Blueprint for American Prosperity

Unleashing the Potential of a Metropolitan Nation

A Bridge *to Somewhere*

RETHINKING AMERICAN TRANSPORTATION FOR THE 21ST CENTURY

Metropolitan Policy Program
at BROOKINGS

About the Metropolitan Policy Program at Brookings

Created in 1996, the Metropolitan Policy Program provides decisionmakers with cutting-edge research and policy ideas for improving the health and prosperity of metropolitan areas including their component cities, suburbs, and rural areas. To learn more visit **www.brookings.edu/metro**

The Blueprint for American Prosperity

The Blueprint for American Prosperity is a multi-year initiative to promote an economic agenda for the nation that builds on the assets and centrality of America's metropolitan areas. Grounded in empirical research and analysis, the *Blueprint* offers an integrated policy agenda and specific federal reforms designed to give metropolitan areas the tools they need to generate economically productive growth, to build a strong and diverse middle class, and to grow in environmentally sustainable ways. Learn more at **www.blueprintprosperity.org**

The Metropolitan Policy Program Leadership Council

The *Blueprint* initiative is supported and informed by a network of leaders who strive every day to create the kind of healthy and vibrant communities that form the foundation of the U.S. economy. The Metropolitan Policy Program Leadership Council—a bipartisan network of individual, corporate, and philanthropic investors—comes from a broad array of metropolitan areas around the nation. Council members provide us financial support but, more importantly, are true intellectual and strategic partners in the *Blueprint*. While many of these leaders act globally, they retain a commitment to the vitality of their local and regional communities, a rare blend that makes their engagement even more valuable. To learn more about the members of our Leadership Council, please visit **www.blueprintprosperity.org**

Blueprint for American Prosperity
Unleashing the Potential of a Metropolitan Nation

A Bridge *to Somewhere*

RETHINKING AMERICAN TRANSPORTATION FOR THE 21ST CENTURY

THE BROOKINGS INSTITUTION | METROPOLITAN POLICY PROGRAM © 2008

CONTENTS

In an era of declining revenues, of continued transportation problems, and a fiercely competitive global economic environment, American transportation policy should be about more than just dividing the spoils.

EXECUTIVE SUMMARY

In the past, strategic investments in our nation's transportation infrastructure—the railroads in the 19th century, the interstates in the 20th—turbocharged growth and transformed the country. But more recently, America's transportation infrastructure has not kept pace with the growth and evolution of its economy. At the precise time when the nation desperately needs to prioritize its limited investments and resources, the federal transportation program has lost focus.

The time is long past due for a national transportation vision that recognizes America's economic challenges and opportunities and where those challenges and opportunities are located. Specifically, the top 100 metropolitan areas together take up only 12 percent of the land in the United States, but account for 65 percent of our population, 68 percent of jobs and 75 percent of the nation's economic output. This is in part due to their high concentrations of the nation's key economic assets, such as infrastructure. Here, these largest metro areas handle 72 percent of the nation's seaport tonnage, 92 percent of air passengers, and 93 percent of rail travelers. In short, metro areas are the economic engines of the U.S., drawn by the clustering of people, the movement of goods, and the agglomeration of economic activity.

If talented people, quality jobs, innovative firms, advanced universities, planes, trains, and automobiles make the world go round—then metropolitan areas are the axis. They need a strong, deliberate and strategic federal partner (working closely with states and the private sector) to do what is necessary to keep America competitive and sustainable.

In other words, our nation needs a new federal transportation program that keeps pace with today's economic, social, and environmental landscape and helps the U.S. prosper. Yet, the nation's transportation program falls short of this vision.

This report provides a framework for understanding the myriad policy problems that undergird the federal transportation program today and how those structural issues hamper the ways federal, state, and local leaders work together to meet our nation's most critical transportation

challenges. ***A Bridge to Somewhere: Rethinking American Transportation for the 21st Century*** then offers the kinds of reforms needed to unleash the economic potential of metropolitan areas and, by extension, the rest of the nation.

AMERICA'S CHALLENGE

Fortunately, interest in improving national transportation policy could not come at a better time. The massive demographic, economic, and social changes underway today present the nation with a complex and, at times, conflicting set of transportation challenges that continue to plague the largest metropolitan areas.

- **A collective "infrastructure epiphany" has arisen about the need to reinvest in America's aging and outdated transportation network.** Only one-third of roads in urban areas are in good condition, transit systems are aging, and tens of thousands of bridges are structurally deficient.
- **The movement of people within and between metropolitan areas has become challenging due to ever-present traffic congestion and unconnected modes.** About half of Americans do not have access to a range of travel options to avoid these delays.
- **The interstate and intermodal movement of goods is projected to get more difficult.** Due to the changing nature of the American economy, congestion in and around the nation's metropolitan ports and other freight corridors is consistently worse than the overall transportation network.
- **There is growing concern about a "perfect storm" of environmental and energy sustainability, and the role transportation plays.** The continued growth in driving is projected to cancel out both the benefits from vehicle efficiency and fuel alternatives. At the same time, the U.S. is still overly dependent upon petroleum-based fuel imported from unstable nations.
- **Finally, a large portion of the American workforce is concerned about the size of household spending on transportation-related items—such as gasoline.** Transportation is now the second largest expense for most American households, consuming on average 20 cents out of every dollar. Only shelter eats up a larger chunk of expenditures, with food a distant third.

The massive demographic, economic, and social changes underway today present the nation with a complex and, at times, conflicting set of transportation challenges.

THE LIMITATIONS OF EXISTING FEDERAL POLICY

The conversations about these critical challenges are taking place in a fiscally-constrained environment that should be the motivating factor and opportunity for real reform. The question of how to pay for transportation—both in the short and long term—is vexing policy makers nationwide. So prevalent is this concern, in fact, it spawned two national commissions, several congressional hearings, and a sustained drumbeat for more funding.

The problem is that while there is a pervasive desire to invest, a growing mountain of evidence and analysis shows that the real challenges facing the network are far more fundamental. In short, the current slate of federal policies—and the lack of clear policy in specific areas—appear to exacerbate the ability for federal, state, and local leaders, with their private sector partners, to meet our competitive and environmental challenges.

Without a vision, goals, purpose, or means for targeting, the U.S. approach to transportation has been to keep throwing money at the problem.

First, for the vast majority of the program the federal government is absent when it should be present. The federal transportation system lacks any overarching vision, goals, or guidance. It is no wonder, then, that the U.S. Government Accountability Office recently referred to transportation as a "cash transfer, general purpose grant program."

Second, as a program with its roots in the 1950's the federal surface transportation program is woefully outdated. Federal transportation policy has only haltingly recognized metropolitan areas' centrality to transportation outcomes, and continues to favor roads over transit and other non-motorized alternatives to traditional highway building.

The third major policy problem is that the lack of a 21st century approach to government means the program is underperforming and failing to maximize efficiencies. Formal benefit/cost analyses are not used and regular evaluations of outcomes are typically not conducted. The tools that are employed today for tracking federal transportation spending and performance data are archaic and out of step with today's needs.

Without a vision, goals, purpose, or means for targeting, the U.S. approach to transportation has been to keep throwing money at the problem. Little attention is being given to managing the demand for revenues, how existing funds are spent and for what purpose, or how these spending decisions affect metropolitan areas.

Taken together, the absent federal leadership in certain areas means that the broad issues that transcend state and metropolitan areas go unaddressed; outdated policies pursued under federal law work against many states and

metropolitan areas' efforts to maintain modern and integrated transportation networks; and underperforming grantees means the transportation program has little ability to strongly shape economic competitiveness, environmental quality, and the nation's quality of life.

A NEW FEDERAL APPROACH

If our transportation policy is going to achieve critical national objectives in an era of fiscal constraints it is going to need to focus and prioritize.

Yet the national goal should not be a transportation goal, nor should it be to deliver transportation projects faster. Transportation is a means to an end, not the end itself. The nation should settle for nothing less than evidence-based, values-driven decisionmaking. This means the development of a three-pronged strategy for our national transportation program:

1. The federal government must LEAD in those areas where there are clear demands for national uniformity or else to match the scale or geographic reach of certain problems. There are several core steps that the federal government can take here:

- ***The U.S. needs to define, design, and embrace a new, unified, competitive vision for transportation policy—its purpose, its mission, its overarching rationale.*** The focus should be on investing in infrastructure that supports the competitiveness and environmental sustainability of the nation, rather than on funding individual states or singular needs.
- ***Congress should authorize a permanent, independent commission—the Strategic Transportation Investments Commission (STIC)—to prioritize federal investments.***

The Strategic Transportation Investments Commission would develop a national priority map that would become the basis of a multi-year federally driven program prioritized on a cost-benefit basis taking into account multimodal interactions.

The identification of these important federal investments should be based on the overarching vision and goals set above.

The charge of this commission is more limited than that proposed by the National Surface Transportation Policy and Revenue Study Commission in 2008. Instead of focusing on all specific investments and projects that use federal money, the STIC would focus on three specific program areas of national importance: the preservation and maintenance of the interstate highway system, the development of a true national intermodal freight agenda, and a comprehensive national plan for inter-metro area passenger travel.

In this regard, the STIC should evaluate proposals for expansion of the interstates competitively and federal funds should be directed to projects where there is a clear demonstration that they will return value for money, the same it currently is for transit projects. To ensure the efficient inter-metropolitan movement of people and goods, the STIC must identify gateways and corridors of national significance. Prime candidates are the congested ports in the largest metropolitan areas and those corridors that connect large places less than 500 miles apart.

These investments would be subject to benefit/cost analysis and outcome measures that go beyond traditional metrics like number of passengers or cost effectiveness and consider energy and environment, access and social benefits, land use and others.

2. The federal government should EMPOWER states and metropolitan areas to grow in competitive, inclusive, and sustainable ways. With the federal government focused on areas of national concern, there are other aspects of transportation policy where metropolitan areas should lead.

This means moving to a tripartite division of labor: (a) the STIC recommending major national transportation expansions and investments; (b) the states retaining the primary role on most decisionmaking and in small and medium sized metropolitan areas; (c) the major metropolitan areas are given more direct funding and project selection authority through a new Metropolitan Empowerment Program (METRO). The availability of these METRO funds not only provides financing for vital local projects but also encourages local officials to get involved in the transportation decisionmaking for their region.

But the realignment of responsibilities also means the federal government needs to go beyond funding and give metro areas the critical tools and flexibilities to lead. For instance:

- ***It needs to embrace market mechanisms and establish a national policy for metropolitan road pricing to allow for better management of the metropolitan network.***
- ***The federal government should also pursue a strategy of "modality neutrality."*** Transportation policy should enable metro areas to meet their goals on economic competitiveness, environmental sustainability, and/or equity by the best means available, rather than be constrained by rules governing a particular mode (e.g., highway, transit, bike/pedestrian, air).
- ***Lastly, the federal government needs to assist states and metropolitan areas in developing truly integrated transportation, land use, and economic development plans to serve the projected growth over the next several decades.*** Sustainability Challenge Contracts should be awarded to entice states and metropolitan areas to devise their own visions for coping with congestion and greenhouse gas emissions across transportation, housing, land use, economic development and energy policies.

3. The federal government should OPTIMIZE Washington's own performance and that of its partners to maximize metropolitan prosperity. In order to rebuild the public trust, the rationale for the federal program should be abundantly clear to the American people and to which a tangible set of outcomes must be explicitly tied.

While no simple analytical tool can provide all the answers, in this era of fiscal austerity the federal government should take steps to ensure grantees apply rigorous benefit/cost analyses to any project that uses federal funds. High performing federal grantees could be given

relief from regulatory and administrative requirements in order to accelerate project delivery where appropriate. By the same token, intervention strategies for consistent low performers should be considered. Recognizing the political hurdles in linking funding to outcomes, performance, and accountability, states should be allowed to opt-out of the revamped federal transportation program and forgo their allocation of federal trust fund revenues.

Another idea is to revamp existing formulas so federal funds are not distributed based on factors that potentially increase greenhouse gas emissions, on overly simplistic equity provisions, or on the basis of earmarking. Yet in order to commit to an evidence-based program, a major overhaul is needed in how the federal government collects, assembles, and provides data and information. We desperately need a sunshine law for transportation data to better inform decisionmaking at the state and metropolitan levels and to regain the credibility of the public.

The challenge is to take transportation out of its box in order to ensure the health, vitality, and sustainability of our metropolitan areas.

A frank and vigorous conversation about transportation finance should only come *after* these accountability and performance measures are put in place. To meet the challenges of the future while also ensuring financial revenues will be available, all options toward re-invigorating transportation funding should be on the table:

FIRST, to fund the projects of national significance identified by the STIC the federal government should act as a guarantor of debt and create a National Infrastructure Corporation that would sell bonds to private investors who would take this interest income in the form of credits against federal income tax liability. SECOND, to empower states and metropolitan areas the federal fuel tax should be raised while recognizing the nation should not be tethered long term to the fuel tax for transportation revenues. THIRD, the federal government should also provide strong incentives for the adoption of market mechanisms like congestion pricing, true guidance on the use of public/private partnerships, as well as the expansion of a range of user fees.

These ideas about finance and revenue sources should not preclude a comprehensive and inclusive discussion about transportation—a discussion that includes accountability, overall intent, and connection to broader goals of economic growth and personal mobility.

We must recognize that we are on the cusp of a new wave of transportation policy. The infrastructure challenge of President Eisenhower's 1950s was to build out our nation and connect within. For Senator Moynihan and his colleagues in the 1980s and 1990s it was to modernize the program and better connect roads, transit, rail, air, and other modes. Today, the challenge is to take transportation out of its box in order to ensure the health, vitality, and sustainability of our metropolitan areas.

I. INTRODUCTION

Since the beginning of our republic, transportation and infrastructure have played a central role in advancing the American economy—from the canals of upstate New York to the railroads that linked the heartland to industrial centers and finally the interstate highway system that ultimately connected all regions of the nation. In each of those periods, there was a sharp focus on how infrastructure investments could be used as catalysts for economic expansion and evolution.

Physical neglect, congestion, and environmental degradation now seriously compromise the efficiency of the transportation network crucial to the national interest.

Other nations around the globe have continued to act on the calculus that state-of-the-art transportation infrastructure—the connective tissue of a nation—is critical to moving goods, ideas, and workers quickly and efficiently.

In the United States, however, we seem to have forgotten. Lost in a morass of pet project pork and politics, American transportation policy today is an unaccountable free for all, geared more to building bridges to nowhere than maintaining the ones we have, developing world class transit or unblocking the movement of freight at our sea, rail, and air hubs. Federal transportation expenditures are neither evidence-based nor outcome-oriented nor performance-measured, leading to politically-driven, rather than market-strengthening, investments.

The result: physical neglect, congestion, and environmental degradation now seriously compromise the efficiency of a network crucial to the national interest, with a price tag of needs conservatively estimated in the hundreds of billions.

Yet this urgent challenge is not experienced evenly across the American landscape. Today, in our post-agricultural, postindustrial, innovation-dependent economy, the roads to prosperity inevitably pass through a few essential places: our nation's largest metropolitan areas.

Metropolitan areas are where most Americans live, work, and produce the majority of the nation's economic

output. The services and revenues they generate drive state economies. These places gather and strengthen the assets that drive American prosperity—innovative firms, educated and skilled workers, institutions of advanced research, and specialized legal, technology, and financial firms—forming the front lines of competitiveness in the global economy.

As a consequence, all roads (and rails and air traffic) literally lead to these metropolitan engines, drawn by their clustering of people, the movement of goods, and the agglomeration of economic activity. The top 100 metros handle 72 percent of the nation's seaport tonnage, 79 percent of air cargo weight, 92 percent of air passengers, and 93 percent of rail travelers.

The time is long past due for a national transportation vision that recognizes the spatial concentration of our economic life and responds accordingly. It requires an extreme makeover, with a fundamentally new approach to almost every aspect of national policy: how we allocate funding; how we set priorities; how we apportion responsibilities; how we engage the private sector; how we price the system; how we connect transportation to other policies; how we structure the national government; and how we move from pork-driven politics to empirically grounded policy.

Fortunately, the time is ripe for such systemic reform. From genuine concern about the condition and quality of our existing infrastructure, to difficulties and limited choices in moving people and goods, to major national problems like climate change, foreign energy dependence, and strained household budgets, there is growing recognition that left unchecked these challenges threaten not only the quality of life in our country but also the competitiveness of our nation.

Today's fiscally-constrained environment must also be recognized and should be the motivating factor for real reform. In this regard, one thing is abundantly clear: If national transportation policy is going to achieve critical national objectives (e.g., advancing competitiveness, promoting sustainability, enhancing security) it is going to need to focus unwaveringly upon them and prioritize accordingly.

This report is organized as follows:

This first section provides a brief introduction. The second section sets the demographic, economic, and social context for the discussion about transportation today. Section three frames the major problems driving widespread demand for reform. The fourth section connects conversations about the U.S. economy and transportation with the health of metropolitan areas. The fifth section highlights current flaws in federal transportation policy. And the final section presents a framework and discrete action steps for a pro-metropolitan policy agenda that advances American economic productivity, promotes environmental sustainability, and improves the assets and opportunities of families and workers.

II. THE CONTEXT FOR THE DISCUSSION

Interest in reforming national transportation policy could not come at a better time. The United States is currently undergoing a transformation of dramatic scale and complexity comparable to what it experienced at the beginning of the last century—another period characterized by the radical reshaping of the American landscape.

Unlike peer countries in Western Europe and parts of Asia, the U.S. is continuing to grow by leaps and bounds. The nation surpassed 300 million in population in October 2006 and is projected to gain another 120 million people by 2050. Only China and India will experience this level of growth.

The pace of population growth and demographic change in our country is matched by the intensity of its economic transformation.

An enormous wave of immigration will continue in part to fuel this increase in population. Currently, more than 12 percent of our residents—some 35 million people—were born outside the United States, the highest share since 1920. About nine in 10 of these foreign-born residents live in the top 100 metropolitan areas. Two-thirds live in just the top 25.[1]

This immigration offsets another major demographic trend. The aging of the baby boom generation will make pre-seniors this decade's fastest growing age group, expanding an amazing 50 percent in size from 2000 to 2010 with a "senior tsunami" predicted to arrive soon thereafter.[2]

Partly as a result of these shifts, the average U.S. household size has fallen by nearly one full person—from 3.5 in 1950 to 2.6 today and projected to drop below 2.5 by 2020.[3] Nationally, the traditional married-coupled households with children declined from 43.0 percent in 1950 to just 23.1 percent today. Since 1980, the largest percentage point increase in terms of family type was in so-called "non-families"—that is, households maintained by one person living alone or with non-relatives only.

The pace of population growth and demographic change in our country is matched by the intensity of its economic transformation.

Evidence abounds pointing to rapid changes in a more interconnected global economy—U.S. imports tripled during the 1990s and exports doubled. The share of the nation's economy attributable to international trade continues to rise and is now about one-third of GDP, up from 11 percent in 1970.[4] Major American corporations like General Electric, Ford Motor Co., and Hewlett Packard realize at least one-third of their sales, and hold more than half their assets, in foreign countries.[5]

The share of the nation's economy attributable to international trade continues to rise and is now about one-third of GDP, up from 11 percent in 1970.

In addition, technological innovation has shrunk the world, exponentially reducing the costs and increasing the speed of sending goods and information. For example, an enormous container ship can be loaded with only a fraction of the labor and time needed to handle a small conventional ship 50 years ago.[6] Parallel advances in logistics have produced ever-longer supply chains, and have made it possible for Shanghai, Shenzhen (China), and Busan (Korea) to rank among the largest ports in the world. Economists estimate that improvements such as these have reduced the cost of moving manufactured goods by an estimated 90 percent in real terms over the course of the twentieth century. They conclude that transportation costs–at least for goods–"should play an increasingly irrelevant role in the metropolitan economy."[7]

What is clear is that, together, these demographic and economic changes have three major spatial effects on the national, inter-regional, and intra-metropolitan landscape.

1. First, rather than dispersing randomly across the globe, all this demographic and economic activity is shifting and re-aggregating in major metropolitan areas, both domestically and internationally.

At the global level, the best evidence for the continued importance of metropolitan areas lies in a simple fact: In 2006, for the first time ever, more than half the world's population lived in urban areas. But even more so than population, global economic output concentrates in major metropolitan areas. The top 30 worldwide—including Tokyo, New York, London, and Boston—generated roughly $10 trillion in GDP in 2005, equivalent to about one-sixth of global output, despite containing just one-twenty-fifth of the world's inhabitants.[8]

The American economy is characterized by significant geographic clustering, too.

The top 100 metropolitan areas alone claim only 12 percent of our land mass but harbor more than 65 percent of our population, 74 percent of our most educated citizens,

77 percent of our knowledge economy jobs, and 84 percent of our most recent immigrants.[9]

At the root of these agglomerations is the evolution of the American economy into a series of clusters—networks of firms that engage in the production of similar and related products services. And firms within these clusters crave proximity—to pools of qualified workers, to specialized legal and financial services that often require face-to-face interaction, to infrastructure that enables the mobility of people and goods, and to other firms so that ideas and innovations can be rapidly shared. Density (the essence of urban and metropolitan places) matters even more in the knowledge economy than it did in the industrial economy.

As a result of these assets and agglomerations, the 100 largest metro areas generate 75 percent of the nation's gross domestic product, reinforcing their critical role as engines of the U.S. and global economy .

Metropolitan areas also represent the geographic reality of how our labor and housing markets are organized.

Metropolitan areas are labor markets, in that the vast majority of people who live within a given metropolitan area also work there. In 2000, 92 percent of workers living in the nation's 100 largest metropolitan areas commuted to jobs within their own metropolitan area. Yet commuters frequently cross municipal and county borders within metropolitan areas on their way to work. Roughly 30 percent of workers in major metropolitan areas commute to jobs outside their county of residence, a share that has steadily increased over time.[10]

Metropolitan areas also represent the geographic reality of how our labor and housing markets are organized.

Metropolitan areas are also housing markets, in that when households move, they tend to stay within their home market. In the 100 largest metropolitan areas, about 70 percent of households who move within a given year select a residence elsewhere in the same metropolitan area.[11]

2. The second spatial effect of the changing demographic and economic landscape is the increasing primacy of certain ports of entry and key corridors that link major metropolitan areas to each other and the rest of the nation.

The oft-noted effect of the nation's economic transformation is the increase in freight and goods coming in and out of the nation's ports and the trucks and trains distributing those goods throughout the country. For example, in 2005 there were 1.9 million tractor trailer trucks in the U.S., up from 1.7 million in 2001—a 13 percent increase.[12] One factor explaining the increase in trucks is that the volume from container ships continues to grow a rapid clip and is expected to increase by 186 percent over the next 20

years.[13] This intermodal traffic is also predicted to double the amount of freight traffic hauled by train.[14]

These gateways and corridors mean a new regional hierarchy has emerged in the form of vast, newly recognized "super regions" that combine two or more metropolitan areas into a single huge urban system. *Megapolitan* areas refer to those metros that have "fused together" due to their outward expansion and reflect the fact that every day about 3.4 million people commute more than 50 miles or more to get to work.[15] Examples include those places like the Washington/Baltimore or San Francisco/Sacramento areas that share commuting and housing sheds. *Megaregions* are the larger cousins of megapolitan areas and generally refer to large networks of two or more metropolitan areas that share large scale environmental, cultural, and functional characteristics.[16]

3. The third spatial effect is that the dynamic forces restructuring the American economy are revaluing the assets of the cities and urban cores within *metropolitan areas.*

The increased mobility—both domestically and internationally—of firms means that the success of cities increasingly rests on their role as centers of consumption.[17] Likewise, increased incomes and education levels have increased the demand for these urban amenities, and together with reductions in nuisances like crime have fueled the resurgence of city populations.[18]

However, America's metropolitan areas have also become exceedingly complex.

Suburbs are no longer just bedroom communities for workers commuting to traditional downtowns. Rather, they are now strong employment centers serving a variety of functions in their regional economies. An investigation into the location of jobs in the nation's largest metropolitan areas finds that over half are located more than 10 miles outside of downtowns. Only about one in six metropolitan jobs is located near the metropolitan core, within 3 miles of the downtown.[19]

Without a doubt some of this suburban growth is happening in city-like settings.[20] Yet a significant share of economic growth in metropolitan areas is also occurring in low density, non-compact forms. The American economy has largely become an "exit ramp economy," with office, commercial, and retail facilities increasingly located along suburban freeways.[21]

Poverty, once overwhelmingly concentrated in cities, has likewise drifted into the suburbs. In 2005, for the first time in American history, more of America's poor live in large metropolitan suburbs than live in big cities.[22] Alarmingly, and in bleak contrast to their decline in big cities, the number of neighborhoods of high poverty in many older inner ring suburbs is actually increasing.[23]

These spatial patterns are changing the nation in many important ways and have enormous implications for transportation. However, these effects are extraordinarily complex and broad agreement does not exist with respect to the nature of the relationship. For one thing, there is an obvious nexus between demographic trends (such as household formation) and economic growth and transportation, but causality is unclear. Nevertheless, the relationships are undeniable. In setting the stage for future discussions of federal transportation, decision-makers must keep in mind these important changes in shaping the physical landscape and economic destiny of this nation.

III. SEVERAL FACTORS ARE DRIVING THE WIDESPREAD DEMAND FOR REFORM

Against this backdrop, several forces present the nation with a complex and, at times, conflicting set of transportation challenges that continue to plague the largest metropolitan areas, and are driving increasing demand for reform, especially at the federal level.

1. A COLLECTIVE "INFRASTRUCTURE EPIPHANY" HAS ARISEN ABOUT THE NEED TO REINVEST IN AMERICA'S AGING AND OUTDATED TRANSPORTATION NETWORK

There is genuine urgency and concern over the state of the nation's public infrastructure.

The most basic are concerns about the very reliability and safety of the nation's transportation infrastructure following several high-profile breakdowns: the collapse of the I-35W bridge in Minneapolis in the summer of 2007, the steam pipe explosion in Manhattan just weeks before, and the catastrophic levee breakdown in New Orleans in 2005. These tragedies each arose from a different set of circumstances, but there is no doubt that they have had a primary role in thrusting infrastructure into the national spotlight. The poor state of infrastructure in the U.S. today is forcing the very real question of what impact that neglect is having on our nation's cities, suburbs, and metropolitan areas.

The condition of U.S. roads, bridges, and rail are generally declining, especially in urban areas

In its most recent Conditions and Performance report, the U.S. Department of Transportation (DOT) estimates that, based on vehicles miles traveled, nearly 15 percent of major U.S. roadways (except rural and local) are in *unac-*

ceptable condition. Just over 41.5 percent are in *fair* condition and only 43.8 percent are considered to be in *good* condition. For these roadways, conditions have not improved much since 1995.

It is also interesting to consider conditions in rural vs. urban—or metropolitan—areas. In 2002, 58.0 percent of rural roadway miles were considered to be in good condition, compared to only 34.1 percent in urban areas. Moreover, the percent of good quality rural road miles actually increased since 1995 from 46.3 percent while the percent in urban areas *declined* from 35.2 percent. Based on intensity of use, the discrepancies between rural and urban are even more pronounced.[1]

Detailed data from the Federal Highway Administration (FHWA) shows that rural interstates have the highest percentage of roadway in good condition at 72.2 percent. Urbanized interstates come in at 43.8 percent while principal arterials in urban areas have the lowest percent of good quality roads: only 23.8 percent. Rural roads also showed the greatest improvement since 1995 while those in urbanized areas continue to deteriorate.[2]

Much specific attention has also been given to bridge conditions since the Minneapolis collapse last year. According to he latest FHWA data, in December 2007 over 72,000 bridges in the U.S. were characterized as "structurally deficient" meaning their condition had deteriorated to the point that rehabilitation or replacement is approaching or imminent. This figure represents 12.1 percent of all bridges and, while the percent of deficient structures declines every year, it does not decline by much—only 1 percent since 2004. In states such as Kentucky, Pennsylvania, and South Carolina, there are more structurally deficient bridges today than in 2000.[3]

When it comes to transit infrastructure, though improvements have been made to the nation's fleet in recent years, there are still some important deficiencies, especially related to "hard" infrastructure such as station platforms and elevated rail lines. According to a presentation before the National Surface Transportation Policy and Revenue Commission, in 2004 the overall condition of our nation's transit infrastructure was somewhere between "adequate" and "good." Buses—of which there are nearly 69,000 in the U.S. today—ranked lowest with an average score indicating the fleet is "moderately defective."[4]

The poor state of infrastructure in the U.S. today is forcing the very real question of what impact that neglect is having on our nation's cities, suburbs, and metropolitan areas.

Additionally, our nation's rail transit infrastructure is reaching the end of its useful life. In 2005, 45 percent of the nation's subway cars were over 20 years old. Excluding New York's extensive system (which recently replaced a large portion of its fleet) 53.3 percent of rail cars have been operating for more than two decades. Half of those

The overwhelming majority of system mileage built in this county in recent years came in the form of public roads.[9]

	1985	1990	1995	2000	2005	Change 1985–2005
Highway	3,863,912	3,866,926	3,912,226	3,936,222	3,995,635	131,723
Freight rail	145,764	119,758	108,264	99,250	95,830	-49,934
Navigable channels	26,000	26,000	26,000	26,000	26,000	0
Amtrak	24,000	24,000	24,000	23,000	22,007	-1,993
Commuter rail	3,574	4,132	4,160	5,209	7,118	3,544
Heavy rail	1,293	1,351	1,458	1,558	1,622	329
Light rail	384	483	568	834	1,188	804

Source: National Transportation Statistics, 2007

are over 25 years old, which is when the Federal Transit Administration recommends replacement.[5] Significant progress has been made in terms of the nation's transit communications and revenue collection systems. More than three-quarters of these systems were in excellent or good condition in 2004. Unfortunately, the number of rail stations in the same condition has dropped considerably in recent years from 61 percent in 1995 to 35 percent in 2004. The number of substandard or poor stations doubled in that time.[6]

The condition of our nation's rail network—for both passengers and freight—are more difficult to assess. A 2007 Government Accountability Office (GAO) report report found that since the railroad infrastructure is almost completely privately owed, little information is publicly available.[7] The private railroad companies consider this information proprietary and share it with the federal government selectively. For infrastructure owned by the nation's national passenger rail service—Amtrak—it appears some progress is being made but still is woefully inadequate. A 2008 performance assessment by the U.S. Office of Management and Budget (OMB) found that while the condition of Amtrak-owned equipment has improved five-fold since 2002, it is still falling well short of expectations.[8]

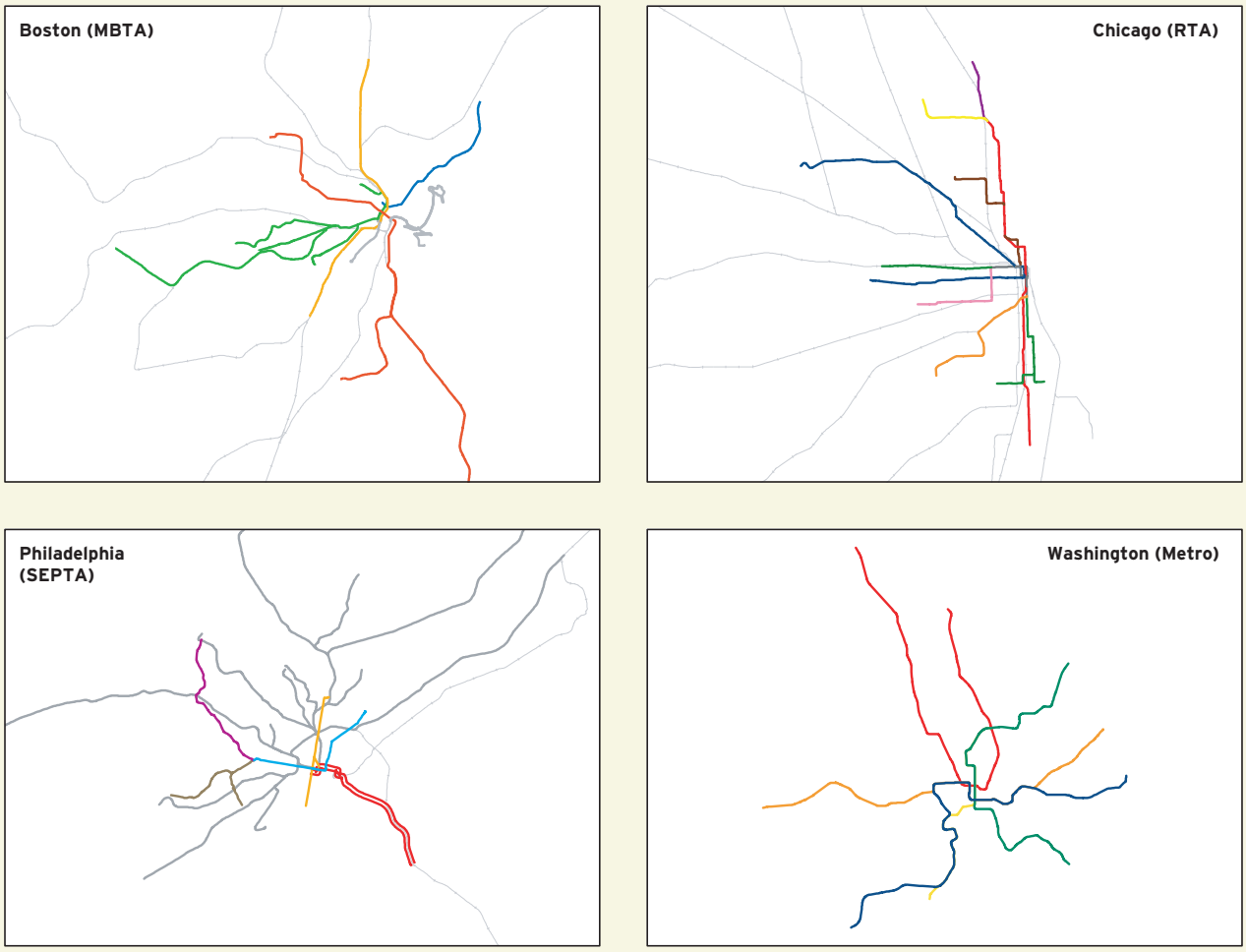
The U.S. transportation network is obsolete, no longer reflecting today's travel patterns nor fully embracing technological advancements

In addition to its condition, the very design of our transportation infrastructure is becoming obsolete. Most cities and older communities have inherited a road and transit infrastructure that may fit commuting patterns of the 1950s (when cities still acted as regional hubs) but are of little utility today. The current pattern of infrastructure undermines metropolitan economies.

The table above shows that the overwhelming majority of system mileage built in this county in recent years came in the form of public roads. The nation constructed 131,723 miles of additional roadways—enough to circle the globe more than five times—in the past twenty years. Two of those planetary revolutions have come since just 2000. Since they started with a very low base, in percent terms the growth in intrametropolitan rail clearly dominates. Light and commuter rail mileage has more than doubled, reflecting the policy shift to those modes and away from heavy rail which has grown only slightly in recent years. The only declines came in the form of freight and intermetropolitan passenger rail. Fully one-third of the freight rail mileage has disappeared since 1985.

Although nearly half of work commutes still originate from, or terminate in, center cities, 40.8 percent of work trips are entirely suburban.[10] Many older rail transit sys-

Hub-and-spoke transit patterns have difficulty serving some suburb-to-suburb trips



Source: Geographic Information Systems datasets from individual transit agencies

tems—which still move millions of daily commuters—capture very little of this market because they were laid out when the dominant travel pattern was still radial and before business and commercial development began to follow the "edgeless" pattern.[11] The maps above illustrate how these hub-and-spoke patterns serve dense metropolitan cores with a large supply of suburban workers but present difficulties in serving other parts of the metropolitan area. Plus, because commute trips make up only 15 percent of all trips, many other routes and options are being ill-served by these outmoded patterns.

The nation is also not updating its transportation infrastructure with new intelligent transportation systems (ITS) technologies. These advancements in telecommunications, computer, and other control devices have proven low-cost benefits that result in cost and time savings, and obviate the need for building new infrastructure in many cases.[12] Yet metropolitan deployment of ITS is still lagging.

In 78 of the largest metropolitan areas surveyed by the FHWA, about three-quarters have pursued some technologies like computer-aided dispatch for emergency vehicles and/or electronic toll collection systems. But despite the fact that fully one-quarter of traffic congestion is caused by incidents such as crashes and vehicle breakdowns, less than half of freeway miles are covered by relatively inexpensive service patrols that can be dispatched to clear

incidents quickly and get traffic moving again.[13] Only about one-third of those miles are monitored by freeway management centers that can identify those incidents.[14]

The state of technology for transit systems is somewhat better in certain areas as all rail stations have electronic fare payment capabilities, and 85 percent have automated locators for their buses. However, only eight percent of those buses can be electronically monitored in real-time and less than one percent of bus stops have electronic displays of traveler information for the public.[15]

Potholes, rough surfaces, and rusting bridges are the physical manifestations of a deteriorating system. Most investigations into the state of U.S. transportation infrastructure today quickly reveal a network that is crumbling, obsolete, and outdated.

2. THE MOVEMENT OF PEOPLE WITHIN AND BETWEEN METROPOLITAN AREAS HAS BECOME CHALLENGING DUE TO EVER-PRESENT TRAFFIC CONGESTION AND UNCONNECTED MODES

At its most basic, transportation is critically important to the U.S. economy for its ability to move people across and between metropolitan areas. Unfortunately, even this function is under threat due to ever present traffic congestion, lack of travel choices in most places, and unconnected modes.

The increase in traffic congestion has brought severe costs to families and the economy as a whole

In recent years, U.S. metropolitan residents have come to regard traffic congestion as one of the most serious problems in the nation. The reasons for this are, for the most part, obvious. Congestion imposes physical and psychological costs and it hinders access to jobs, recreation, and time with family members. At the same time, metropolitan civic and business leaders are leading the drumbeat concerning the economic effects of growing congestion, mainly due to lost time and productivity.

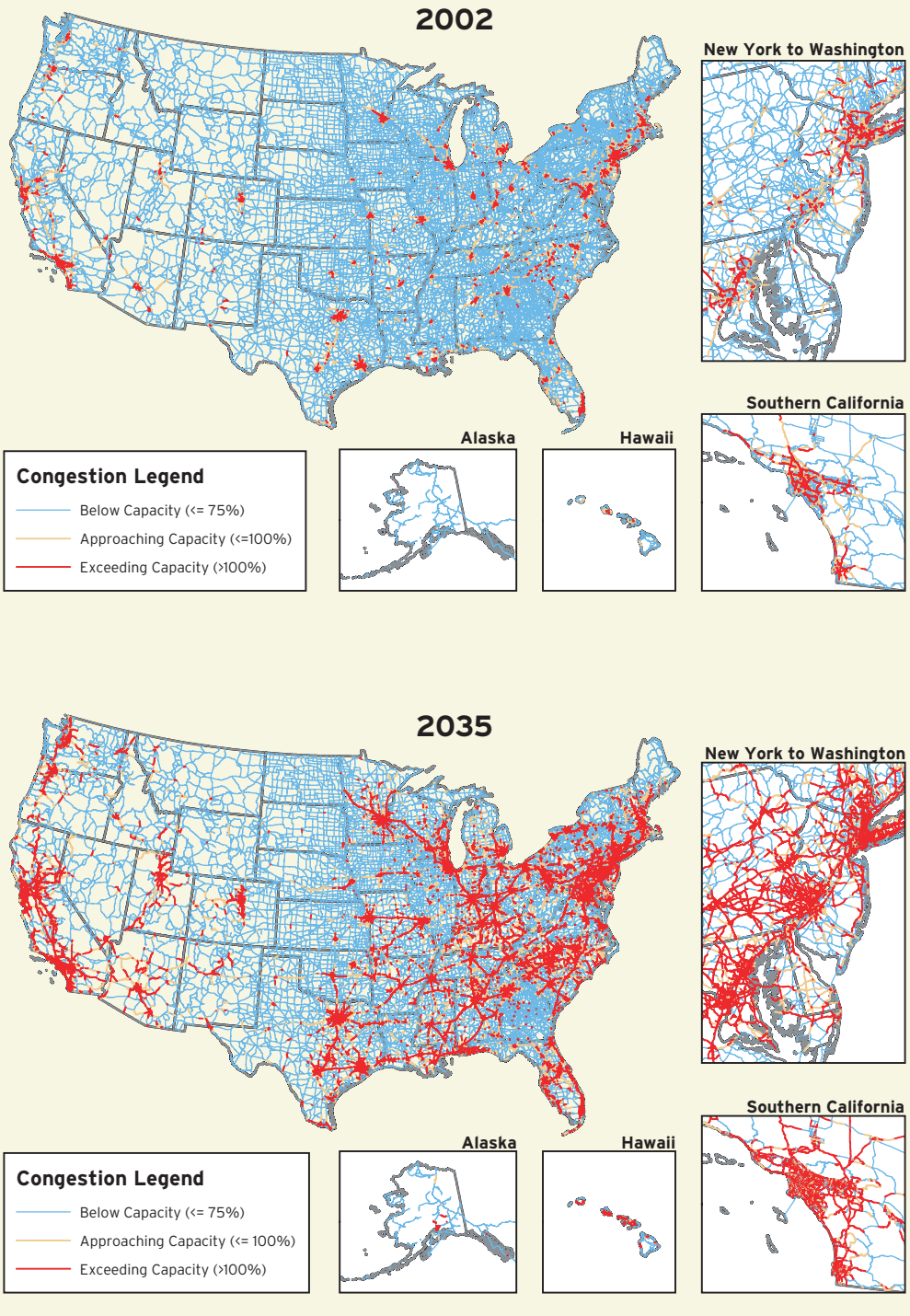
The most prominent attempt at measuring congestion comes semi-annually from the Texas Transportation Institute (TTI). Among other indicators, TTI has developed a travel time index as a ratio of congested to uncongested travel. In 1982 the average ratio was 1.09 in metropolitan America. In other words, traffic added 9 percent to the average trip. By 2005, that number had risen to 1.26—essentially a tripling of the amount of congested travel in just over twenty years. Looking at another measure, the annual delay per rush hour traveler has grown to 38 hours from just 14 in 1982. This is especially a problem for travelers in the nation's very large metropolitan areas which now average 54 hours of annual congestion per person.[16]

The effects of congestion are just as pronounced. The average American in metropolitan areas wastes 26 gallons of fuel each year due to congestion. This may not seem like much, but aggregated it means nearly 2.9 billion gallons each year is wasted–nearly one-fifth of the total equivalent of oil imported from the Persian Gulf last year.[17] Factoring in this wasted fuel, metropolitan congestion is now costing Americans about $78.2 billion each year, an increase of $20 billion since just 2000.[18]

Intuitively, we know that increased congestion does lead to slower, more variable journey times, which does impact economic efficiency. However, in the U.S. the economic implications of congestion are under-studied. Most of the U.S. research focuses on the *benefits* of highway investments, not the *costs* of congestion. Yet important analysis does exist and shows that the costs of congestion have the greatest impact on high-value-added, skilled labor occupations.[19] Additional work has been done in specific metropolitan areas. One recent study for greater New York, for example, finds a net loss in regional economic output of at least $3.2 billion to $4 billion annually due to congestion. Combined business costs, lost revenues, and lost productivity mean that there are 37,000 to 52,000 fewer jobs created in that metropolitan area each year.[20]

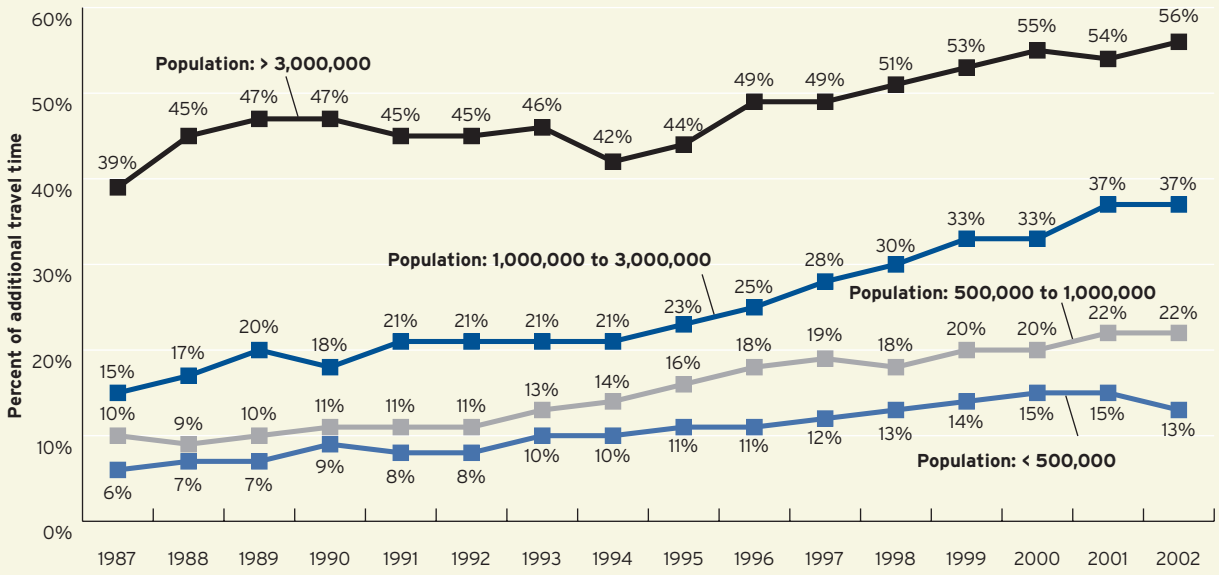
There is no shortage of passionate tomes commissioned by business, civic, and corporate leaders about the problem of congestion. As such, this paper does not attempt to recreate those arguments. However, one point is often overlooked perhaps because it appears self-evident: Traffic congestion is predominantly a *metropolitan* phenomenon and is especially acute in the very largest places. Certainly smaller areas jam up in tourist season and accidents can shut down rural interstates for miles. But there is no doubt that the most important national trend regarding congestion is that for every year studied, and for every measure, the problems of congestion increase as metropolitan area size increases.

Looking to the future, the problems of congestion continue to increase as metropolitan area size increases.



Source: Brookings analysis of U.S. DOT Freight Analysis Framework, Version 1.0, built with FHWA's HPMS Data; Version 2.2

Traffic congestion is primarily a metropolitan phenomenon, 1987-2002



Source: Texas Transportation Institute, for FHWA Performance Plan Congestion/Mobility Measures

On one level this should not be surprising as the vast majority of travel occurs in just a few places in general relationship to the population there. The table to the right shows that nearly eight out of every 10 vehicle miles traveled occurs in metropolitan areas. About six in 10 are in just the 100 largest.[21]

The economic cost of congestion is also a disproportionate problem for the nation's largest places. Just five of the largest metropolitan areas (Los Angeles, New York, Chicago, San Francisco, Dallas) count for one-third of the total congestion cost.

Recent research for the FHWA found that about 60 percent of traffic can be considered "non-recurring" congestion. That is, the majority of congestion is caused by events like accidents, bad weather, and construction zones. Only 40 percent is considered "recurring" congestion at regular times—such as the daily commute—at relatively predictable locations like bottlenecks.[22] Studies like these are starting to shed some light onto the conversation about what steps can be taken to reduce congestion or at least mitigate its rate of increase. Figuring out the right scope and balance of policy responses to congestion is critical to the health of metropolitan America.

Nearly eight out of every 10 vehicle miles traveled occurs in metropolitan areas, 2005

	VMT	Percent of total
U.S. Total	2,982,131	100.0%
Just Metropolitan Areas	2,365,709	79.3%
Just Micropolitan Areas	349,787	11.7%
Not Metro or Micro	266,635	8.9%
100 Largest Metro Areas	1,777,405	59.6%
50 Largest Metro Areas	1,434,357	48.1%
25 Largest Metro Areas	1,071,907	35.9%
10 Largest Metro Areas	645,927	21.7%
5 Largest Metro Areas	401,323	13.5%

Source: Aggregated from Federal Highway data (in millions of miles)

At the same time, evidence also supports the benefits of congestion reduction for economic productivity. One recent British study found that a 5 percent reduction in travel time for all business travel could generate around the equivalent of nearly $5 billion in cost savings.[23] In essence, workers that are not stuck in traffic are, indeed, working and adding to national productivity.

Workers in certain specialized industries are drawn from a larger area than lower skilled workers and businesses are willing to pay more to lure them. This means that congestion also requires metropolitan employers to pay their workers higher salaries.[24] Put another way, a 2004 study found that congestion reduces the agglomeration effects that accrue to dense urban places by reducing access to specialized labor and delivery markets.[25] Conversely, increasing travel options is likely to increase the benefits by providing access to a wider range of employees. Since reducing congestion is likely not possible on a large scale, the denser and larger metropolitan areas can benefit instead from providing a range of transportation options and alternatives.

Most metro areas are beset with limited transit and overall travel options

Having a range of travel options is thus essential for many communities, not to reduce traffic congestion in a significant way but to maximize the productivity and other benefits of a dense labor and job market.

In 2001, the Surface Transportation Policy Project created a Transportation Choice Ratio that examined not just the traffic congestion present in an area, but also the transit options available to travelers to avoid it.[26] The more transit options present in a metropolitan area, the study found, the less the exposure to congested conditions. However, the provision of transit does not eliminate or even reduce congestion on a metropolitan scale because there is no slack in the system and whatever capacity is freed-up by moving a traveler from roadways to transit is quickly occupied by someone else.[27] Thus, the very real benefits of transit investments are in providing alternatives to congested travel and supporting agglomeration, not in reducing that overall congestion.

Unfortunately, in many parts of the U.S. Americans do not have access to a range of travel options, and substandard transit exists in most places. One way to examine the nation's transit investment deficit is to determine which metropolitan areas have high quality service. It is admittedly a difficult determination, but based on readily available data we can at least identify which metropolitan areas have any service.

One source of data to examine this question is the American Housing Survey which asks residents whether or not they live in a neighborhood where transit is available.[28] Aggregating the last three years of the survey responses shows that only 55.2 percent of respondents reported that transit is available to them.[29] Even more disturbing is that only one-third of respondents in newly-constructed housing reported that transit was present. Transit was much more readily available in center cities (81.9 percent) than in suburbs (57.9 percent).

Also not surprisingly, these figures vary widely across the nation.[30] A much higher percentage of respondents reported transit availability in the West (72.6 percent) and Northeast (66.3 percent) than in the Midwest (53.5 percent) and the South where only 39.8 percent reported that there was transit service present.[31]

But beyond these survey data empirical data exists from the National Transit Database (NTD) that lets us count up the number of transit vehicles and service available in metropolitan areas throughout the country.[32]

Based on this exercise, we see that the largest metropolitan areas clearly dominate. Fully 90 percent of the nation's 55,000 transit buses operate in the 100 largest metropolitan areas. Half serve just 10 metropolitan areas and more than one-third are in just the four largest: New York, Los Angeles, Chicago, and Washington, DC.[33]

Of course, this is intuitive in some respects since there are more people and (usually) more transit riders in these areas. But calculating a ratio of buses to population of just the 50 largest metropolitan areas reveals that the larger places still have more buses per capita than the smaller places. About 60 percent of metropolitan areas operate fleets of 20 buses or more including small metropolitan areas such as Wenatchee, WA, Rome, GA, and Altoona, PA. Only two of the 50 largest metropolitan areas—Oklahoma City and Birmingham—operate less than 100.

Heavy rail subways exist in only 11 metropolitan areas. New York, Chicago and Washington capture over 80 percent of all these vehicles and two-thirds of all the subway stations nationally. Light rail systems, on the other hand, are about twice as common in terms of the number of metropolitan areas served, 26; however, only 20 of these operate more than 8 vehicles. Commuter rail is also garnering attention as a fast-growing transit mode but these systems exist in only 14 metropolitan areas and are heavily concentrated in only four places: New York, Chicago, Boston, and Philadelphia.

Based simply on the amount of transit infrastructure available, 54 of the 100 largest metropolitan areas do not have any rail service and also have a bus volume per capita ratio lower than the average for the top 100 metropolitan areas. By far, most of these metropolitan areas—26—are found in the south. Five are in Florida alone. Twelve are found in the Midwest, 10 more in the northeast, and only 6 are found in the west. All told, 90 million Americans live in metropolitan areas with substandard transit including a range of large places like Indianapolis, and Orlando; fast growing places like Raleigh and Jacksonville; and slow growing places like Youngstown and Rochester, NY.[34]

Responses to the American Housing Survey transit question on transit availability

		Access to public transportation		
		Yes	No	Not reported
Housing	Total occupied units	55.2%	41.8%	3.0%
	Owner	47.6%	49.4%	3.0%
	Renter	71.2%	25.7%	3.1%
	New construction	33.2%	62.1%	4.7%
	Moved in past year	59.3%	35.7%	5.0%
Demographic	Black	70.5%	27.2%	2.3%
	Hispanic	71.7%	26.0%	2.3%
	Elderly	52.3%	45.1%	2.6%
	Below poverty level	58.0%	38.9%	3.1%
Geographic	Central cities	81.9%	15.3%	2.7%
	Suburbs	51.9%	44.5%	3.5%
	Rural	15.7%	81.9%	2.4%
	Northeast	66.3%	30.9%	2.8%
	Midwest	53.5%	43.2%	3.3%
	South	39.8%	56.9%	3.3%
	West	72.6%	25.0%	2.4%

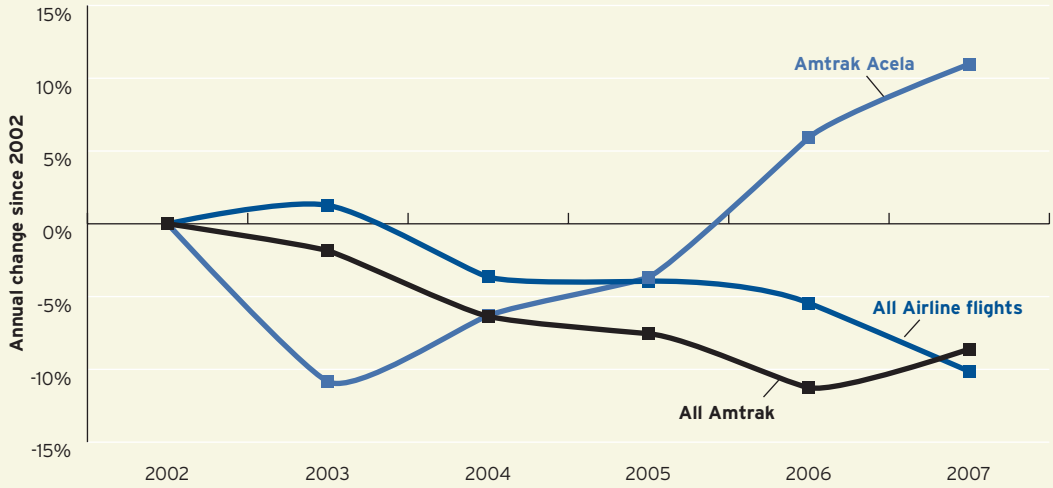
Source: Brookings Analysis of American Housing Survey, 2002-2004

Transit vehicles are concentrated in large metropolitan areas, 2005

	Buses	Percent of Total	Heavy Rail	Percent of Total	Light Rail	Percent of Total	Commuter Rail	Percent of Total
U.S. Total	55,167	100.0%	8,931	100.0%	1,235	100.0%	5,272	100.0%
100 Largest Metro Areas	49,960	90.6%	8,931	100.0%	1,235	100.0%	5,272	100.0%
50 Largest Metro Areas	45,260	82.0%	8,931	100.0%	1,233	99.8%	5,254	99.7%
25 Largest Metro Areas	38,521	69.8%	8,931	100.0%	974	78.9%	5,232	99.2%
10 Largest Metro Areas	26,147	47.4%	8,333	93.3%	514	41.6%	4,940	93.7%
5 Largest Metro Areas	19,532	35.4%	7,369	82.5%	228	18.5%	4,214	79.9%

Source: Brookings Analysis of National Transit Database

On-time performance for airlines is decreasing while Amtrak has improved (2002-2007)



Source: Bureau of Transportation Statistics, "On-Time Performance - Flight Delays at a Glance," 2008; and Office of Management and Budget, "Detailed Information on the Amtrak Assessment," 2008.

There are also limited travel options between metro areas

Americans are also struggling with trips between metropolitan areas. While about nine in 10 long distance trips (over 50 miles) are taken by personal cars, most of the nation's metropolitan and interstate highways will soon exceed or be at capacity. Unfortunately this delay is occurring at the same time capacity in air and train travel between metropolitan areas appear to be suffering, as well. The figure above shows rapid declines in the percent of inter-metro air and rail trips that arrive on time.[35]

Yet while Amtrak is portrayed as a national system serving both urban and rural areas (30 percent of Amtrak's stations are in non-metropolitan locations), Amtrak riders are almost entirely metropolitan. In 2006, 97 percent of all Amtrak boardings and alightings took place in metropolitan areas. Over nine out of every 10 Amtrak trips took place in just the top 100 metro areas and more than half were in just the top 10. And while the New York metropolitan area dominates with 22 percent of all Amtrak riders, it is by no means just a New York story. Taking New York out of the calculations, 96.3 percent of all trips are still metropolitan with 44 percent in just the top 10 metro areas.

Amtrak passengers are overwhelmingly metropolitan residents

	Ridership	Percent of total	Without New York metro
U.S. Total	48,400,970	100.0%	
Just Metropolitan Areas	46,930,909	97.0%	96.3%
Just Micropolitan Areas	1,085,365	2.2%	2.7%
Not Metro or Micro	384,696	0.8%	1.0%
100 Largest Metro Areas	44,924,909	92.8%	91.2%
50 Largest Metro Areas	39,332,344	81.3%	77.1%
25 Largest Metro Areas	33,008,152	68.2%	61.2%
10 Largest Metro Areas	26,319,530	54.4%	44.3%
5 Largest Metro Areas	19,431,144	40.1%	26.9%

Source: Brookings Analysis of Amtrak State Fact Sheets, Fiscal Year 2006

A healthy national economy depends on healthy metropolitan economies and mobility for residents is critical to promoting metropolitan health. Therefore, for our transportation system to continue to provide a competitive edge improving the movement of people by multiple means both within and between metropolitan areas should continue to be an explicit national priority.

3. THE INTERSTATE AND INTERMODAL MOVEMENT OF GOODS IS PROJECTED TO GET MORE DIFFICULT

The changing nature of the American economy—particularly increased overseas manufacturing and "just in time" delivery supply chain operations—directly impacts America's infrastructure needs especially when it comes to the movement of goods by freight. Metropolitan transportation infrastructure is critical for advancing American prosperity, and for the nation to compete we need to be able to move goods, between metropolitan areas by truck, rail, as well as intermodally.

The volume of trucks carrying goods is expected to add to traffic congestion, while increasing traffic congestion will further delay freight deliveries, especially from ports to trucks and other modes

According to the U.S. Bureau of Transportation Statistics (BTS), 43 million tons of goods valued at about $29 billion moved nearly 12 billion miles on the nation's interconnected transportation network each day in 2002. The figures translate into 300 pounds of daily freight valued at about $100 transported over 43 miles for each person in the U.S. Nearly two-thirds of the overall value, half of the tonnage, and one-third of the miles of the nation's total commercial freight are moved by trucks.[36]

Although trucks only make up about 7 percent of all vehicle miles traveled in the U.S. in 2005, U.S. DOT statistics show that on about one-fifth of the Interstate network, truck traffic accounts for more than 30 percent of the vehicles. This number is expected to grow substantially over the next 20 years. Those portions of the highway network designated as truck routes are already consistently more congested than other routes.[37]

The latest figures from the FHWA show that in 2005 there were 1.9 million tractor trailer trucks in the U.S., up from 1.7 million in 2001—a 13 percent increase.[38] By comparison, there was an equal amount of farm vehicles, about 600,000 school buses, and over 93 million trucks that fall into the "light" category that includes pickups, vans, and sport utility vehicles. But while truck VMT is certainly increasing, it is not rising at a faster rate than cars or "light" trucks like pickups or SUVs. Even as far back as 1991, miles traveled by heavy trucks has remained relatively constant. However, projections do suggest steady increases in truck traffic due to the changing nature of the economy. The FHWA's freight analysis framework (FAF) forecasts a 2.5 percent annual increase in truck VMT through 2035.[39] Trucks are projected to carry 82 percent of the new freight travel by 2020.[40]

Trucks also matter disproportionately because they are very sensitive to transportation-related disruptions as companies have shifted from standard warehousing of goods to just-in-time manufacturing and delivery - i.e., sending smaller, more frequent shipments. These new logistics strategies mean more and more cargo is being shipped over short distances. The average length of the haul of truck freight (485 miles) is the shortest of all the major modes such as air (973), rail (902), and coastwise water (1,269).[41] In fact, it is estimated that two-thirds of U.S. truck freight tonnage goes less than 100 miles.[42]

This revolution in goods movement has been hugely successful for the trucking industry and, as a result, never before has the country's business structure been so dependent on trucks as an integral part of the production line. Therefore, the economic effects of congestion are especially acute because it increases the costs of shipping goods and disrupts production schedules. One estimate on shipper's inventory found that congestion adds from $4 billion to $7 billion in costs annually.[43] Reducing trucking costs 2.5 percent in the Chicago and Philadelphia regions generated a $980 and $240 million per year business cost benefit, respectively.[44]

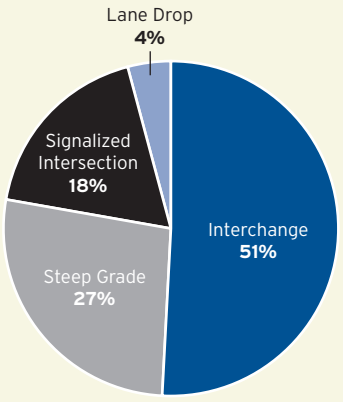
One of the only examinations of the causes of truck congestion is

Truck routes are consistently more congested than other routes

	Percent of roadway sections that are congested	
Metropolitan Area	**All**	**Truck Routes only**
Atlanta	63%	75%
Baltimore	45%	52%
Dallas	46%	68%
Detroit	50%	64%
Houston	45%	66%
Los Angeles	76%	87%
Miami	67%	78%
New York	50%	55%
Philadelphia	56%	64%
San Diego	57%	62%
Seattle	26%	27%
St. Louis	25%	32%

Source: Michael Meyer, "Road Congestion Impacts on Freight Movement," in The Future of Urban Transportation II, Eno Transportation Foundation, Washington, DC, 2008.

Interchange delays present the biggest slowdown for truck traffic



Source: Cambridge Systematics, Inc., "An Initial Assessment of Freight Bottlenecks on Highways," Prepared for Federal Highway Administration in association with Battelle Memorial Institute. Columbus: 2005.

very helpful in order to understand the policy responses discussed later in this paper. Measuring annual hours of truck delay found that half of the delays occur at interchanges where major urban highways meet.[45] The traffic at these choke points is caused by geometry of the roadway and/or weaving and turning movements of the vehicles within the interchanges. Another 27 percent of the delay is caused by steep slopes as roadways climb or descend steep grades causing trucks to reduce their speeds, and 18 percent by signalized intersections off of the interstates that are timed so as to cause numerous starts and stops. Only 4 percent of the delays are caused by capacity constraints or "lane drops" where lack of roadways reduce throughput and create traffic queues.[46]

Trucks are also frequently used to pickup and deliver freight and other products to and from ports—air, sea and rail—to large distribution centers, warehouses, and the like. So the major issue with trucks and congestion is not simply their experience on the major roadways but how they intersect intermodally with facilities like sea and air ports. Indeed, congestion in and around the nation's ports is widely recognized as the most critical issue facing the shipping industry because lengthy delays can eliminate the cost benefits of intermodal movements of freight.[47]

Metropolitan areas like Los Angeles, Miami, New York, San Francisco, Seattle, and Portland, OR have seen some of the largest increases in traffic congestion in the last 20 years, impeding traffic in and around these key ports. In 1989, a survey of logistics managers found that traffic congestion was not a significant implement to their operations.[48] But a more recent study reveals that 80 percent of managers consider traffic congestion a serious problem for their business with 33 percent calling it very serious or critical.[49] In 2005 more than one-third of total trade was through the 10 largest metros and almost two-thirds in just the 50 largest.

New bottlenecks have appeared on the road and rail networks that link ports to inland locations. Inadequate infrastructure and congestion often results in spillover traffic onto local roads, worsening the traffic problem.[50] Although shippers seem adept at squeezing out more efficiency, these "first mile" connectors pose an especially difficult challenge.[51]

These intermodal port connections have often been called the orphans of the freight transportation system. A 2005 U.S DOT report to Congress found that intermodal connectors have significant mileage with pavement deficiencies, and suffer from general lack of public agency awareness and coordination.[52] The agency also concluded that as the constituency that supports augmenting such connections is small, transportation funds are rarely allocated to such projects from state departments of transportation—given the intense competition for such funds.

Congestion in and around the nation's ports is widely recognized as the most critical issue facing the shipping industry because lengthy delays can eliminate the cost benefits of intermodal movements of freight.

Metropolitan areas dominated waterborne trade tonnage in 2006

	Total	Percent of total
U.S. Total	2,664,591,412	100.0%
Just Metropolitan Areas	2,533,485,950	95.1%
Just Micropolitan Areas	63,423,777	2.4%
Not Metro or Micro	67,681,685	2.5%
100 Largest Metro Areas	1,927,462,974	72.3%
50 Largest Metro Areas	1,723,956,055	64.7%
25 Largest Metro Areas	1,205,070,385	47.2%
10 Largest Metro Areas	869,950,391	32.6%
5 Largest Metro Areas	371,499,040	13.9%

Sources: Shipping Statistics Yearbook 2006; Containerization International Yearbook 2007; U.S. Army Corps of Engineers, Waterborne Commerce of the United States CY 2005.

Related is a series of challenges facing the U.S. freight rail system—increases in traffic and shortage of rail capacity—that are resulting in service delays and disruptions.

According to the American Association of State Highway and Transportation Officials (AASHTO) the freight rail system carries 28 percent of total ton-miles, 40 percent of intercity ton-miles, and six percent of the nation's freight value. They estimate that the freight rail network eliminates nearly 100 billion truck miles of travel from American roads and will save tens of billions in highway improvements over the next 20 years.[53]

But there are major problems with the freight rail network in the U.S. The primary problem is the significant and growing delays on the system which are the direct result of dramatic increases in traffic, reductions in the infrastructure necessary to handle that traffic, and consolidation in the industry which has resulted in fewer companies to haul the traffic. The impacts of the capacity crunch are well-known service related problems on parts of the network. One primary reason for the capacity crisis on the freight rail network is, of course, increased traffic. The Congressional Budget Office reports that freight traffic on U.S. railroads increased more than 50 percent from 1990 to 2003 principally from the growth in both coal and intermodal traffic.[54]

Adding to the crunch is the fact that the average length of each freight haul rose from 615 miles in 1980 to 902 miles today; and the total distance of freight trips moved on rails in the U.S. rose from 572 million miles in 1960 to 1.5 billion today.[55]

The railroads, naturally, prefer longer trips because they are more profitable. But the problem is that while traffic and trip lengths are increasing sharply, the U.S. freight rail network—although it is still large—has declined dramatically over the years. In 1960, there were 207,000 miles of Class 1 rails in the U.S. Today there are only just under 100,000 miles of track left to handle the increase in merchandise and products moving through the system. These reductions in infrastructure come as the result of the deregulation of the railroad industry a quarter-century ago, and the subsequent decisions by the railroads to both merge their operations and contract their network.

While traffic and trip lengths are increasing sharply, the U.S. freight rail network has declined dramatically over the years.

The future rise in intermodal freight traffic, combined with concerns over infrastructure and potential consolidation of the industry has some experts concerned. Given the critical part that ports and railroads play in moving freight throughout the nation and its fundamental role in the U.S. economy, the issue is currently receiving considerable attention from federal regulators and industry observers.

4. THERE IS GROWING CONCERN ABOUT A "PERFECT STORM" OF ENVIRONMENTAL AND ENERGY SUSTAINABILITY, AND THE ROLE TRANSPORTATION PLAYS

Transportation has a vital role to play in supporting economic growth, but it is also becoming clear to many that true prosperity also requires sustainable growth. Through the lens of transportation, there is growing concern about the twin challenges of climate change and energy security for our nation's economic future.

In the not-so-distant past, environmental concerns related to transportation revolved around such things as ground-level ozone, photochemical smog, and increased sprawl from road building. These issues certainly have not disappeared as metropolitan areas continue to take transportation-focused efforts to reduce high-ozone days in the summer and countless citizens groups organize around preventing sprawl in their respective localities.

But with a growing mountain of evidence and nearly universal agreement on the causes of global warming, climate change has quickly emerged as the main environmental problem linked to transportation. And the scope of the problem is far greater than previous transportation-related problems. While smog and sprawl affect metropolitan areas—with negative externalities crossing county and state lines—climate change threatens national and global impacts.[57] Improving transportation thus becomes an even greater national priority.

Today, transportation accounts for one-third of all carbon dioxide emissions in the U.S.

U.S. transportation is a key ingredient of global climate change due to the large amount of carbon dioxide (CO_2) emissions generated by the nation's fleet of automobiles.[58] In 2005, transportation accounted for 33 percent of all U.S. CO_2 emissions—the single largest contributor to total emissions of all end-use sectors.[59] This was not always the case.[60] As recently as the mid-1990s, transportation trailed the industrial sector as the leading cause of CO_2 emissions.[61]

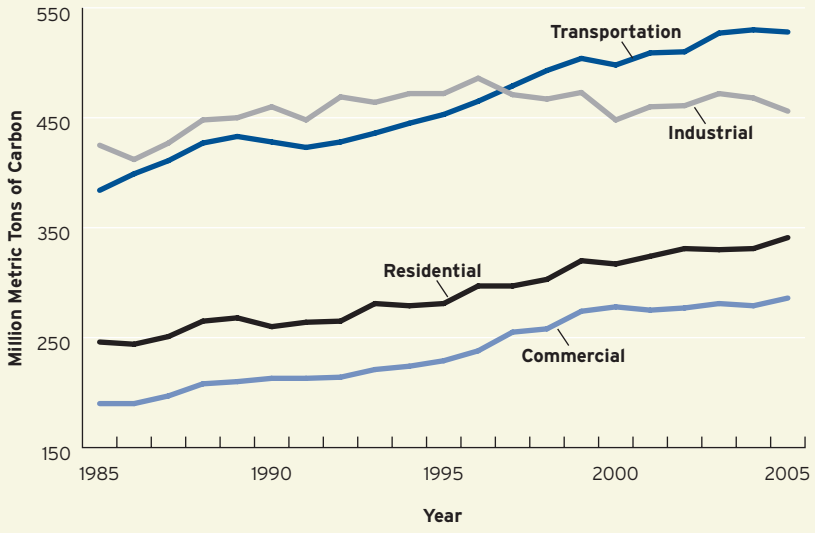
But in 2003, about 81 percent of transportation-related greenhouse gas emissions in the United States came from "on-road" vehicles, including passenger cars, sport-utility vehicles, vans, motorcycles, and medium- and heavy-duty trucks and buses.[62] Tailpipe emissions are magnified when vehicles idle in traffic and are a major source of compliance problems with federal air quality standards.[63]

Three factors affect the amount of CO_2 released into the air from transportation: the type of fuel used, the fuel efficiency of the automobile, and the amount of miles traveled.

First, because 98 percent of transportation fuel is petroleum-based, nearly every automobile emits CO_2.[64] The only exceptions—in very small numbers—are all-electric vehicles that run on batteries charged from the electric grid. However, even these vehicles indirectly produce CO_2, as the primary energy source of electric power is coal burned in power plants. Newer "plug-in" hybrids use a mix of electric power and gasoline. Nevertheless, analysts believe these technological improvements have the potential to improve fuel economy by 50 to 100 percent by 2030.[65]

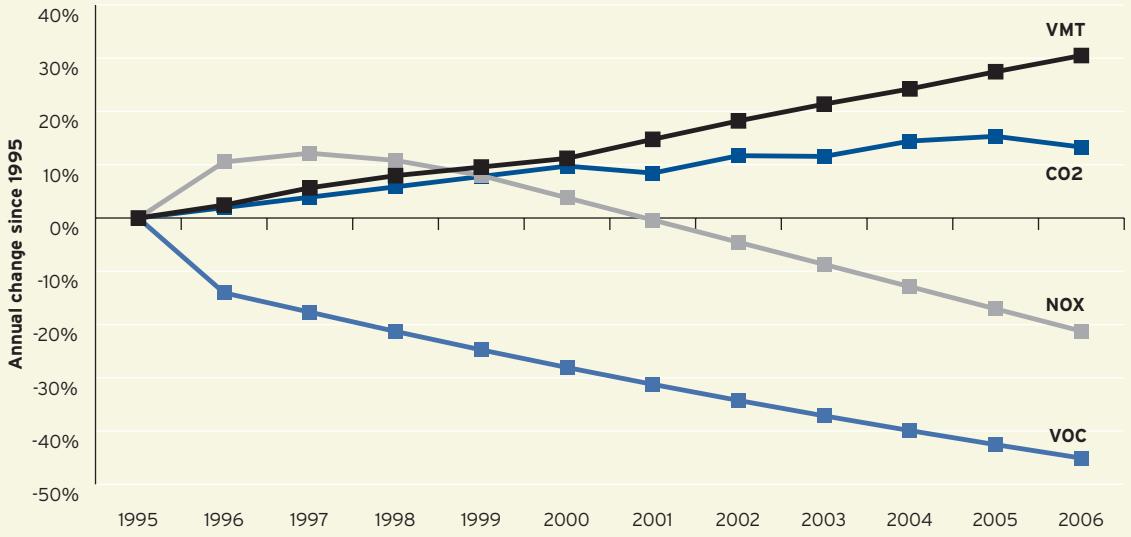
The second factor that determines just how much CO_2 each automobile emits is vehicle fuel efficiency, usually reported in miles per gallon (MPG). The trend in U.S. MPG over the last three decades is indicative of the nation's increasing transportation carbon footprint. While MPG increased steadily from the mid-1970s to 1987—from 13.1 to 22.1 MPG—the ensuing 10 years witnessed a gradual decrease in fuel efficiency, down to 20.9 MPG in 1997. Since then, efficiency has slightly improved—up to 21.0 MPG—but still falls below the high reached nearly 20 years ago. This trend is the result of the larger market share of light trucks, including SUVs, which average more than 6

Over the last 20 years, transportation has emerged as the leading CO_2 emitter



Bureau of Transportation Statistics, "Pocket Guide to Transportation," 2007.

CO_2 emissions generally continued to rise along with VMT from 1995-2006



Source: EPA and FHWA

MPG less than passenger cars.[66] Internationally, U.S. automotive fuel efficiency of new vehicles significantly trails other industrialized countries. Australia and China, for instance, each average slightly more than 29 MPG, compared to the U.S. average of 24.1 MPG. The average fuel economy of new vehicles in the European Union clocks in at 37.2 MPG. And Japan's 46.3 MPG nearly doubles the U.S. mark.[67]

Third, while emissions of other pollutants—such as volatile organic compounds (VOC) and nitrogen oxides (NOx)—has fallen over time as a result of engine and fuel policies, emissions of CO_2 continue to rise with VMT.[68] Thus, the nation's contribution to climate change from transportation continues to worsen. As a result it appears that the continued growth in driving cancels out both the benefits from vehicle efficiency and fuel alternatives.[69]

It appears that the continued growth in driving cancels out both the benefits from vehicle efficiency and fuel alternatives.

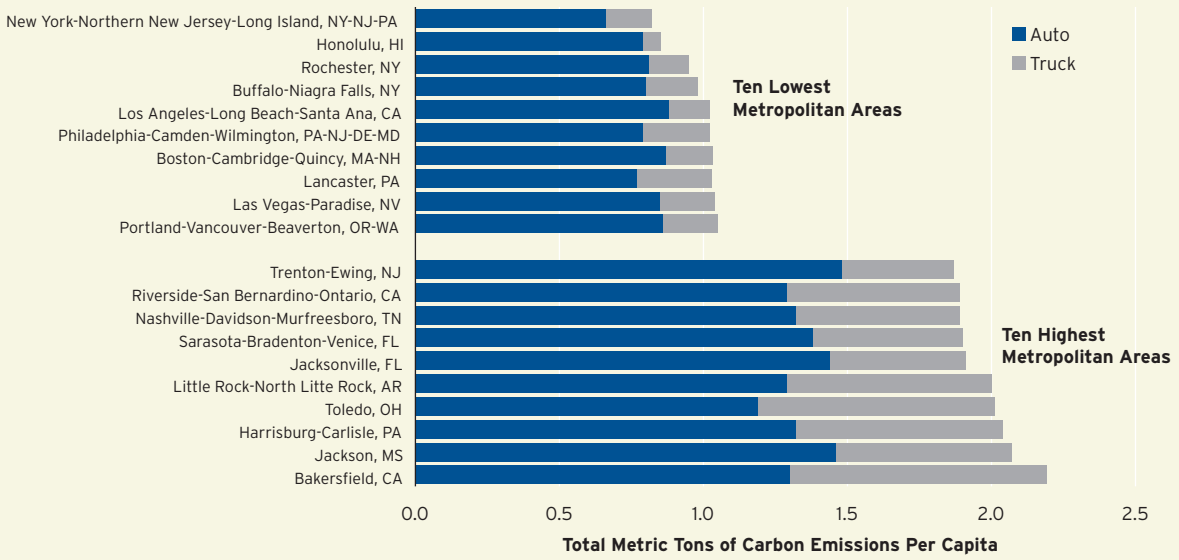
Per capita carbon emissions from cars and freight are generally lower in metro areas than the rest of the nation, in part due to denser land use patterns and greater transportation options

A recent examination of the energy consumed and the CO_2 emitted in the nation's 100 largest metropolitan areas shows that many of our largest metropolitan areas emit less carbon from auto and truck transportation on a per capita basis, and especially on a per dollar of gross metropolitan product (GMP) basis than smaller and non-metro areas.[70] Per capita VMT, fuel and energy use, and carbon emissions are all higher for the U.S. as a whole than in the 100 largest metropolitan areas.[71]

However, carbon emissions per person and per dollar of GMP vary a good deal across metro areas. As might be expected, metropolitan areas with a higher percentage of trucking activity tend to have larger carbon footprints, especially if their annual VMT profile exhibits a larger than average share of combination truck miles of travel, a good deal of which may involve low MPG trips that either start and/or end outside the metro area's boundaries.

But these impacts are not just a function of transportation and driving. A number of variables related to metropolitan form correlate with the variability in both per capita and per dollar of GMP carbon intensities. A metro-

Dense metropolitan areas correlated positively with lower emissions per capita in 2005



Source: Brown, Southworth, and Sarzynski, "Shrinking the Carbon Footprint of Metropolitan America," Brookings, 2008.

politan area's average density of population, housing, and jobs correlates positively with lower carbon emissions. Centrality measures also show mild positive correlation with lower carbon, as does a broad county-based jobs-housing balance measure. Metropolitan areas that act as the primary base for rail transit systems (also some of our largest and densest places) were also found to have lower carbon per capita and per $GMP emissions than metros that do not operate such systems.[72]

The U.S. transportation system is almost entirely dependent upon petroleum-based fuels, often supplied by other countries

U.S. transportation performance on the three legs of the stool—fuel type, fuel efficiency, and miles traveled—result in the world's largest amount of oil consumption per capita, at 8.35 tons of oil equivalent per person, or about 61.2 barrels per year for every man, woman, and child. Though Canada comes in a close second, with 59.8 barrels per person, the next closest country (Finland) uses almost 25 percent less oil per capita. France and Japan use about half and the United Kingdom just 47 percent of the U.S. level.[73]

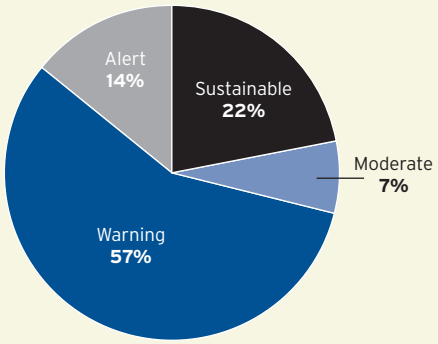
Metropolitan areas with a higher percentage of trucking activity tend to have larger carbon footprints.

Many oil exporting nations are unstable

	2000	2007	Change	Country's Stability Ranking
U.S. Domestic Production	2,130,707	1,862,441	-12.6%	
Total U.S. Imports	4,194,086	4,905,234	17.0%	
Top 10 U.S. Import Sources				
Canada	661,351	885,366	33.9%	Sustainable
Mexico	502,509	559,676	11.4%	Warning
Saudi Arabia	575,274	543,508	-5.5%	Warning
Venezuela	565,865	496,984	-12.2%	Warning
Nigeria	328,079	413,184	25.9%	Alert
Algeria	82,345	244,590	197.0%	Warning
Angola	110,321	185,130	67.8%	Warning
Iraq	226,804	177,009	-22.0%	Alert
Russia	26,382	150,594	470.8%	Warning
United Kingdom	133,799	101,570	-24.1%	Moderate

Source: Energy Information Administration, "U.S. Imports by Country of Origin" (in thousands of barrels annually); and Foreign Policy and the Fund for Peace, "The Failed States Index," Washington, 2007

Over half of U.S. oil imports in 2007 came from potentially unstable nations



Source: Energy Information Administration, "U.S. Imports by Country of Origin."

Of larger concern, however, is where the oil Americans consume is coming from and issues of oil and energy security. The U.S. does not come close to producing the oil it consumes and that figure is declining over time, decreasing by 12.6 percent since 2000.[74] As the table above shows, only about one-third of the crude oil consumed in the U.S. is domestically produced. Nearly twice as much is imported and the majority of that from countries considered to be in danger of "state failure" based on a range of social, economic, and political factors.[75]

With the nation's transportation challenges escalating at the same time that growth and development, global climate change, and energy security issues are on the rise, many observers believe a "perfect storm" is on the horizon.

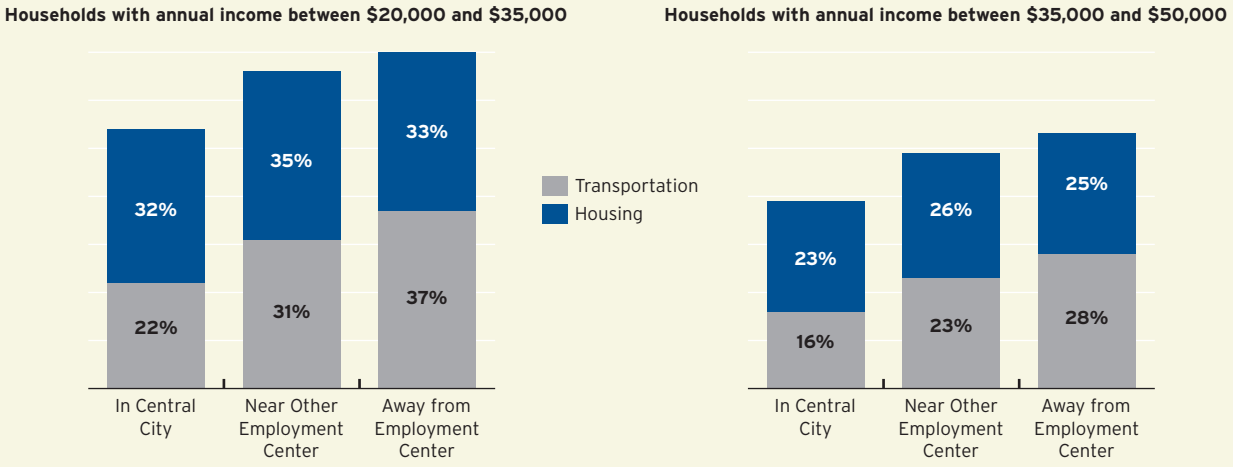
5. A LARGE PORTION OF THE AMERICAN WORKFORCE IS CONCERNED ABOUT THE SIZE OF HOUSEHOLD SPENDING ON TRANSPORTATION-RELATED ITEMS—SUCH AS GASOLINE

As discussed earlier, the geographic patterns of metropolitan areas have gradually changed over time so that a majority of employment and residents are located in suburban neighborhoods far from the urban core. Recent Brookings analysis found that only 37.7 percent of Americans lived in major cities or in older inner ring "first" suburbs. The remainder is in other suburbs, exurbs, or rural areas.[76] As economies and opportunity decentralize and the working poor remain disproportionately centralized, a "spatial mismatch" arises between jobs and people in metropolitan areas and is frequently cited as a primary explanation for the transportation barriers faced by poor families. While it is important to note that spatial mismatch is not just a "people to jobs" problem but also a "jobs to people" problem caused by massive metropolitan decentralization, many scholars have provided compelling evidence that the spatial separation of housing and employment exacerbates the poverty in inner-cities.[77] Low-wage jobs are increasingly located further out in the urban periphery, and competition for the remaining central-city jobs can be fierce.[78]

As jobs dispersed through metropolitan areas and lower income workers found themselves spatially isolated from available jobs, car ownership among lower income households surged.

As jobs dispersed through metropolitan areas and lower income workers found themselves spatially isolated from available suburban jobs, car ownership among lower income households surged—from 67 percent in 1993 to 73 percent just ten years later.[79] This increase far outpaced the rate of car purchases among higher-income households.[80] Often faced with limited transit options, many low-income families are driven to purchase cars out of necessity. But such a need is an expensive one as a percentage of household income for low-income families.

Transportation represents a sizable share of household spending



Source: Center for Housing Policy (2006) based on calculations from 2002 and 2004 by the Center for Neighborhood Technology

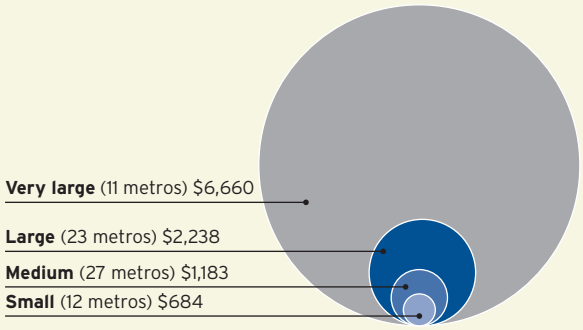
Recent analysis finds that the working poor spend 6.1 percent of their income on commuting compared to 3.8 percent for other workers. The working poor that commute using their own car spend the most: 8.4 percent. The combined costs of commuting and housing for the working poor make up a larger portion of their household budget than other households.[81] Other research finds that auto insurance and car loans tend to be more expensive in lower income neighborhoods than higher income neighborhoods.[82]

Transportation is now the second largest expense for most American households, consuming on average 20 cents out of every dollar.

But the problem of transportation costs on household budgets is not just a problem of low income families. Congestion and automobile dependence also affect the pocketbooks of citizens and commuters. The dominant pattern of suburban growth—low-density housing, sprawling job base, and limited transit options—has made residents and commuters completely dependent on the car for all travel needs.

Partly as a result of this dependency, household spending on transportation has risen across the country. Transportation is now the second largest expense for most American households, consuming on average 20 cents out of every dollar. Only shelter eats up a larger chunk of expenditures (27 cents), with food a distant third (11 cents).[83] The cost of transportation has become increasingly central to family budgets, given their choices to live further from jobs in a housing landscape that often requires car usage for errands or children's school transportation.

Average total crash costs increase with metropolitan size

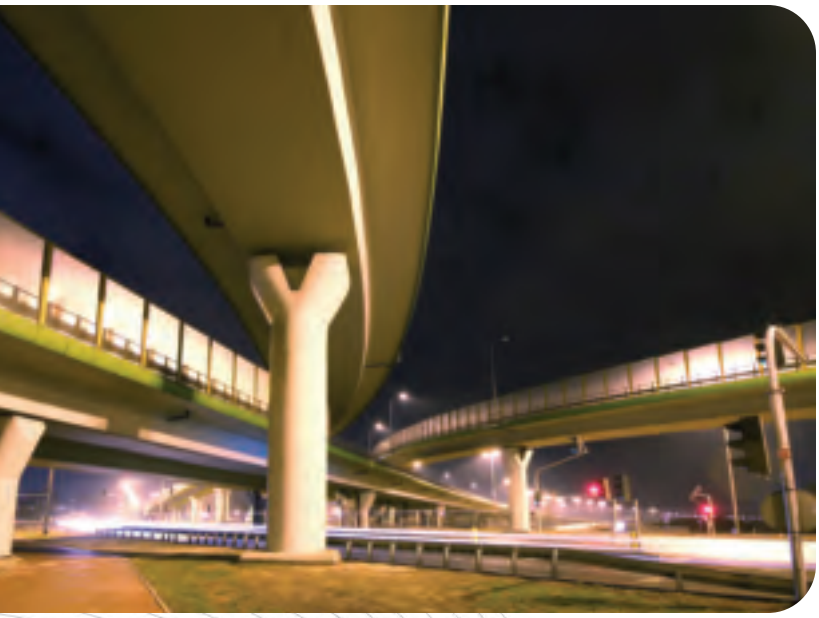


Source: American Automobile Association, "Crashes vs. Congestion – What's the Cost to Society?" prepared by Michael D. Meyer and Cambridge Systematics, Inc., 2008.

The cost of transportation relates directly to housing affordability: A Center for Housing Policy report found that for every dollar a working family saves on housing by moving into less urban areas, they end up spending 77 cents more on transportation.[84] Once an individual's commute has surpassed 12 to 15 miles, the increase in transportation costs usually outweighs the savings on housing.[85]

Once an individual's commute has surpassed 12 to 15 miles, the increase in transportation costs usually outweighs the savings on housing.

Lastly, new analysis shows that the costs of accidents and crashes on our nation's roadways impose a considerable financial burden on households and on metropolitan areas in general. These costs include property damage, lost wages, and medical and legal costs. In the nation's largest metropolitan areas alone, the cost of traffic crashes is far greater than the bill for congestion in those places ($164.2 billion vs. $67.6 billion) with the largest metropolitan areas absorbing the largest share of the cost. Of the 73 metros studied, the five largest account for one-third of the total cost.[86]



6. FINALLY, AMID THESE TRANSPORTATION-RELATED CHALLENGES, WORRIES AROUND TRANSPORTATION FUNDING AND FINANCE DOMINATE

The previous sections highlighted important challenges and changing realities that should drive a healthy and productive conversation about the nation's transportation policies. However, to the detriment of other issues finance and revenue distribution dominates the discussion about transportation in the U.S. today. These concerns are so prevalent that they spawned not one—but two—national commissions, and the U.S. Government Accountability Office (GAO) recently added transportation financing to its annual list of high-risk areas suggested for oversight by the current Congress.[87]

This section frames some of the major issues in the current finance discussion and sets up the subsequent sections on federal policy reform.

There is still little precision on measuring the size of our national needs

The basic argument about transportation finance on the national level usually begins with daunting, overwhelming numbers about the investment needs for the system, followed by the revenues available, and the gap between what we need and what we have. The argument ends with an urgent call for increasing revenues by a variety of means and usually ends with hand-wringing similar to the frustration expressed by Senator Daniel Patrick Moynihan years ago when he wrote that "The urge to have highways [is] not matched by the urge to pay for them."[88]

"The urge to have highways [is] not matched by the urge to pay for them."

—Senator Daniel Patrick Moynihan

There are several oft-cited sources for transportation investment needs: the American Society of Civil Engineers' (ASCE) *Report Card for America's Infrastructure* and the U.S. DOT's *Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report to Congress* (C&P report). The latter is commonly referred to as the national "needs" statement by many constituency groups. Analysts from the U.S. DOT testify and update these figures regularly—but with caveats as described below.

The ASCE, which relies on a variety of sources and advocacy groups for their figures, estimates that $1.6 trillion is needed over a five-year period to bring the nation's entire infrastructure (beyond just surface transportation) to good condition.[89] This group, which represents the builders and fixers of the worlds' infrastructure, relies to a large extent on the findings of the U.S. DOT for this semi-

annual Infrastructure Report Card.

For roadways, the U.S. DOT estimates that the maximum investment level required to eliminate the project backlog for bridges and to implement all proposed highway improvements is $131.7 billion per year for the next 20 years.[90] Analysts at the department report that this figure represents the "investment ceiling" and that investments should not be made that exceed this ceiling, even assuming unlimited funding availability. The cost per year just to maintain current highway and bridge conditions is estimated to be $78.8 billion. For transit the figure is $15.3 billion, with the cost to improve conditions and performance is estimated to be $24.0 billion. The overwhelming majority of these needs (85 percent) are in the 50 largest metropolitan areas.[91]

Analysts at the U.S. DOT as well as the language in the C&P itself reinforce the limitations in using these sources to determine what the appropriate federal investment level should be. The basis for the roadway figures is an engineering model called the Highway Economic Requirements System (HERS) used to suggest improvements to a particular stretch of highway. The Federal Transit Administration uses the Transit Economic Requirements Model (TERM) to estimate future transit capital investment needs. So the overall estimates ignore intermetropolitan modes like buses and both freight and passenger rail and intermodal transportation facilities.[92] Further, the analyses only focus on capital expenditures and not on the costs for maintaining and operating the new facilities once they are in place. They use current base year dollars and ignore inflation as well as the rapid cost increase in construction materials.

Yet they also do not take into consideration investments that could obviate the need for future investments. They do not consider land use impacts or effects. By separating highway and transit investments they ignore the potential for the modes to work together and, indeed, often these modes represent alternative investments in the same corridor. As such, the report actually states that it "makes no recommendations concerning future levels of federal investment."[93]

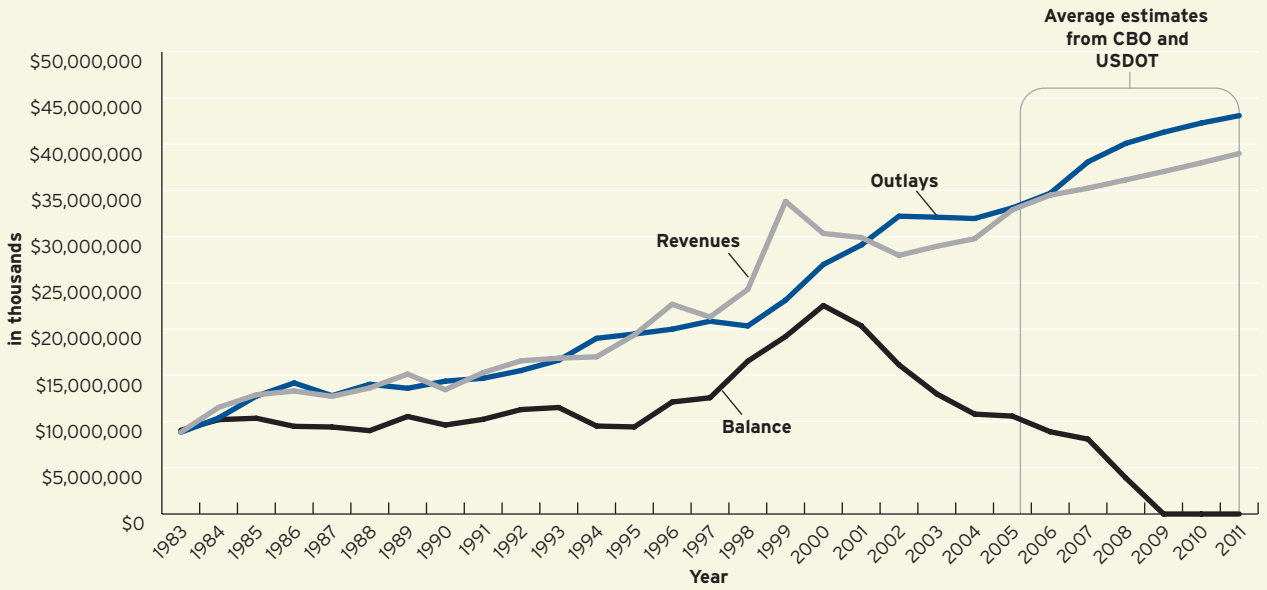
The National Surface Transportation Policy and Revenue Study Commission (NSTPRSC), which was established in 2005 under Section 1909 of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU) to study the future needs and revenue sources of the surface transportation system, addressed some of these shortcomings with a different base case needs assessment in their final report, *Transportation for Tomorrow*. For one, they included modes such as freight and passenger rail and considered scenarios that would potentially avoid high-cost expansion projects, such as through the use of telecommunications and pricing technologies.[94] And because they also considered recent costs of construction inflation, the NSTPRSC found that between $241 and $286 billion is needed for all modes annually through 2020. The NSTPRSC also considered the impact of demand management strategies such as aggressive adaptation of congestion pricing.[95]

While this represents a major analytical contribution by including cost-benefit assumptions, some concerns remain. For instance it makes no attempt to prioritize between projects and fails to consider the full range of impacts including the benefits of agglomeration and economic development, as well as the social and environmental costs of emissions like carbon.[96] A comprehensive British economic study found remarkable returns for certain projects when these impacts are considered.[97]

The political jurisdictions with responsibility over the investments are not considered, nor are the sources of revenue generation. So the investment responsibilities of federal, state, metropolitan, or local governments or the private sector is unknown. One U.S. DOT analysis clearly states that linking investment needs analysis to federal funding alternatives requires an intermediate step to define the federal role and responsibilities.[98]

Lastly, while it is difficult to model the range of political considerations that may influence project selection, the GAO recently pointed out that as these factors have the primary influence over project selections, "There is currently no way to measure how funding provided to the states is being used to accomplish particular performance-related results such as reducing congestion or improving conditions."[99]

The balance of the Highway Account of the Federal Transportation Trust Fund is falling



Source: Federal Highway Administration, Highway Statistics Series Table FE-210, Fiscal Years 1957-2005, plus CBO and USDOT estimates

Federal revenues are not sufficient to cover its authorizations

The primary reason the conversation about needs is so prevalent is due to the looming concerns (and awareness) over the status of the federal transportation trust fund. The outlays from the highway account are estimated to begin to outpace the revenues into the account sometime in 2009.

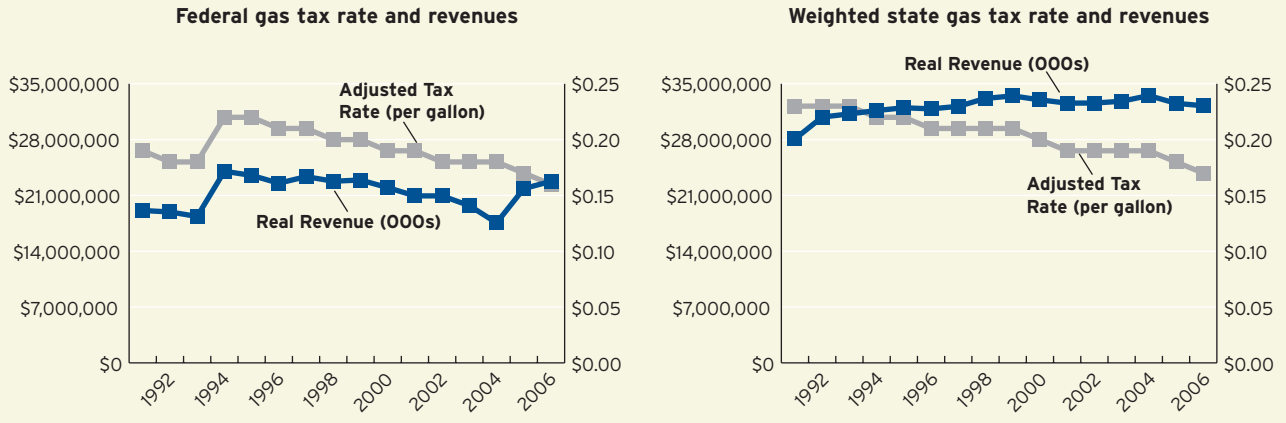
A report from the GAO illustrates this problem by examining the estimates in receipts and outlays from both the Congressional Budget Office (CBO) and the U.S. DOT. The agencies estimate that receipts into the highway trust fund will continue to increase by 13.8 and 10.3 percent, respectively, from 2006 through 2011. The chart above shows that revenues have remained consistently steady since the fund was split into highway and transit accounts in 1983. What has clearly changed is that outlays have increased at a rapid rate. As a result, whenever outlays have outpaced revenues (as they have since 2001), it drains the reserves in the account, and since 2001 the reserves have dropped precipitously. The transit program is projected to be oversubscribed to where revenues available reach a zero balance three years later, in 2011.[100]

The critical subset of that problem is that because the federal gas tax has not been raised since 1993, even to keep pace with inflation, it is having less of an effect as it could. In FY 2005, nearly 90 percent of the federal revenue that went into the federal transportation trust fund was derived from fuel taxes so as the rate effectively declines, there is clearly an impact.[101] As reflected in the figure opposite, the real gas tax rate and the real revenues fell together from 1993 to 2004. Receipts from the federal gas tax leaped by $5.5 billion between 2004 and 2005, and rose slightly through 2006.

Yet the gas tax remains a critically important revenue source and will continue to be so for the foreseeable future. The figure on the next page shows that between 2001 and 2005 only tolls and bond "revenues" grew at a faster rate than fuel taxes in terms of all funds used for highways. However, these other sources still make up a very small share of total revenues—fuel taxes still dominate at nearly 40 percent of the total. Revenues from fuel taxes also rose faster than any other source since 2001 in nominal terms and are still rising as a share of the national total.

There are many excellent reasons to move aggressively to expand tolling and to explore revenue sources such as mileage-based fees. For example, the expanded use of these mechanisms is an effective and practical solution for mitigating the growth in congestion. But they are likely to be less effective as solutions to the funding challenges in the short term.

Inflation is eating away at both the federal and state gas taxes



Source: FHWA, Highway Statistics, various years.

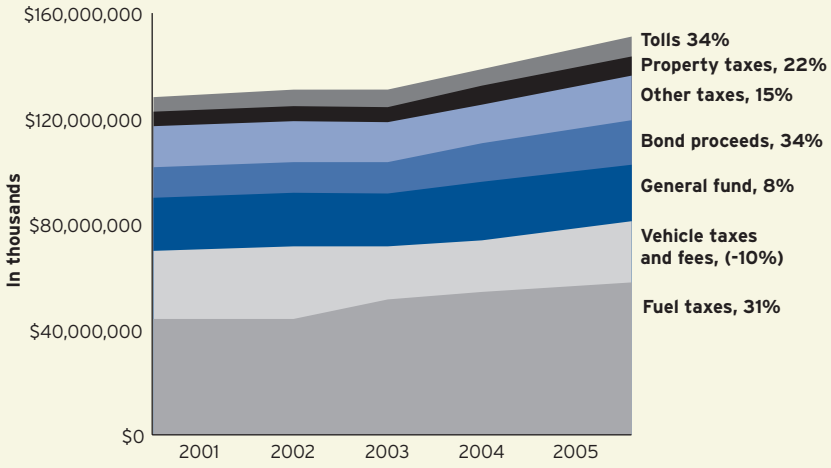
States are facing their own budgetary problems

Transportation expenditures (of all kinds) made up 8.1 percent of state spending in FY 2006, down from 8.6 percent in 2005. According to the National Association of State Budget Officers, state transportation expenditures have increased by an average of 5.5 percent each year since 1988. And from 2005 to 2006 state-sourced funds for transportation increased by 1.6 percent while federal funds increased by more than four times that at 6.8 percent.[102]

From 1992–2005, 54.5 percent of the funds that states spend on transportation come from other own sources such as gas and vehicle taxes, tolls, and general funds. Bond proceeds provided 13.9 percent of funding and local payments 1.8 percent. Another 29.7 percent is derived from payments from the federal government.[103]

Though state spending on highways is twice as much as federal spending, there is considerably more attention on the former, especially at the national level. The state view of the funding coming from the federal government as "free" money contributes to that attention deficit. The federal government gives the states "wide latitude in deciding how to use and administer federal grants," and there is some concern that states substitute federal funds for spending they would have otherwise had to generate themselves.[104]

Revenues for highways from most sources have increased in recent years



Source: Brookings analysis of federal highway data for all levels of government, various years

In fairness, not all of this is unfounded. Throughout the country, states are still reeling from a budget situation described as more severe than any of the past 60 years by the National Association of State Budget Officers. State revenues have plummeted, forcing policymakers to slash budgets, scavenge for funds, and shift priorities in response. Transportation spending has been particularly affected by these fiscal stresses.

So without the political desire to raise funds through taxes and fees, states are increasingly turning to debt. In fact, state spending on debt service has not been this high since 1945. In just 10 years, state bond "proceeds" used for highways have increased by 169.7 percent from $4.3 billion in 1995 to $11.6 billion in 2005.[105]

Complicating the finance challenge are the uneven rules and constraints applied to the different transportation modes and to different levels of government

As mentioned, the federal highway trust fund is the source of federal funding for transportation and is fed primarily by the federal gas tax. However, not all trust fund revenues are spent on the highway system. While 15.5 cents of the 18.4-cents-per-gallon federal gas tax accumulates in the Highway Account, the remainder is distributed to the Mass Transit Account (2.8 cents).[106] Yet, of the $27 billion in total transit operating expenses during FY 2004, only 8 percent comes from federal assistance. Passenger fares (34 percent) pay the lion's share, with local (29), state, (22), and other sources (7) making up the rest. States' general funds are increasingly important sources of funding for transit.[107]

The federal presence in transit funding is more prominent in terms of capital expenses, providing 39 percent of all capital funds spent on transit nationally. But even here, the federal investment is not the largest. Local funds (46 percent) are the primary source. States only contribute about 14 percent. This trend is increasing as cities, counties, and transit districts are all increasingly turning to "local option transportation taxes" to fund new transportation investments.[108] The most visible examples of these in recent years have been voter-approved sales taxes to fund particular roads and rail transit projects. Between 2000 and 2002 public transit dollars from local sources soared 73 percent from $2.7 billion to $4.7 billion.[109]

The state role in transit funding is complicated by the fact that thirty of them, unlike the federal government, prohibit the use of gas tax revenues for purposes other than road construction and maintenance. Such rules make it inordinately difficult for transit projects to obtain additional funding, which is why they often must opt for local ballot referenda or general revenue sources at the local level.[110]

Another critical challenge is that the federal government has authorized more money than it has to spend in SAFETEA-LU. From fiscal years 2005 to 2008, the federal government has had to rescind $12.6 billion in funds it apportioned previously to the states.[111] It is essentially up to the states to decide from which programs the funds to send back to Washington; usually choosing from programs they have not spent down—like the Congestion Mitigation and Air Quality (CMAQ); Bridge, and Transportation Enhancements (TE) programs that primarily fund non-highway projects. During FY 2006 Congress issued three separate rescissions totaling more than $3.8 billion. Nearly 60 percent of the recessions came from these programs despite the fact they made up only 20 percent of all funds.[112]

The state role in transit funding is complicated by the fact that thirty of them, unlike the federal government, prohibit the use of gas tax revenues for purposes other than road construction and maintenance.

The cost of construction materials has sky-rocketed

One real and growing concern with respect to transportation finance is the cost of materials for building, repairing, and augmenting our nation's transportation infrastructure. As economists from the Association of General Contractors (AGC) point out, there is no single measure that fully captures the change of costs for infrastructure.[113] However, it is generally acknowledged as a pressing problem.

According to a recent analysis of Consumer Price Index (CPI) data, the costs of transportation construction materials increased only modestly up until 2004. Since 2004, however, the costs of these materials—primarily steel, wood, and concrete—rose sharply especially in comparison to other items reflected in the CPI for non-construction items.

The reasons for these sharp increases—which are expected to continue in coming years—is largely attributed to the expanding economies and the demand for building materials is countries like China and India.

But these are not the only costs that are increasing. Land acquisition costs for rights-of-way, station and terminal locations, and other service facilities have become alarmingly expensive. Couple this with the increasing costs of transporting materials to construction sites due to the congestion in and around major ports, and it is clear to see why simply examining the costs of the materials is not sufficient.

IV. TRANSPORTATION, THE U.S. ECONOMY, AND THE METROPOLITAN PRIORITY

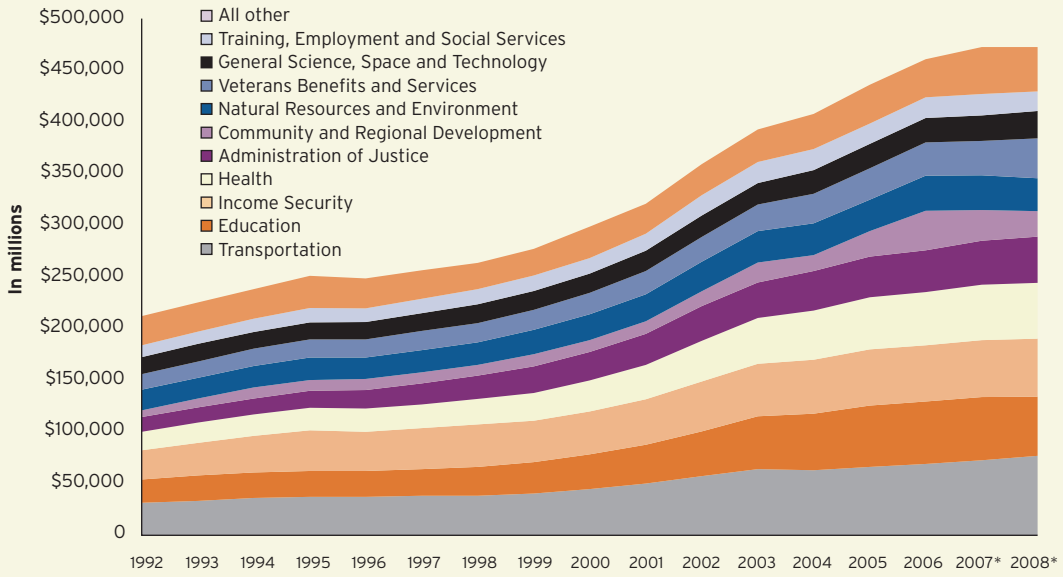
The federal transportation debate is frequently framed as an agent for economic growth. Much of this is intuitive. Transportation links people to jobs, facilitates the production of goods, and brings those goods to consumers. Only 27 percent of all personal trips are social or recreational in nature. Everything else is in some ways related to economic productivity, such as commuting and work related trips (17 percent of all trips), shopping and running errands (45 percent), and trips to school (10 percent).[1]

However, a good rule of thumb for policy makers to keep in mind is Joseph Giglio's admonition that "transportation systems (including roadways) exist to support the economy not vice versa."[2] That truism is often forgotten.

Simultaneously, we see that when ignored, transportation can also have broad negative impacts on the nation. For example, in some metropolitan areas like New York and Los Angeles congestion has become a drag on the national economy, especially in the dense urban core and in and around the ports. Personal spending on transportation is second highest household expense, and in some metropolitan areas like Houston and St. Louis consumers spend more on transportation than on shelter.[3] Greenhouse gas emissions, of which transportation is a major contributor, have significant costs to the economy in the U.S. and abroad.[4] In short, the economic impacts of transportation must be considered broadly.

One major deficiency in the research is that although there are many studies—and much rhetoric—showing that though transportation and the economy are related, the

Transportation made up the largest share of federal domestic discretionary spending in 2006.



*The * denotes estimated spending in 2007 and 2008.*
Source: Brookings analysis of Historical Tables, Budget of The United States Government (FY 2008), Table 8.7

causality is still generally unknown. For example, does a country begin to invest in transportation to boost its economy, or does a country first have to do well before it invests in its transportation infrastructure? In some respects it seems like it would have to be the latter because some transportation infrastructure is tremendously expensive.[5]

One study goes so far as to say that because of the difficulty in considering externalities and causality there simply is no estimate of the effect of transportation investment on GDP.[6] A review by the National Academy of Sciences of recent models for assessing the relationship between transportation and the economy found that there is a suggestion of a relationship but, they caution, the nature of this is tenuous.[7] Another found that transportation is highly susceptible to recessions and economic slow downs and slowdowns in the transportation sector tend to last longer than those in the overall economy.[8] This suggests that transportation reacts to the trends in the national economy, and not the other way around.

Nevertheless, there is no doubt that the transportation sector is quite large. A 2002 Eno Foundation study found that in 2001, total spending on transportation exceeded $1.5 trillion. Government expenditures make up only about 10 percent of this total and only about one-third of that is federal.[9] Yet, transportation made up the largest share of federal domestic discretionary spending in 2006. It held the top rank every year since 1992 (except for four years in the mid-1990s when it was a close second to income security).

The vast majority of expenses for transportation are from private vehicles (households and businesses) while roads are provided as a substantial public good. In fact, our road network—valued at over $1 trillion—is the nation's largest civilian investment.[10] Transportation itself is also a heavy consumer of products in other industries. About three-quarters of the rubber and lead used in the U.S. is used by transportation, as is 40 percent of plastic, and over one-quarter of the cement and steel.[11]

Looking back at the discussion that launched the interstates shows that the motivation in that era was largely economic.[12] Both President Eisenhower and the congressional committee set up to plan the interstates touted the economic impacts for the nation as a whole.[13]

To a large degree that investment has paid off and transportation investments historically have fostered large productivity gains. A major review of "a century of data" for the FHWA recently found positive relationships between public infrastructure investments and economic productivity—especially in the freight and industrial sector. The benefits and savings for trucking alone justify one-third to one-half of the federal highway investments between 1950 and 1973.[14] These investments largely took the form of the interstate system.

But the literature also shows that this exceptional productivity has not continued in recent decades as investments have lost focus and direction and failed to invest in key areas. A 2004 study found that the transportation investments the U.S. made in the 1970s generated an 18 percent return followed by a 5 percent return for 1980s investments, and only a 1 percent return for the 1990s. The authors speculate that this is due, in part, to the ineffectiveness of national transportation policy that results in poor project selection and pricing inefficiencies.[15] Other reports show similarly alarming declines over time.[16] The example of the interstates is illustrative here as 70 percent of the 42,500 miles proposed were in service by the end of 1970. By 1980 only 1,575 miles were left to be built. So it should come as little surprise that the return on investment in the years since then have been relatively lacking.

The sum and substance of this argument is that the first highways in an area provide massive benefits because they represent prioritized investments. They are theoretically the most important metropolitan investments necessary. The first road between A and B has a huge economic payback. The second (and third) roads have successively smaller effects. Other evidence shows that investments in metropolitan highways do have positive economic impacts on land prices, population, and employment changes near the project. However, those changes generally come at the expense of losses elsewhere in the metropolitan area.[17] It is largely a zero-sum game within metropolitan areas as economic activity is redirected from one area to the next, resulting in zero net national benefit.[18]

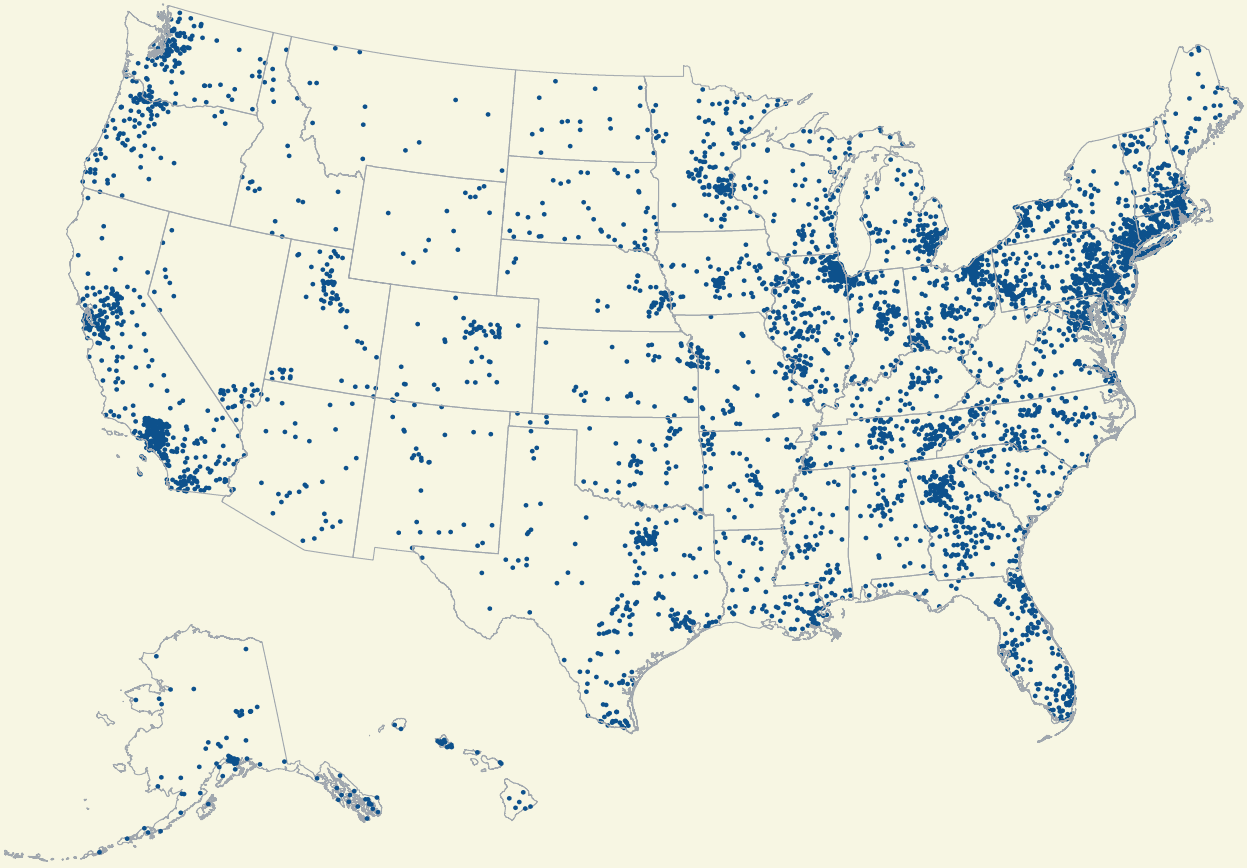
The conversation about transportation's impact on the national economy must go beyond the current narrow debate about spending levels.

Returning to an earlier vision of transportation's role and impact will require a sea change in thinking about where transportation dollars go and how they are invested.

For one, we need to rethink transportation spending as a short term stimulus for job growth.

Since the time when the interstates were finished transportation has become less about the national economy and more about job growth. President George H. W. Bush was widely quoted in 1991 when he said the federal transportation law he signed "could be summed up in three words: jobs, jobs, jobs."[19] In recent years the motivation for this job growth has been restricted to the relatively small confines of individual congressional districts. But as the Heritage Foundation points out in this context, "creating jobs is not the same thing as creating value."[20] Transportation spending is a very blunt instrument for job creation.

Only about half of the total funding from 2005 transportation earmarks goes to the 100 largest metropolitan areas.



Note: One dot equals one earmark project
Source: Brookings analysis of SAFETEA-LU, Public Law 109-59, various sections.

Yet even if the singular focus of the federal transportation program was to "create" jobs in the short term, there is doubt that even those investments are being done in an optimal way. During the 2003 federal transportation reauthorization debate, policy makers and others widely cited a FHWA economic model known as JOBMOD showing that every $1 billion in federal transportation investments resulted in the creation of 47,000 new American jobs. However, at least one analysis of this model shows that jobs vary considerably by investment type. The model shows that if the goal is to create jobs, then shifting spending to maintenance and repair, and public transportation would result in more employment.[21]

The federal transportation program must not be treated as a giveaway for special pork projects. There is little economic justification for a nation making broad transportation and infrastructure improvements in all places. Yet, that is exactly how the American transportation structure operates as we do not prioritize projects on the national level. SAFETEA-LU's entropic 6,373 earmarks and special interest giveaways have replaced and trumped any unified national purpose. The figure above identifies where these projects are located on the national map. Only about half of the total funding from these earmarks goes to the 100 largest metropolitan areas.

Rather than this hodgepodge of pork, the conversation about transportation's impact on the national economy must go beyond the current narrow debate about spending levels. It is not sufficient to simply know the value of an extra dollar invested in transportation. Although from a public policy perspective we need to know **where** (geographically), and on **what** (modally) to invest, it is also of paramount importance that the federal transportation program clearly articulate **why** and for what purpose investments are to be made.[22]

V. THE POLICY PROBLEM: FEDERAL TRANSPORTATION POLICY IS ABSENT, OUTDATED, AND UNDERPERFORMING

A growing mountain of evidence and analysis shows that the current slate of federal policies—and the lack of clear policy in specific areas—actually appear to exacerbate a range of transportation and related challenges.

Today the federal government has no comprehensive vision for the program, no sense of the spatial patterns of the economy, and decisionmaking still takes place in opaque and unaccountable ways. Moreover, those decisions that are actually open and visible are out of step with national interests. Alaska's infamous "bridge to nowhere" became a catch phrase for a political and decision making process gone wild. The result is that to many observers, the words "infrastructure" and "pork" are more commonly associated than the words "infrastructure" and "competitiveness."

This section discusses the major existing policy flaws.

1. FIRST, FOR THE VAST MAJORITY OF THE PROGRAM THE FEDERAL GOVERNMENT IS *ABSENT* WHEN IT SHOULD BE PRESENT, LACKING ANY OVERARCHING NATIONAL VISION, GOALS, OR GUIDANCE

The decades from the 1950s to the early 1990s were the halcyon years for highway planning and construction. The "interstate era"—the first era of the modern highway program—survived because of a broad consensus that was forged between transportation and political leaders, who were united in their belief that the highway system was essential and necessary to the health and security of the nation. As more than one observer has noted the need for the interstates was not controversial.

Historical accounts from this time suggest that President Eisenhower and his advisors were concerned that while the U.S. had the finest network of highways in the world, there were looming challenges. For one, they expected the U.S. population to reach 200 million by 1970. If so, the nation would need a functioning transportation system to solve myriad problems, including "metropolitan area congestion, bottlenecks, and parking."[1] These ideas electrified governors and other state officials from coast to coast who were otherwise unaccustomed to having a discussion about national transportation policy in such broad terms. However, by the end of the 1980s that consensus had all but disappeared with the completion of the interstates.[2]

It wasn't until 1991's Intermodal Surface Transportation Efficiency Act (ISTEA) that a compelling new purpose for national transportation policy was delineated beginning its second modern era.

When the interstates were nearing completion another national discussion about transportation was taken up by Senate leaders such as New York's Daniel Patrick Monyihan, Rhode Island's John Chafee, and House members like New Jersey's Robert Roe, Pennsylvania's Bud Shuster, and California's Norman Mineta. These architects of ISTEA offered a compelling new framework and clearly articulated a vision, purpose, and direction that resulted in the most important transportation bill in 35 years.

The initial statement of national transportation policy in ISTEA is worth restating here:

> *It is a goal of the United States to develop a national intermodal transportation system that moves people and goods in an energy efficient manner. The Nation's future economic direction is dependent on its ability to confront directly the enormous challenges of the global economy, declining productivity growth, energy vulnerability, air pollution, and the need to rebuild the Nation's infrastructure.*

Unquestionably that statement of policy purpose is just as salient today. Distressingly, 1998's Transportation Equity Act for the 21st century (TEA-21) did away with this declaration of policy, eliminated the purpose statement, and changed the "E" from "efficiency" to "equity" (referring to the equalization of state funding contributions.)[3] The policy purpose language was also omitted from the preamble of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005.[4] This seemingly arcane bit of trivia is actually quite revealing regarding its lack of clear federal policies and objectives.[5]

Put another way, the program does not recognize that there is a role for the federal government in areas inherently national in scope. This includes functional areas, such as the interstate system created by bold federal vision. It also includes the basic movement of people and goods across states and between metropolitan areas and mega-regions.[6] Today the nation has no overarching agenda or strategic plan for coping with the current challenges or projected increases in freight movement, or in how passengers will travel these longer distances.[7]

But the federal transportation program is also absent in providing leadership and direction on issues only addressable on the national level such as broad economic prosperity, environmental sustainability, and climate change, as well as safety and security. These issues transcend state and metropolitan boundaries and can only be dealt with on a large scale.

Instead, each reauthorization cycle is dominated by parochial interests around funding. In particular are the debates over donors and donees: the desire for each state to receive a level of federal transportation funding that matches the federal gas tax and other revenues that are collected within their state borders.[8] This approach is anathema to achieving a true national purpose and vision and turns the program into one of revenue distribution instead of one designed to meet national needs.[9] The U.S. Government Accountability Office (GAO) found that the federal transportation program is functioning to some extent as a "cash transfer, general purpose grant program."[10]

This approach is also remarkably inconsistent when compared to other recently federal reforms in welfare and education.

Unlike other major federal programs, transportation has not undergone substantial reform

Program	Preamble	Requirements/accountability	Yearly Spending ($ billions)
Welfare: Temporary Assistance for Needy Families, 1997	"To (1) provide assistance to needy families so that children may be cared for in their own homes or in the homes of relatives; (2) end the dependence of needy parents on government benefits by promoting job preparation, work, and marriage; (3) prevent and reduce the incidence of out-of-wedlock pregnancies and establish annual numerical goals for preventing and reducing the incidence of these pregnancies; and (4) encourage the formation and maintenance of two-parent families."	Recipients must work as soon as they are job ready. Single parents are required to participate in work activities for at least 30 hours per week. Failure to work can terminate benefits. States have to ensure that 50 percent of all families and 90 percent of two-parent families are participating in work activities.	$16.5
Education: No Child Left Behind Act, 2001	"To close the achievement gap with accountability, flexibility, and choice, so that no child is left behind."	Designed to improve the performance of U.S. primary and secondary schools by increasing the standards of accountability for states, school districts and schools, as well as providing parents more flexibility in choosing which schools their children will attend. Promotes an increased focus on reading and enacts the theories of standards-based education reform, formerly known as outcome-based education, which is based on the belief that high expectations and setting of goals will result in success for all students.	$13.0
Transportation: Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, 2005	"To authorize funds for Federal-aid highways, highway safety programs, and transit programs, and for other purposes."	For highways, program funds are allocated by formula. Project criteria and justification consists primarily of environmental measures; no requirement for cost effectiveness. Peer comparison is rare. Alternative comparisons are optional at state level. Information and data are difficult to access and unclear for the general public. For new fixed guideway transit projects federal oversight is intense as are requirements for multiple project criteria and justifications.	$47.7

2. SECOND, YET, WHEN IT IS PRESENT, THE FEDERAL TRANSPORTATION PROGRAM TAKES AN *OUTDATED* APPROACH TO THE CHALLENGES OF TODAY

As a program with its roots in the 1950s the federal surface transportation program is woefully outdated and cannot meet the challenges of the modern metropolis. There are several key problems.

a. For one thing, the federal government is still not attuned to the needs, problems, and challenges of metropolitan areas

The intent established in 1991 to elevate the importance of metropolitan decisionmaking to better align with the geography of regional economies, commuting patterns, and social reality has largely been subverted. Federal transportation policy has only haltingly recognized metros' centrality to transportation outcomes, and continues to assign states the primary role in transportation planning and programming

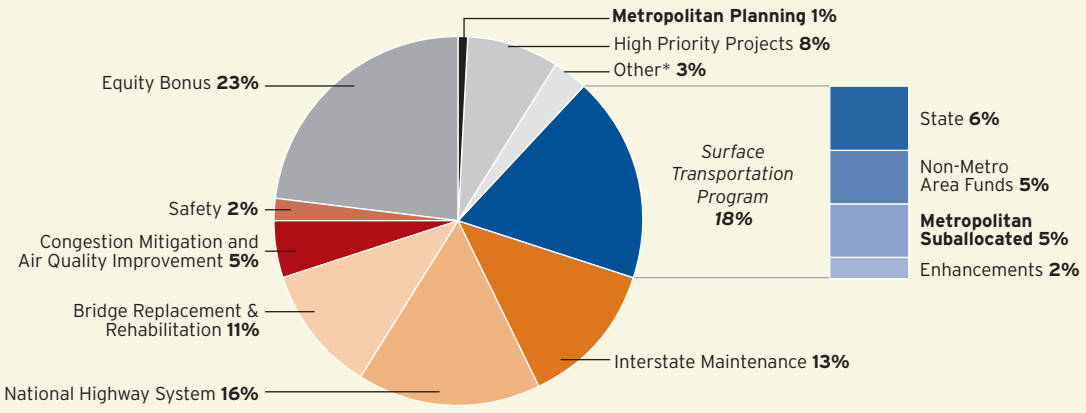
Left to their own devices, most states have not embraced the intent of federal law and have not devolved sufficient powers and responsibilities to their metropolitan areas. They remain the principal decisionmaker on transportation projects, including those within metropolitan areas. Many state DOTs still wield considerable formal and informal power and retain authority over substantial state transportation funds.

By the same token, the Metropolitan Planning Organizations (MPOs) have been dealt a weak institutional hand, and the visions and expectations for metropolitan decisionmaking were not accompanied by a supportive regulatory and funding framework.[11] The governor and state DOT still have veto authority over MPO-selected projects. The GAO found that although large MPOs (in areas with populations over 200,000) also have authority to veto projects, the reality is that the state receives and manages all the federal transportation money, as well as large amounts of state transportation money, and the state's political leverage is far greater than the MPOs.[12] Such arrangements create an unfavorable climate for the flowering of federal policy reforms and frequently cut against metropolitan interests.

Although the federal government is loathe to interfere with the project decisions of state DOTs, one recent example in Portland, OR shows that metropolitan area plans do not enjoy the same freedom. In response to that MPO's regional transportation vision the FHWA admonished the Portland plan for being too focused on "land use goals" and that "the plan should acknowledge that automobiles are the preferred mode of transport."[13]

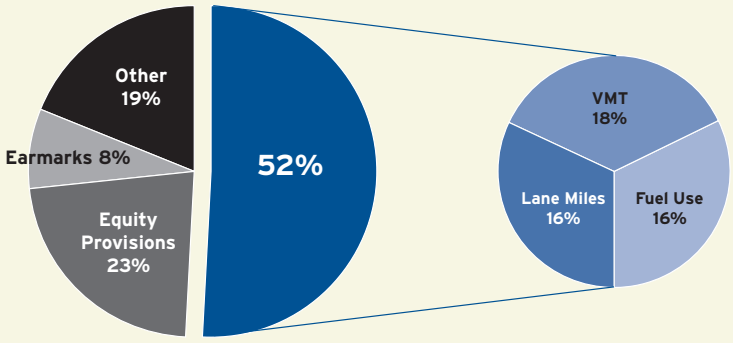
One positive step to enhance metropolitan decision

SAFETEA-LU's highway authorizations are made under a wide variety of rubrics



**Other includes 54 other items such as Safe Routes to School, Toll Facilities Workplace Safety Study, National Historic Covered Bridge Preservation*
Note: Spending depicted from FY2005-2009

More than half of the funds authorized in SAFETEA-LU are appointed to states based on the traditional factors.



Source: Brookings Analysis of Federal Highway data, FY 2005-2009

making was the suballocation of funds directly to the regional and local government structures initiated by ISTEA. This helped strengthen metropolitan areas by changing the decisionmaking body for a portion of the overall funding, giving local officials the ability to spend federal transportation funds based on the unique needs of their region. However, the reality is that these funds still make up only a very small share of the overall funding pie. Taken together, federal law only gives metropolitan areas direct control over a small share of road and bridge funding under SAFETEA-LU. This misalignment has led to a dramatic shift in the way funds are raised in major metropolitan areas as these places are increasingly turning to voter-approved "local option taxes" to pay for certain metropolitan-scale projects.[14]

Funding analyses in several states show how these biases harm metropolitan areas.[15] These areas contribute significantly more in tax receipts than they receive in allocations from their state's highway fund or through direct local transfers. In other words, although the donor/donee debate is alive and well on the national level *between* states, that same rationale—logical or otherwise—does not appear to have had anywhere near the same impact on spatial funding allocation within states.[16] A comprehensive analysis of metropolitan spending based on estimates of federal gas tax revenues generated found that U.S. metropolitan areas together were net donors of over $1 billion in transportation revenues from 1998 to 2003.[17]

This uneven allocation on the highway side—which is repeated in state after state, and metropolitan area after metropolitan area—is starving the older portions of our metropolitan areas areas. This at the very time when those places are struggling with the highest need for repairs and congestion relief, and are ultimately central to economic prosperity and growth in this nation.

b. Federal transportation dollars continue to be distributed to its grantees based on archaic funding and equity formulas

The formulas for allocating federal highway trust fund dollars are largely made on the basis of highway mileage and use. More than half of the funds authorized in SAFETEA-LU are appointed to states based on the traditional factors: amount of roads, miles driven, and fuel consumed and/or gas tax paid. Less than one-fifth comes from other measures of need such as number of deficient bridges, roadway fatalities, or population in air quality non-attainment areas.

While this may seem intuitive on some level, it also presents obvious problems in that it rewards those places with road expansions and high gas consumption. There is no reward for reducing consumption in any of these formulas. In fact, any investment in transit or promotion of land use to reduce fuel consumption or substitute for lane miles may result in fewer federal dollars

Partly as a result, transportation spending from all levels of government on new highway capacity increased $20 billion (40.9 percent) from $48.4 billion in 1997 to $68.2 billion in 2002. At the same time unfortunately, spending on maintenance and services only increased $6.4 billion (23.8 percent) from $26.8 billion to $33.2 billion.[18] This legacy of the Eisenhower interstates illustrates that our nation has done a good job in building new highway infrastructure. Fixing, updating, and modernizing that infrastructure is where the nation is falling short.

Some argue that the critique of these formulas is overblown because of provisions guaranteeing that states receive a portion of their highway trust fund payments back from Washington-currently at least 92 percent. Nevertheless, states that take steps to manage demand and/or reduce consumption receive fewer funds overall based on current formulas.

c. The federal highway and transit programs operate on an unlevel playing field

Another outdated flaw in recent transportation reform that adversely affects metropolitan areas is that the rules governing transportation policy continue to favor roads over transit and other alternatives to traditional highway building. As a result the metropolitan transportation system, which should serve as the connective tissue within and between metropolitan areas, is woefully incomplete. As discussed earlier, more than half of the largest metropolitan areas have inadequate transit service and very few have regular, reliable passenger rail service.

There is no doubt that the federal policies that govern highway, transit, and passenger rail projects are not equal. These modes, which federal law specifically expects to work together in the development of a balanced multimodal system, are treated differently. This unlevel playing field has profound impacts on metropolitan America and on how they structure their transportation programs to meet the economic, environmental, and social changes of today.

While states do not seek permission to build highway projects, this is dramatically different from the situation that applies when areas want to construct rail or certain bus projects. The U.S. DOT's program for identifying and funding new fixed guideway transit projects is known as the "New Starts" program. The program is totally discretionary and highly regulated by the DOT, and because of incredibly high demand, new transit funding is oversubscribed and competition for these funds is intense.[19] Projects must progress through a regional review of alternatives, develop preliminary engineering plans, and meet the DOT's approval for final design before final approval is given and the project is recommended for a multiyear "full funding grant agreement." And even then each project's share of federal funds is subject to the annual congressional appropriations process.

Another inequity exists in terms of the total percentage of costs the federal government is willing to contribute to highway and transit projects. As mentioned, ISTEA maintained an 80 percent funding ratio for formula and other discretionary programs but capped funding rates for transit New Starts at up to 80 percent of total project costs. In reality, actual funding rates are much lower. In 2002 Congress directed the FTA not to approve New Starts projects with more than a 60 percent federal share.[20] In contrast, highway funding continues to enjoy a federal matching ratio of 90 percent for improvements and maintenance on the interstate highway system, and an 80 percent rate for most other projects.

The high federal highway match also results in inefficient use of funds. States often use their own funds for the matching portion of highway projects, with little or no funding required from the local area. This can lead to inefficient use of federal resources and poor stewardship for federal investments in highways. In contrast, with their lower match, costs for most transit projects must be kept low as local sources of revenue must be identified, and commitments for operating costs and local shares of capital costs must be provided as a key project justification criterion. In the last year for which data is available, federal funds provided 40.6 percent of the capital funds used by transit agencies while state sources provided 11.6 percent and local sources provided 47.8 percent.[21]

Further unbalancing the playing field, the federal government actually removed the one requirement intended to result in better decisions. The 1991 federal law established the major investment study (MIS) process to provide a basis for reaching decisions by requiring a comprehensive analysis of all reasonable alternatives for addressing a particular transportation problem. ISTEA's metropolitan planning regulations required MIS analyses to evaluate the efficacy and cost-effectiveness of alternative investments or strategies in attaining local, state, and national goals and objectives. The MIS considered the benefits and costs of investments related to such factors as mobility improvements; social, economic, and environmental effects; safety; operating efficiencies; land use and economic development; financing; and energy consumption. However, TEA-21 eliminated the MIS as a way to determine benefits and costs of major transportation investments.

Taken together, these biases ensure that state transportation policy pursued under federal law works against many metropolitan areas' efforts to maintain modern and integrated transportation networks.

d. The policy framework for the intermetro passenger rail continues to be the 1970 law that reorganized the network

The National Railroad Passenger Corporation—known as Amtrak—is in disarray as it continues to operate under the 1970s Rail Passenger Service Act that created it from private rail companies' passenger service. Private railroads retained control of profitable freight service.

Since Amtrak is neither a publicly traded private corporation, nor a public entity, its results are not subject to normal accountability mechanisms. Since it is not an instrument of the U.S. government, it not subject to federal disclosure requirements or the Government Performance and Results Act, nor is it answerable to shareholders, like other companies, or Securities and Exchange Commission reporting rules.[22] Since Amtrak has never enjoyed full support of any presidential administration, it does not have the certainty of funding to conduct strategic, long-range planning.

No doubt Amtrak has received significant public subsidies since its creation in 1971. But the $30 billion Amtrak received in that time pales in comparison to what the airlines have received. First, airlines received nearly $15 billion in direct subsidies following 9/11 – and several are still facing financial ruin.[23] Also, according to the GAO, general fund revenues have composed on average 20 percent of the Federal Aviation Administration's (FAA) budget since Fiscal Year 1997.[24] With the FAA's average annual budget exceeding $10 billion, the total general fund contributions were at least $20 billion over those ten years. Further intensifying the discrepancy, the airline industry supports a proposed additional $40 billion in subsidies to upgrade its air traffic control system.[25] This number dwarfs the $11.4 billion in total, six-year subsidies for Amtrak recently passed by the Senate.[26]

e. The federal program has not embraced market mechanisms or a range of pricing schemes to better operate and manage the system

Economists have long criticized the current system of roadway pricing contending user fees should be structured such that those levied on different classes of vehicles reflect the costs borne by governments to provide those vehicles with the opportunity to travel.[27] One such study found that single-unit trucks weighing more than 50,000 pounds contribute in user fees only 40 percent of the estimated costs of their use. Autos contribute 70 percent of their costs; pickup trucks and vans, 90 percent; and single-unit trucks weighing less than 25,000 pounds contribute 150 percent of their costs through the taxes and fees that they pay.[28]

Another found that even though the gas tax is commonly considered a "user fee" drivers only pay about 80 percent of the costs of the roadways. This does not even account for the external costs of driving.[29] Other studies show this is true within many states.

If charges were levied fairly in proportion to the costs imposed by vehicle type and those charges vigorously enforced, and if roads were constructed to more demanding standards, savings in road maintenance and replacement costs over time would be great enough to permit lower user fees for all classes of vehicles. But getting the prices right also means taking into account the range of impacts such as social costs and environmental impacts on climate change. For example, though the 1978 Energy Tax Act established a "Gas Guzzler Tax" on fuel inefficient vehicles, personal trucks such as pickups and SUVs are exempt.[30]

The expanded use of tolling and other market mechanisms is, as discussed above, an effective and practical solution for mitigating the growth in congestion. Sir Rod Eddington called congestion pricing an "economic no-brainer."[31]

3. THIRD, THE LACK OF A 21ST CENTURY APPROACH TO GOVERNMENT MEANS THE PROGRAM IS *UNDERPERFORMING* AND FAILING TO MAXIMIZE EFFICIENCIES

The federal government is not getting the most out of its $286 billion investment in transportation.

Without a vision, goals, purpose, or means for targeting, the U.S. approach to transportation has been to keep throwing money at its problems. While additional sources are important, little attention is being given to managing the demand for revenues, how existing funds are spent and for what purpose, or how these spending decisions affect our metropolitan areas and ultimately the economic, environmental, and social goals of our nation.

There are five factors in which the structure and the implementation of the program weakens its effectiveness overall.

a. The federal transportation program has almost no focus on outcomes, performance, or accountability

Although the U.S. DOT outlined appropriate performance measures as required by the Government Performance Results Act, it cannot hold the recipients of federal highway funding accountable for their performance, nor is funding linked to success.[32] This undercuts the viability of the national program.

To be sure, SAFETEA-LU outlines criteria to be "considered" in the metropolitan and statewide planning processes—and could, if adhered to, improve the quality of transportation planning and spending in metropolitan areas.[33] However, SAFETEA-LU's additional funding does not hold states accountable for their performance regarding these factors. In fact, few performance standards were imposed.

Currently, MPOs that receive federal funds are evaluated every four years to determine their minimal consistency with the Civil Rights Act, the environmental justice executive order, and the Americans with Disabilities Act. Any MPO that is not certified can lose up to 20 percent of its federal funding, though no MPO has ever done so. State DOTs, on the other hand, are not subject to certification by the federal government. Statewide transportation improvement plans are to be developed every four years to ensure compliance with the planning factors outlined in the law. However, there is no stated penalty for disapproval of the plan, nor is the failure to consider any factor reviewable in court.

It is important to note that this is not true among all agencies within the U.S.DOT. The National Highway Traffic Safety Administration (NHTSA), for example, has incentive programs and links funding to goals such as increased use of set belts. States have responded to these federal incentives and as a result, 49 states now require vehicle occupants to wear them.[34] In 1984 Congress gave the U.S. DOT the authority to withhold up to 5 percent of federal highway funding from states that did not adopt a minimum 21-year-old drinking age. And in 2003, the nation adopted a blood alcohol level standard to attempt to deal with the problem of drunk driving.[35]

By contrast, the states do not seek permission to build highway projects. Once funds are appropriated, the states can distribute them among projects as they see fit. In fact, the U.S. code neuters the federal role and specifically says that the appropriation of highway funds "shall in no way infringe on the sovereign rights of the states to determine which projects shall be federally financed."[36] The states themselves often do not use formal benefit/cost analysis in deciding among alternative projects and regular evaluations of outcomes are typically not conducted.[37] Amazingly, states do not even have to build over 5,600 of the projects (including the 5,173 "High Priority" projects) that are earmarked specifically in the federal law because the states are allowed to shift the funds to any other project in such section in the same state.[38]

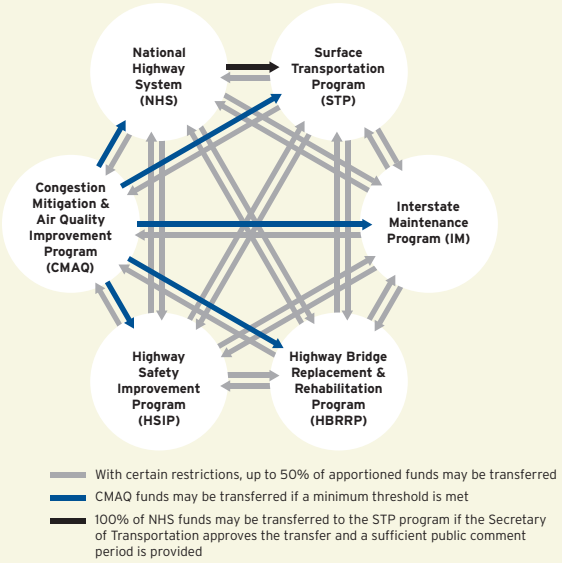
Nor has there been any real attempt to determine the effectiveness of the federal highway program. The 2007 analysis by the Office of Management and Budget points out that there are "no comprehensive and independent program evaluations currently scheduled for the federal-aid highway program, nor have any been completed as a routine measure." They go on to say that it is unlikely that such a study will be conducted.[39]

b. Such analytical exercises are largely impossible due to the astonishing lack of data and information

The federal program does not sufficiently collect, use, or analyze data and information about the transportation system. Although it is imperative that public expenditures are measured and defensible given increased spending scrutiny and tighter budgets, the current state of federal transportation data is woefully inadequate and outdated in terms of its technological reach. The GAO argues that "improvements in data, performance measures, and evaluations are needed to determine whether programs are achieving intended results."[40] Yet credible data largely does not exist on the conditions, operations, benefits, cost, and performance of our transportation network. Without solid data and information transportation decisionmaking is often made based on ideology, rather than solid facts. As former U.S. Deputy Transportation Secretary Mortimer Downey described it, when it comes to transportation policy, "We are flying blind."[41]

The federal government requires states to build and maintain the nation's roadway network, but it does not require them to provide the public with accessible,

States can transfer federal transportation funds multiple ways



Source: U.S. GAO, "Restructured Federal Approach Needed for More Focused, Performance-Based, and Sustainable Programs," GAO-08-400, p 22.

detailed information about state investment decisions using those funds. It is far easier for citizens to discern where private banks and thrifts lend (thanks to the federal Home Mortgage Disclosure Act) than to determine where public transportation agencies spend. The tools that are employed today for tracking federal transportation spending are archaic and out of step with today's needs and are unequipped to handle performance data. The FHWA information system only tracks costs for contracts, not for projects.[42] The information that is readily available, such as the FHWA's highway statistics series, is not complete at a governmental level smaller than the state.

Ultimately this lack of transparency reduces the ability of employers, workers, and citizens in general to influence the regional transportation systems that so strongly shape economic competitiveness, environmental quality, and the nation's quality of life.

c. The substantial flexibility in the program is not accompanied by reciprocal performance or accountability

The framers of the "flexible funding" provisions of ISTEA intended to give planners and decision makers at the state and local level the authority to transfer funds between a range of programs, with the direction of the transfers unspecified, but to be determined based on locally-defined goals. Among other things, this freedom of financing greatly assists in the consideration of alternative solutions in order to achieve a more balanced transportation network.[43] However, by not requiring transparency in the process of selecting projects, nor accountability for the results in system performance, the end result of this flexibility has been to weaken the purpose and design of these programs.[44]

For example, up to half of the funds states receive under the Interstate Maintenance program (a program singularly focused on fixing the existing interstate system) and all of the funds in the National Highway System can be transferred to the Surface Transportation Program whose funds can be used for almost any conceivable transportation purpose. According to the GAO, states have this broad flexibility for over half of their federal highway dollars.[45] If the federal program were outcome-oriented and performance-based this kind of flexibility would be useful to achieving goals. But under the current system it actually exacerbates the lack of federal oversight.

d. Guaranteeing a minimum level of funding undercuts efforts at accountability

One of ISTEA's legacies was to ensure that states received a certain amount of funding based not on needs but rather on their share of contributions to the federal highway trust fund. This guarantee inhibits the possibility of a new framework for accountability, tighter disclosure requirements, improved performance measures, and rewards for exceptional performance.

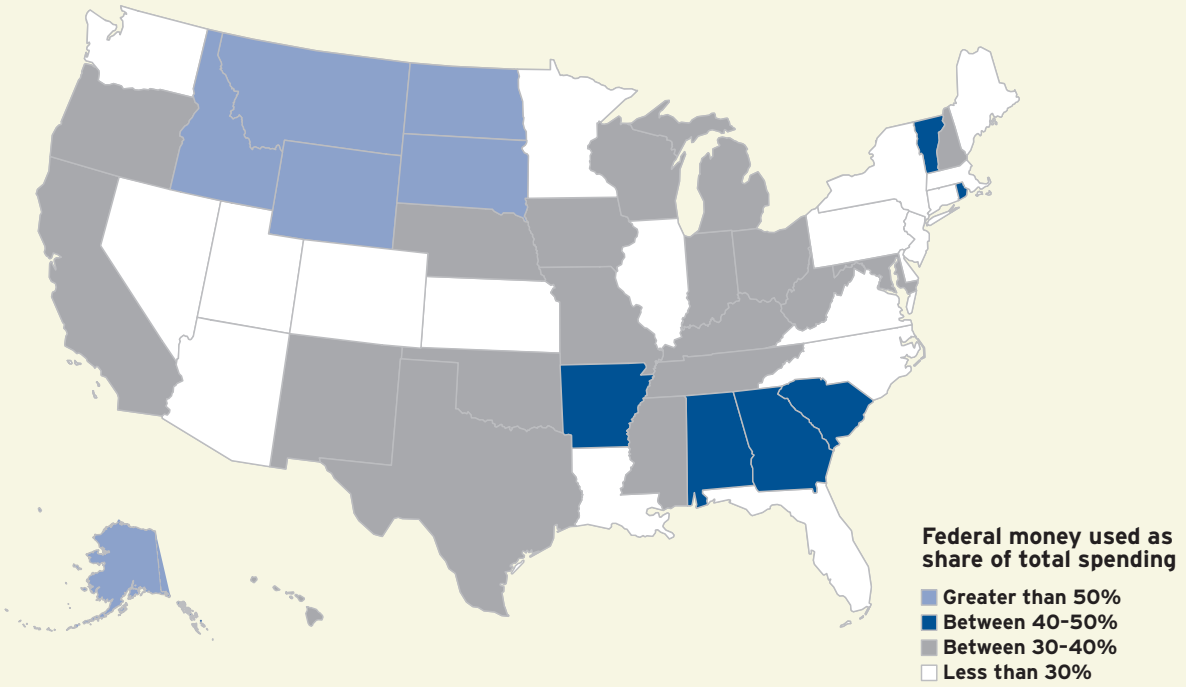
One potential problem is the issue of a "substitution effect" where federal funds—such as the gas tax—are increased the states may reduce their own contributions or shift state resources to other areas.[46] It is important to note that comprehensive analysis of the literature contends that the substitution effect "is not a major concern."[47] Nevertheless, the latest data shows that between 1995 and 2005 six states—Alaska, Idaho, Montana, North Dakota, South Dakota, and Wyoming—relied most heavily on the federal government for the revenues they used for state-administered roads and bridges. The map following shows that only 19 states generated more than 70 percent of their funds from their own sources.

e. Federal policies are highly compartmentalized and often work at cross-purposes

Failing to recognize that transportation is means to an end, not the end itself, policies remain rigidly stovepiped and disconnected. This is a very different approach from how localities function and is out-of-step with metropolitan innovations to connect transportation investments with other policies such as housing, environment, and growth and development.

Although our nation's federal housing program (as articulated in the U.S. Department of Housing and Urban

States often use federal monies for state-administered highways



Source: Brookings analysis of Federal Highway Administration, Highway Statistics, table SF-3 1995-2005.

Development's current strategic plan) has bold goals to increase homeownership opportunities, promote affordable housing, and strengthen communities, our federal transportation policies do not directly support those goals and arguably undermine them. Three of the four appropriating and authorizing committees and subcommittees in Congress have both the words "housing" and "transportation" in their name. Yet the reality is that those areas of domestic policy are rarely, if ever, considered together.

For example, while federal transportation policy continues to disproportionately invest outside of the core areas of metropolitan America, federal housing policy continues to favor the concentration of affordable housing in central cities. Also, by making half of the transportation funding formula based on vehicle miles traveled, lane miles, and fuel use, the federal government is in effect rewarding those states and metropolitan areas that *increase* their greenhouse gas emissions. This at a time when reducing those emissions and driving down the length and frequency of travel are emerging as a key national goal. And similar to the inconsistencies with the federal housing program, the U.S. Environmental Protection Agency's strategic goals to clean the air and address the problem of global climate change, promote clean and safe water, promote land preservation and restoration, and foster healthy communities and ecosystems is not necessarily supported by our transportation policies.

Lastly, even the modes within the federal transportation program are hampered by lack of connections and cohesiveness. By failing to link the nation's separate aviation, rail, transit, and passenger rail networks the U.S. remains the only industrialized country that has not taken an integrated approach to transportation policy. We do not even have a unified trust fund on the federal level. The federal highway trust fund, which is the source for the surface transportation program is split into a "highway account" and a "transit account." Because these accounts are split in this manner, the Bush Administration's FY 2009 budget was able to propose transferring some $3.2 billion from the transit account to fund highway programs to cover the looming shortfall on the highway side of the ledger.

Such rigidity not only undermines metropolitan areas but it hampers our economic, environmental, and social equity goals more broadly.

VI. POLICY RECOMMENDATIONS: A TRANSPORTATION AGENDA FOR A PROSPEROUS AMERICA

One thing is abundantly clear: If national transportation policy is going to achieve critical national objectives (e.g., advancing competitiveness, promoting sustainability, enhancing security) in an era of fiscal constraints it is going to need to prioritize. Such a development would be the opposite of what has occurred the past several decades, which have seen dollars sent in all directions as the result of a "log-rolling" exercise based more upon political dynamics than on national interest.

The current system is fundamentally broken and major, not incremental, solutions are required to implement next generation solutions. Transportation policy is littered with small, precious, ill-funded efforts to address everything from metropolitan congestion, to deteriorating air quality, to spatial mismatch, to funding concerns. We need to throw out the 1950s-era transportation program and replace it with one that reflects the distinctive realities of our moment: fast-moving, hyper-competitive, super-volatile, and metropolitan-focused. The starting point from the *Transportation for Tomorrow* report is exactly right: **We need a new beginning**.

This, then, is a call for substantive reform. Transportation policy and program governance currently favors par-

ticular modes but is indifferent to substantive outcomes. We propose the reverse: a single minded focus on achieving declared national priorities and indifference to the modal means of achieving them. The nation should settle for nothing less than evidence-based, values-driven decisionmaking.

The political obstacles to such a targeted and purposeful national transportation policy are more difficult than those for particular policy tools. Yet the challenges discussed previously are not resolvable through micro initiatives. It will only come through systemic change in the way we think about, design, and implement transportation policies and how we connect those policies to other aspects of sustainable metropolitan growth: housing, land use, and economic development. Substantial federal foresight is essential.

This means the development of a three-pronged strategy for our national transportation program. First, the federal government must lead where there are clear demands for national uniformity or else to match the scale or geographic reach of certain problems. Yet there are other aspects of transportation policy where metropolitan areas should lead—where we should, in essence, "flip the pyramid," and put the federal government squarely in the service of state and local leaders whose quintessential knack for solving problems are driving this country forward. Finally, the federal government needs to re-orient transportation policy to remedy the mistakes of the past and establish a coherent performance-measured and outcome-based program for the future.

Above all, the national goal should not be a transportation goal, nor should it be to deliver transportation projects faster. Transportation is a means to an end, not the end itself. The following recommendations are based on that fundamental premise.

National Infrastructure Investment Strategies

Due to divergent issues like failing infrastructure grades across the county and general frustration with Washington, public officials across the political spectrum recognize the serious problems with our national transportation policy framework.

- Pennsylvania Governor Edward Rendell, along with California Governor Arnold Schwarzenegger, and New York City Mayor Michael Bloomberg, formed a coalition, "Building America's Future," to assemble support for a renewed federal commitment to infrastructure.
- Leveraging the centennial anniversaries of two great national infrastructure initiatives, Oregon Congressman Earl Blumenauer and America 2050 are calling for the creation of a broad infrastructure investment plan for the nation that includes key national transportation priorities such as interstate goods and passenger movement.
- Several of our international contemporaries have already initiated national transportation reinvestment plans. Recommendations from Australia's National Transportation Council present a model for creating a national transportation commission that recognizes the need for coordination within a republican government. Canada's *Straight Ahead* transportation plan offers a legislative blueprint to promote market competition, emphasize multimodal investments, and coordinate transportation policies with interrelated objectives like environmental sustainability.

1. THE FEDERAL GOVERNMENT SHOULD *LEAD* THE NATIONAL TRANSPORTATION PROGRAM BY DEVELOPING A COHERENT NATIONAL VISION AND IDENTIFYING STRATEGIC NATIONAL INVESTMENTS

Rather than writing blank checks with no purpose or accountability, the federal government should take a strategic and rigorous approach to transportation policy making. It must no longer focus solely on funding individual states or singular needs. The focus of the federal program should be on solving problems and on investing in infrastructure and the competitiveness and environmental sustainability of the nation.

This new paradigm must be rooted in the empirical reality of a changing nation and a globalizing economy. It must be grounded in what we know about the relationship of infrastructure to community building and economic prosperity. It must be cognizant of what other nations are doing, particularly in the industrialized West. And it must be respectful of the wide variance in population and economic growth between the disparate parts of our nation.

The vision should identify strategic infrastructure investments that are of critical importance to national economic competitiveness. The identification of these important federal investments should be based on the overarching vision and the result of a collaborative process of congressionally-appointed civic, corporate, and

elected leaders. In this regard we concur with the *Transportation for Tomorrow* report that Congress should authorize a permanent, independent commission to identify, describe, and map specific priority projects with Congress having the right to vote up or down on the map without amendment. The model is the successful Base Realignment and Closure Commission and the Postal Regulatory Commission.[1]

The **Strategic Transportation Investments Commission (STIC)** would develop a national priority map that would become the basis of a multi-year federally driven program with each specific project prioritized on a cost-benefit basis taking into account multi-modal interactions. The goal of the STIC would be to take a national perspective, as opposed to one based on congressional jurisdictions, and determine which investments are truly national in scope, scale, and return and deserve special federal attention.

The charge of this commission is more limited than that proposed by *Transportation for Tomorrow* which recommended a commission to develop the nation's vision, evaluate all projects, and determine the best ways to pay for them.[2] In this case, instead of focusing on all specific investments and *projects* that use federal money, the STIC would focus on three specific *program* areas of national importance: the preservation and maintenance of the **interstate** system, the development of a true national **intermodal** freight agenda, and a comprehensive national plan for **inter-metro** area passenger travel.

a. Protect the existing asset by making the preservation of the interstate highway system a priority

The 46,000 mile interstate highway system should be considered a critical federal responsibility. The maintenance and preservation of this vital asset should be the primary target of federal dollars.[3] The federal focus on the existing interstate system could serve as the basis for a re-energized federal program by requiring the STIC to identify those specific places most in need of targeted federal attention.

At its core, this strategy entails the most essential responsibilities such as ensuring the interstate network meets basic safety and security standards and that pavements are of acceptable ride quality. There is no reason why the United States should not strive for broad and ambitious safety goals. Several major industrialized countries (e.g., Sweden, Netherlands, U.K.) have made the drastic reduction of transportation deaths and injuries a major goal, for example.[4] It also demands full scale deployment of advanced (but relatively inexpensive) telecommunications technologies to operate and manage the existing system better, respond to incidents faster, and generate data and information.

Replacement and upgrading of existing interstate highway infrastructure is not insignificant, particularly in metropolitan areas with aging freeway systems. This money should be spent efficiently and wisely. The 2006 *Conditions and Performance Report* found that preservation and upgrades of the interstates would cost between $9.3 and $12.3 billion over the 20-year period from 2005–2024. This figure includes system rehabilitation as well as safety, telecommunications, and environmental enhancements.[5]

Expanding the existing interstate network effectively doubles these estimates. Therefore the process used to assess the expansion of the interstate needs to be substantially improved and must be subject to rigorous cost effectiveness hurdles that include externalities such as potential increases in greenhouse gas emissions. The STIC should evaluate proposals for system expansion competitively and federal funds should be directed to projects where there is a clear demonstration that they will return value for money, the same it currently is for transit projects.

The focus of the potential expansion should be to uncork bottlenecks to slow the growth in metropolitan congestion. As mentioned, recent research shows that major bottlenecks and clogged highway interchanges are major sources of the congestion problem. The federal government should focus on providing support for untangling bottlenecks of national significance as identified by the STIC. The STIC would need to **identify those bottlenecks most appropriate for federal attention** based on a comprehensive and competitive analysis of problem areas and an accompanying benefit/cost analysis. In this way, the solutions would not mean large scale reconstruction in all cases. Instead, technological fixes, minor augmentations, and other strategies can be used, depending on the project. Building smart should also mean building small.

The STIC should also identify those portions of the interstate system that, because of employment and residential decentralization, no longer serve central transportation goals and are capable of being **decommissioned or downsized**. In center cities and older suburbs the land reclaimed can be leveraged for its market and redevelopment potential. A transformational transportation infrastructure effort, similar to HOPE VI, should be initiated and targeted to economically struggling places where interstates slice through cities such as 1-81 in Syracuse which cuts off University Hill from downtown. The options here are many: cities like Forth Worth have relocated a portion of their interstate away from downtowns, Providence turned one into a human-scaled boulevard, others like Seattle, Phoenix, San Diego, and Hartford have capped their downtown interstates with decks, reclaiming the land for parks, museums, schools, and housing. The effort should be pursued as a public-private partnership

with all appropriate levels of government as well as land owners, developers, and other not-for profit community development organizations.

b. Focus on key freight hubs and trade corridors and develop a meaningful intermodal freight agenda

The national economy is increasingly dependent on trade and just-in-time deliveries and the modern logistics systems that can ensure the efficient operation of supply chains for freight movement that are essential to prosperity. The future economic success of the nation is dependent on the ability to move goods through and between our major metropolitan areas.

However, America's transportation hubs and corridors are under severe stress. Increases in global trade are taxing the nation's current network of airports, seaports, rails and roads. And while each of these modes are working with increasing interdependence the lack of a unified freight strategy has only exacerbated our nation's ability to manage and strategically invest funds. As a result responses are uneven and although congestion is severe in some metropolitan areas we have excess capacity in others. It is no surprise then that several of the early calls for a national transportation vision focus on critical freight corridors between metropolitan areas.

Certainly this is an area where the federal government must lead. Although the federal role in overseeing interstate commerce has changed over the years fostering a productive economy is still a key purpose of national transportation investments. This transcends traditional borders, decisionmaking structures, and industry clusters. The freight transportation industry is highly decentralized with private operators owning almost all of the trucks, rails, and the public sector owning the roads. Given the complexities of the industry, considerable federal leadership is essential.

At the national level, strategic corridors have been identified on a modal or earmarked basis to improve the movement of freight. In addition, newer federal funding mechanisms offer some promise for multimodal freight efforts and regions have used federal funds as well as innovative financing to advance important initiatives such as cleaning up some ports. The federal roles in regulation, safety, and security continue to help ensure those aspects of the nation's freight system.

But there is much more to do. The federal government, in collaboration with states, metropolitan areas, the freight-rail industry, and shippers should develop a comprehensive **National Freight Transportation Plan** as a framework for goods movement policy and investment that spans all modes. It should be a component of the overall national vision—not separate from it. It should go beyond traditional approaches and traditional measures to take into account environmental and social impacts in addition to economic realities. Without factoring the full scope of impacts, the economic benefits are likely to be overstated.

The bottom line is that the U.S. needs a freight system that can reach globally, be efficient and effective domestically, and be responsive to community concerns about quality of life, safety, security, and the environment. Three discrete, but related, strategies are recommended:

First, there is broad understanding that truck traffic accessing and departing metropolitan area seaports is a major source of congestion in these places. Yet without a visible constituency group the attention to the "first mile" connections these vehicles need is disproportionately small. The federal government should take on the responsibility of **improving these intermodal connections** for efficient and reliable port access. These relatively short connectors would link existing interstates with port terminals (both air and water) to ensure the efficient movement of goods and, in some cases, relieve the burden of this traffic from local neighborhoods. The precise projects would be identified and measured by the STIC and subject to benefit/cost analysis and performance-based outcomes that include environmental and social measurements.

These connectors should take the form of either rail shuttles to distribution hubs or truck-only toll lanes since they are the primary beneficiaries of the improved facility. A recent NCHRP analysis found that this network would require the addition of 400 lane miles of interstate (100 center line miles). They estimate the costs to be about $12 billion in current dollars.[6] Public/private partnerships have already been used for such projects in metropolitan Los Angeles, Miami, and Savannah. A good place to start is to build off the current federal effort, the Freight Intermodal Distribution Pilot Program. The pilot is woefully underfunded only at only about $5 million per year, all of which is earmarked.

Next, to ensure efficient movement of goods, the STIC must also **identify freight gateways and corridors of national significance**. Prime candidates are the congested ports in the largest metropolitan areas such as Los Angeles, New York, Seattle, and Chicago. Investments in these corridors should be a matter of federal attention. In this way it should build off of the FHWA's Freight Performance Measures Initiative and prioritize corridors on a benefit/cost basis that would include all modal options. As with the intermodal connectors analyses should include economic metrics such a increasing the velocity of freight movement but not be limited to that frame. Thus major investments in supertrade corridors would not necessarily be favored over technological fixes, or minor augmentations. At the same time, the federal government should be taking steps to help America's intermodal ports shed their reputation as gross polluters. This requires not only the maximum use of freight rail as possible, but also the employing machinery that utilizes alternative and efficient fuels. Freight planning should include specific goals to reduce freight VMT by shifting to rail.

Finally, the federal government should **encourage collaboration and coordination among public agencies within these corridors and hubs** of national significance and where major multijurisdictional projects are under consideration. Federal funding should be contingent on proof of local and state agency collaboration, coordination and agreement on key initiatives. Planning in these megaregions that cross state and MPO administrative borders should involve all modes of transportation, including highway, transit, airport, rail, and port links.

c. Commit to a comprehensive national plan for inter-metro area passenger movement

The third area where the federal government must lead is in developing a fundamentally new and bold national plan and strategy for inter-metropolitan area passenger travel. In 2003, Congress missed a prime opportunity to consider the statutes governing surface transportation policy (highways, transit, rail, aviation) during the same session. As a result, the United States is still the only industrialized country in the world that has not pursued an integrated approach to transportation policy.

This ignores both travel and political reality and perpetuates the inefficient and ineffective modal silos that separate aviation from rail from highways and hampers their ability to work together to provide convenient and reliable options for movement between metropolitan areas and in high-growth mega regions. The triple crises of our congested highways, the outmoded aviation system, and the inadequate passenger rail network can be better addressed though an integrated and holistic national approach that the federal government must lead.

Investing in 21st Century Port Infrastructure

Many of the nation's leading transportation gateways, whether through sea or air, are beginning to invest in their intermodal connections. Using numerous mechanisms and arrangements to meet their construction finance needs, these localized projects operate like a veritable lab for governments and other port facilities to learn which options might work best for them.

Miami is in the process of awarding a concession agreement to construct a tunnel between downtown and its port. This tunnel will extend the local interstate to the port, thereby separating port traffic from congested city streets. Financially, the concession agreement shifts a significant amount of the $1.2 billion project's risk to the concessionaire and ensures the Florida DOT will only make payments concordant with the project's condition and performance.

The Alameda Corridor, a rail expressway connecting the ports of Los Angeles and Long Beach to transcontinental rail yards near downtown Los Angeles, was a partnership between the port authorities, railroad companies, and government at the local, state, and federal level. These two ports are the major gateways to Asian markets, and as such it was determined that an efficient connection to all domestic markets via Los Angeles' primary rail facility was mandatory. The project cost over $2 billion and elected to use container fees to finance the debt, which is turning out to be a deft move: the repayment schedule is currently ten years ahead of schedule due to unexpected cargo levels.

Another rail project is the upgrading of the Heartland Corridor, which connects Columbus, Ohio to Hampton Roads, Virginia. The agreement between the FHWA, three states, and Norfolk Southern Rail is expected to reduce truck traffic in Virginia and reduce delivery times by up to one day between the mid-Atlantic and the Midwest. The deal also works in concert with an arrangement between Norfolk Southern and the Columbus Regional Airport Authority that constructed an intermodal facility adjacent to Columbus' airport.

Bold Inter-Metropolitan Area Passenger Rail Plans

When it comes to comprehensive planning for inter-metro connectivity, there is no doubt that Europe is the current world leader. Its Trans-European Transport Network, or TEN-T, is a collection of modal networks that are centrally coordinated to enhance connectivity between the metropolitan centers throughout Europe. The network carries more than half of all European freight and passenger traffic, making it a significant contributor to European economic prosperity. In 2005 TEN-T elected to expand its focus from the original fourteen projects and corridors to thirty. These projects vary in mode and scope, but all maintain the common thread to enhance connectivity while taking advantage of the particular characteristics of each area. TEN-T figures that completing this work will lead to annual benefits of $12.6 billion for regional transportation alone, as well as significant reductions in transportation-related emissions.

The first order of business is for the federal government to integrate inter-metropolitan area passenger travel as part of the national vision. Since the nation is already well-connected between metropolitan areas by both highway and aviation infrastructure a key component of this recommendation is a **re-thinking of inter-metropolitan area passenger rail** (Amtrak). The current structure is unaccountable, financially unstable, and an institutional monopoly. Correcting these mistakes is of paramount importance, and all ideas should be considered, taking into account the differences between metropolitan areas based on distance, growth rates, and potential market demand. Some solutions will be more applicable in certain metropolitan areas or mega-regions than in others and should consider sharing of freight right of way, identifying where high speed rail is appropriate as opposed to conventional rail, and integrating the nodes with higher density land uses.

Metropolitan areas within 500 miles of one another should be the targets for a re-invigorated rail network that expands options, mitigates the growth in highway traffic, and relieves congestion in crowded airports—particularly along the coasts. A Passenger Rail Working Group (PRWG) analysis showed that leading candidates would include mega-regions in California, the Northeast, the Piedmont, and the western Great Lakes.[7]

A strong federal/state partnership with metropolitan area leaders and regional transit providers may make sense in the jurisdictionally fragmented Northeast mega-region where the rail tracks are dedicated to regional as well as commuter rail travel. In others, including California and Florida, where new rails and rights-of-way are needed, public/private partnerships could be catalyzed for investments.[8] In others, such as the Chicago metropolitan area, careful consideration and planning with freight rail providers may result in a different arrangement.

The plan should also focus on a "system of systems" for surface transportation by fully **integrating the rail network into existing air and road transportation networks**. Doing so would improve landside access to metropolitan airports (or, "travelports") to enable them to flourish as hubs of regional economic activity.[9]

The STIC should designate these critical corridors that are most in need of national attention. These investments would also be subject to benefit/cost analysis and outcome measures that go beyond traditional measures like number of passengers or cost effectiveness and consider energy and environment, access and social benefits, land use and others (see discussion about performance measures). Like the rest of the transportation program federal spending on inter-metropolitan area passenger travel—including rail—must be subject to the Government Performance and Results Act.

Irrespective of the specifics a national plan must recognize the key role state and metropolitan partners will play in the system of the coming decades. In this regard inter-metropolitan area passenger rail should be **eligible for the broad flexible funding provisions** that govern the rest of the federal transportation program. If states and metropolitan areas wish to spend federal transportation funds on passenger rail they should be allowed to do so. States such as California, North Carolina, and Washington are working closely with the federal government to maintain passenger rail service by investing in station renovations, track upgrades and other infrastructure needs. The states are also providing planning resources that have been absent on the federal level.

The nation needs a functioning inter-metropolitan area network for passenger travel. Americans should have access to safe, reliable, and convenient choices. By not providing these options the U.S. stands out from its global competitors. The federal government should take the lead role in establishing a new frame for inter-metropolitan area travel that is flexible and responsive to the different travel needs of the nation. Doing so will move us to a more integrated, sustainable, and competitive future.

2. THE FEDERAL GOVERNMENT SHOULD *EMPOWER* STATES AND METROPOLITAN AREAS TO GROW IN SUSTAINABLE WAYS

The range of challenges as well as the profound demographic, economic, and spatial changes underway in the United States calls for a new federal partnership with state and metropolitan leaders, along with local governments and the private sector, to promote environmental sustainability and strengthen metropolitan economies.

The late 20th century model in transportation retained the standard federalism pyramid structure: with the federal government providing resources that rain down from the state, to metropolitan, and ultimately the local level. But while this structure may have been appropriate for 1956, the problem is that today it is without the meaningful national purpose that the Interstates provided. The result is that this devolution of responsibility produced results that are so far uneven and generally disappointing.

What we need now is a new 21st century compact that flips the pyramid and challenges our nation's state and metropolitan leaders to develop deep and innovative visions to solve the most pressing transportation problems. The federal government should become a permissive partner in such an effort but should hold these places accountable for advancing this tailor-made, bottom-up vision. Metropolitan areas should have the predictability of funding necessary to make long-term planning possible, and the ability to make innovative strategic decisions. We need to go further than the federal experiment that began in 1991 by devolving more decisionmaking power and funding to metropolitan entities.

This means moving to a tripartite division of labor: (a) the STIC deciding major national transportation expansions and investments as discussed; (b) the states retaining the primary role on most decisionmaking, for preserving and maintaining the interstates, and in small and medium sized metropolitan; and (c) the major metropolitan areas with a population over two million are given more direct funding and project selection authority through a new program we're calling METRO (**M**etropolitan **E**mpowermen**T** p**RO**gram).

The METRO program should be formula-driven based on population and modeled after the Community Development Block Grant program. The program would consolidate several categorical programs that would include not just the Congestion Mitigation and Air Quality (CMAQ) and Transportation Enhancements (TE) funds (which many states already suballocate directly to metropolitan areas) but also the Job Access and Reverse Commute, and Transportation and Community and System Preservation programs as well as portions of major programs such as bridge repair.

Congress directly holds MPOs responsible for developing transportation plans and programs to help their regions meet federal air quality standards and these entities should be given direct access to these implementation funds. The MPO planning process offers untapped opportunities to identify environmental issues and account for them in the process of defining project alternatives. When the MPO has more discretionary funding for local projects, local officials are more likely to participate in the process. The availability of these funds not only provides financing for vital local projects but also encourages local officials to get involved in the transportation decisionmaking for their region.

A realignment of responsibilities also means the federal government needs to empower states and metropolitan places in areas like congestion pricing, providing a range of transportation choices, and connecting infrastructure investments to housing and land use:

a. Embrace pricing and incentivize market mechanisms to allow for better management of the metropolitan network

The mounting transportation pressures on metropolitan areas occur at a time of severe fiscal constraint, pervasive frustration with congestion, and increasing opposition to road expansion. As in Europe, this requires a firm national commitment to make maximum use of existing road capacity and expand transportation alternatives. The federal government must, therefore, augment efforts to use state-of-the-art technology and communications to encourage market responses that would make better use of the existing system, including road pricing.

With a considerable number of successful projects, tests, and studies in the U.S. and around the globe there is little doubt that the greater use of market mechanisms and pricing strategies can effectively address congestion on major roads and highways during peak times and manage the enormous demand for scarce capacity. While the ability of tolls to make a meaningful impact on overall revenues is still years away the increased use of tolling will help the nation correct the critical problem of today's transportation network not being priced correctly. It is critical for the United States to understand what most other nations already know: that the mispricing of transportation has enormous consequences.

The federal government should establish a **national policy for metropolitan road pricing** to assist and guide metropolitan areas as they struggle with capacity constraints, climate challenges and revenue allocation. Such a policy should lay out a bold, flexible vision that includes a range of strategies including standard tolling, variable pricing, high occupancy toll (HOT) lanes, cordon and area wide schemes. The goal of the national policy would be to permit metropolitan areas to experiment with the best mix

of strategies for their particular area. But any project using federal money to add additional lanes to the interstate highway system within metropolitan areas should be required to be tolled with optimal electronic collection strategies.

A national metropolitan road pricing strategy should also address several issues:

First the federal government should **remove the archaic restrictions on tolling the interstate system**. Metropolitan and local leaders—in conjunction with the states—are in the best position to determine which interstate roadway segments are the strongest candidates for pricing strategies. Such portions would include those where a range of travel options exist or are planned, and where the most intense peak-hour congestion on expressways is present. A broad range of tolling strategies should be considered–not solely for revenue generation but for congestion and demand management strategies such as on beltways, downtown spurs and within mega regions.

Next, the federal government should follow the advice of the NSTPRSC and **promote a national standard for electronic toll collection**. With a number of toll networks already established and more certainly on the way the federal government clearly has a role in making sure electronic toll payments by motorists do not become a burden in interstate commerce. Electronic tolling also allows the migration to variable pricing and other innovative strategies. Since idling and delays at toll booths increase vehicle emissions and add to overall metropolitan area traffic congestion the federal government should assist metropolitan and state transportation authorities, through guidance and flexibility, to convert their traditional toll booths to fully electronic lanes. A worthy goal would be to eliminate all toll booths in the U.S. by 2015.[11]

Third the federal government should help metropolitan areas address what Anthony Downs refers to as the "economically discriminating" nature of road pricing.[12] There are several ways to do this. One would be to require that at least a portion of the revenues generated from the tolls on the federal interstate go into a **Metropolitan Equity Pool** to fund programs to improve job access and ease the burden on low income families. Metropolitan areas could determine what other toll facility revenues would contribute to the fund and what remediation strategies should be considered. For example, revenues could subsidize the costs of increased paratransit type-services or could fund "toll credits" that low income households would receive to occasionally drive on priced lanes.

The federal government should also incentivize a range of **market-based demand management strategies** such as commuter choice, car sharing, feebate programs, location-efficiency, parking cash-out, and pay-as-you-drive (PAYD) auto insurance programs. For example by pricing auto insurance per mile driven rather than as a lump sum per vehicle, PAYD would give drivers an incentive to reduce vehicle miles traveled. A reduction in VMT of 8 percent, which would yield $52 billion in social benefits from reduced traffic accidents, congestion, air pollution, greenhouse gas emissions, and dependence on oil. PAYD would also reduce the cost of insurance for two-thirds of drivers, who would save an average of $270 each, and be more equitable since low-mileage drivers—including low-income people and women who tend to drive fewer miles on average—currently subsidize high-mileage drivers.[13]

Lastly, because the movement to employ public/private partnerships (PPPs) for transportation ostensibly—and appropriately—involves the use of tolling strategies for profit making, the federal government should assist metropolitan areas and other transportation authorities by **developing meaningful guidance** as part of its overall road pricing vision. The primary purpose would be to enable decisionmakers on the state, local, and metropolitan levels to consider PPPs in a holistic context, rather than solely through a financial lens. Thus, the intention is not to focus on the art of the deal but, rather, on the key policy issues that both sides need to consider, how they are connected to larger national transportation discussions, and how they play out on the state, metropoli-

Metropolitan Suballocation

California, where 97 percent of employment and output is generated within metropolitan areas, is a unique state when it comes to state and metropolitan interaction. Starting in 1998, California has suballocated all of its CMAQ funds as well as 75 percent of the remaining program funds, including those from the STP. The result is stark: in California's metropolitan areas, 21 percent of the STP funds were flexed to transit from 1998 to 2002. During that same time other MPOs across the country spent 9.3 percent of all devolved STP funds on transit projects whereas only 2.5 percent of state-controlled STP funds were so allocated.[10] It should be no wonder that the state that has made the most significant commitment to tackling the challenges of climate change is also the one that put its metropolitan areas in charge of the air quality funds.

Public-Private Partnership Units

Many countries have begun implementing specialized units throughout various governmental agencies to assist with the expanding opportunities for public-private partnerships (PPPs). So-called PPP Units provide divergent services based on the needs of the department or agency, but all share the common goal of protecting the public's interest by providing critical assistance regarding PPPs.

- Canada maintains one of the most well-funded and expansively responsible PPP units. Formed in 2007, PPP Canada Inc. administers a $1.2 billion fund to support and invest in PPP infrastructure projects, in addition to providing other public units and private firms with valuable information regarding the PPP process. The unit and its fund operate within a broader Canadian infrastructure plan, Building Canada, which commits $32 billion over seven years to promote a growing economy, a cleaner environment, and more prosperous communities. In addition to the federal unit, Canadian Provinces also may maintain their own PPP units. For example, British Columbia's Partnerships British Columbia, a company owned by the Province, offers a range of functions from guidance materials to contractual monitoring.
- Ireland utilizes two separate units to split the tasks of informing and financially supporting PPPs. The Central PPP Policy Unit's primary responsibilities are to develop the framework, including legislation, to support the PPP process while also disseminating best practice information. The companion program, the National Development Finance Agency, operates in the financial sector by applying commercial financial evaluation standards to ensure the Exchequer maximizes the public investment returns. The Agency also oversees the procurement process in the health, justice, and education sectors. Since 2005 both units have received votes of confidence from the central government by receiving expanded responsibilities.

Canada and Ireland display just two of the different approaches to national PPP unit development; India, the Netherlands, South Africa, and Italy are a sampling of the other countries that employ PPP units to facilitate their PPP process.

tan, and local level with respect to issues such as metropolitan growth, housing, public health, and climate change. So although it is discussed here as part of the overall road pricing plan, the guidance should address the broad range of potential deals such as private leases of existing public toll roads, concession agreements involving new toll roads, transit PPPs including partnerships related to the significant increase in (mostly private) land value associated with (mostly public) investments in rail transit infrastructure, and freight rail and port infrastructure.

b. Level the playing field by pursuing a strategy of modality neutrality

Transportation policy and program governance currently favors particular modes but is indifferent to substantive outcomes. This is an inefficient and unrealistic approach. The term "modality neutrality" should redefine how transportation is perceived and should reinforce that it is a tool to advance broader national goals. In other words, examining particular policy areas through the broad lens of the policy outcomes (e.g. economy, environment, equity) rather than that of a particular mode (e.g., highway, transit, bike/pedestrian, air). Without a doubt specific and different modes are critical to delivery, but that should not be the starting point.

Yet such modal agnosticism does not mean ignoring realities. Metropolitan areas across the country are seeking innovative ways to shape future growth, provide more choices, and at least somewhat mitigate climate changes. Civic, corporate, and business leaders are constructing bold new visions, engaging local governments in true metropolitan decisionmaking, and leveraging private funding for infrastructure projects. Formerly auto-centric metropolitan areas like Los Angeles and Dallas have made transformative use of new investments in key corridors. Metropolitan Denver is embarking on arguably the most extensive multi-modal transportation expansion this nation has even seen.

Unfortunately most of this innovation is happening in spite of—rather than in conjunction with—the support of the federal government. Transit and highway systems are treated differently by federal policy, law, and regulations. This is not sensible policy and is completely out of step with social, environmental, and political reality and it has to change.

In order to empower metropolitan entities to make good decisions about transportation investments, various

transportation options must be compared holistically, equally, and consistently based on their merits. Metropolitan decisionmakers should be able to choose the best set or combination of transportation strategies that meet their views, values, and directions. Thus metropolitan leaders should be able to pursue the best transportation alternatives for their communities, not the alternative that is simply the easiest to get funded or approved. Several reforms are needed.

For one, the federal government should **require equal treatment of proposed highway and transit projects**. Scrutiny of new transit projects is certainly warranted given the incredibly high demand for scarce funding and the dramatic impact such investments can have on a metropolitan area when done correctly. The federal government must prioritize transit investments in those metropolitan areas where states and localities have made the strongest commitment to making the maximum use of the investment. But there is no reason why new roadway projects using federal funds should not face the same level of scrutiny as new rail projects.

The federal agencies should evaluate and rate candidate all new capacity projects (including highways) similar to what it does now for new transit projects. It should create a single review process for all new capacity (roads and rails) and **bring back the major investment study requirement** for corridor planning. Then, depending on what the locally defined outcomes are (e.g., safety, improved mobility, job access, better air quality) a range of alternatives can be studied. Aside from considering environmental impacts all projects must be reviewed for their impacts on employment, operating efficiency, cost effectiveness, land use policies, and level of local funding commitment. By doing so a broad range of stakeholders are engaged early in the development of alternatives. As a result there is greater transparency, review is expedited, and certain corridors get projects delivered quicker.

Similarly, long-range **financial requirements for highway projects should be disclosed at program level**, as they now are for transit projects. In order to receive federal funding new transit projects must demonstrate their ability to maintain, operate, and preserve the facility. The federal government should ensure the long term financial stability of their investment. What makes sense for a transit project surely also make sense for a roadway project. The financial package should be part of a benefit/cost analysis for all new capacity projects so the federal government can determine which will have return value for the money.

Lastly, the existing highway trust fund should be converted into a **unified Transportation Trust Fund** by doing away with the separate highway and transit accounts as the NSTRSPC suggested. The federal government also must take steps to address the disparities in the federal match ratios between highways and transit. Simply put, the disparity between the 50 to 60 percent federal match for transit and the 80 to 90 percent match for highways is far too dramatic to ensure proper metropolitan and local decisions. The issue is not that the transit share is not high enough; rather the issue is that it distorts decision inputs by not being equal to the highway share. The federal share should be the same irrespective of mode.

c. Support innovation through Sustainability Challenge Contracts that connect transportation to housing, land use, and metropolitan growth

Although transportation investments are widely perceived as economic stimulants, the last several years demonstrated that as a nation we are not using transportation to plan for metropolitan prosperity. Household spending on transportation is very high, energy security is a major question, and climate change is a national concern.

With the U.S. set to add another 120 million people by 2050 such resource pressures are likely to intensify. As a result of this growth, Arthur C. Nelson has estimated that the United States will require an additional 213 billion square feet of homes, retail facilities, office buildings, and other built space. How and where we build in the future carries far-reaching implications for the health of our environment, our energy security, and our economic security and will continue to be a barrier to our metropolitan areas' economic success and our ability to compete globally. Addressing these national concerns will require the federal government to reach across sectoral and bureaucratic silos.

The federal government needs to assist states and metropolitan areas in developing truly integrated transportation, land use, and economic development plans in order to envision how, in what form, and what kind of infrastructure will be necessary to serve the projected growth over the next several decades. In this regard, **Sustainability Challenge Contracts** should be created to entice states and metropolitan areas to devise a broad vision for coping with congestion and greenhouse gas emissions across transportation, housing, land use, economic development and energy policies. Selected places would be provided additional resources (on top of regular block grant allocations) as well as new powers to align disparate federal programs in support of the vision. The mechanism for these grants could be the Climate Security Act of 2007 currently under consideration in Congress.

Partnerships of states, metropolitan areas, localities, and the private sector would apply for these competitive grants that would ideally encompass a range of solutions from all modes and would tie-in directly to an articulated set of national transportation outcomes rather than simply extrapolating from past trends. Examples include household savings, accessibility/choices, climate goals,

Scenario Planning

A major challenge facing many metropolitan areas is how to develop ways to define growth, instead of being defined by it.

- In 2002, the Sacramento region initiated its Blueprint project to devise alternatives to current transportation investment priorities and land use patterns in order to increase travel options, shorten commutes, improve air quality, and provide for housing choices that more closely align with the needs of an aging population. This broad vision—the result of scenario planning with local officials and the general public—is intended to guide land-use and transportation choices over the next 50 years. The preferred land use scenario is expected to result in 33 percent less water consumption, 26 percent less vehicle travel per new household, and a 7 percent reduction in travel time spent in heavy congestion when compared to existing land-use patterns.

- Envision Utah is a public-private partnership that promotes sustainable growth in Utah's Greater Wasatch Area through their Quality Growth Strategy. The strategy is a collection of six interconnected goals, including the promotion of transportation choices alongside the provision of housing choices at all income levels, and 32 strategies to meet these goals. One of the primary tools to inform those goals and strategies was the application of a scenario plan, which extrapolated past development trends to uncover what the region would look like if growth went unchecked.

least cost infrastructure and others discussed above. The federal government should fund most of the development of these plans (e.g., at an 80/20 split) in exchange for which official action should be taken by state legislatures and/or MPOs for official endorsement.

MPOs in those places that put these plans in place should receive federal funding (and technical assistance) to prepare regional housing strategies that complement the regional transportation plans already mandated by federal law. The metropolitan transportation plans required by SAFETEA-LU should be explicitly coordinated with U.S. Department of Housing and Urban Development's (HUD) requirements for Consolidated Housing Plans, and both should be based on end-user, full cost of living impacts on the costs for shelter and transportation.

This requirement would begin the process of linking regional housing and transportation and could encourage some metropolitan regions to begin addressing regulatory barriers and other rental housing supply constraints. To support MPOs in this expanded mandate, the federal government should provide funding to enable hiring of qualified housing staff, as well as technical assistance. MPOs are a logical choice for the development of regional housing strategies, given that they are generally governed by elected representatives of city and county governments, have been responsible for metropolitan transportation decisionmaking since the early 1990s, and increasingly are staffed with professionals with planning expertise.

Over time, these regional housing strategies should ensure that all communities in a metropolitan area, including the prosperous ones, participate in the production of housing for families with a broad range of incomes. Within this new regional planning framework, cities and urban counties would continue to receive funds under the HOME Investment Partnerships and Community Development Block Grant programs, but would be required to implement housing programs in ways that further and are consistent with regional housing strategies. MPOs would have the authority to certify compliance, and cities and counties that were found in non-compliance with these metropolitan strategies would be given a designated period of time to correct the identified deficiencies. Failing that, the jurisdictions would no longer be eligible to receive either federal housing production funds or federal transportation resources.

Relatedly, the federal government has a special chance to leverage the billions that have already been invested in rail and other fixed-transit projects. Congress should direct the U.S. DOT to work with HUD on a special interagency effort to assist metropolitan areas to realize the real estate potential of transit stations and then figure out a way to capture that value. This public/private initiative could involve a range of activities (such as research, technical assistance, and joint agency planning) and could provide a helpful forum for metropolitan officials, transit operators, private sector developers, financial institutions, and secondary mortgage market entities. The U.S. DOT should initiate a **Smart Transportation Partnership**

headed by the most progressive developers, federal officials, and private sector financiers.

To take full advantage of development opportunities around transit stops the federal government must **overhaul the cost-effectiveness index** that determines which metropolitan projects receive New Starts funding for rail projects. It needs to move well beyond the overly simplistic calculation of the ratio of capital and operating costs divided by time saved. The ability for the right kind of investments to stimulate efficient high-density transit-oriented development and the environmental and agglomeration benefits that accrue should be sufficiently weighted.

Beyond transportation, the federal government should remove the prohibition for dense concentrations of affordable units if they are within close proximity to transit stations. Indeed, such location-efficient clustering of affordable units should be encouraged.

3. *OPTIMIZE* WASHINGTON'S OWN PERFORMANCE AND THAT OF ITS PARTNERS WITH A GREATER FOCUS ON OUTCOMES, ACCOUNTABILITY, AND TRANSPARENCY TO MAXIMIZE METROPOLITAN PROSPERITY

Lost in the dominant discussion about how much money we are spending on the federal transportation program is the question about how we can spend that money better. To be sure, federal investments in transportation are substantial; yet there is broad agreement that this level of investment is not enough. Why not? Prior to the discussion about how much money to spend, we need a frank and rigorous debate about how to spend that money better.

Simply put, we cannot afford a free-rider program any longer. The prioritization of transportation policy and spending means the federal program should focus on those places where positive returns are certain.

Therefore, the first order of business is to re-orient transportation policy so the federal government and its state and metropolitan partners are purposeful, accountable, and outcome-based. In order to rebuild the public trust, the rationale for the federal program should be abundantly clear to the American people to which a tangible set of outcomes must be explicitly tied. The recipients of federal dollars should then be held accountable for meeting these goals.

This is not a new idea and is one that was embraced by the NSTPRSC in their call to "begin anew." The regular and predictable pushback from the states and metropolitan areas is the oft-cited complaint that the nation is too broad and diverse for national standards. No doubt this is an important consideration. Yet this is not a call for rigid, uniform rules but for an **intentional, evidence-based program** structured around broad national goals. It should be up to the federal transportation partners on the state and metropolitan level to demonstrate how they will meet or exceed those goals.

As mentioned, there is substantial federal precedent for such a national accountability framework in education and welfare, for example. Why recipients of federal transportation dollars should be exempt from such stewardship has yet to be fully explained. The transportation system of governance and finance shares similarities with many other areas of domestic policy—and should operate under similar accountability.

Recognizing the political hurdles in linking funding to outcomes, performance, and accountability, **states should be allowed to opt-out** of the revamped federal transportation program. Those states would be free from most federal regulations but would also forgo their allocation of transportation trust fund revenues. They would still be required, however, to maintain and preserve their portion of the interstate highway system through whatever means they deem appropriate but failure to do so would jeopardize their opt-out status.[14]

However, there is no doubt that as large, bureaucratic agencies that state DOTs should strive to improve their internal management and operations in order to improve project delivery, reduce cost overruns, and keep the existing system in state of good repair. These are basic elements of a functioning system. However, one thing is certain: broad based outcomes must be part of the conversation and they must begin to move away from transportation-for-transportation's-sake notions and toward investments that deliver an America that is more economically competitive and productive, improves the environment, and provides greater mobility and access to opportunity. These three categories clearly overlap and there are many options here:

To serve the nation's economy, congestion costs should be reduced for both providers and users as well as passengers and increasing the velocity of freight at international gateways and internal hubs. Agglomerations of economic activity, especially around labor markets, should be enhanced at the same time that new markets are built such as around alternative fuels and new technology. There is also a basic imperative to make the transportation safe and secure for all travelers. Reducing transportation-related deaths and injuries by making the system safe and secure is paramount. In this way, certain transportation investments could also reduce the nation's massive health care costs which would have a positive impact on the economy.

To improve the environment, several states as well as the federal government have already articulated a desire to reduce transportation-related mobile source emissions in order to confirm with the transportation provisions of

Reforms for Coordination, Efficiency and Transparency

Metropolitan Chicago, one of America's most vibrant economies, maintains a unique duel role when it comes to transportation policy. Serving both the nation and the region as a freight and passenger transportation hub, Chicago's officials must ensure its external transportation network is operating efficiently. At the same time, Chicago's intrametropolitan transportation network must serve its diverse economy. These two major responsibilities place significant emphasis on sound decisionmaking by the area's Regional Transportation Authority. The RTA serves the six counties of Illinois-based metropolitan Chicago and oversees the primary budget and financing of three local service boards: the Chicago Transit Authority, Metra commuter rail, and Pace suburban bus services.

In recognition of RTA's dual responsibilities and modal breadth, the Illinois Legislature in January 2008 amended RTA's authorizing legislature in an effort to enhance metropolitan coordination and efficiency. The primary vehicle to achieve these ends was the establishment of a Strategic Plan. First, the RTA must identify goals and objectives, and then measure the progress towards achieving them. The Plan also must contain strict criteria for capital project selection. These criteria will ensure the RTA's Capital Program is filled with projects that conform to RTA's metropolitan objectives and have a reasonable chance of being funded. Finally, the RTA must work with Chicago's Metropolitan Agency for Planning in creating the Strategic Plan, thereby establishing metro-wide coordination with other public objectives.

By reforming the RTA with the goals of coordination, efficiency, and transparency in mind, Chicago is ensuring it has the institutional framework to meet the area's transportation demands. Just as importantly, Chicago's method to address its diverse responsibilities can serve as a model to other public transportation agencies looking to reform.

the Clean Air Act. We should go further and in addition to a net reduction in carbon dioxide emissions a reduced dependence on foreign oil is also critical (which is a clear benefit to the national economy). To that end, the federal program should support all three legs of the stool—vehicle efficiency, fuels standards and alternatives, as well as demand reduction strategies promoting efficient development patterns, telecommuting, and increasing travel options for people and goods.

To provide greater mobility and access to opportunity the range of transportation choices must be expanded. This must be done in such a way that increases travel reliability and affords better access to a range of employment, services, educational, and recreational opportunities. Such improvements would address another key outcome: saving taxpayers' money and reducing the share of household budgets dedicated to transportation. Certain groups could be explicitly targeted such as low income households or the elderly.

Once there are clear goals and objectives the federal program needs to augment and enforce new accountability and performance standards, dramatically improve data collection, information, and transparency, and reorganize the U.S. DOT to optimize its performance.

a. Augment existing accountability efforts and reward performance

Unfortunately, today the states and MPOs are not equipped to deliver an outcome-driven structure for transportation. No doubt, in recent years several states have developed certain measures to monitor their performance on transportation-related outcomes. Yet they need to go beyond the traditional measures and reorient their planning and programming processes to clearly demonstrate how they will meet the broad set of national outcomes. In this way, the federal government can foster a climate of shared responsibility with its partners on the state and metropolitan level.

Given the wide variation among federal transportation grantees around the nation, broad flexibility should be afforded to states and MPOs to deliver on the outcomes consistent with their particular circumstances. Yet this should not neuter the federal role as is done now with the planning factors by prohibiting courts from reviewing grantees' progress toward considering these goals. Indeed, the U.S. DOT should assess state and metropolitan transportation plans to ensure they are consistent with the goals and purpose articulated in the federal program as a condition for them to continue to receive federal funding.

While no simple analytical tool can provide all the answers, in this era of fiscal austerity the federal government should also take steps to ensure grantees **apply rigorous benefit/cost analyses** to any project that uses federal funds. In this way there can be some assurances that high returns are being generated and that smaller scale investments are properly evaluated. Yet in order for such analyses to be truly useful in making investment decisions, they need to be tightly coordinated with the full range of decisions that local, state, and metropolitan officials make. For one land use measures should be improved and incorporated into any economic analysis. They should also examine the distribution of the benefits and costs of investments across social and income groups, as well as geographic areas. Finally, these newfangled analyses need to understand the rapidly changing travel patterns and characteristics of people and goods.

Congress should then allow the U.S. DOT to maintain an **incentive pool to reward states** and metropolitan areas that consistently perform at an exceptional level. This includes those places that take full advantage of merit-based decisionmaking utilizing relevant empirical evidence resulting in projects that generate very high returns even after accounting for the full range of environmental, social, and geographic impacts. The department should also give high performers relief from regulatory and administrative requirements in order to accelerate project delivery where appropriate. By the same token, the federal DOT should consider possible intervention strategies for consistent low performers. (In designating high and low performers, DOT should take into account the difficult challenges facing state agencies and MPOs in large and multi-state metropolitan areas).

Another idea would be to reorient the discussion to reward states and metropolitan areas that can demonstrate how they are achieving national priority goals such as GHG and oil consumption reduction. One way to approach this is to **overhaul existing out-of-date funding formulas** so federal funds are not distributed based on factors that potentially increase greenhouse gas emissions, overly simplistic equity provisions, or on the basis of earmarking. Serious consideration should be given as to whether VMT and gasoline consumption make sense at all as a basis for apportionments. By the same token, bonus allocations should be considered for those states and metropolitan areas that reduce their VMT and gasoline consumption through demand management techniques and strategies.

Recognizing that state DOT certification is non-existent and MPO certification is process-driven and weak, a new framework that emphasizes performance is necessary. Every three years the federal government should assess how well its transportation partners on the state and metropolitan level are meeting federal laws and regulations, and what progress they are making to meting the articulated national goals. The accreditation of these agencies should be based on meeting these accountability standards in order to make it a meaningful process and direct loss of federal funds should be a genuine consequence.

b. Build a world-class data and information system ("TranStat") and make it transparent and accessible

In order to commit to an evidence-based program, a major overhaul is needed in how the federal government collects, assembles, and provides data and information. That is a key—and relatively inexpensive—reform to improve the system as a whole, support metropolitan areas, and to regain the credibility of the public. We desperately need a **sunshine law for transportation data** to better inform decisionmaking at the state and metropolitan levels.

But what's more difficult to ascertain about federal transportation funding is how much different spending decisions could be if policymakers had better information on which to base funding priorities. The current lack of transportation information reduces the ability of policymakers, employers, workers, and citizens in general to influence the metropolitan transportation systems that so strongly shape economic competitiveness, development trends, environmental quality, and the nation's quality of life.

Bold changes to transportation data programs can improve policymakers' understanding of the challenges

Data Availability

The Virginia DOT Dashboard system is the transportation segment of the statewide Virginia Performs program. The overarching goal of the system is to ensure that each state agency and department is held accountable for its performance. The Dashboard system operates as a straightforward clearinghouse for transportation data, enabling citizens and transportation officials to stay familiar with performance at the local and statewide levels. The especially salient data piece is the release of complete financial data alongside a three-level rating system for project progress. This pressure is confirmed by the numbers; Governing magazine reports that after the system was implemented the Virginia DOT's percentage of projects delivered on time increased from 27 percent in FY 2003 to 87 percent in FY 2008.

Washington is another state that emphasizes data availability to support performance accountability. Anchored by the Government Management, Accountability, and Performance (GMAP) program, Washington DOT meets monthly to discuss agency performance and publishes extensive data every quarter through the Grey Book. The Grey Book data utilizes a rolling cycle to publish certain data ranging from statewide to project specific. In turn, this data is then utilized at GMAP meetings to make crucial management decisions regarding the state's finite resources.

that lie ahead and the changes that are needed. The following should be pursued:

Establish a new federal framework to **ensure the transparency and accessibility of data** and information. State and metropolitan entities should, at a minimum, disclose their spending patterns by political jurisdiction and origins of the revenue used, especially federal dollars, so that the public can better evaluate the spatial equity of transportation spending in accordance with broad goals and performance measures. To the greatest extent practicable, disclosures should take advantage of recent advances in geographic information systems and provide citizens with easy-to-read state and metropolitan and regional maps that chart and chronicle core investments.

Utilize all **funding strategies for transportation data programs**. One option for policymakers is to establish takedowns of federal gas tax funds that are distributed to states. Taxing the flow of selected federal funds at a fraction of one percent could help solidify transportation data collection priorities such as the National Household Travel Survey (NHTS), which offers substantial benefits to users at all levels. Although an expansion of the takedown program would result in slightly less funding for states and regions, those areas would benefit by having regularly funded data programs that increase their understanding of the transportation system and allow them to allocate their own funds more efficiently.

Improve metropolitan-area data on mobility and transportation accessibility. Currently, much of the federal transportation data is designed to meet either bureaucratic requirements or narrow highway engineering and safety specifications. These data are ill-suited for use by planners, citizens, or policymakers. While meeting bureau-

cratic expectations should be a primary concern to keep data programs funded, a fundamental change in mindset also is needed. Data collection should be designed from the beginning to provide more basic, useful information on mobility and accessibility in metropolitan areas. Technical tools and models should be sophisticated and sensitive enough to respond to changes in land use projections.

The Bureau of Transportation Statistics (BTS) has gone years without serious institutional investment. A primary goal of any invigorated transportation data effort should be to strengthen this agency that has a mandate to provide data to policymakers. A stronger BTS would frame the debate as policymakers decide how to spend scarce funds on specific projects and programs and improve the patchwork of transportation data programs. Travel and freight surveys should be revised to improve data for long-distance travel and the nation's private truck fleet. In addition, the frequencies of personal travel and freight shipment data should be increased. Policymakers require better than 5- to 7-year-old data in a world of just-in-time goods delivery and increasing personal travel.

Finally, the nation needs independent analysis to answer hard and tough questions on transportation and competitiveness. A greater commitment needs to be made in order to **develop a network of independent and objective researchers** who can help communities grapple with the serious transportation challenges they face in the new century. Evaluations are needed of the benefits and drawbacks of existing programs and policies, replicable innovations, the relation between housing, transportation and other areas of domestic policy, and the development of next generation financing, location and other mechanisms. For example, Congress could specifically direct the GAO to analyze the potential costs savings associated with linking transportation and housing programs in ways that promote more environmentally sensitive, energy efficient and health-enhancing growth patterns. At minimum the federal government should produce a compendium of the work of the Council of University Transportation Centers (CUTC). The federal government spends $100 million each year that is almost totally unaccounted for.

The bottom line is that the federal government can take a lead role in at least providing data, information, and analysis to empower its partners on the state and metropolitan level to make better decisions and judge performance.

c. Organize for success and reorient the mission and purpose of the transportation program

Bold reforms toward empirical analysis in decisionmaking by examining a range of impacts will require substantial reorientation of the mission of transportation related agencies, officials and personnel. A new cadre of broad-minded transportation professionals needs to be nurtured and sustained to move many of these agencies far beyond mere compliance with the minimum requirements of the law. A detailed evaluation of the current federal metropolitan capacity-building program as well as the review of statewide transportation improvement plans is needed to determine whether how well they are working, and whether they are achieving new and modern strategic management and human capital goals.

But the federal government should also **review and improve professional development** at the metropolitan level, with particular attention to knowledge of the new national priorities, techniques to promote efficient development patterns, application of new and emerging transportation technologies, comparative experience, especially in the spatial context of more transportation decisions (city, inter-city, rural etc.). Many MPOs have already become a regional "go to" place for technical planning information and capability. This could bring greater legitimacy to MPO operations and interests. This support could come in the form of increased staff financial support, support to develop analytical technologies and support for university research.

For its part, the recommendations of the NSTPRSC to combine the department's 108 separate surface transportation programs into ten should be given serious consideration. To accomplish this it would be necessary to reorganize the U.S. DOT to reflect a functional—rather than modal—set of purposes.

A new office should be created within the U.S. DOT along with a **Deputy Secretary for National Priorities Implementation** with responsibility for overseeing and monitoring performance in furthering the national priorities. This would also serve as the direct liaison between the STIC and the administration.

Moreover, the U.S. DOT needs to better integrate its own agencies' relationships with its partners and should strengthen the effort to achieve cross-site learning at the subnational level through evaluation of results, benchmarking of performance, and wide dissemination of

Functional Reorganization

The British Ministry for Transport is structured away from *modal* schemes (transit, highways, maritime, etc.) and instead reflects *functional* schemes such as City, Regional, National, and International Networks. These functional schemes also sit together on a Department Board, ensuring that each function has a voice in the establishment of national strategy and policy.

emerging "best practices." To facilitate this, a special research program should be created at the national level to identify and evaluate innovative approaches to metropolitan transportation challenges. An office for Climate Change and Land Use Policy innovation could be established within the U.S. DOT to study innovative climate, energy security, and land use initiatives.

Finally, in order to make progress toward these accountability and performance goals it will be necessary to re-orient the mission of state and metropolitan transportation agencies in order to understand and respond to the diverse and complex transportation challenges of our nation. We need a new pool of transportation practitioners that are expert in a broad range of disciplines, including law, business, economics, finance, social equity, land use, and planning. The U.S. should work closely with the nation's universities to expose students in relevant disciplines to transportation issues and concerns. Such **a "teach transportation" effort** could ultimately attract a cadre of smart and able students to the profession. Congress should dedicate sufficient resources—say $50 million annually—to this critical area.

4. FUNDING FOR THE FEDERAL PROGRAM—BOTH FUNDING LEVELS AND SOURCES—SHOULD ONLY BE CONSIDERED AFTER THE REFORM IDEAS ARE PUT IN PLACE

Just as transportation is not an end in and of itself – neither is increasing funding the primary solution to the transportation problems. However, because of the short term conundrum of the federal government obligating more federal money for transportation than it has to spend and the disdain for the annual rescissions, many are calling for the next Congress and the new President to increase the federal gas tax. This puts the cart before the horse.

Simply put: we should not continue to pour more money into a dysfunctional system before serious attempts at significant policy reform. In other words, the federal transportation program is not just broke; it is broken.

The funding debate needs to shift from spending more and more taxpayer dollars on the same product to where, what, and how to spend that money better. So in addition to just focusing on increasing revenues for the existing program the nation deserves a real conversation about curbing the demand for transportation spending.

It is impossible to start with a funding solution or what the optimal level of investment should be when there is no agreement about what the federal role should be, what problems we are trying to solve, or what questions we are trying to answer. Indeed, although the NSTPRSC did call clearly and specifically for an increase in the fuel tax, they also maintained that adding revenues to the program in its current form would "not be acceptable." We concur.

Given the track record of the program in recent years such systemic reform may seem difficult to achieve. However, it has been argued that during their times as transportation visionaries, President Dwight Eisenhower and Senator Daniel Patrick Moynihan did not so much have an inspiration for transportation as they had a revenue stream. Indeed, history has shown that each new wave of transportation policy carried with it a major restructuring in how the system is planned and financed. Looking at it another way: no major federal transportation reform has ever occurred without a major increase in revenues.[15] This should be another one of those times.

We need a clear articulation of the goals and objectives of the federal program, and the desired outcomes. The program should then be structured to get to those outcomes. There then should be a frank and vigorous conversation about the revenues currently available and whether or not additional funding is necessary. At that time, all options toward re-invigorating transportation funding should be on the table to meet the transportation challenges of the future while also ensuring financial revenues will be available. We recommend that the federal government reinvigorate its transportation funding structures

based on the three-pronged strategy to lead, empower, and maximize performance.

***FIRST*, to fund the projects of national significance identified by the STIC the federal government should act as a guarantor of debt and create a National Infrastructure Corporation.** The concept of a **National Infrastructure Corporation (NIC)**—a concept that has gained traction in this year's presidential race. The corporation would sell bonds to private investors who would take this interest income in the form of credits against federal income tax liability. The NIC would be the window through which states and groups of states and localities would request financing or grants for a range of infrastructure projects from road and rails to ports and pipes.

Such an entity could, over time, replace the existing dedicated highway and possibly aviation trust funds, as well as address the new visions for America's transportation system that were never considered fifty years ago. In addition to addressing the financing issue, the NIC also helps prioritize projects that are critical to the nation's competitiveness.

The NIC could be similar to—or spun off of—the existing Federal Home Loan Bank.[16] The long-term bonds issued by the European Investment Bank for the European Union represents another potential model. However whereas the European bank is capitalized by funds from its member countries, initial funding for a U.S. model should come from a dedicated stream of existing transportation trust fund revenues. This stream could be a portion of the $3 billion that currently supports the so-called High Priority Projects. This initial capitalization could leverage several times that amount in infrastructure investments.

The funding for most infrastructure, including transportation, is considered yearly discretionary spending. This system is completely absent of capital budgeting principles, meaning the federal government does not utilize amortization or depreciation of assets nor is there a separate federal system for financing maintenance. Additionally, there is currently no central office with the Executive Office of the President to coordinate or oversee government-wide infrastructure investments.[17] Overall, assessing successful projects within the Executive Branch is a disjointed affair at best.

Reorienting our funding, the argument goes, promotes a national perspective free from politics which facilitates the internalization of all benefits and costs associated with capital expenditures. Capital spending tends to have distributional effects and enhances the chance for poorer citizens to receive equitable public infrastructure resources. Programs could also receive a scoring bonus if they work with other agencies' programs to break down departmental silos. Thus, establishing a new funding system will present new opportunities to cross promote the interests of multiple agencies. Also since transportation and infrastructure, writ large, is a series of networks building one piece adds value to all other network pieces. For example, a new road enhances adjoining roads' values.[18] A new system could help produce more new pieces, thereby providing new value to those infrastructure pieces already constructed.

To paraphrase the 1999 Report of the President's Commission to Study Capital Budgeting: there are critical components of the current process that should be considered first. They include setting priorities, reporting and evaluating decisions, and providing appropriate information in order to 1) spend money better and 2) be held accountable for those decisions.[19] This idea would need to be polished to ensure it does not serve to simply obviate the broader discussions of reform, prioritization, and raising taxes in the context of the existing program. But if nothing else, this is an important idea that needs to be amplified and aired in the halls of transportation power and research.

***SECOND*, to empower states and metropolitan areas to grow in sustainable ways the federal fuel tax should be raised and the outdated formulas that apportion funds largely based on consumption rather than conservation should be overhauled.**

The federal gas tax will and should continue to provide the lion's share of revenue for the federal program for the foreseeable future. It is easy to administer and it closely integrated with the gas tax leveled at the state level. It also has the ability to affect consumers' preferences and behavior in some cases. At the same time, a sharp increase in the tax on fossil fuels could prove to be a way to address the problem of climate change and the dependence on foreign energy sources, another key national priority.

It is not without its detractors, though. The gas tax is commonly considered to be inherently regressive, burdening lower income households disproportionately. Further, with the slowing down of vehicular miles traveled, and increasing fuel economy of the vehicle fleet, coupled with

public disdain for gas tax increases, these converging influences will affect anticipated gas tax revenues and, by extension, transportation expenditures, unless changes in tax policy and transportation spending occur at the federal and state levels.

At minimum, the **fuel tax** should be indexed to a reasonable measure of inflation in order to rationalize the process of increasing the tax rate and allow revenues to keep pace with rising costs. But a nominal increase beyond inflation should be strongly considered. Relatedly, the loophole that allows SUV's and light trucks to be exempt from the federal gas guzzler tax should be eliminated.

At the same time, the federal government could reward states that increase their funding or index tax rates to inflation. States, for their part, should pursue a financial policy of "modality neutrality" and remove the restrictions on their gas tax that allows spending on roads only as a condition to receive federal trust fund revenues. In this way, states would undoubtedly make better use of federal funds by increasing their ability to meet federal matching requirements. Currently, states are unable to take advantage of these federal initiatives because they are often unable to come up with their share of the match.

Yet the nation should not be tethered long term to the fuel tax for transportation revenues. Other sources have the ability to not just raise revenues but—more importantly—better manage demand on the system and use the existing network better. For example, a **carbon tax** is a good idea as an environmentally-motivated tax that could potentially generate revenues for a range of transportation choices such as transit.

***THIRD*, to optimize Washington's performance and that of its grantees, the federal government should also provide strong incentives for the adoption of market mechanisms like congestion pricing that allow for better management of metropolitan road networks, as well as the expansion of a range of user fees.**

The increased use of **tolling** is critically important in order to use the existing system more efficiently and to better align charges with the costs imposed by users. But tolling can also serve as a key supplement to revenue generation. Toll receipts still make up a very small portion of the total revenue sources used for highways, yet since 2001 the total amount raised from tolls has increased at a faster rate than any other source apart from borrowing. Far reaching tolling strategies such as nationwide congestion pricing for all major roadways in large metropolitan areas could serve to reduce VMT and congestion and provide a net benefit of $113 billion over a 20 year period, in 2004 dollars.[20] Such a proposal is on the far end of the spectrum yet it does compellingly demonstrate the ability of tolling strategies to raise significant revenues and supplement the existing fuel tax.

Heavy truck fees and **transit user's ticket taxes** make sense in the spirit of allocating costs directly to users. A **mileage fee** (or VMT tax) is a long term idea given the technological challenges. It would use satellite tracking devices to record how far and when motorists drive and would assess a fee based on those travel habits. Benefits include better allocation of revenues (based on the roads used), better allocation of costs (vehicles damaging to infrastructure such as heavy trucks could be assessed a greater fee), and better allocation of resources (higher fees could be charged based on time of day and congestion levels). Sources to raise revenues related to Intermodal port and freight include container fees, waybill fees, and customs duties.[21]

All of these mode-neutral sources are important and have merit and should be discussed as part of a larger conversation about national transportation reform. Yet the overall message is that these ideas about finance and revenue sources should not be motivated by the desire to avoid the necessary task of a more comprehensive and inclusive discussion about transportation—a discussion that includes accountability, overall intent, and connection to broader goals of economic growth and personal mobility.

All options toward re-invigorating transportation funding should be on the table to meet the transportation challenges of the future while also ensuring financial revenues will be available.

VII. CONCLUSION

During this time of economic uncertainty, environmental anxiety, and household stress the nation must maximize the returns from its largest discretionary domestic program—transportation.

Right now, federal transportation decisionmaking is misaligned with the geographic realities of travel patterns, goods movements, commute trips, and everyday errands. It is an antiquated, anachronistic, and ultimately wasteful approach to transportation policy. As such it functions mainly as a Rube Goldbergian revenue generation and distribution system for the gas tax it collects.

In an era of declining revenues, of continued transportation problems, and a fiercely competitive global economic environment, American transportation policy should be about more than just dividing the spoils. All states should not be robotically guaranteed a certain level of funding based on who buys gasoline within their borders. The nation does not operate in this fashion with social security, education, or homeland security spending and it should no longer do so for transportation.

Reform of the federal transportation program must target those regions most critical to ensuring national success: its largest metropolitan areas. Federal policy must place a greater emphasis on policies that allow robust, inclusive, and resource-efficient growth to flourish in these places. This will position America to compete for high quality jobs in the global marketplace and serve as the linchpin of a new, unified, competitive and compelling vision for transportation in the U.S.

Reform of the federal transportation program must target those regions most critical to ensuring national success: its largest metropolitan areas.

By focusing reforms on three major policy areas—federal leadership, empowerment of metropolitan areas, and optimization of other extent programs—federal transportation policy can move from the outdated, outmoded structure that exists today to something that actually works for the nation and metropolitan America. Emphasizing better spending and accountability would enable policy makers to regain credibility and open the door to proposals for increased funding. Developing a coherent national purpose and targeting spending would help establish transportation as a true national priority program that focuses on congested areas, gateways and corridors, and freight hubs. Unleashing market dynamics would address finance, demand, and operational efficiencies and enable important ideas like congestion pricing to thrive.

These are important reforms that can go a long way to providing a metropolitan framework for the nation's transportation program. No doubt, even these modest reforms will not come easily to the transportation sector. The deficiencies in transportation policies and practices are deeply rooted—in constituency and money politics, in state governance, and in the history of metropolitan development. Yet change must come if our nation is going to invest transportation resources in a way that ensures vitality and competitiveness for the U.S. economy, our cities, and our families.

ENDNOTES

SECTION II: THE CONTEXT FOR THE DISCUSSION

1. Audrey Singer, "The Rise of New Immigrant Gateways: Historic Flows, Recent Settlement Trends." In A. Berube, B. Katz, and R. Lang, eds., *Redefining Urban and Suburban America: Evidence from Census 2000,* Vol. II, Washington: Brookings Institution, 2005.
2. William H. Frey, "Mapping the Growth of Older America," Brookings, 2007.
3. Based on projections by the Joint Center for Housing Studies, Harvard University.
4. Hudson Institute, *2010 and Beyond: A Vision of America's Transportation Future,* New York, 2004, p. 50.
5. UNCTAD, FDI/TNC Database, 2007
6. Marc Levinson, *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger,* Princeton University Press, 2006.
7. But it is still expensive to move people and transportation *within metropolitan areas* and is consuming a larger and larger share of household costs, as discussed below. Edward L. Glaeser and Janet E. Kohlhase, "Cities, Regions and the Decline of Transport Costs," Cambridge: National Bureau of Economic Research Working Paper No. 9886: 2003.
8. PricewaterhouseCoopers, "UK Economic Outlook 2007," London.
9. Alan Berube, "MetroNation: How U.S. Metropolitan Areas Fuel American Prosperity," Brookings, 2007.
10. Alan E. Pisarski, "Commuting in America III," National Cooperative Highway Research Program Report 550 and Transit Cooperative Research Program 110 Washington: Transportation Research Board, 2006.
11. Based on Brookings analysis of IRS 2000-2004 migration data.
12. The FHWA notes that these figures are much higher than those reported in the U.S. Census' vehicle inventory for 2002 because of new data collection and reporting, and not necessarily because of not because of substantial vehicle registration changes. See Office of Highway Information Management, "Highway Statistics 2005," Federal Highway Administration Table MV-9.
13. Eno Transportation Foundation, "Efficient Goods Movement and the Environment," Summary of Symposium Series, October 2005 – March 2006, p. 5.
14 Congressional Budget Office, "Freight Rail Transportation: Long-Term Issues," 2006
15. Robert E. Lang and Arthur C. Nelson, "Beyond the Metroplex: Examining Commuter Patterns at the 'Megapolitan' Scale," Lincoln Institute of Land Policy Working Paper WP07RL1, 2007.
16. Regional Plan Association, "America 2050: A Prospectus," New York: September 2006.
17. Edward Glaeser, Jed Kolko, and Albert Saiz, "Consumer City." *Journal of Economic Geography* 1: 27–50: 2001.
18 Edward Glaeser and Joshua D. Gottlieb, "Urban Resurgence and the Consumer City," Harvard Institute of Economic Research Discussion Paper 2109: 2006.
19. Brookings analysis of data from the Bureau of Labor Statistics, U.S. Department of Labor. Updated from Edward L. Glaeser, Matthew Kahn, and Chenghuan Chu, "Job Sprawl: Employment Location in U.S. Metropolitan Areas," Brookings, 2001.
20. A heavily-used transit corridor in Arlington, Virginia boasts low vacancy rates in its 21.1 million square feet of office space—nearly as much space as the city of Denver's entire downtown. Dennis Leach, "Roslyn-Ballston Corridor," in *The New Transit Town: Best Practices in Transit-Oriented Development,* H. Dittmar and G. Ohland, eds, Washington: Island Press, 2004.
21. One recent study of 13 large metropolitan areas found that small-scale, scattered commercial development—referred to as Edgeless Cities—account for about 40 percent of the total office space. Traditional downtowns follow with nearly 33 percent of space. Edge cities have about just over 15 percent, with the remaining 13 percent in suburban corridors and secondary downtowns Robert E. Lang, Thomas Sanchez and Jennifer LeFurgy, "Beyond Edgeless Cities: Office Geography in the New Metropolis," National Center for Real Estate Research, National Association of Realtors, 2006.
22. Alan Berube and Elizabeth Kneebone, "Two Steps Back: City and Suburban Poverty Trends 1999–2005," Brookings, 2006.
23. Robert Puentes and David Warren, "One Fifth of America, A Comprehensive Guide to America's First Suburbs," Brookings, 2006.

SECTION III: SEVERAL FACTORS ARE DRIVING THE WIDESPREAD DEMAND FOR REFORM

1. U.S. Department of Transportation, "Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report to Congress," (the C&P report) (2006), exhibit 3-11.
2. Ibid.
3. Brookings analysis of data from FHWA National Bridge Inventory. Yearly tables: http://www.fhwa.dot.gov/bridge/deficient.htm.
4. Richard Steinmann and Robert Tuccillo, "Transit in the U.S.: Conditions, Performance, and Finance," Briefing for the National Surface Transportation Revenue and Policy Study Commission, June 27, 2006.
5. Federal Transit Administration, National Transit Database, Table 2: Revenue Vehicle Inventory, 2004.
6. Bureau of Transportation Statistics, "National Transportation Statistics 2007," U.S. Department of Transportation, Table 1-28c: Condition of Rail Transit Infrastructure (Percent).
7. U.S. Government Accountability Office, "Federal Role in Providing Safety Oversight and Freight Infrastructure Investment Could Be Better Targeted," GAO-07-770, 2007, p. 11.
8. OMB, "Detailed Information on the Amtrak Assessment," January 2008, http://www.whitehouse.gov/omb/expectmore/detail/10004000.2005.html
9. The highway figures include only public road and street mileage. Beginning in 1998, approximately 43,000 miles of Bureau of Land Management Roads are excluded. The transit system length is measured in both directions and beginning in 2002, the data for commuter and light rail modes include "purchased" transportation service provided to a public transit agency from transportation provider based on a written contract.
10. Pisarski, Table 3-5.
11. Lang, Sanchez , and LeFurgy, 2006.
12. Mitretek Systems, "Intelligent Transportation Systems Benefits and Costs," prepared for Federal Highway Administration, May 2003. Report: FHWA-OP-03-075
13. The congestion figure is from: Cambridge Systematics, Inc., "Traffic Congestion and Reliability: Trends and Advanced Strategies for Congestion Mitigation," prepared for Federal Highway Administration, 2005
14. U.S. DOT C&P report, 2006, exhibit 2-11. The American Association of State Highway and Transportation Officials found that only half of Americans have access to easy-dial "511" traveler information systems. AASHTO, "Invest in our Future: Future Needs of the U.S. Surface Transportation System." 2007.
15. U.S. DOT, "Highlights from the 2006 ITS Deployment Tracking Database," 2006.
16. Schrank and Lomax, 2007.
17. Energy Information Administration, "Annual Energy Outlook 2008 (Revised Early Release)," Report #:DOE/EIA-0383(2008). http://www.eia.doe.gov/oiaf/aeo.
18. David Schrank and Tim Lomax, "The 2007 Urban Mobility Report," Texas Transportation Institute, 2007, http://mobility.tamu.edu.

19. National Cooperative Highway Research Program, "Economic Implications of Congestion," Report 463, Transportation Research Board, 2001.
20. Partnership for New York City, "Growth or Gridlock? The Economic Case for Traffic Relief and Transit Improvement for a Greater New York," 2006.
21. For this analysis we used raw data from the FHWA's Highway Performance Management Systems (HPMS) database and aggregated the county level data up to the latest metropolitan area definitions. Note that this is different from urbanized areas which the FHWA also uses.
22. Cambridge Systematics, Inc., "An Initial Assessment of Freight Bottlenecks on Highways," Prepared for Federal Highway Administration in association with Battelle Memorial Institute. Columbus: 2005.
23. Although the report points out that the costs of delivering these benefits could be substantial depending on the congestion strategy. See: Rod Eddington, "Main Report: Transport's Role in Sustaining the UK's Productivity and Competitiveness," HM Treasury, UK, 2006a.
24. Partnership for New York City, p. 40.
25. See NCHRP Project 8-36, Task 22.
26. Surface Transportation Policy Partnership, "Easing the Burden, a Companion Analysis of the Texas Transportation Institute's Congestion Study," Washington: 2001.
27. For a comprehensive discussion of the causes of congestion, its dynamics, and its relative incidence in various parts of the country, see Anthony Downs, *Still Stuck in Traffic: Coping with Peak-Hour Traffic Congestion* Brookings, 2004.
28. This is similar to the approach in Paul Weyrich and William Lind, "Does Transit Work? A Conservative Reappraisal," Free Congress Research and Education Foundation, 1999.
29. For this paper, data from 2002, 2003, and 2004 are examined for the nation and for the 32 metropolitan areas surveyed during those years.
30. The top five metropolitan areas ranked by perceptions of transit availability are Los Angeles, New York, Denver, Anaheim, and Seattle. The bottom 5 are Kansas City, Indianapolis, Oklahoma City, Charlotte, and Fort Worth.
31. An ABC/Time/Post poll generally confirm these statistics and in 2005 found that public transit is more available in the Northeast and West (where seven in 10 said it was an option) than it is in the South and Midwest (only five in 10). (ABC News/Time Magazine/ Washington Post Poll, "A Look Under the Hood of a Nation on Wheels," 2005); Another study from the Bureau of Transportation Statistics found that only 40 percent of Americans reported that they live within a quarter mile of a bus stop of any kind, and under a quarter live within five miles of rail. (Bureau of Transportation Statistics, "National Transportation Availability and Use Survey," 2002.)
32. The information in the NTD is presented by transit agency so what is reported here has been aggregated up to the urbanized area level. For consistency's sake they are referred to as metropolitan areas here.
33. These figures for buses report number of vehicles operated in maximum service (VOMS). According to the National Transit Database: "VOMS is the revenue vehicle count taken during a transit agency's maximum season of the year, on the day of the week that this maximum occurs. It is not taken on a day when a special event or other extreme set of circumstances would cause the resulting tally to represent a one-time event rather than a recurring maximum service requirement. Because it does not include spare and stored vehicles, this fleet-size measure provides a more meaningful estimation of a transit agency's operating characteristics."
34. Brookings analysis of Federal Transit Administration data from the National Transit Database.
35. Amtrak would have generated $122 million more in 2006 if it achieved a 75 percent on time performance in 2006, mostly from increased fare revenues. Office of Inspector General, "Effects of Amtrak's Poor On-Time Performance," U.S. Department of Transportation Report Number CR-2008-047, 2008.
36. Bureau of Transportation Statistics, "Freight," U.S. Department of Transportation. Undated, available at http://www.bts.gov/programs/freight_transportation/html/more_freight.html.
37. Michael Meyer, "Road Congestion Impacts on Freight Movement," in *The Future of Urban Transportation II*, Eno Transportation Foundation, Washington, DC, 2008.
38. The FHWA notes that these figures are much higher than those reported in the U.S. Census' vehicle inventory for 2002 because of new data collection and reporting, and not necessarily because of not because of substantial vehicle registration changes. See Office of Highway Information Management, "Highway Statistics 2005," Federal Highway Administration Table MV-9.
39. National Surface Transportation Policy and Revenue Study Commission, "Transportation for Tomorrow," 2008, p. 2-16.
40. Bureau of Transportation Statistics, "National Transportation Statistics 2007."
41. Ibid; U.S. Department of Transportation, Table 1-42 Average Length of Haul, Domestic Freight and Passenger Modes (Miles).
42. Jean-Paul Rodrigue and others, *The Geography of Transport Systems,* London: Routledge, 2006.
43. Chad Shirley and Clifford Winston, "The Impact of Congestion on Shippers' Inventory Costs," Final report to the U.S. Department of Transportation, Federal Highway Administration. 2004.
44. Glen Weisbrod, Donald Vary, and George Treyz, "Economic Implications of Congestion," National Cooperative Highway Research Program Project 2-21, Transportation Research Board, 2001; cited in Cambridge Systematics, "The Benefits of Reducing Congestion," National Cooperative Highway Research Program Project 8-36, Task 22, 2002.
45. The most sinister of these interchanges come with their own monikers like Spaghetti Junction, the Mixing Bowl, Orange Crush, Malfunction Junction, and the Stack.
46. Cambridge Systematics, Inc., 2005.
47. HLB Decision Economics Inc., "Public Policy Impacts on Freight Productivity," 1999.
48. Kant Rao and William L. Grenoble, "Modeling the Effects of Traffic Congestion on JIT," *International Journal of Physical Distribution & Logistics Management,* Vol 21(2): 1991.
49. Thomas Golob and Amelia Regan, "Traffic Congestion and Trucking Managers' Use of Automated Routing and Scheduling," *Transportation Research Part E: Logistics and Transportation Review*, Vol 39(1) 2003, pp. 61-78.
50. Isaac Shafran and Anne Strauss-Weider, "Financing and Improving Land Access to U.S. Intermodal Cargo Hubs," Transportation Research Board NCHRP Report 497, 2003.
51. These terms for these connectors is sometimes inconsistent. "First mile" is used here to reflect the infrastructure needed to transport goods out of air and marine terminals to the broader road and rail shipping network in the U.S. "Last mile" is often considered the final delivery directly to the consumers themselves.
52. Maritime Administration, "Report to Congress on the Performance of Ports and the Intermodal System," U.S. Department Of Transportation, June 2005.
53. American Association of State Transportation Organizations "Freight-Rail Bottom Line Report," 2003.
54. CBO, 2006.
55. BTS, 2007.
56. Ibid.
57. To be sure, greenhouse gases are not all bad. The earth benefits from a natural "greenhouse effect," whereby greenhouse gases—including CO_2, methane, nitrous oxide, and others—absorb some of the heat that is emitted by the earth's surface after being warmed by sunlight. This naturally occurring effect keeps average surface temperatures at about 45 degrees Fahrenheit as opposed to the -15 degrees Fahrenheit that the earth would endure without the effect. Pew Center on Global Climate Change, "Climate Change 101: Understanding and Responding to Global Climate Change," 2006.
58. Energy Information Administration, "Emissions of Greenhouse Gases in the United States," 2005. Note that while CO_2 has a low warming potential, the enormous amount of it in the atmosphere means that it comprises 84 percent of total greenhouse gas warming potential.

59. Intergovernmental Panel on Climate Change, "Climate Change 2007: The Physical Science Basis."
60. For examples of the potential consequences of climate change, see: Intergovernmental Panel on Climate Change, 2007.
61. David Greene and Andreas Schafer, "Reducing Greenhouse Gas Emissions from U.S. Transportation," Pew Center on Global Climate Change, 2003.
62. Ibid.
63. U.S. Environmental Protection Agency, "Health Effects of Pollution." 2006.
64. Energy Information Administration, 2005. Additionally, almost 2 percent of U.S. transportation is fueled by natural gas. While cleaner, the use of natural gas also emits CO_2. The balance of U.S. transportation fuels include renewable options like ethanol, which also releases CO_2 when burned. However, fuels like ethanol can be considered carbon-neutral because the original source of the fuel—plants such as corn—sequesters carbon.
65. Greene and Schafer, 2003.
66. Environmental Protection Agency, "Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2006."
67 Feng An and Amanda Sauer, "Comparison of Passenger Vehicle Fuel Economy and GHG Emissions Standards Around the World," Pew Center on Global Climate Change, 2004.
68. U.S. Department of Transportation, "Vehicle Miles Traveled (VMT) and Vehicle Emissions," 2002. Because CO_2 emissions are dependant primarily on MPG and VMT, and because MPG remains relatively constant, any increase in VMT coincides with a proportionate increase in CO_2 emissions.
69. See: Reid Ewing and others, *Growing Cooler: The Evidence on Urban Development and Climate Change*, Washington: Urban Land Institute, 2008.
70. Source: Brookings analysis of federal highway data
71. Marilyn A. Brown, Frank Southworth, and Andrea Sarzynski, "Shrinking the Carbon Footprint of Metropolitan America," Brookings, 2008.
72. Ibid.
73. International Energy Agency, "Energy Balances of OECD Countries, 1999–2000," 2001. Conversion to barrels of oil equivalent was made by multiplying tonnes of oil equivalent by the conversion factor of 7.33. See the Society of Petroleum Engineers for more conversion factors.
74. Energy Information Administration, "U.S. Imports by Country of Origin." http://tonto.eia.doe.gov/dnav/pet/hist/mcrfpus1m.htm.
75. The rankings come from the 2007 Failed States Index prepared by The Fund for Peace and Foreign Policy Magazine. The index employs a rating of 12 social, economic, and political/military indicators as well as other assessments of institutional capabilities. See: http://www.foreignpolicy.com/story/cms.php?story_id=3865&page=0.
76. Alan Berube and others, "Finding Exurbia: America's Fast-Growing Communities at the Metropolitan Fringe," Brookings, 2006.
77. John F. Kain, "Residential Segregation, Negro Employment, and Metropolitan Decentralization," *Journal of Economics* 82 (1968): 175–97.
78. Harry J. Holzer and Michael A. Stoll, "Meeting the Demand: Hiring Patterns of Welfare Recipients in Four Metropolitan Areas," Brookings, 2001.
79. Keith R. Ihlanfeldt and David L. Sjoquist. "The Spatial Mismatch Hypothesis: A Review of Recent Studies and Their Implications for Welfare Reform," *Housing Policy Debate,* 9: 849-93 (1998). Also see: Michael A. Stoll, "Job Sprawl and the Spatial Mismatch between Blacks and Jobs." Brookings, 2005.
80. Bureau of Transportation Statistics, "Transportation Statistics Annual Report," 2005.
81. Elizabeth Roberto, " Commuting to Opportunity: The Working Poor and Commuting in the United States," Brookings, 2008.
82. Matt Fellowes, "From Poverty, Opportunity: Putting the Market to Work for Lower Income Families," Brookings, 2006.
83. Ibid.
84. Center for Housing Policy, "A Heavy Load: The Combined Housing and Transportation Burdens of Working Families," Washington, 2006.
85. Center for Neighborhood Technology and Center for Transit-Oriented Development, "The Affordability Index: A New Tool for Measuring the True Affordability of a Housing Choice," Washington: Brookings, 2006.
86. American Automobile Association, "Crashes vs. Congestion – What's the Cost to Society?" prepared by Michael D. Meyer and Cambridge Systematics, Inc., 2008.
87. Two other new high risk areas are national security and food safety. See: U.S. GAO, "High-Risk Series: An Update," GAO-07-310, 2007.
88. Cited in: Robert A. Katzman, ed., *Daniel Patrick Moynihan: The Intellectual in Public Life* Washington: Woodrow Wilson Center Press, 1998, p. 78.
89. The ASCE reports that they "assembled a panel of 24 of the nation's leading civil engineers, analyzed hundreds of studies, reports and other sources, and surveyed more than 2,000 engineers" to determine investment needs for the nation's infrastructure. American Society of Civil Engineers, "Report Card for America's Infrastructure: Methodology," 2005.
90. Ross Crichton, "Highway Investment Scenario Estimates: Impacts of Analytical Assumptions," Briefing for the National Surface Transportation Revenue and Policy Study Commission, July 2006.
91. U.S. DOT C&P report, 2006, exhibit 7-10.
92. Freight and passenger rail estimates are also large and differ somewhat depending on the source. The range for freight rail is between $4 and $10 billion annually. Passenger rail is between $3 and $7 billion. AASHTO, 2003.
93. U.S. DOT C&P report, 2006, exhibit ES-13.
94. See e.g., National Surface Transportation Policy and Revenue Study Commission, "Base Case Needs Assessment: Highways," Commission Briefing Paper 6A-01, 2007.
95. Transportation for Tomorrow, Exhibit 4-22.
96. National Transportation Policy Project, "Commentary on the Report of the National Surface Transportation Policy and Revenue Study Commission," Washington: Bipartisan Policy Center, 2008.
97. Eddington, 2006a.
98. Susan Binder, "Limitations of the USDOT Investment Analysis," Briefing for the National Surface Transportation Revenue and Policy Study Commission, July 2006.
99. U.S. Governmen Accountability Office, "Federal-Aid Highways: Trends, Effect on State Spending, and Options for Future Program Design," GAO-04-802, 2004, p. 39.
100. Gary Maring, "Future Financing Options to Meet Highway and Transit Needs," Prepared for the Regional Plan Association National Roundtable on Surface Transportation, Tarrytown, New York, February 20–22, 2007.
101. Federal Highway Administration, Highway Statistics 2005, table FE-10.
102. National Association of State Budget Officers, "State Expenditure Reports: 2004–2006."
103. Brookings analysis of FHWA Highway Statistics Series Table SF-3, 1995–2005.
104. U.S. GAO, "Federal-Aid Highways," GAO-04-802, 2004, p. 5.
105. Source: Highway Statistics Series, SF-1. Although the federal highway data presents it as such, it is questionable whether bond proceeds should be included here as "revenues." Bond proceeds must be repaid in the future, along with the interest payments, presumably by other sources of revenue—such as the state gas tax revenue or from general funds. See: Robert Puentes and David Warren, "Today's Roads with Tomorrow's Dollars: Using GARVEE Bonds to Finance Transportation Projects," Brookings, 2005.
106. The Leaky Underground Storage Tank Trust Fund receives .10 cents.
107. Bureau of Transportation Statistics, "Survey of State Funding for Public Transportation," 2005.
108. Martin Wachs, "Improving Efficiency and Equity in Transportation Finance," in *Taking the High Road: A Metropolitan Agenda for Transportation Reform,* B. Katz and R. Puentes, (eds.) Brookings Press, 2005.
109. U.S. DOT C&P report, 2006, p. 6-22.
110. Source: Robert Puentes and Ryan Prince, "Fueling Transportation Finance: A Primer on the Gas Tax," in *Taking the High Road: A Metropolitan Agenda for Transportation Reform,* B. Katz and R. Puentes, eds., Brookings, 2005.

111. The rescission orders can be found on the FHWA's website of Directives and Policy Memorandums: http://www.fhwa.dot.gov/legsregs/directives/notices.htm
112. Surface Transportation Policy Partnership, "President Bush Signs FY'07 Spending Measure, Largest Single Program Rescission on the Way," 2007.
113. Ken Simonson, Testimony before the National Surface Transportation and Policy Revenue Study Commission, March 19, 2007.

SECTION IV: TRANSPORTATION, THE U.S. ECONOMY, AND THE METROPOLITAN PRIORITY

1. School and church trips are combined. See Bureau of Transportation Statistics, "Highlights of the 2001 National Household Travel Survey," 2003.
2. Joseph Giglio, *Mobility: America's Transportation Mess and How to Fix It,* New York, Hudson Institute, 2005, p. xii.
3. According to the latest Consumer Expenditure Survey data on the whole, consumers in the entire southern region of the U.S. spend more on "transportation" than they do on "shelter" although total "housing" expenses are the largest component. U.S. Department of Labor, "Consumer Expenditures in 2005," Bureau of Labor Statistics, Report 998, 2007.
4. Nicholas Stern, "The Economics of Climate Change," HM Treasury, UK, 2006.
5. Eddington discusses this balancing act by examining three economically growing countries: China, India, and Ireland and how the latter two grew their national economy with only limited transportation investment. The report warns, however, that this is a difficult model to sustain and targeted investments do become necessary. Eddington, 2006a, p. 11.
6. Randall Eberts, "How Levels of Investment in Transportation Affect Economic Health," University of California, Irvine, 1999.
7. National Research Council, "Key Transportation Indicators: Summary of a Workshop," Janet Norwood and Jamie Casey, eds. National Research Council, 2002. p. 26.
8. Kajal Lahiri, Wenxiong Yao and Peg Young, "Transportation and the Economy: Linkages at Business Cycle Frequencies," *Journal of Transportation Research,* No. 1864: 103-111. 2004.
9. Rosalyn A. Wilson, "Transportation in America 2001," Eno Transportation Foundation, 2002.
10. Clifford Winston, *Government Failure versus Market Failure,* AEI-Brookings Joint Center for Regulatory Studies, 2006, p. 63
11. Wilson, 2002, p. 5.
12. One study found that the aggregate population of center cities would have grown by about 8 percent if the interstates had not been built. Nathaniel Baum-Snow, "Did Highways Cause Suburbanization?" *The Quarterly Journal of Economics,* MIT Press, vol. 122(2), pages 775-805, 05 (2007).
13. This is, of course, in addition to national defense. Before he signed the bill, Eisenhower notes that "in case of atomic attack on our key cities, the road network must permit quick evacuation of target areas." Cited in: Kathleen Tobin, "The Reduction of Urban Vulnerability: Revisiting 1950s American Suburbanization as Civil Defense," *Cold War History,* Vol, 2(2) 1-32; 2002.
14. HLB Decision Economics Inc. and KPMG LLP, "Public Policy Impacts on Freight Productivity: Final Report with Annotated Bibliography," prepared for Federal Highway Administration, 1999. The authors note that caution should be used in interpreting these results for policy making.
15. Chad Shirley and Clifford Winston, "Firm Inventory Behavior and the Returns from Highway Infrastructure Investments," *Journal of Urban Economics* 55 (2004) 398–415. Another way to look at it is that there are potentially large returns from the initial capital investment in the highway system, but once the system was completed subsequent expenditures that primarily attempted to maintain the system were likely to yield lower returns.
16. See e.g., Theofanis P. Mamuneas and M. Ishaq Nadiri, "Production, Consumption and the Rates of Return to Highway Infrastructure Capital," Report prepared for U.S. Department of Transportation, 2003.
17. This is similar to the principle of triple convergence which holds that major improvements to a roadway will result in shifts to that roadway from other routes, other times, and other modes until that facility becomes congested. See Downs, 2004, p. 327.
18. Marlon G. Boarnet and Andrew F. Haughwout, "Do Highways Matter? Evidence and Policy Implications of Highways' Influence on Metropolitan Development," Brookings, 2000.
19. Mark H. Rose, "Reframing American Highway Politics, 1956-1995," *Journal of Planning History* 2003; 2; 212.
20. Ronald D. Utt, "More Transportation Spending: False Promices of Prosperity and Job Creation," Heritage Foundation Backgrounder #2121, 2008.
21. See also: Federal Highway Administration, "Highway Operations Spending as a Catalyst for Job Growth," MacroSys Research and Technology, 2003. Of course, the point could easily be made that spending a billion dollars on just about anything (e.g., transit, housing, medical care, alternative energy, convention centers, pollution control) would support job creation of roughly the same magnitude.
22. This argument was recently made at a National Research Council conference: "Key Transportation Indicators: Summary of a Workshop," Janet Norwood and Jamie Casey, eds. National Research Council, 2002.

SECTION V: TTHE POLICY PROBLEM: FEDERAL TRANSPORTATION POLICY IS ABSENT, OUTDATED, AND UNDERPERFORMING

1. Tom Lewis, *Divided Highways,* New York: Viking Press, 1997, p. 104.
2. Richard F. Weingroff, "Creating a Landmark: The Intermodal Surface Transportation Efficiency Act of 1991" Federal Highway Administration, 2005.
3. The law also required that the Secretary of Transportation distribute copies of the policy declaration to every employee and that it was posted in every office of the U.S. DOT. This statutory requirement was never fulfilled. ISTEA, P.L. 102-240, Sec. 2. (1991).
4. Although there was strong language inserted with respect to the Future of Surface Transportation System Section 1909.
5. Although obscured by its disagreements about funding levels and sources, the NSTPRSC's most important contribution is its forceful call for a renewed federal purpose. In recent months organizations within the transportation lobby such as the U.S. Chamber of Commerce, the Association of Metropolitan Planning Organizations, the American Road & Transportation Builders Association, American Association of State Highway and Transportation Officials, and the American Public Transportation Association have all called for some articulation of a national vision and purpose as have a diverse group of research and policy organizations such as the T4America Campaign, the Bi-Partisan Policy Center, the Reason Foundation, America 2050, and the Hudson Institute. The National Stone, Sand and Gravel Association said that developing a new vision for transportation in the U.S. is "not negotiable – it's a matter of life and death..." NSSGA, "Aggregates in Action," 2007.
6. The 2006 National Strategy to Reduce Congestion on America's Transportation Network comes close. However, that plan is focused only on strategies ostensibly intended to reduce traffic congestion such as toll roads and methods such as congestion pricing. While important, this does not represent a comprehensive approach to the nation's transportation challenges. U.S. Department of Transportation, "National Strategy to Reduce Congestion on America's Transportation Network," 2006.
7. While the federal and state governments have provided extensive funding for truck, barge, and airline infrastructure over the past quarter century, freight railroads receive little funding assistance. The railroads pay all of their own infrastructure and rights-of-way costs and are responsible for the risks associated with those costs. Since 1980, the largest freight railroads invested over $350 billion split about equally between infrastructure and equipment.
8. For an insider discussion about this congressional fight, see: Costas Panagopoulos and Joshua Schank *All Roads Lead to Congress: The $300 Billion Fight Over Highway Funding,* Washington: CQ Press, 2007.
9. Thomas M. Downs, "Is There a Future for the Federal Surface Transportation Program?" *Journal of Transportation Engineering,* Vol. 131, No. 6, June 1, 2005. 393-396

10. U.S. GAO, 2004, p. 5.
11. See: James F. Wolf, Robert Puentes, Thomas W. Sanchez, and Tara K. Bryan, "Metropolitan Transportation Planning in the Post-ISTEA Era: What Happened, and What Do We Do Now?" in *The Future of Urban Transportation II*, Eno Transportation Foundation, 2008.
12. Bruce McDowell, "Improving Regional Transportation Decisions: MPOs and Certification," Brookings, 1999.
13. FHWA, "Comments on Draft 1.0 Regional Transportation Vision (First Chapter of the RTP)," 2007.
14. Martin Wachs, "A Quiet Crisis in Transportation Finance: Options for Texas." *Horizon: The Future of Transportation; A Publication of the Texas Department of Transportation,* Summer, 2006, pp. 2-27.
15. For regional analyses, see the following—Atlanta: Duane D. Stanford, "Metro Roads Shortchanged: Funding Formula Steers Cash to Rural Highways at the Expense of Gridlocked Atlanta Motorists," *Atlanta Journal-Constitution,* September 28, 2004, p. A1; California: Adrian R. Fleissig and William F. Gayk, "Distribution of State Transportation Funding," Sacramento: California State University Center for California Studies, 2003; Houston: Catherine Rentz Pernot, "Transportation Funding Equity: The Local Pie Is Strangely Sliced," Houston: Gulf Coast Institute, 2003; Pennsylvania: Anne Canby and James Bickford, "Highway Investment Analysis," Philadelphia: 10,000 Friends of Pennsylvania, 2003; San Antonio: Bill Barker, "Gasoline Tax Shortchanges Big-City Drivers," *San Antonio Express-News,* January 19, 2003; St. Louis: University of Missouri-St. Louis, "Analysis of Metropolitan St. Louis State Transportation Fiscal Flows," Public Policy Research Center, 2001; Phoenix, Denver, Dallas, and Seattle: Paul Dempsey et al, "Metropolitan Planning Organizations: An Assessment of the Transportation Planning Process," A Report To Congress, University of Denver, 2000; Ohio: Edward W. Hill and others, "Slanted Pavement: How Ohio's Highway Spending Shortchanges Cities and Suburbs," Brookings, 2003: Michigan: Citizens Research Council of Michigan, "Improving The Efficiency Of Michigan's Highway Revenue Sharing Program," Livonia, MI; No. 1085: 2008
16. Metropolitan Seattle and Denver are exceptions and successfully fought to receive an equitable funding share.
17. Environmental Working Group, "Gas Tax Losers: Why Congress Must Ensure a Fairer Share of Gas Tax Revenues for Metro America." Washington, 2004.
18. U.S. DOT C&P report, 2006, exhibit 6-7.
19. U.S. GAO, "Bus Rapid Transit Offers Communities a Flexible Mass Transit Option," GAO-03-729T, 2003, p. 3.
20. Making Appropriations for the Department of Transportation and Related Agencies for the Fiscal Year Ending September 30, 2002, and for Other Purposes, H. Rept. 107-308, 107 Cong., 1 sess., 2001.
21. U.S. DOT C&P report, 2006, exhibit 6-25.
22. U.S. GAO, "Amtrak Management: Systemic Problems Require Actions to Improve Efficiency, Effectiveness, and Accountability," GAO-06-145, 2005.
23. Air Transportation Safety and System Stabilization Act. 147th Congressional Record, pages H5894-5918.
24. U.S. GAO, "Challenges Facing the Agency in Fiscal Year 2009 and Beyond." GAO-08-460T, 2008.
25. Daniel Machalabra, "Crowds Heed Amtrak's 'All Aboard'," *Wall Street Journal,* August 23, 2007
26. The Senate passed the Passenger Rail Investment and Improvement Act of 2007 (S. 294) on October 30, 2007.
27. See e.g., Kenneth Small, Clifford Winston, and Carol A. Evans, *Road Work: A New Highway Pricing and Investment Policy,* Brookings: 1989.
28. The heaviest combinations, those over 80,000 pounds, pay only half of their cost responsibility. James W. March, "Federal Highway Cost Allocation Study," *Public Roads* Vol 61(4): 1998.
29. M. A. Delucchi, "Do Motor-Vehicle Users Pay Their Way?," *Transportation Research* A 41: 983-1003 (2007).
30 Lazzari, Salvatore. "Energy Tax Policy", Congressional Research Service of The Library of Congress, Updated April 22, 2005; page 16.
31. Rod Eddington, Speech to the Commonwealth Club, London, December 1, 2006.
32. No doubt a key reason for the federal non-interventionist approach is the states themselves. During the deliberations regarding TEA-21 several AASHTO policy documents illustrate this resistance in no uncertain terms. In 1996 they wrote that "there would be considerable problems and the states would object to tying any federal distributions to national performance goals." Then in 1997 the group resolved that "performance measures should not used by the federal government as a means of restricting the authority and flexibility of state transportation officials, complicating or further regulating the program, or creating additional data collection burdens on the states." Cited in Teresa Curristine, "Reforming the U.S. Department of Transportation: Challenges and Opportunities of the Government Performance and Results Act for Federal-State Relations," *Publius,* Vol. 32(1), page 25 (2002).
33. The criteria to be evaluated in planning highway projects are: 1) economic vitality and global competitiveness; 2) safety; 3) security; 4) accessibility and mobility of people and freight; 5) environmental protection and energy conservation; 6) connectivity; 7) system management; and 8) preservation and maintenance. Public Law 109-59, Sections 5303 (h)(1) and 5304 (d)(1)
34. New Hampshire is the only state without a seat belt law, consistent with its motto: Live Free or Die. TEA-21 created two federal incentive grant programs to encourage states to increase the use of seat belts and child safety seats: Section 405 incentive grants and Section 157 incentive grants. These grant programs are designed to encourage states to increase seat belt use rates and target specific occupant protection laws and program. U.S. Department of Transportation, "Buckle Up America: Incentive Grants for Increasing Seat Belt Use," 2000.
35. NHTSA identified 6 states and a total of $137.4 billion that could be withheld under this regulation. U.S. Department Of Transportation, "Annual Core Apportionments and Potential Penalties Under Sec. 163(A) for FY 2004 and Thereafter," 2007.
36. 23 U.S.C. 145(a)
37. U.S. Government Accountability Office, "Options for Improving Information on Projects' Benefits and Costs and Increasing Accountability for Results," GAO-05-172, 2005.
38. SAFETEA-LU Section 1102 (j)(1); and Section 1935 (b)(1-4)
39. OMB, "Detailed Information on the Highway Infrastructure Assessment," Section 2.6, 2007. (http://www.whitehouse.gov/omb/expectmore/summary/10000412.2007.html)
40. U.S. GAO, "Performance and Accountability: Transportation Challenges Facing Congress and the Department of Transportation," GAO-07-545T, 2007.
41. Eno Transportation Foundation, "Forum Summary," *The Future of Urban Transportation II,* Washington, DC, 2008.
42. OMB, "Detailed Information on the Highway Infrastructure Assessment," Section 3.1, 2007. (http://www.whitehouse.gov/omb/expectmore/summary/10000412.2007.html)
43. Robert Puentes, "Flexible Funding for Transit: Who Uses It?" Brookings, 2000.
44. The American Road and Transportation Builders Association recently stated that the "18 year shift to flexible federal funds has created a serious obstacle to meeting emerging national needs." ARTBA, "America's Future Federal Surface Transportation Program," Washington: 2007.
45. U.S. GAO, "Federal-Ad Highways: Trends, Effect on State Spending, and Options for Future Program Design," GAO-04-802, 2004, p. 35.
46. Ibid, p. 40.
47. Parsons Brinckerhoff, "Identification of Opportunities to Improve the Leveraging Potential of Federal Transportation Funding with Other Public Sector and Private Sector Resources," Briefing paper 5C-04 prepared for the National Surface Transportation Revenue and Policy Study Commission, 2007.

SECTION VI: POLICY RECOMMENDATIONS: A TRANSPORTATION AGENDA FOR A PROSPEROUS AMERICA

1. The U.S. Postal Service is the nation's largest public enterprise with current annual revenues approaching $70 billion. Winston, 2006.
2. That report referred to the authority as the National Surface Transportation Commission (NASTRAC).
3. This proposal is consistent with the American Association of State Highway and Transportation Officials' 2007 recommendations on the future of the interstate system. However, this report stops well

short of their proposal to more than double the size of the interstate system. See: American Association of State Highway and Transportation Officials, 2007, "Transportation Invest In Our Future: Future Needs Of the U.S. Surface Transportation System," 2007.
4. It should be noted that the focus is on traffic calming and accidents that take place off the interstate system. See: Neal Peirce, 'Vision Zero' for Traffic Deaths: Wild Dream or Critical Goal?" Washington Post Writers Group, 2007.
5. U.S. DOT C&P report, 2006, exhibit 7-2.
6. Transportation Research Board, "Future Options for the National System of Interstate and Defense Highways," NCHRP Project 20-24(52) - Task 10, Prepared by PB Consult, Inc. and others, 2007.
7. Passenger Rail Working Group, "Vision For The Future: U.S. Intercity Passenger Rail Network Through 2050," prepared for National Surface Transportation Policy and Revenue Study Commission, 2007.
8. Rutgers University Voorhees Transportation Center, 2006, "New York Northeast Corridor Action Plan: A Call for a New Federal-State Partnership," prepared for Newark Regional Business Partnership.
9. Reconnecting America and the Center for Neighborhood Technology, "Missed Connections: Finding solutions to the Crisis in Air Travel," Chicago, 2002.
10. Robert Puentes and Linda Bailey, " Improving Metropolitan Decision Making in Transportation: Greater Funding and Devolution for Greater Accountability," in *Taking the High Road: A Metropolitan Agenda for Transportation Reform,* B. Katz and R. Puentes, eds., Brookings, 2005.
11. Robert W. Poole, Jr., "Is it Time to Scrap Toll Booths and Toll Plazas? Technology Makes it Possible to Go Fully Cashless," Reason Foundation Commentary, 2005.
12. Downs, 2004, p. 162.
13. Jason Bordoff and Pascal Noel, "Pay-As-You-Drive Auto Insurance: A Simple Way to Reduce Driving-Related Harms and Increase Equity," Brookings Hamilton Project Discussion Paper, forthcoming July 2008.
14. Ronald D. Utt, "Congress Gets Another Chance to Improve America's Transportation: Should It Be Its Last?" Heritage Foundation WebMemo #9999, 2005.
15. Mortimer Downey, "Legislative Considerations for Long Term Policy Change," in *The National Roundtable on Surface Transportation Discussion Papers and Summary,* by Lincoln Institute of Land Policy and Regional Plan Association, 2007.
16. Felix G. Rohatyn and Warren Rudman, "It's Time to Rebuild America," *Washington Post,* December 13, 2005; p. A27.
17. Michael Moynihan. "Investing in Our Common Future: U.S. Infrastructure," NDN, November 13, 2007, p. 9
18 "Public Works, Public Wealth: New Directions for America's Infrastructure," CSIS, 2005, p. 7
19 Report of the President's Commission to Study Capital Budgeting, Washington, 1999.
20. David Lewis, "America's Traffic Congestion Problem: A Proposal for Nationwide Reform," Brookings Hamilton Project discussion paper, April 2008.
21. Maring, 2007.


SPEED
LIMIT
65

Acknowledgments

The Brookings Institution Metropolitan Policy program wishes to thank The Surdna Foundation and The Rockefeller Foundation for their support of the Program's Metropolitan Infrastructure Initiative, a multi-year effort launched in 2008. We also wish to thank the members of the Metropolitan Leadership Council for their support of the *Blueprint* Initiative.

This study is the result of a collaborative process with a network of civic, corporate, academic, and political leaders in metropolitan areas across the country. In the summer of 2007, The Rockefeller Foundation sponsored a summit of American and international experts in transportation policy, planning and governance to take part in a session devoted to metropolitan transportation and infrastructure reform in the United States. This study draws heavily from that exchange and the ideas discussed that week.

Many people provided valuable information, advice, and comments during the development of this paper. For their participation in the 2007 transportation summit and/or substantive and thoughtful comments on earlier drafts and other elements of this paper, we wish to acknowledge:

Sharon Alpert, Geoff Anderson, Linda Bailey, Scott Bernstein, Jeff Boothe, Maura Breuger, David Burwell, Anne Canby, Tim Ceis, Stuart Cohen, Joe Cortright, Lutke Daldrup, Shirley DeLibero, Mortimer Downey, Tom Downs, Anthony Downs, Doug Foy, Emil Frankel, Joseph Giglio, Jacky Grimshaw, Steve Heminger, Mell Henderson, Oliver Jones, Jack Lettiere, David Lewis, Robert Liberty, Steve Lockwood, Pat McCrory, Michael McLaughlin, Ellen McLean, Faye Nelson, Robert Padgette, Neil Peirce, Karen Phillips, Marco Ponti, Bob Poole, Shelley Poticha, George Ranney, Martin Robins, Joel Rogers, Janette Sadik-Khan, Thomas Sanchez, Joshua Schank, Bill Smith, Jacob Snow, Chris Swope, Petra Todorovich, Ronald Utt, Richard Voith, Mike Wiley, Clifford Winston, and Mariia Zimmerman.

This paper benefited enormously from the Brookings Metro Program team especially Alan Berube, Bruce Katz, Chris Leinberger, Amy Liu, Mark Muro, and Julie Wagner. Adie Tomer provided invaluable research assistance, detailed data collection and analysis, and substantive feedback. Tyler Kinder, Shoshanna Lew, and David Warren also lent critical research assistance at various steps along the way. Sean Hardgrove contributed detailed fact checking, and David Jackson managed the paper through the editing process. Additional thanks go to Sese-Paul Design.

About the Author

Robert Puentes is a fellow at the Metropolitan Policy Program at Brookings and the director of the program's Metropolitan Infrastructure Initiative

For More Information

Robert Puentes
Metropolitan Policy Program at Brookings
(202) 797-6071
rpuentes@brookings.edu

About the Brookings Institution Metropolitan Infrastructure Initiative

To address the pressing transportation and infrastructure challenges facing the United States and abroad, the Brookings Institution launched the Metropolitan Infrastructure Initiative to inform a national discussion about how smart, targeted transportation and infrastructure policies can enhance U.S. competitiveness and help the country grow in environmentally sustainable and socially inclusive ways. At the core of this initiative is the fact that cities and suburbs are home to the bulk of the nation's transportation assets and therefore hold the greatest promise for helping the nation achieve prosperity. The goal of the initiative is to develop timely, independent analysis, frame key debates, and offer policy recommendations to help leaders in the U.S. and abroad address key infrastructure challenges with specific emphasis on transportation. This work builds on a decade of independent and rigorous research and policy development.

This and other publications, speeches, presentations, and commentary on transportation and infrastructure are available: **http://www.brookings.edu/topics/transportation.aspx**

BROOKINGS

1775 Massachusetts Avenue, NW
Washington D.C. 20036-2188
telephone 202.797.6000
fax 202.797.6004
www.brookings.edu

Metropolitan Policy Program
at BROOKINGS

telephone 202.797.6139
fax 202.797.2965
www.brookings.edu/metro