **Ensure the costs** and benefits of public infrastructure decisions are fairly distributed in society.

## Promoting Fairness in Infrastructure Decisions

In the past, national plans and the infrastructure investments they inspired resulted in dramatic economic growth. In many places, however, this growth was accompanied by unanticipated consequences, including damage to the environment and often unfair and inequitable distribution of economic benefits. In 21st century America, however, these tradeoffs should not be accepted as the inevitable consequence of economic growth. As in the past, the federal government should provide leadership in setting goals



for national-scale infrastructure investments that will shape the quality and direction of the nation's growth, while at the same time focusing on the steps needed to ensure that these investments promote more sustainable and more equitable patterns of development.

The concept of the "triple bottom line," introduced in the 1990s as an accounting method to capture the economic, ecological, and social impacts of investments, captures the same values that should be considered in weighing major public infrastructure investments and policies. Instead of after-the-fact accounting, however, the federal government should set out performance standards that measure progress toward meeting economic, environmental and social equity goals and can be used in the project decision-making process.

Looking at one of the nation's largest historic infrastructure investments, the interstate highway system, one could imagine an alternative form that would have resulted had each individual segment of the broader vision been subject to performance standards related to environmental sustainability and fairness. While

the system as a whole would have largely the same scope and positive impact on national economic growth, individual components may very well have looked dramatically different than they do today. The Cross-Bronx Expressway in New York City, for example, is clearly integral to the highway network of the eastern seaboard yet it has had a pronounced negative impact on the health, economic vitality, and environmental quality of the local community through which it passes. A stronger consideration of avoiding adverse environmental and social impacts would have identified strategies including a slightly different course; decking, local parkland, housing replacement, and other elements which would have enabled the same level of regional and national economic development while mitigating many of the local negative externalities.

A National Infrastructure Plan Will Require All Levels of Government and the Private Sector

## The Federal Government: Setting Clear Objectives and Measuring Performance

While many land use decisions and infrastructure investments in the United States are made at the state and local levels, historically, federal policy and resources have had an unseen hand in shaping the development of the national landscape. For example, the combination of the interstate highway system and the lending practices of the Federal Home Loan Mortgage agency in the post World War II era transformed America to a more suburban nation. Today, federal policies and funding programs continue to shape America's growth, and not always in ways that help America respond to the key challenges of the 21st century.

With the urgent need to reduce America's reliance on foreign oil and respond to climate change, national policies should be aligned to support the type of development that will make the most of the nation's existing infrastructure systems and provide increased mobility options in built areas. The federal role in infrastructure investment should be one that encourages innovation at the state and local levels to meet clear federal objectives expressed as outcomes, such as safety, performance, accessibility and meeting the "triple bottom line" of economic prosperity, fairness, and sustainability. The performance of states and local government in meeting



# Renewing America

these outcomes would be measured and encouraged with federal incentives and technical support.

The federal government could promote the implementation of a national infrastructure plan by taking the following actions.

→ **Establish a vision** and priorities for the nation's infrastructure needs by setting goals to align departmental policies, ensure best value from government spending, reduce duplication, and show how investments can reinforce one another. This framework would avoid the enormous time delays and costs in delivering major projects that arise because of the lack of agreed-upon national priorities, and set the context within which decisions are taken at the state and local levels (and by the private sector) with confidence and evidence.

→ **Set standards for efficiency and safety:** examples include CAFE standards for automobiles and light trucks and efficiency standards for appliances. In safety, the federal government plays an important role in many areas including the work of the Federal Aviation Administration, the Food and Drug Administration, and the Occupational Safety and Health Administration, for example. The federal government should set a high bar for minimum standards of safety, efficiency and health, and yet individual states should not be discouraged from aiming higher.

→ **Promote federal objectives** with "conditionality." The promise of federal funding and financial tools for states and regions that take action to meet federal objectives can act as a powerful motivating force. Equally compelling is withholding federal funds or financing for not meeting federal objectives. For example, Congress used both the "carrot" and "stick" approach in the 1991 transportation bill, to promote state laws mandating seat belts and motorcycle helmets.

→ **Convene multi-state partnerships.** To address issues at the megaregion or multi-state scale, the federal government can provide the incentive and the legal basis for states to finance multi-state transportation projects or regulate and protect environmental resources that span multiple jurisdic-



Top to bottom: *Portland, ME, Minneapolis, and Los Angeles*

tions. Entities like the Port Authority of New York and New Jersey, the Alameda Corridor Authority, the Tennessee Valley Authority and the Bay Delta Commission were created through federal actions.

→ **Measure performance** and collect data. The federal government should collect data to measure and rate the performance of states and local government in meeting the objectives of federal programs for which they receive funding, such as in education with the No Child Left Behind Act. Rigorous evaluation of performance should be

extended to other federal programs, particularly transportation, to increase transparency in federal spending, reward states and local governments that perform well, and provide the tools to make better decisions about the effectiveness of federal programs.

## Leadership of States, Regions and Local levels of Government

States and local government will continue to play the important role of planning, developing and maintaining much of the nation's infrastructure investments within the context of a national vision and clear federal priorities and performance standards. Across the country, states have been leading the way in adopting climate change policies that are more ambitious than those of the federal government. For example, California's AB 32 legislation, which requires CO<sub>2</sub> reductions to 1990 levels by 2020, has already begun to foster innovation and investments in new technologies that will help the rest of the nation respond to the climate change challenge. To date, 29 U.S. states have also adopted Renewable Portfolio Standards (27 of them mandatory), which set varying targets for the states' use of renewable energy.

Metropolitan regions will also play an important role in transportation policy and in coordinating transportation and land use investments to promote greater energy efficiency, sustainability and quality of life. Measured by the geographic extent of integrated labor markets, metropolitan regions function as the basic units of the nation's economy. In transportation and land use policy in particular, there is a compelling case for strengthening the decision-making power of and direct funding to regional agencies, such as Metropolitan Planning Organizations, Councils of Government, and regional transit authorities. According to the Brookings Institution, America's top 100 metros alone account for over three-quarters of the nation's air cargo tonnage, seaport tonnage, and rail passengers, yet they struggle to receive adequate funding and tools from their state governments, despite contributing disproportionately to state and federal gas tax revenues.

Cities and local government have an important role to play in concentrating jobs, housing, and activities in central places, where transportation options are plentiful. After enduring a long era of decline from the 1960s to the 1990s, many of the nation's urban places have undergone radical transformations to become more stable, prosperous places, while others are just beginning to turn around. The nationwide decline in crime and sustained economic growth has played a role in this transformation, as have demographic and market forces that are leading more young people, immigrants, and "empty nesters" to seek homes in urban places.

## Megaregions – The Building Blocks of a National Plan

In addition to states, regions, and local levels of government, a new urban scale has emerged that presents a framework for responding to large scale, cross-border challenges. Megaregions are networks of metropolitan areas, connected by travel patterns, economic links, shared natural resources, and social and historical commonalities. In the U.S., 11 emerging megaregions have been identified, where the majority of the nation's growth will take place by 2050. Megaregions are becoming more cohesive as technology and globalization promote the movement of goods, people, and information at lower costs, greater frequency, and higher speeds. Megaregions are America's gateways to the global economy where our global ports, airports, communication centers, financial and marketing centers converge.

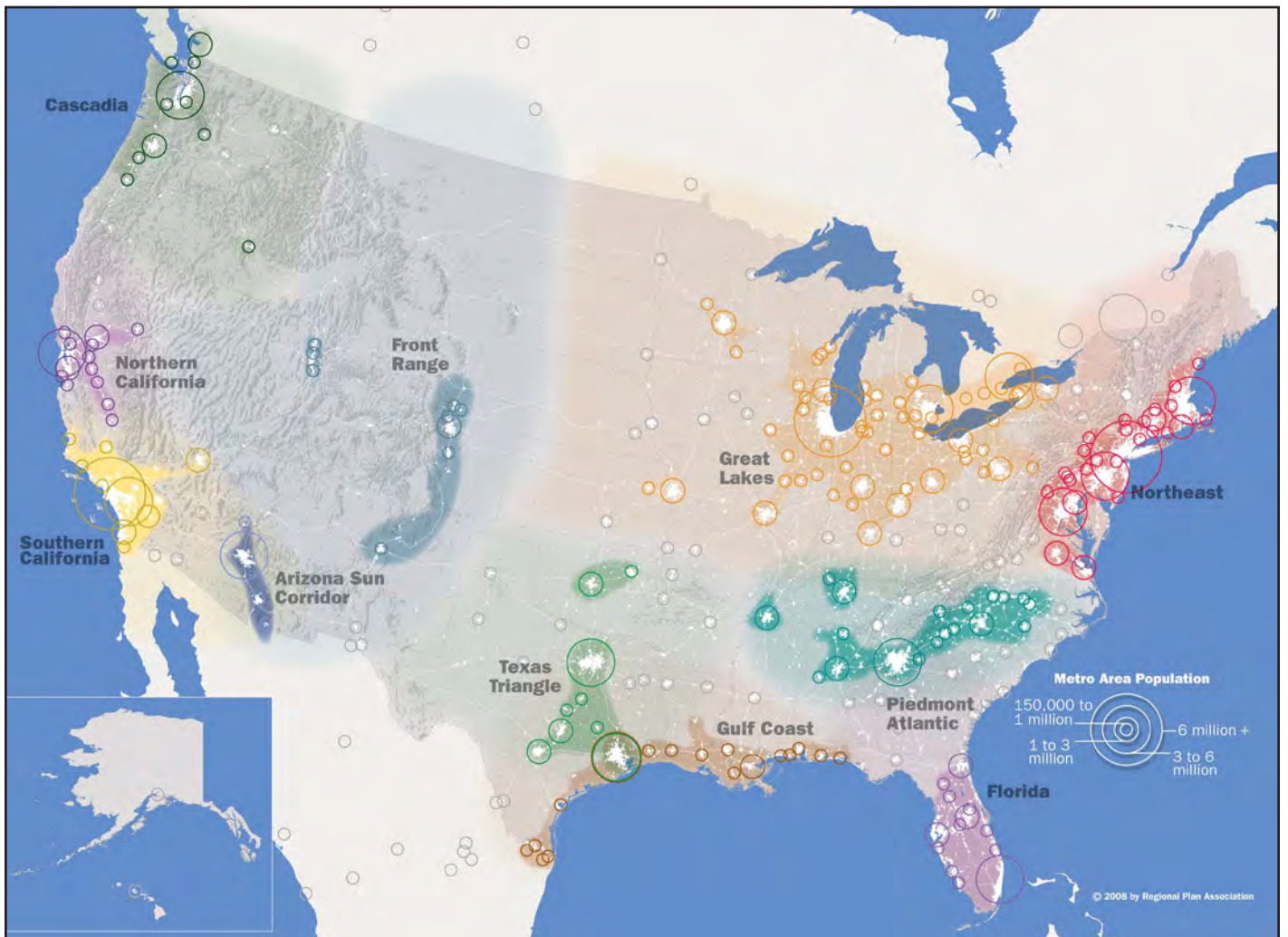
Given their importance in the national economy and their mostly multi-state nature, megaregions can play an important role in identifying the components of a national infrastructure investment plan. Increasingly complex networks of intermodal transportation and goods movement systems, as well as energy transmission and coordinated land use planning and environmental protection are needed in the nation's fast growing megaregions. Coalitions of adjacent metropolitan areas within megaregions can help develop a national infrastructure investment plan by identifying and coming to agreement about the big infrastructure systems that cross multiple city, region and state boundaries, and require federal assistance and coordination. Examples include high-speed rail systems that connect cities within the megaregions, major seaports and their landside intermodal connections to distribution centers, freight rail, and highways, and multi-state interstate corridors that require technology investments or strategic congestion relief.

Increasing interactions between the metropolitan areas that make up megaregions also present the opportunity to expand industry clusters to a larger scale. In a knowledge-based economy, cities can expand the reach of their labor markets by investing in high-speed rail transport that connects multiple cities within the megaregion and takes advantage of the complementary economic specializations in adjacent regions. With better transportation connections, firms can also take advantage of lower-cost labor and start-up costs in rural or older industrial communities that are distant from the economic core but still within the megaregion, as an alternative to international

outsourcing. A megaregion can capitalize on the presence of a wide range of economic functions (from headquarter locations to low-skilled manufacturing) within a single geographic "megazone."<sup>2</sup>

Megaregion-scale coordination, planning and advocacy could achieve the following objectives:

- **Development of intercity and high-speed rail corridors** that move people and goods linked to global ports and other multi-state or interregional transportation networks requiring coordinated planning, investment and management across local, state and international borders.
- **Protection, restoration, and management** of large environmental systems and resources such as watersheds, farmland, forests and coastal areas.
- **Competition with international megaregions and global integrations zones**, such as Europe's "pentagon" and China's Yangtze River Delta, Pearl River Delta, and Capital Region megaregions.
- **Creation of economic revitalization strategies** for underperforming regions such as the Midwest and the Gulf Coast.
- **Promotion of industry clusters and labor markets** over a larger geographic scale when enabled by strategic passenger rail and goods movement investments to better connect megaregions internally.
- **Creation of megaregion-scale cap-and-trade agreements** to limit carbon emissions from power plants, such as the Regional Greenhouse Gas Initiative of 10 Northeast states.



Megaregion	Counties	Area (sq.mi.)	Population 2000	Density 2000 (per sq.mi.)	Pop 2025/ percent growth	2005 GDP (billions of US\$)
Arizona Sun Corridor	8	48,803	4,535,049	93	7,362,613/ 62%	191
Cascadia	34	47,226	7,400,532	157	10,209,826 /38%	337
Front Range	30	56,810	4,733,679	83	6,817,462/44%	229
Gulf Coast	75	59,519	11,747,587	197	15,832,117/35%	524
Great Lakes	388	205,452	53,768,125	262	62,894,147/17%	2,073
Northeast	142	61,942	49,563,296	800	58,124,740/17%	2,591
Northern California	31	47,928	12,724,861	265	17,290,363/36%	623
Piedmont	121	59,525	14,855,052	250	20,505,381/38%	486
Southern California	10	61,986	21,858,662	353	28,692,923/31%	1,037
Southern Florida	42	38,356	14,686,285	383	21,358,829/45%	608
Texas Triangle	101	85,312	16,131,347	189	23,586,856/46%	818
<b>Megaregions</b>	<b>967</b>	<b>772,860</b>	<b>206,780,494</b>	<b>268</b>	<b>265,216,481/28%</b>	<b>9,199</b>
<b>Rest of Country</b>	<b>2,117</b>	<b>2,245,370</b>	<b>73,508,817</b>	<b>33</b>	<b>90,820,565/24%</b>	<b>3,235</b>
<b>United States</b>	<b>3,085</b>	<b>3,018,230</b>	<b>280,289,311</b>	<b>93</b>	<b>356,037,046/27%</b>	<b>12,434</b>
<b>Megaregion Percent</b>	<b>31%</b>	<b>26%</b>	<b>74%</b>	<b>N/A</b>	<b>74%</b>	<b>74%</b>

# The Three Components of a National Infrastructure Investment Plan

## Water

### A Strategic, Integrated Approach

The water resource policies of the last thirty years must be adapted and expanded to meet the more complex needs of a new century. Changing settlement patterns, aging infrastructure, climate change, the global markets for agricultural commodities and ever more fierce competition for access to scarce water are posing distinct new challenges. These are combined with new understandings of hydrologic

cycles, water and ecology, the potential for water resource conservation, watershed management, and payment for ecosystem services, which offer new opportunities for sustainable water management. Water policy in the United States must address the challenges above and adopt new integrated solutions to ensure that

*The River Des Peres in St. Louis, Missouri, formerly a natural waterway became a major component of the city's sewer system in the early 20<sup>th</sup> century.*



The heavily engineered, capital-intensive, facility-construction solutions that dominated 20th-century approaches to water management are no longer sufficient.

America's water infrastructure remains an unrivaled advantage for our country and makes clean and abundant water a central element of a sustainable future.

Water resource management crosses many political, economic, institutional and disciplinary boundaries. Establishing guiding principles that work across these divides to create policy synergies must be a top priority for a national infrastructure plan. Water resource managers increasingly understand that the heavily engineered, capital intensive, facility construction solutions that dominated 20th century approaches to water management are still necessary but no longer sufficient. And without careful consideration of alternatives, they can be wasteful and even counterproductive. An increasingly complex set of water problems requires a policy framework that encourages innovation and efficiency, utilizes natural systems, promotes creative uses of market tools, eliminates perverse incentives and subsidies, aggressively promotes integrated management of water supply, wastewater and stormwater systems, and links water resource management to land use decisions.

Thanks to the landmark 1972 Clean Water Act, and subsequent federal and state policies, the United States has made enormous strides in reducing pollution from municipal and industrial point sources. According to the U.S. Environmental Protection Agency (EPA), pollutant discharges are half of what they were in 1970, despite waste loads that have grown by a third. Cleaner water has benefited public health, created new recreational opportunities, improved fisheries and wildlife habitat, and spurred waterfront-based urban growth and development. These achievements are directly tied to officially mandated investments in water resource infrastructure and water resource management. The EPA estimates that public spending on water systems has doubled since 1970 and spending on wastewater systems has tripled.

But even so, the Clean Water Act goals of fishable and swimmable waters have not been met. The most serious remaining problems oc-

cur in water bodies where older combined sewers, diffuse non-point urban stormwater, and growing runoff of agricultural pollutants have remained largely uncontrolled by traditional capital investment approaches. Lack of adequate upkeep of aging pipes and plants, sprawl, and more frequent intense storms are even reversing hard-won gains. The restoration of water bodies, such as Puget Sound, San Francisco Bay-Delta, the Everglades, Great Lakes, Chesapeake Bay and the Gulf of Mexico, will require complex, multi-stakeholder strategies, increased investments and the application of new scientific and ecological insights that go far beyond today's efforts.

Population growth and migration are also changing the priorities of water resource management in ways that national water infrastructure policy needs to recognize and address. Emerging megaregions and growing metropolitan areas will significantly increase demands for water in these urbanized areas. Physical scarcity of water is a growing concern in Southern California, the Arizona Sun Corridor, and the Texas Triangle. Areas in the Southeast are also experiencing water shortages despite relative water abundance, due to a lack of institutional and financial willingness to face the realities of over-burdened, finite water resources. Even in seemingly water-rich locations like the Northeast, exurban sprawl into drinking watersheds is requiring new infrastructure upstream, while degrading quality for downstream urban areas.

Climate change is already altering hydrologic cycles and the dynamics of this debate. The reliability of water supplies has been reduced, and will continue to be in the future. Warmer temperatures and changing precipitation patterns will reduce annual snow packs and increase evaporation, lowering storage capacity of reservoirs and watersheds. Weather extremes will occur with greater frequency, stressing not only humans but also wildlife and natural systems. Sea level rise and higher intensity storms will steadily increase risks on the coasts and inland. Flooding and severe storms will incur even greater costs above the billions of dollars of damage this nation experiences each year. This is compounded by land use decisions that allow construction in flood-prone areas and a reliance on levees and other engineering struc-



*Watersheds of the United States: An integrated approach to water resource management will require coordinated land use planning and water infrastructure investments at the watershed scale.*

tures built in opposition to, rather than as a complement of, natural hydrological dynamics. Federal and state flood insurance and disaster relief policies have allowed developers to avoid the financial consequences of such unwise decisions by subsidizing such developments from the public purse.

The nation's water infrastructure is also aging. Many urban areas still rely on distribution systems installed in the 19th and early 20th century. And many of the massive infrastructure investments of the 1970s are nearing the end of their useful life and will soon require renovation or replacement.

Addressing these needs will be expensive. While federal, state, and local sources have invested about \$18-20 billion a year toward these capital needs since 1970, the EPA has conservatively projected a gap of \$534 billion, or about \$27 billion a year, to meet unmet clean water and drinking water capital needs, operations and maintenance over the next 20 years, and these costs are likely to escalate with climate change impacts. The relative role of different levels of government, utilities, and developers in closing this gap, and keeping the bill for water resource management affordable for ratepayers and taxpayers, are key questions.

EPA has proposed a "four pillars" approach that incorporates an integrated structure of better management, full cost pricing, more efficient use of water, and wa-

tershed management approaches. Two recent reports by the National Academy of Public Administration have similarly proposed that EPA and the Army Corps of Engineers develop outcome-orientated policies and integrated strategies that connect land use and infrastructure investments.

The case for new policy principles that give equal weight to non-structural solutions to water resource problems is clear. Experience over the last fifteen years has demonstrated that pollution prevention, water conservation, appropriate pricing, ecosystem service and use of "green infrastructure" approaches that protect or mimic natural systems, and improving management efficiency can provide the same benefits at a far lower cost than the traditional exclusive reliance on larger capital-intensive facilities. These non-structural approaches have also been proven to provide greater flexibility, save money, use less energy, protect and restore wildlife habitat and scenic and recreation areas, reduce flooding and flood damage, and create local jobs.

However, no strong, effective coalition of interests has yet proven able to break the status quo and redirect any significant amount of public investment toward non-structural approaches. Federal, state, and local leaders must chart a new path. To be effective, a national infrastructure investment plan must outline how traditional federal mandates and ongoing capital investments in water management will

# Case Study:

## Green Infrastructure in Portland, Oregon

Portland, Oregon is using multiple green infrastructure techniques to reduce stormwater runoff and water pollution, create a more livable urban environment, and save money on infrastructure repair and maintenance. Green Infrastructure is an approach to development that minimizes its impact on the environment by mimicking the earth's natural capabilities. Portland's Green Streets program has retrofitted streets with curb extensions, swales, and porous pavement to filtrate stormwater. The city estimates that Green Streets saves 40 percent of stormwater runoff compared with traditional stormwater infrastructure.<sup>3</sup> Portland's "ecorooft" pro-

gram requires all city-owned buildings to be retrofitted with a green roof that filters rain water and provides incentives for developers to build ecoroofs in their projects. And Portland has an \$8 million program that offers household subsidies for disconnecting downspouts from the stormwater system, which allows roof water to drain into lawns and gardens. This has saved the city \$250 million that would be used for infrastructure improvement and encourages the residents of Portland to participate in the sustainability movement.<sup>4</sup> More than one billion gallons from the combined sewer system is diverted each year, because of resident participation.



Vegetated swales absorb and filter rain water and stormwater runoff naturally.

be linked to non-structural alternatives. It should provide powerful incentives for smarter, systematic approaches that link upstream and downstream investments, and green and grey infrastructure investments that provide better cost to benefit ratios. Perhaps most critically, it should break down traditional sector responsibilities and insure cost-effective coordination between land use planning and water resource management.

The national water policy choices that will be made over the next several years will determine whether America's water resource managers, in the face of growing challenges and complexity, can produce safe drinking water for over 300 million Americans, dispose of their sewage safely, provide industry and agriculture with the water it needs, and do all of this and much more in a way that is both environmen-

tally sustainable and economically affordable. The task will be to use the successes of the past and the many promising initiatives of the present to create the integrated, multi-dimensional, goal-oriented policies the future demands.

### Draft Recommendations:

→ **Eliminate the bias** in federal funding and regulation toward centralized, engineered water systems. Provide compelling incentives through federal programs to encourage states and localities to utilize the most cost-effective and environmentally sound non-structural solutions for drinking water, sewage treatment, stormwater/flood management, and irrigation needs.

→ **Reform federal policies** that provide perverse incentives for unsustainable water resource use and investments, such as subsidies of pollution-intensive agricultural practices, promotion of vulnerable development on flood plains and in coastal zones, Army Corps of Engineer projects that destroy or disrupt natural hydrological systems that are providing crucial ecosystem services, and suburban sprawl dependent on unsustainable uses of groundwater resources.

→ **Develop and implement** the means of pricing ecosystem services so that the value of forested watersheds and wetlands and other green infrastructure can be accounted for and managed appropriately. And require full accounting of ecosystem service costs/benefits as well as full life-cycle planning for any infrastructure – grey or green – funded with federal dollars.

→ **Integrate and coordinate** the missions and programs of federal agencies such as Bureau of Reclamation, EPA, FEMA, the Army Corps of Engineers, USDA's Forest Service and Natural Resources Conservation Service, and others to ensure that they are equally supporting sustainable water system approaches. (And do the same within agencies like EPA, which has siloed drinking water, stormwater, and wastewater programs.)

→ **Substantially increase R&D** funding in non-structural and decentralized technologies to ensure that the U.S. can compete with other nations who are far ahead of us in developing and utilizing integrated water technologies.

→ **Provide tax credits** and other incentives to stimulate private sector investment and development of new green infrastructure technologies, improve economies of scale, and boost wide-scale implementation.

→ **Promote new models** of watershed management at the regional and megaregion scale that link water resource management to land use decisions. Condition federal and state funds on this linkage, and provide other "carrots and sticks," to give integrated planning real impact.

# Energy & Climate

## Transformative Investments in Efficiency and Technology

America's response to the dual challenge of meeting its growing energy needs and responding to the threat of global climate change will define its ability to compete globally in the 21st century. Generating and delivering electricity to meet the demand of America's increasingly hi-tech society is a critical component of our national infrastructure strategy. Without the capabilities to provide an adequate supply of energy to meet demand, our economy will stagnate or contract as businesses move to where their energy intensive needs can be met. And yet, with the nation's energy demand growing at a faster rate than its population, attention to managing demand by promoting greater efficiency in new and existing buildings, industry, and transportation must be at the core of national energy policy. To meet this challenge, America must holistically examine our existing electrical power generation, transmission and distribution infrastructure, much

of which still relies on antiquated 20th century technology. We must identify areas for investment, assign priorities, and clearly define the roles and responsibilities of both the private and public sectors.

As the world's largest economy, the United States also has the responsibility to provide global leadership in reducing greenhouse gases through the adoption of renewable sources of generation. The nation currently emits approximately 24 tons of greenhouse gases per capita compared to China's three tons per capita. With China looking to emulate America's

post-WWII growth patterns and automobile culture as it embarks on a period of unprecedented economic and population expansion, the need for America to show leadership in climate change responsibility is clear. China, as the United States, also relies heavily on coal-fired power plants for electricity generation, a major source of greenhouse gas emissions. Domestically, electricity production is responsible for 40 percent of U.S. carbon emissions – a direct result of our heavy reliance on coal as a fuel source. The share of U.S. electricity generation from coal fired power plants is projected

The nation currently emits approximately 24 tons of greenhouse gases per capita compared to China's three tons per capita.

*Installation of renewable energy technologies, such as solar panels, can be a new source of jobs for American workers. Below: Solar panel installation in Sarasota, Florida.*



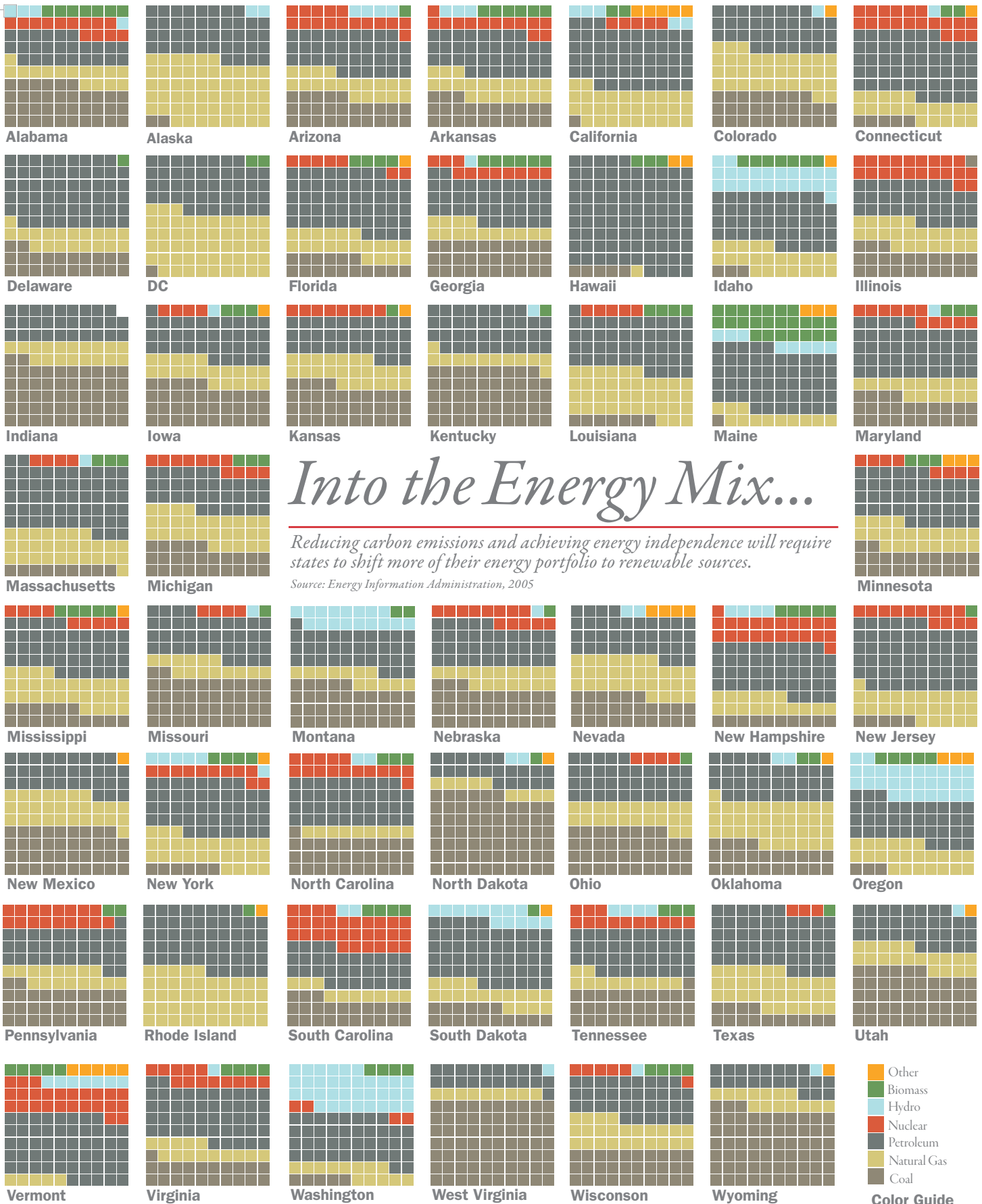
to grow from 50 to 57 percent by 2030.

Over the next decade, energy efficiency offers the most immediate large-scale payback from investments. Retrofitting commercial, industrial and government buildings and home weatherization will stop waste and cut demand. These programs require a clear commitment by the federal government to act on its own properties and practices, as well as tools and incentives for homeowners, businesses and state and local governments.

Renewable energies, such as wind and solar, are seen as the wave of the future but will require sustained government investment to gain a foothold in the marketplace. After failing to extend tax credits for wind and solar in the 2007 energy bill, Congress extended the renewable energy investment tax credit for eight years in the Emergency Economic Stabilization Act of 2008 at the same time that renewable energy businesses faced new challenges: frozen credit markets and falling natural gas and oil prices. The fluctuation of fossil fuel prices will create an uncertain market for investment in renewables for the foreseeable future. This equation could change, however, if Congress puts a price on carbon.

Some of the challenges associated with bringing wind and solar online involve building up transmission lines to get power from the remote windy or sunny areas to urban areas where it's used. Currently, with electric generation growing at a rate four times faster

1%



# Into the Energy Mix...

*Reducing carbon emissions and achieving energy independence will require states to shift more of their energy portfolio to renewable sources.*

*Source: Energy Information Administration, 2005*





*To maximize the potential of wind energy, America needs to invest in strengthening the transmission capacity of the grid. Above: wind turbines in Wyoming.*

than transmission capacity, the existing grid is failing to meet the challenge of transmitting energy generated from new wind turbines, particularly over long distances.

Finally, there are a number of technologies which, if implemented, will have the potential to mitigate some of the environmental impacts of the legacy power plants. Advancements in “clean coal” and carbon capture and sequester (CSS) technologies could substantially reduce the damaging emissions from these plants, and create new technologies marketable to China and other developing countries. Investments in renewable energy sources like solar, wind, and geo-thermal, as well as a greater role for nuclear and natural gas power generation, could also be a part of a comprehensive package of improvements contributing to the reduction of our national carbon footprint.

The 2007 energy bill has begun to address these concerns by advancing research on the “Smart Grid.” This next generation grid would integrate broadband telecommunications technologies and sensing devices that would be installed in our homes and appliances, permitting bi-directional communication between the customer and energy supplier. These technologies would allow for real-time monitoring and pricing, and provide for automatic load adjustment on the supplier and consumer ends, which would increase throughput, conserve energy and prevent blackouts.

The Smart Grid would significantly improve the transmission system’s ability to respond to and recover from an unforeseen crisis through its ability to “self heal,” preventing a

reoccurrence of large scale outages like the one experienced in the Northeast in summer 2003. Perhaps the greatest advancement of this new grid is that it will be designed to both distribute and store energy. Everyone would be able to draw or purchase power from the grid and feed or sell any surplus back to it. This surplus power could then be allocated to meet other demands. This model improves the economics of cogeneration - the simultaneous production of heat and electricity - and promotes the use of renewable energy. This innovative program was federally funded at \$100 million dollars each year from 2008 to 2012 – a dollar amount that could be greatly expanded with public and private investments.

Private sector corporations play a dominant role in the U.S. energy sector; they provide 75 percent of net power generation and own almost 80 percent of transmission lines. The remaining generation and transmission is provided by government power marketing authorities such as the Tennessee Valley Authority (TVA) and other cooperatives. Because the private sector is positioned as the principal provider and owner of our nation’s energy infrastructure, market forces tend to dictate whether infrastructure investments are promoted. To get around this issue, the government could further incentivize industry investments in renewable energy sources and in improvements like the Smart Grid.

We must today start the process of creating a national framework that ensures the stability of our future energy supply, the adequate generation of electrical power to meet demand,

a robust infrastructure to deliver electricity, and the capacity to lead in fighting global climate change. By actively engaging both private and public sectors, we can systematically and comprehensively plan for the long-term health and efficiency of these critical systems.

### **Draft Recommendations:**

- **Issue a presidential executive order** that would require a climate action plan from every federal agency and encourage similar plans at local levels of government. Set a carbon performance standard for every federally financed activity, whether at the federal, state or local level.
- **Send stable market signals** by putting a price on carbon – whether by a cap-and-trade program or a carbon tax.
- **Fast-track and expand** the federal government’s research program in the Smart Grid and new technologies for long distance electrical transmission.
- **Invest in research and development** of clean coal technologies that have private sector backing and participation.

# Transportation

## Purpose, Accountability and Vision

The centerpiece of the America 2050 vision for infrastructure is a new, national transportation program that sets out a framework for federal investment while promoting increased flexibility and demanding greater accountability of states and local governments to meet federal objectives. This transportation program must effectively respond to national and global trends such as rising goods movement, changing demographics, and global climate change. It should prioritize investments in locations that are best equipped to provide capacity for low-carbon population and economic growth – the nation’s metropolitan areas and megaregions. Importantly, the nation’s transportation policy must be driven by a strongly stated purpose and clear objectives that determine how funding is spent. States and local governments should be held accountable to performance measures that underpin federal objectives. A set of objectives for the nation’s transportation policy are proposed below.

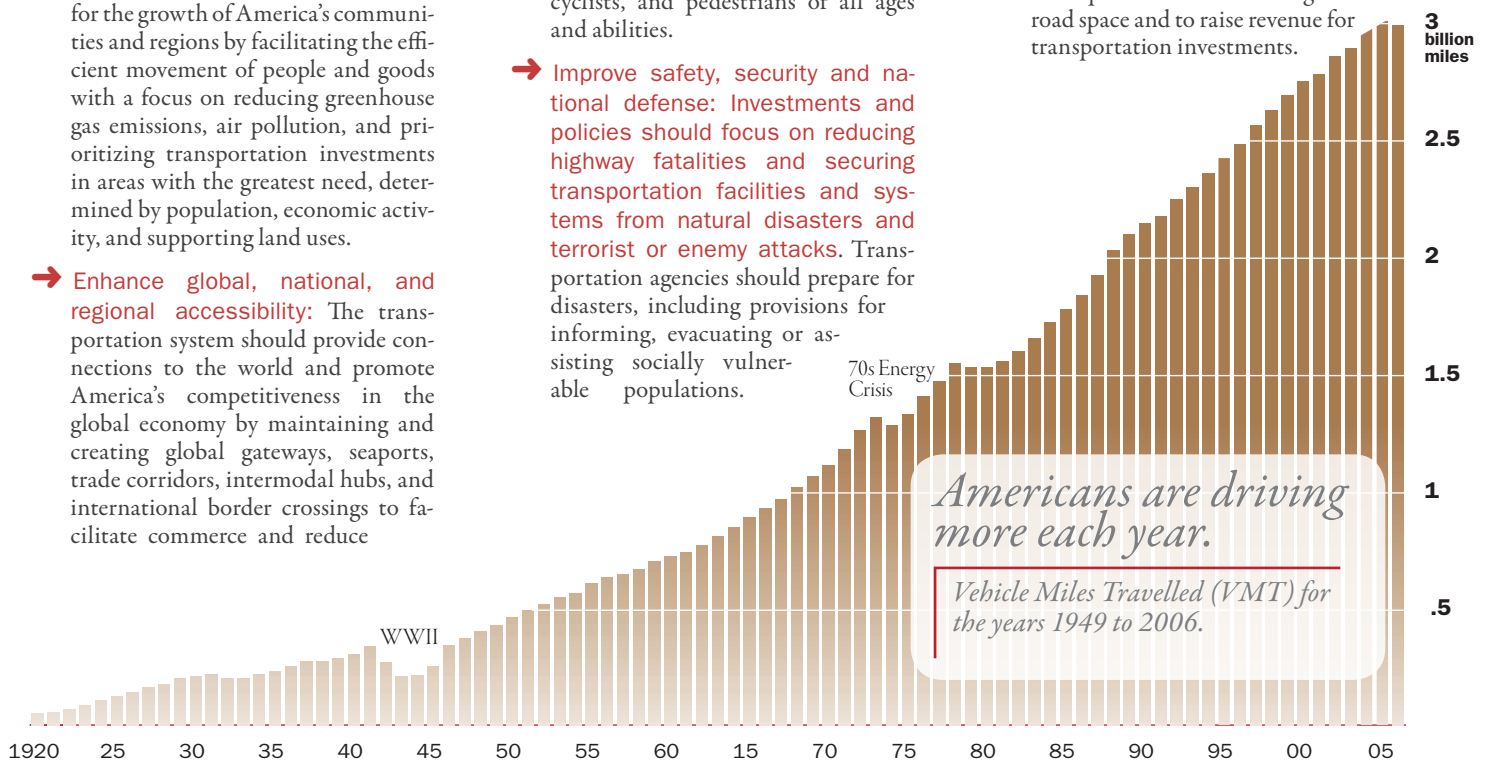
- **Create capacity for long-term, sustainable growth:** America’s transportation system should provide capacity for the growth of America’s communities and regions by facilitating the efficient movement of people and goods with a focus on reducing greenhouse gas emissions, air pollution, and prioritizing transportation investments in areas with the greatest need, determined by population, economic activity, and supporting land uses.
- **Enhance global, national, and regional accessibility:** The transportation system should provide connections to the world and promote America’s competitiveness in the global economy by maintaining and creating global gateways, seaports, trade corridors, intermodal hubs, and international border crossings to facilitate commerce and reduce

the cost to business of congestion and delay. The transportation system should provide choice for intercity travel, such as intercity rail, and invest in metropolitan mobility systems to support the economic growth of the nation.

- **Provide transportation choice, integration of transportation modes, and “complete streets”:** The existing focus on automobile travel has created a transportation network that has become a barrier to people who would choose to travel via bus, rail, foot, or bicycle. These modes expand capacity on crowded roads, put less strain on the infrastructure itself, emit fewer pollutants and greenhouse gases, and are essential to more compact, efficient land use patterns. The federal government can support this by recognizing the importance of planning transportation investments with all users in mind – future road investments should focus on creating complete streets that are complete transportation corridors for drivers, freight, transit vehicles and users, bicyclists, and pedestrians of all ages and abilities.
- **Improve safety, security and national defense:** Investments and policies should focus on reducing highway fatalities and securing transportation facilities and systems from natural disasters and terrorist or enemy attacks. Transportation agencies should prepare for disasters, including provisions for informing, evacuating or assisting socially vulnerable populations.

Reducing the nation’s dependence on foreign oil will increase national security by reducing dependence on unstable oil-producing nations.

- **Reduce our dependence on foreign oil and respond to global climate change:** The transportation sector should reduce its dependence on foreign oil and reduce greenhouse gases by promoting greater efficiency in vehicles, use of alternative fuels, and reducing VMT. Transportation projects should be coordinated with land use to shift more trips to walking, biking, and public transit. Transportation investments should not encourage the development of flood-prone and other environmentally vulnerable areas.
- **Achieve greater system performance and reliability:** The existing system of roads, rails, and connecting modes should be better managed with communications and information technology to achieve greater reliability, flexibility, resiliency, and better connections between modes. Road pricing can be used in congested metropolitan areas to manage valued road space and to raise revenue for transportation investments.



→ **Serve the elderly, people with disabilities, and disadvantaged populations:** The transportation system should place special emphasis on serving elderly populations, people with disabilities and low-income people in urban and rural communities. Transportation investments and methods of collecting revenue should not place undue burdens on disadvantaged communities. Public transportation investments should be designed to provide broad accessibility.

## Restoring Purpose to the Federal Role in Transportation

The nation's last surface transportation bill, SAFETEA-LU of 2005, failed to meet most of these objectives because legislative debate consisted primarily of squabbles over each state's portion of the federal funding pie.<sup>5</sup> As a result of Congress's failure to adopt a strategic national response to transportation needs, we are suffering from inadequate global and national connectivity due to underinvestment, modal silos and fragmentation, and insufficient resources and decision-making authority at the metropolitan level to deal with the pressing needs of congestion and growth in our regional economies.

In response, calls for real reform of transportation policy are growing. The need for a "new beginning" was clearly stated in *Transportation for Tomorrow*, the final report of the National Surface Transportation Policy and Revenue Study Commission, which recommended against "re-authorizing" the current transportation bill in favor of crafting transportation policy anew. Its characterization of the nation's transportation program since completing the Interstate system as "pursuing no discernable national interests other than the political imperative of 'donor states' rights and congressional earmarking" makes clear the failure of today's policies to achieve national goals. In fact, the Commission charged that today's transportation policies work against national goals, by perpetuating oil dependency, raising greenhouse gas emissions, and undermining economic competitiveness, national security, public health and safety.

Despite the clarity of the Commission's criticism, engaging Americans and politicians in a debate about the minutia of transportation policy reform is a challenge. The media frenzy inspired by \$4 a gallon gasoline has done little to promote a substantive debate about how federal transportation funding is spent. Instead, it generated short-term proposals for a gas tax "holiday," which would do nothing to address the fundamental problem that most Americans have no other choice but to drive to their destinations. In response to



*New York City has moved aggressively in 2008 to increase space for pedestrians and bicyclists on city streets while investing in and expanding public transportation.*  
Above: a newly transformed section of Broadway in Times Square.

rising congestion and high gas prices, our national transportation policy is engineered to promote a single solution above others - building more roads - which does little to address either problem.

In keeping with calls for a "new beginning" and a "vision" to guide transportation investment, we propose a new national system, dubbed the "Trans-American Network," which includes three new initiatives, all driven by a stronger role for the federal government to meet a narrower set of clearly defined goals for transportation.

**Competitive Corridors and Gateways:** The centerpiece of the federal program is a new, highly-visible national investment program to build added capacity in seaports, airports, rail (both passenger and freight), and highway freight corridors. A research-driven multi-modal national study could determine pressing national needs to facilitate global trade, intercity passenger movement, and metropolitan and megaregion accessibility. The study would result in a map of national investments, as specific as the Interstate Highway System when it was first proposed. Federal block grants or financing packages issued by a national infrastructure bank could help finance the components of the system, administered to suitable alliances of state transportation departments, high-speed rail authorities, metropolitan transit agencies, and public private partnerships.

**Asset Protection and Performance:** The current federal transportation program would be reoriented toward the goal of maintaining current highway and public transportation assets drawing on the transportation trust fund, with greater restrictions on federal funding to be used toward maintaining existing roads, bridges and transit systems. Federal incentives would be offered for states and regions to experiment with programs that enhance system performance, such as congestion pricing, greater use of ITS, and innovations that in-

crease ridership, safety, and communications technology on transit systems. Existing programs that mitigate air pollution from congestion, such as the CMAQ, would be preserved under this initiative, but the attributable funding for each metropolitan region should be sub-allocated directed to regional authorities.

**Metropolitan Mobility:** This initiative would target new capacity needs in metropolitan regions, tying federal funding more directly to meeting national objectives, but with greater flexibility about how those objectives are met. This would mark a shift away from modal-specific funding categories at the national level and toward mode-neutral project selection based on meeting national objectives. The British government has recently adopted such an approach, spurred by the influential Eddington report, which demonstrated the connection between transportation and the national economy. New projects in the United Kingdom are now evaluated on their ability to meet national economic objectives and other criteria, including cost benefit analysis.

## Paying for the System

A difficult reality of our federal system is the competition for federal transportation dollars between states. The proposed Trans-American Network provides an opportunity to move away from the "donor-donee" squabbling that characterized the last transportation bill by strengthening the purpose for which transportation dollars are intended with a specific set of national-purpose projects, maintenance and performance objectives, and clear criteria for new capacity targeted in metropolitan areas. For states that wish to expand capacity in areas that exceed federal goals, it is incumbent on states to raise their own revenues to fund these projects.

# Cleaning up America's Ports

The rapid projected growth in goods movement and foreign trade poses serious threats to air quality and reducing greenhouse gases. Container ships in the nation's ports use some of the dirtiest diesel fuels available, while trucks that work the short routes between the docks and distribution centers are often those retired by major shipping companies because of their age. Recognizing the importance of foreign trade to the nation's economy, the freight industry must act in partnership with local and state governments to quickly and dramatically reduce air pollution from their growing activities, lest they present undue burdens on local communities and contribute to global warming.

The Ports of Long Beach and Los Angeles, together the largest container ports in the nation, are leading the way to reduce small particulate matter from diesel fuel and their carbon emissions. In response to local and state pressure, the Ports of Long Beach and Los Angeles will soon place a ban on older trucks and are investing in berths to "cold iron" ships, to supply power from the land-side grid. The electrification of the docks is very expensive – about \$15 million for each dock – and will place greater demands on the power grid of Los Angeles. But without these measures, the ports face limits on their growth. As quoted in a recent *New York Times* article, Bob Foster, Mayor of Long Beach remarked, "We're not going to have kids in Long Beach contract asthma so someone in Kansas can get a cheaper television set."<sup>6</sup>

These proactive measures by the Ports are likely to become more commonplace as rising goods movement poses greater environmental burdens to society. In addition to regulating emissions from trucks and vessels, regional solutions to reducing congestion and goods movement bottlenecks must also be explored, such as separated freight right-of-ways, funding for "last mile" bottlenecks, better intermodal connections, and greater use of rail.



Top to Bottom: Ports of Seattle, Miami and Long Beach



This report begins with an overview of the enormous challenges facing the United States and its major infrastructure systems. It is written in the midst of the greatest economic crisis since the Great Depression and at a time when public confidence in the nation's current direction is at an all time low. Concurrently, America faces the urgent and related needs to reduce the nation's dependence on expensive, imported carbon fuels and to reduce our production of carbon in order to meet global climate goals.

How can we plan and build infrastructure systems that will simultaneously reignite America's competitiveness and meet its urgent energy and climate needs? At the heart of the challenge is the reality that there is currently no compelling, broadly supported vision for the nation's future and for the infrastructure investments needed to shape that future. There is a crisis of leadership on these issues in both the public and private sectors and little public confidence in that leadership. Funding is also not currently available to meet the nation's current or projected infrastructure needs at a time when existing trust funds are insolvent or

declining. And finally, the process for planning and designing major projects is broken, adding years to construction schedules and billions of dollars to construction costs and precluding innovation or cost savings. All of this further erodes public confidence in our ability to finance and build the infrastructure that the nation urgently needs.

America 2050 was initiated to address these concerns. Over the coming months and years the participants in the America 2050 process – a diverse group of civic, business, and government leaders from across the country and representing every sector of our society and economy – will flesh out a bold vision for the nation's future and the infrastructure needed to underpin that future, with these building blocks:

A Strategic Investment Framework (SIF) will outline the critical components of national transportation, water, energy and communications systems, creating a 21st century parallel to the proposals for the Interstate Highway system that provided a catalyst for development of America's 20th century infrastructure systems.

Outcome-based performance measures will be developed against which every proj-

ect in the SIF will be evaluated, to screen out projects that aren't consistent with national and regional needs or the "triple bottom line" outcomes called for in this report.

Megaregion-scale investment proposals will be proposed through a "bottom-up" process that will further detail the component parts of the SIF. These proposals will also be measured against the performance measures outlined above.

Funding proposals will be developed that can help break the current deadlock in Washington, and through which every American will be called upon to invest in the nation's future.

Process reforms will be outlined to reform planning, regulatory, procurement and other processes, while protecting environmental and community concerns. These reforms will be required if we are to take years and tens of billions of dollars of waste out of the process of building the infrastructure America urgently needs.

An immediate priority for America 2050 and its partners will be to shape the surface transportation bill soon before the Congress around the vision and principles outlined in this report. We will also work in the coming months and years to incorporate these same principles into other key federal and state legislation and investment strategies dealing with water, energy, telecommunications, climate and land use concerns.

# Next Steps

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## Endnotes:

- 1 According to the U.S. Congressional Budget Office, since the mid-1980s, U.S. public spending on infrastructure as a share of GDP ranges from 2.3 to 2.5 percent. India and China figures are cited in Reuters India (2008) and Singer (2007).
- 2 Saskia Sassen, 2007.
- 3 Center for Neighborhood Technology. "Green Infrastructure Performance Results of Monitoring Best Management Practices." [Accessed at <http://www.cnt.org/repository/BMP-Performance.pdf>.]
- 4 Alexandra D. Dunn, and Nancy Stoner. "Green Light for Green Infrastructure." Environmental Law Institute (2007). [Accessed at [http://www.msdcg.org/downloads/wetweather/greenreport/Files/Green\\_Report\\_Exhibit\\_C.pdf](http://www.msdcg.org/downloads/wetweather/greenreport/Files/Green_Report_Exhibit_C.pdf).]
- 5 See Costas Panagopoulos and Joshua Schank, (2008), All Roads Lead to Congress: the \$300 Billion Fight over Highway Funding, Washington: CQ Press, for a detailed discussion of the passage of SAFTEA-LU.
- 6 Matthew Wald, (2007), Southern California Ports Move to Curb Emissions from Shipping Industry. *The New York Times*. December 3.

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## References

- Allbee, Steve. (2005). "America's Pathway to Sustainable Water and Wastewater Systems", *Water Asset Management International*, March 2005, Issue 1 Volume 1
- Allbee, Steve. (2005). "Finding a Pathway for Sustainable Water and Wastewater", *Underground Infrastructure Management* November/December 2005
- Allen, Michael R. "The Harnessed Channel: How the River Des Peres Became a Sewer." *Common Ground*. Spring 2003. [Accessed August 2008 at <http://www.eco-absence.org/text/desperes.htm>]
- American Association of State Highway and Transportation Officials (AASHTO). (2007). *Transportation Invest in Our Future: A New Vision for the 21st Century*. Washington, D.C.
- American Road and Transportation Builders Association (ARTBA) (2007). *A New Vision and Mission for America's Federal Surface Transportation Program: ARTBA Recommendations for SAFETEA-LU Reauthorization*. Executive Summary. Accessed December 2007 at [http://www.artba.org/pdf/SAFETEA-LU\\_Recommendations\\_Exec\\_1107.pdf](http://www.artba.org/pdf/SAFETEA-LU_Recommendations_Exec_1107.pdf).
- American Society of Civil Engineers (2005). Report Card for America's Infrastructure. <http://www.asce.org/reportcard/2005/page.cfm?id=203>
- Appleton, Albert. (2007) "Non Structural Alternatives to Capital Needs" Remarks at Water Environment Federal Annual Conference, 2005, Washington D.C.
- Benedict, Mark A. and Edward T. McMahon. (2006). *Green Infrastructure: Linking Landscapes and Communities*. The Conservation Fund. Island Press. Washington DC.
- Congressional Budget Office. (2007). "Trends in Public Spending on Transportation and Water Infrastructure, 1956 to 2004." August 2007. <http://www.cbo.gov/ftpdocs/85xx/doc8517/08-08-Infrastructure.pdf>
- Downey, Mortimer L. III. (2007). "Legislative Considerations for Long Term Policy Change." *The National Roundtable on Surface Transportation: Discussion Papers and Summary*. New York: Regional Plan Association and the Lincoln Institute of Land Policy.
- Eddington, Sir Rod. (2006) *The Eddington Transport Study: The Case for action: Sir Rod Eddington's advice to Government*. London: HM Treasury. Accessed December 2007 at: <http://www.dft.gov.uk/162259/187604/206711/executivesummary>
- Fishman, Robert. (2007). "1808-1908-2008: National Planning for America." (*America 2050: Framing Papers for the Rockefeller Foundation Global Urban Summit*. New York: Regional Plan Association.)
- Friedman, Thomas L. (2008) "Dumb as We Wanna Be," *The New York Times*. April 30, 2008.
- Howes, Jonathan. (2007). Taking Environmental Protection to the Next Level: An Assessment of the U.S. Environmental Services Delivery System, A Report by a Panel of the National Academy of Public Administration for the United States Environmental Protection Agency, April 2007
- Intergovernmental Panel on Climate Change. (2007). *Climate Change 2007: AR4 Synthesis Report*. November 17, 2007. [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf)
- Kavinoky, Janet. (2007). Statement of the U.S. Chamber of Commerce on Surface Transportation Needs and Funding to the U.S. House of Representatives Committee on Budget. October 25, 2007.
- Mahone, Amber. (2007). Policy Options for Climate Change Mitigation, Adaption and Energy Security in the United States. (*America 2050: Framing Papers for the Rockefeller Foundation Global Urban Summit*. New York: Regional Plan Association.)
- Mathers, Jason. (2005). Cap-and-Trade Systems. *Catalyst*. Vol. 4(1).
- Milwaukee Journal Sentinel* (2008) "Watershed Trust can be a Force for Regional Unity", Editorial, May 3, 2008.
- National Surface Transportation Policy and Revenue Study Commission (2007). *Transportation for Tomorrow*. <http://www.transportationfortomorrow.org/>
- O'Keefe, Sean et al. (2007). Prioritizing America's Water Resources Investments: Budget Reform for Civil Works Construction Projects at the U.S. Army Corps of Engineers, A Report by a Panel of the National Academy of Public Administration for the U. S. Congress and the U.S. Army Corps of Engineers, February 2007
- Otto, Betsy. (2008). "Floods and Drought, Building Community Resilience in the face of Climate Change", Mayors Water Council Newsletter, US Council of Mayors, Winter 2008.
- Puentes, Robert. (2008). Beginning Again: A Metropolitan Transportation Vision for the 21st Century. Statement before Committee on Transportation and Infrastructure, U.S. House of Representatives. April 9, 2008.
- Puentes, Robert. (2008) *A Bridge to Somewhere: Rethinking American Transportation for the 21st Century*. Washington, D.C.: The Brookings Institution.
- Reuters, India. (2007). "India Needs more Infrastructure Spending – fin min." Sept. 2, 2007. <http://in.reuters.com/article/businessNews/idINIndia-29371020070906>
- Sassen, Saskia. (2007) "Megaregions: Benefits beyond Sharing Trains and Parking Lots?" *The Economic Geography of Megaregions*. The Policy Research Institute for the Region, Woodrow Wilson School of Public and International Affairs, Princeton University February 9, 2007. <http://www.princeton.edu/prior/publicatons/docs/megaregions.pdf>
- Singer, Sean R. (2007). "Beijing's Thirty-year Boom." *The National Interest Online*. July 12, 2007. <http://www.nationalinterest.org/Article.aspx?id=14942>
- United States Congress. (2007). *Energy Independence and Security Act of 2007*. Retrieved April 28, 2008 from Library of Congress legislative website: <http://www.thomas.gov/cgi-bin/query/z?c110:H.R.6.ENR>:
- United States Department of Energy Office of Electricity Delivery & Energy Reliability. (2008). *Electricity 101*. Retrieved April 22, 2008 from website: [http://www.oe.energy.gov/information\\_center/faq.htm#ppl1](http://www.oe.energy.gov/information_center/faq.htm#ppl1)
- United States Department of Energy Office of Electric Transmission and Distribution. (2004). *National Electric Delivery Technologies Roadmap: Transforming the Grid to Revolutionize Electric Power in North America*. Washington D.C.
- United States Environmental Protection Agency. (2002). *The Clean Water and Drinking Water Infrastructure Gap Analysis*, US EPA Office of Water (4606M), September 2002 EPA-816-R-02-020 [www.epa.gov/safewater](http://www.epa.gov/safewater)
- Wald, Matthew. (2008). "The Energy Challenge: Wind Energy Bumps Into Power Grid's Limits" *The New York Times*. August 27, 2008
- Weinschel, Kristy. (2008). State: Regulators Predict Smart Grid R&D Funding for BPL. *UPLC PowerLine*. Vol. 6(1). Retrieved May 1, 2008 from website: <http://www.uplc.org/news/2008/01/16/uplc-powerline-1-16-08>
- Zheng, Alex. (2007). *Smart Grid Newsletter: Grid Automation*. Retrieved April 24, 2008 from website: [http://www.smartgridnews.com/artman/publish/Grid\\_Automation/Next-Generation\\_Grid\\_Visualization\\_251.html](http://www.smartgridnews.com/artman/publish/Grid_Automation/Next-Generation_Grid_Visualization_251.html)



### About America 2050

America 2050 is a national initiative to develop a framework for America’s future growth and development in face of rapid population growth, demographic change and infrastructure needs in the 21st century. A major focus of America 2050 is the emergence of megaregions – large networks of metropolitan areas, where most of the projected population growth by mid-century will take

place – and how to organize governance, infrastructure investments and land use planning at this new urban scale. America 2050 is an initiative of the Regional Plan Association ([www.rpa.org](http://www.rpa.org)), the nation’s oldest independent metropolitan planning group, and the Lincoln Institute of Land Policy ([www.lincolninst.edu](http://www.lincolninst.edu)), a leading international research organization.

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We extend our gratitude to the following supporters of this initiative.

