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 A COLLECTIVE "INFRASTRUCTURE EPIPHANY" HAS ARISEN ABOUT THE NEED TO REINVEST IN AMERICA'S AGING AND OUTDATED TRANSPORTATION NETWORK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

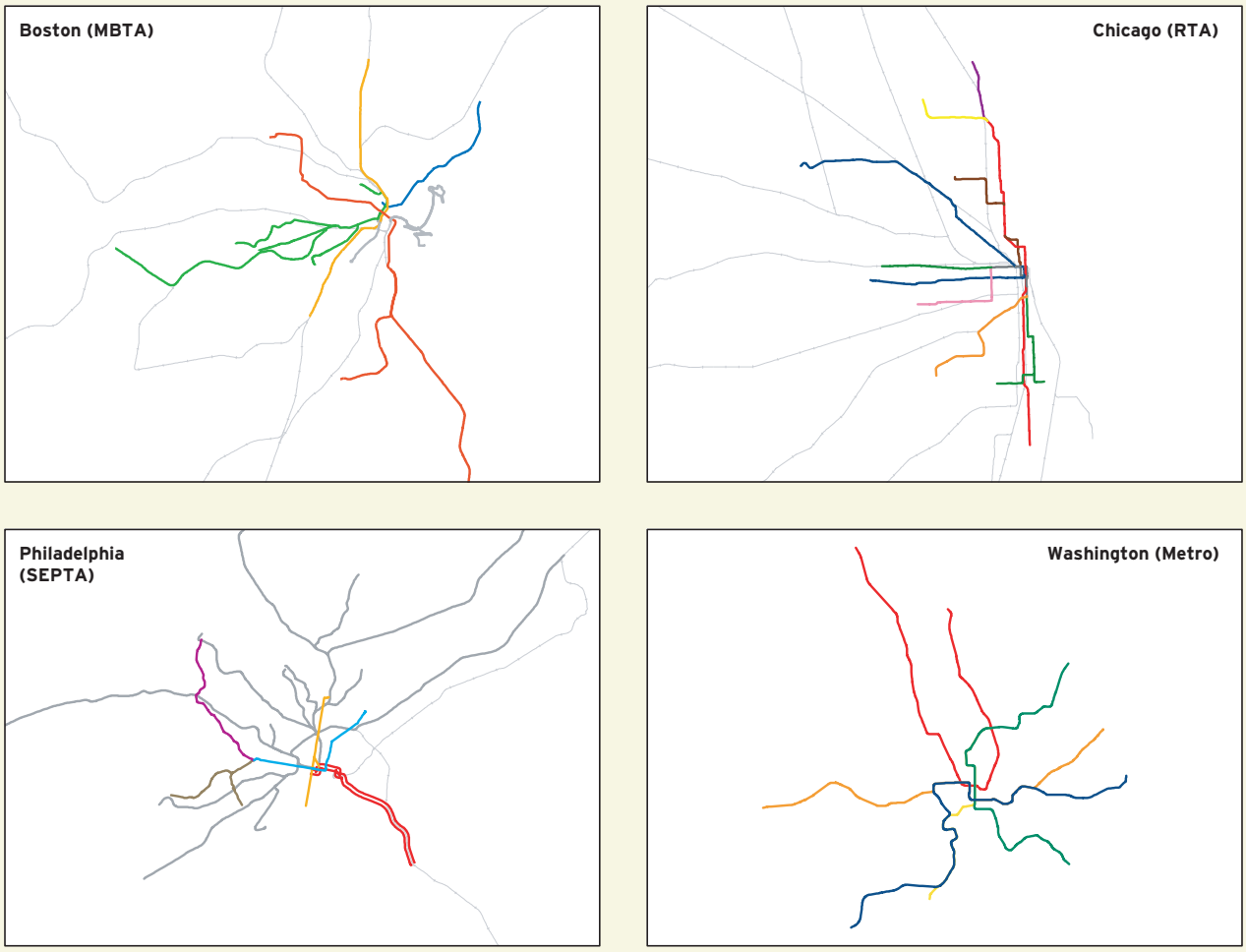
The U.S. transportation network is obsolete, no longer reflecting today's travel patterns nor fully embracing technological advancements

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.

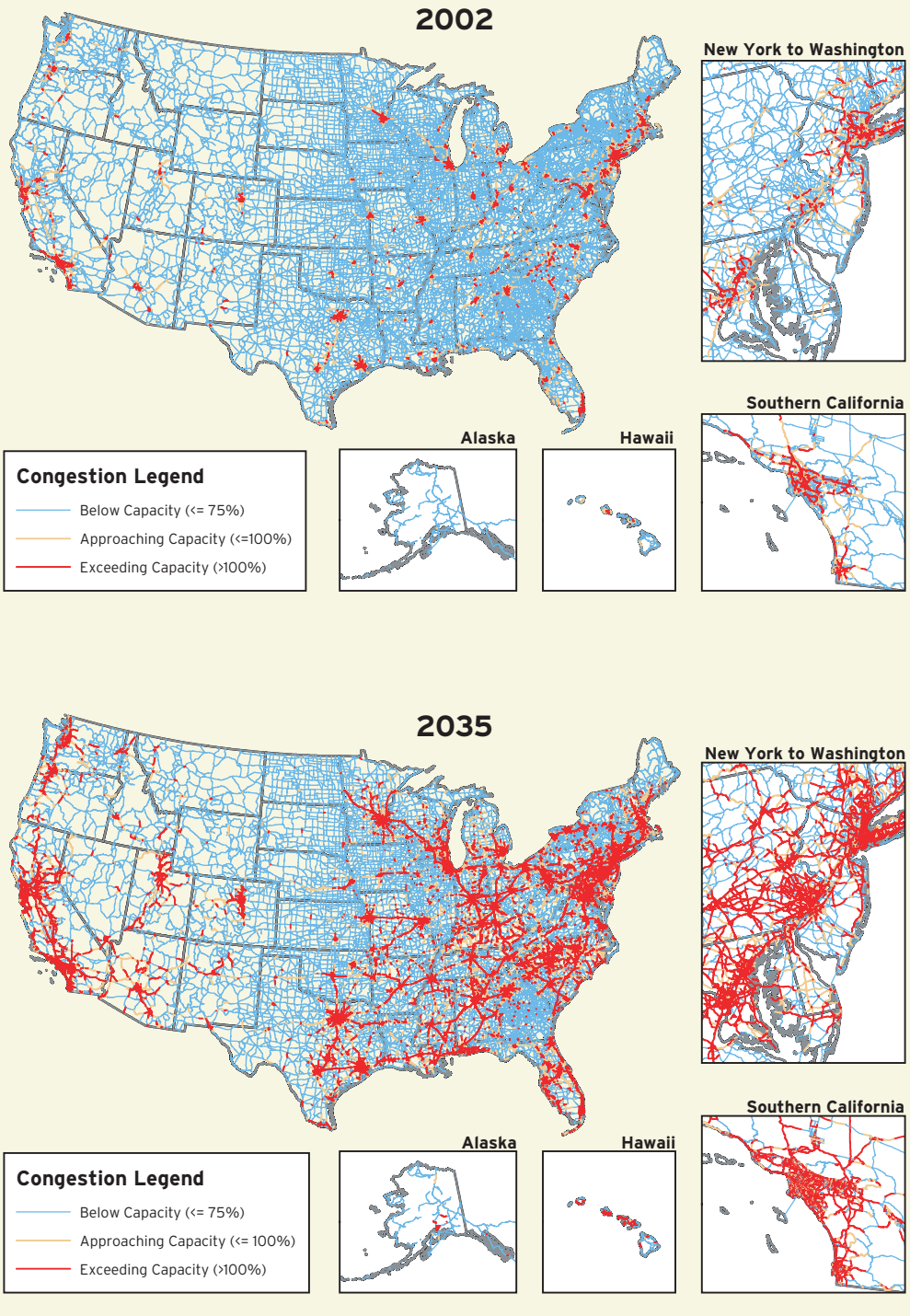
The most prominent attempt at measuring congestion comes semi-annually from the Texas Transportation Institute (TTI). Among other indicators, TTI has developed a travel time index as a ratio of congested to uncongested travel. In 1982 the average ratio was 1.09 in metropolitan America. In other words, 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]

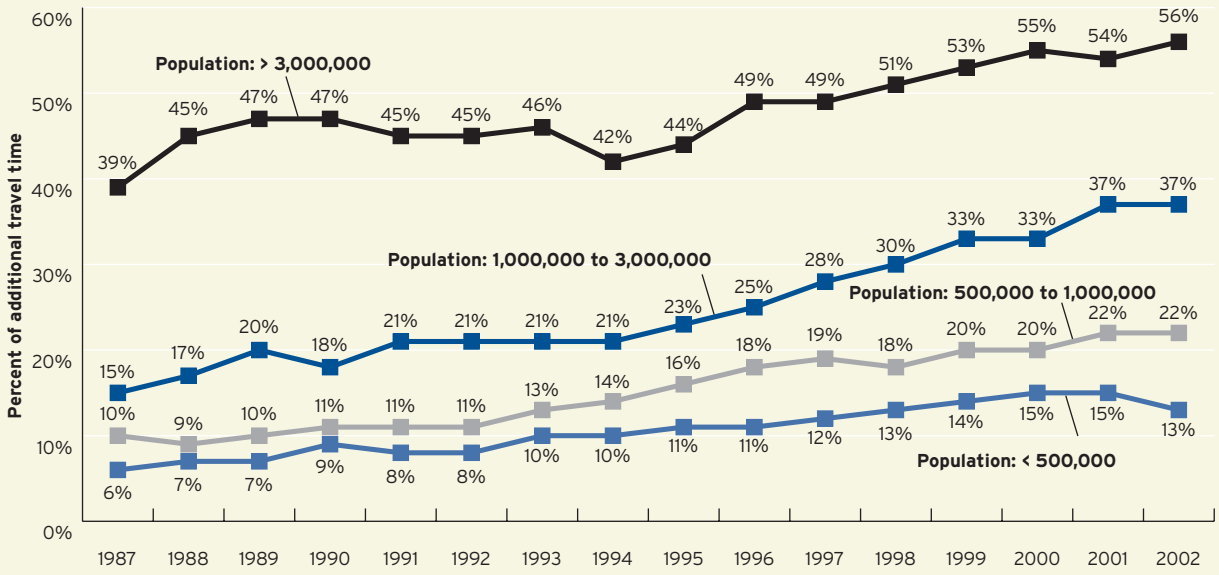
There is no shortage of passionate tomes commissioned by business, civic, and corporate leaders about the problem of congestion. As such, this paper does not attempt to recreate those arguments. However, one point is often overlooked perhaps because it appears self-evident: Traffic congestion is predominantly 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%

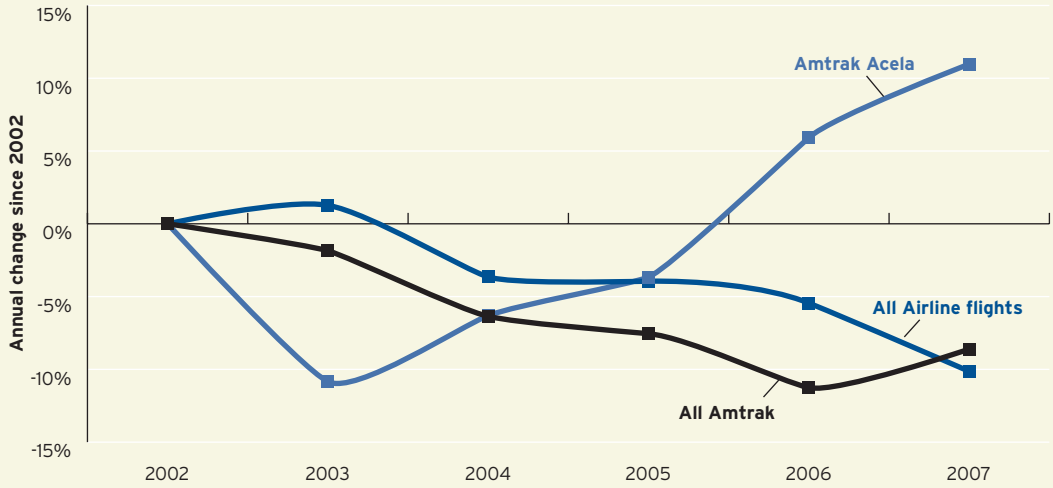
Source: Brookings Analysis of American Housing Survey, 2002-2004

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]

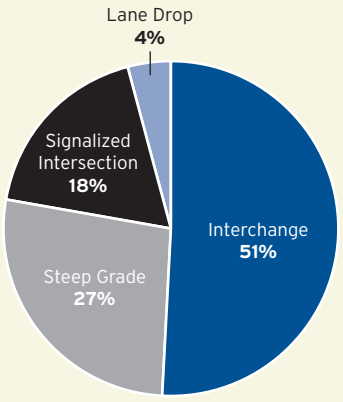
One of the only examinations of the causes of truck congestion is

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]

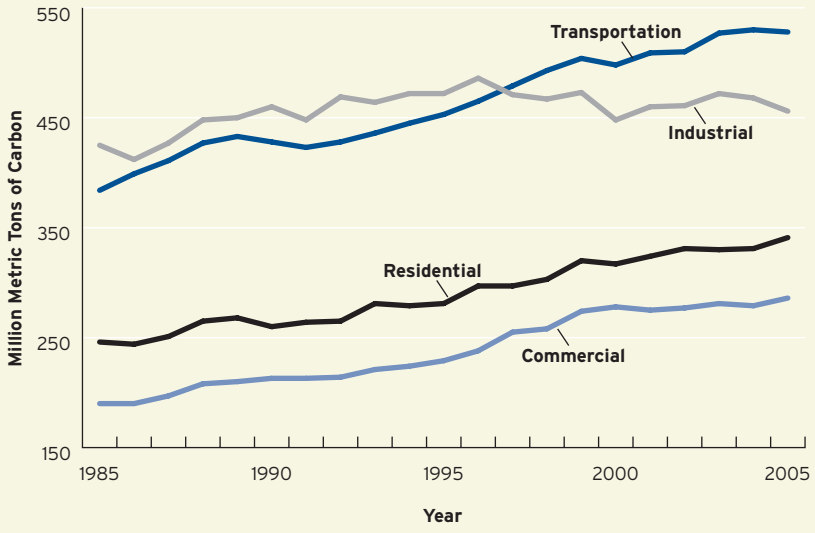
But in 2003, about 81 percent of transportation-related greenhouse gas emissions in the United States came from "on-road" vehicles, including passenger cars, sport-utility vehicles, vans, motorcycles, and medium- and heavy-duty trucks and buses.[62] Tailpipe emissions are magnified when vehicles idle 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]

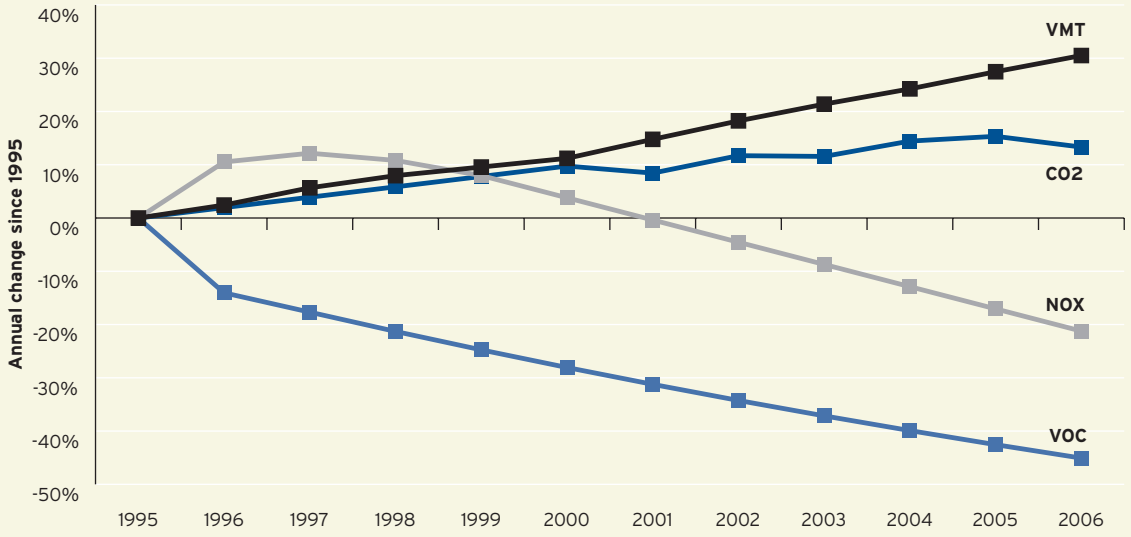
The second factor that determines just how much CO_2 each automobile emits is vehicle fuel efficiency, usually reported in miles per gallon (MPG). The trend in U.S. MPG over the last three decades is indicative of the nation's increasing transportation carbon footprint. While MPG increased steadily from 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.

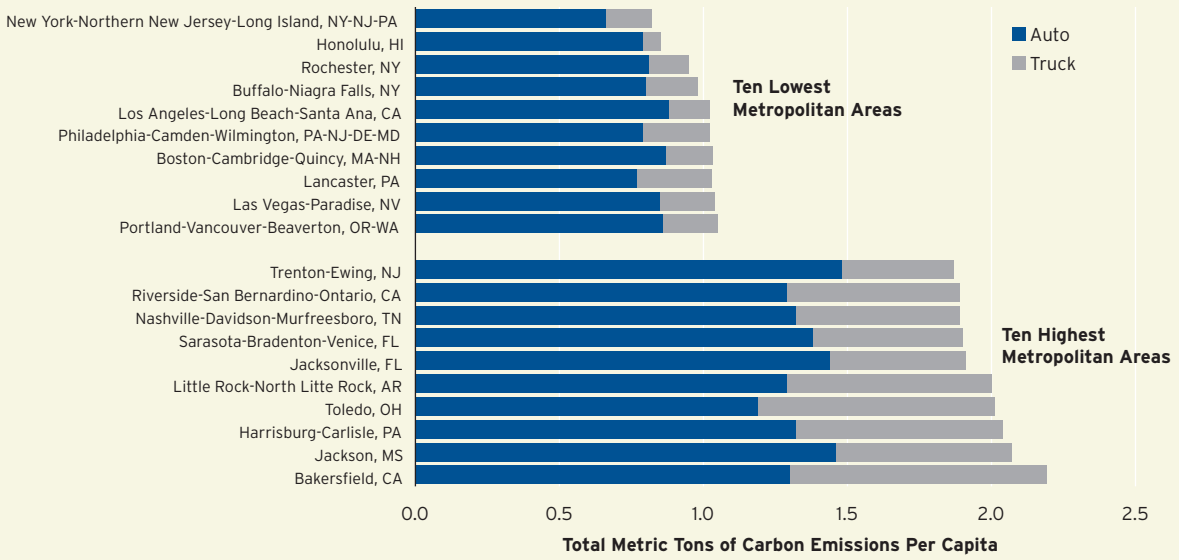
Per capita carbon emissions from cars and freight are generally lower in metro areas than the rest of the nation, in part due to denser land use patterns and greater transportation options

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]

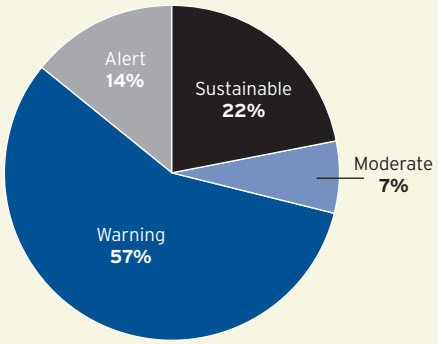
Metropolitan areas with a higher percentage of trucking activity tend to have larger carbon footprints.

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.

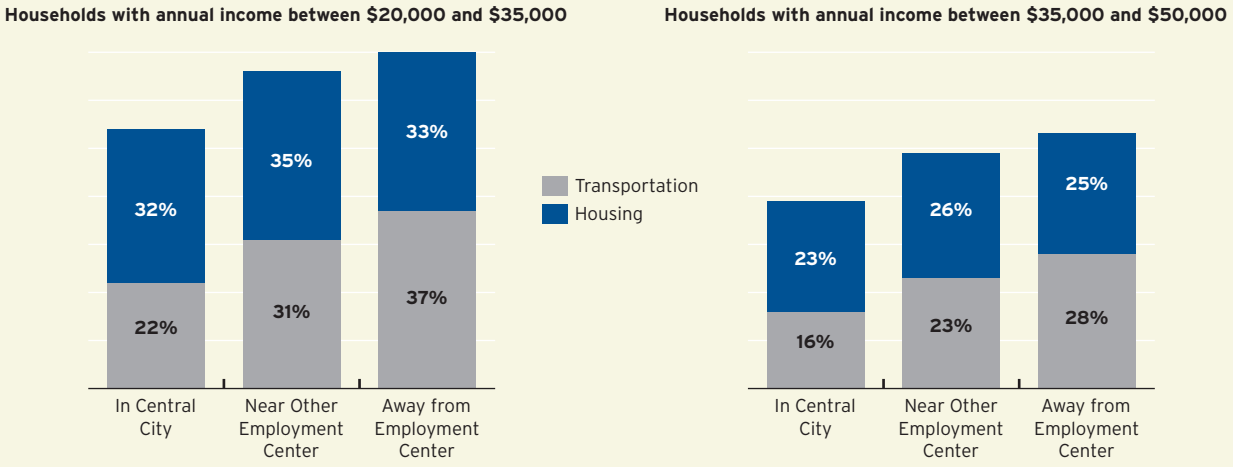
5. A LARGE PORTION OF THE AMERICAN WORKFORCE IS CONCERNED ABOUT THE SIZE OF HOUSEHOLD SPENDING ON TRANSPORTATION-RELATED ITEMS—SUCH AS GASOLINE

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

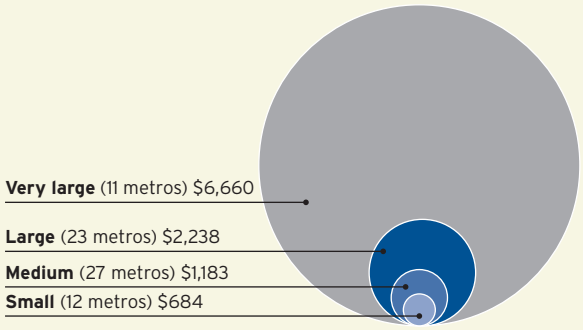
Recent analysis finds that the working poor spend 6.1 percent of their income on commuting compared to 3.8 percent for other workers. The working poor that commute using their own car spend the most: 8.4 percent. The combined costs of commuting and housing for the working poor make up a larger portion 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]

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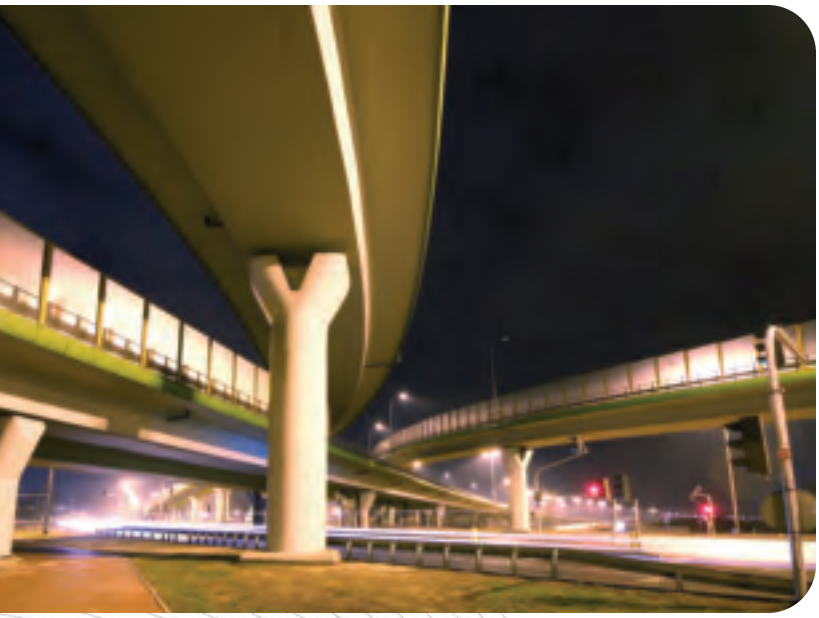
Lastly, new analysis shows that the costs of accidents and crashes on our nation's roadways impose a considerable financial burden on households and on metropolitan areas in general. These costs include property damage, lost wages, and medical and legal costs. In the nation's largest metropolitan areas 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]

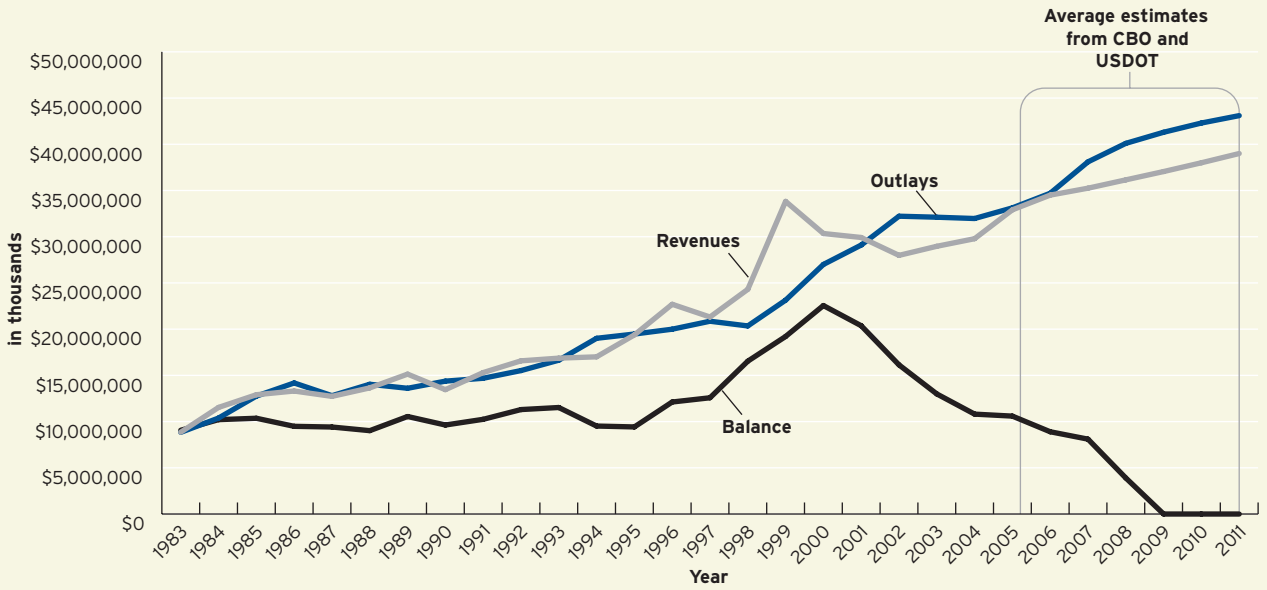
The National Surface Transportation Policy and Revenue Study Commission (NSTPRSC), which was established in 2005 under Section 1909 of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU) to study the future needs and revenue sources of the surface 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.

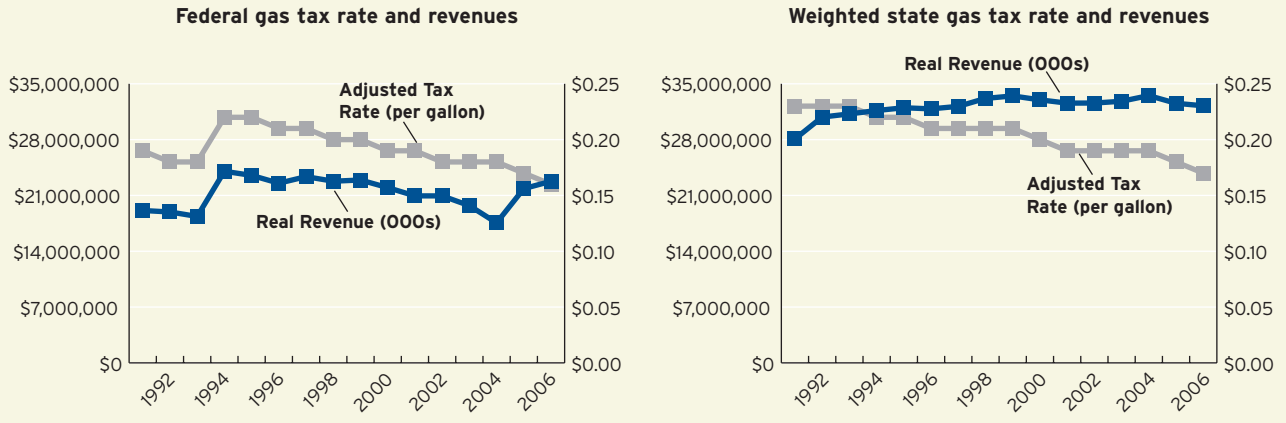
A report from the GAO illustrates this problem by examining the estimates in receipts and outlays from both the Congressional Budget Office (CBO) and the U.S. DOT. The agencies estimate that receipts into the highway trust fund will continue to increase by 13.8 and 10.3 percent, respectively, from 2006 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.

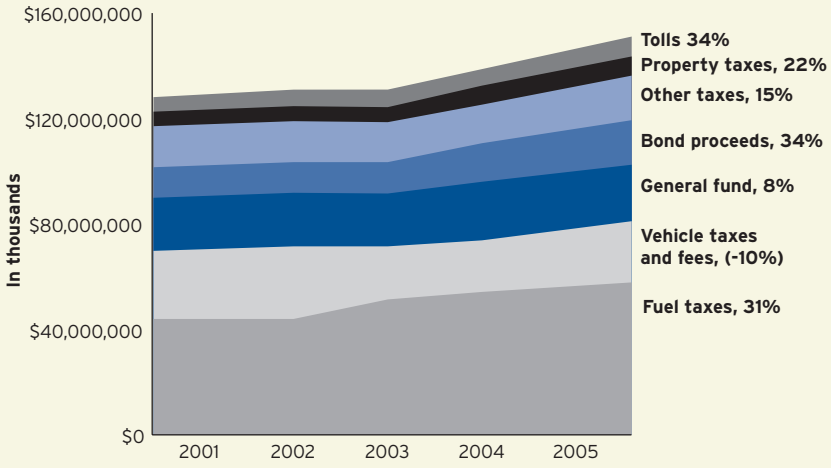
States are facing their own budgetary problems

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]

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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.