

**GAO**

Report to the Ranking Member,  
Committee on Environment and Public  
Works, U.S. Senate

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January 2008

# FREIGHT TRANSPORTATION

## National Policy and Strategies Can Help Improve Freight Mobility



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# Highlights

Highlights of [GAO-08-287](#), a report to the Ranking Member, Committee on Environment and Public Works, U.S. Senate

## Why GAO Did This Study

Continued development and efficient performance of the nation's freight transportation system is vital to maintaining a strong U.S. economy and sustaining our nation's competitive position in the global economy. Yet, increasing congestion on our nation's roads and rail lines threatens to undermine the efficiency of our freight transportation system. Although the Department of Transportation (DOT) has taken some steps to enhance freight mobility, there is growing concern that additional action is needed. To assist the Congress in enhancing national freight mobility, GAO reviewed (1) factors that contribute to constrained freight mobility and their effects in areas with nationally significant freight flows, and (2) approaches to address freight mobility in those areas and the challenges decision makers face in implementing those approaches. GAO analyzed freight transportation data and interviewed stakeholders in four areas with large freight flows.

## What GAO Recommends

GAO recommends that DOT work with the Congress and freight stakeholders to develop a national strategy to transform the federal government's involvement in freight transportation projects. This strategy should include defining federal and nonfederal stakeholder roles and using new and existing federal funding sources and mechanisms to support a targeted, efficient, and sustainable federal role. DOT did not comment on the recommendation.

To view the full product, including the scope and methodology, click on [GAO-08-287](#). For more information, contact JayEtta Z. Hecker, (202) 512-2834 or [heckerj@gao.gov](mailto:heckerj@gao.gov).

## FREIGHT TRANSPORTATION

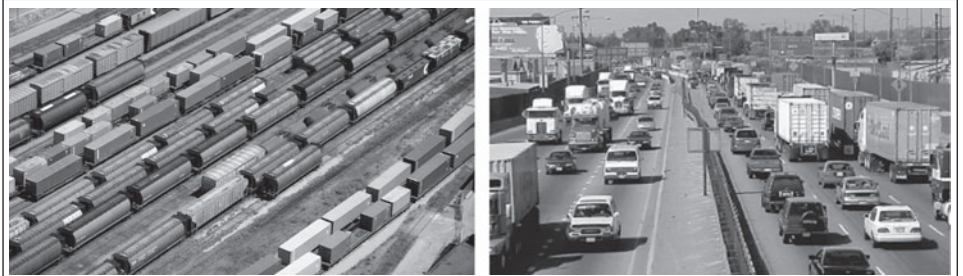
### National Policy and Strategies Can Help Improve Freight Mobility

#### What GAO Found

A number of factors contribute to constrained freight mobility and, together, these factors have significant adverse impacts. First, growing freight transportation demand decreases freight mobility. Volumes of goods shipped by trucks and railroads, for example, are projected to increase by 98 percent and 88 percent, respectively, by 2035. Second, the capacity of our transportation system is constrained by other factors, including the cost of surmounting geographic barriers, such as mountain ranges and waterways, population density, and urban land-use development patterns. Third, freight mobility is limited by inefficiencies in how infrastructure is used, such as poor road signal timing and prices paid by users that do not align with infrastructure costs, resulting in congestion. The widening gap between the volumes of goods and available system capacity is increasing transportation congestion. Constrained freight mobility has adverse economic costs for consumers, shippers, and carriers, as well as in urban centers where congestion exacerbates environmental pollution and increases health risks, such as respiratory illnesses.

Although freight transportation stakeholders have advanced projects and proposals to enhance freight mobility by building new infrastructure and increasing system efficiency, public planners face several challenges when advancing freight improvement projects. These challenges include competition from nonfreight projects for public funds and community support in the planning process, lack of coordination among various government entities and private sector stakeholders, and limited or restricted availability of public funds available for freight transportation. Compounding these challenges facing state and local transportation planners is that the federal government is not well positioned to enhance freight mobility due to the absence of a clear federal strategy and role for freight transportation, an outmoded federal approach to transportation planning and funding, and the unsustainability of planned federal transportation funding. When combined, these challenges and factors hinder the ability of public sector agencies to effectively address freight mobility and highlight the need to reassess the appropriate federal role and strategy in developing, selecting, and funding transportation investments, including those for freight transportation.

#### Examples of Railroad and Highway Freight Movements



Sources: Digital Vision and Port of Long Beach.

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## Abbreviations

AAR	Association of American Railroads
ACTA	Alameda Corridor Transportation Authority
BTS	Bureau of Transportation Statistics
CARB	California Air Resources Board
CMAQ	Congestion Mitigation and Air Quality
CREATE	Chicago Region Environmental and Transportation Efficiency
DOT	Department of Transportation
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
HOT	high-occupancy toll
ISTEA	Intermodal Surface Transportation Equity Act
MPO	metropolitan planning organization
RRIF	Railroad Rehabilitation and Improvement Financing
TIFIA	Transportation Infrastructure Finance and Innovation Act
TRB	Transportation Research Board
TTI	Texas Transportation Institute

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United States Government Accountability Office  
Washington, DC 20548

January 7, 2008

The Honorable James M. Inhofe  
Ranking Member  
Committee on Environment and Public Works  
United States Senate

Dear Mr. Inhofe:

Strong productivity gains in the U.S. economy hinge, in part, on transportation networks working efficiently. Continued development and efficient management of the nation's freight transportation system—especially highways and rail lines that connect international gateways and intermodal facilities to retailers, producers, and consumers—are important to sustaining the nation's competitive position in the global economy. However, the increasing congestion within the freight transportation system poses a threat to the efficient flow of the nation's goods and has strained the system in some locations. Moreover, recent growth in international trade has placed even greater pressures on ports, border crossings, and distribution hubs—key links in the freight transportation system. Congestion delays that significantly constrain freight mobility in these areas could result in serious economic implications for the nation.

Public sector transportation agencies at the federal, state, and local levels have a significant role in developing and efficiently managing the freight transportation system; however, private sector entities, such as railroads and trucking firms, also play a significant role in enhancing freight mobility. Federal law establishes federal funding and financing programs for surface transportation projects. Federal support for freight transportation infrastructure projects mainly occurs through these programs and is allocated to surface transportation modes and purposes. Highway trust fund dollars are apportioned to states according to statutory formulas, and states, in turn, make investment decisions. In past work, we have observed that this framework can lead to a bias for passenger-oriented projects and differential mode treatment, both of which can put

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freight at a disadvantage.<sup>1</sup> State and local planners are more likely to fund projects that directly benefit passengers in their localities rather than freight traffic that moves through the region. Further, though federal law has established intermodal goals and encouraged states to engage in intermodal planning, funding sources have remained largely tied to individual modes. Current federal transportation programs continue this modal treatment. We have previously reported that these factors pose significant challenges to transportation planners in advancing freight projects.<sup>2</sup> Although steps have been taken at the federal level to address these challenges, there is a growing concern that the current funding structure is not well suited to advancing freight improvements and that additional action might be needed to better allocate federal funds in order to address impediments to freight mobility.

As requested, this report provides information on and analyses of issues related to constrained freight mobility in areas with nationally significant freight flows. For this report, we considered areas with nationally significant freight flows to be those that are either a major seaport, international border, or freight distribution hub and areas that combine some or all of these characteristics. Specifically, this report examines (1) factors that contribute to constrained freight mobility in areas with nationally significant freight flows and their effects and (2) approaches that are being used to address impediments to freight mobility in selected regions with nationally significant freight flows and the challenges that freight transportation decision makers face in implementing solutions.

To fulfill our objectives, we reviewed and analyzed industry, academic, and government research reports and analytical studies; interviewed a wide range of stakeholders, including federal, state, and local transportation officials and private industry representatives; and conducted four case studies in regions that represented either international gateways or major distribution hubs.<sup>3</sup> In selecting regions for

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<sup>1</sup>GAO, *Freight Transportation: Strategies Needed to Address Planning and Financing Limitations*, [GAO-04-165](#) (Washington, D.C.: Dec. 19, 2003) and GAO, *Intermodal Transportation: DOT Could Take Further Actions to Address Intermodal Barriers*, [GAO-07-718](#) (Washington, D.C.: June 20, 2007).

<sup>2</sup>GAO, *21st Century Challenges: Reexamining the Base of the Federal Government*, [GAO-05-325SP](#) (Washington, D.C.: February 2005) and GAO, *High-Risk Series: An Update*, [GAO-07-310](#) (Washington, D.C.: January 2007).

<sup>3</sup>The case studies include Los Angeles and Long Beach, Calif.; Houston and Laredo, Tex.; Atlanta, Ga.; and the N.Y. and N.J. port region.

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our case study analyses, we used information available from the Federal Highway Administration's (FHWA) Freight Analytic Framework database regarding freight volumes and values to judgmentally select at least one seaport, inland waterway port, land border, and major distribution center. In addition, we focused mainly on overland surface transportation from ports to markets and on intermodal freight, as these demonstrate freight movement between modes and across multiple jurisdictional lines. The results of our case study analyses are not generalizable because the locations selected are not necessarily representative of other types of international gateways and distribution hubs. See appendix I for more details about our scope and methodology. We conducted this performance audit from July 2006 through January 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Results in Brief

A number of factors contribute to constrained freight mobility, which when combined, have significant adverse economic, environmental, and health impacts. One factor is the growing demand for freight transportation, as reflected by the increasing volume of domestic and international freight that is moved on the nation's transportation system. According to Department of Transportation (DOT) estimates, the volume of goods moved by truck and rail is projected to increase 98 percent and 88 percent, respectively, by 2035 from 2002 levels. Another factor is that adding capacity to accommodate this projected increased demand for freight transportation will be constrained by limitations on the nation's transportation infrastructure, including geographic barriers, such as mountain ranges and waterways, population density, and urban land-use development patterns. A third factor is how freight mobility is limited by inefficiencies in how infrastructure is used. For example, the extent to which carriers bear the full cost of their infrastructure use varies across modes and can contribute to overuse and congestion on some modes. As a result of these factors, freight congestion is rising and is expected to increase in the future. This congestion will have a number of negative impacts. For example, producers, shippers, and consumers will suffer the higher economic costs of freight transportation. One study estimates that

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highway congestion alone costs shippers \$10 billion annually.<sup>4</sup> Also, constraints on freight mobility result in undesirable environmental impacts, such as air pollution, and contribute to increased risks for illnesses, such as respiratory disease.

Although freight transportation stakeholders have advanced approaches to improve freight mobility, public planners still face planning, coordination, and funding challenges when attempting to advance freight improvements. Freight transportation stakeholders have advanced various approaches in order to improve freight mobility. Their proposals involve adding physical capacity to the freight transportation system by building new facilities and increasing the efficiency of existing infrastructure through projects designed to improve traffic flows or influence driver behavior. Although stakeholders have taken steps to enhance freight mobility, public planners in areas with nationally significant freight flows face challenges when attempting to advance freight improvements. These challenges include competition for public funds from nonfreight projects, gaining community support in the planning process, lack of coordination among various government entities and private sector stakeholders, and limited or restricted availability of public funds for freight transportation. These challenges are exacerbated by the absence of a clear federal strategy for enhancing freight mobility; an outmoded, modally-focused federal approach to transportation planning and funding; and projected revenue shortfalls in the Highway Trust Fund, which public sector agencies use to fund the bulk of their transportation projects. When combined, these challenges and factors hinder the ability of public sector agencies to effectively address freight mobility and highlight the need to reassess the appropriate federal role and strategy in developing, selecting, and funding transportation investments, including those for freight transportation.

We are making a recommendation to the Secretary of Transportation to develop, in conjunction with Congress and public and private stakeholders, a national strategy for freight transportation in order to improve freight mobility by more clearly defining the federal role in the freight transportation network and to begin to align federal expenditures with economically significant national public benefits. This strategy should clearly define the federal role using criteria to identify areas of national

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<sup>4</sup>Cost calculation is in year 2000 dollars. Clifford Winston and Ashley Langer, "The Effect of Government Highway Spending on Road Users' Congestion Costs," *Journal of Urban Economics*, vol. 60 (May 2006).



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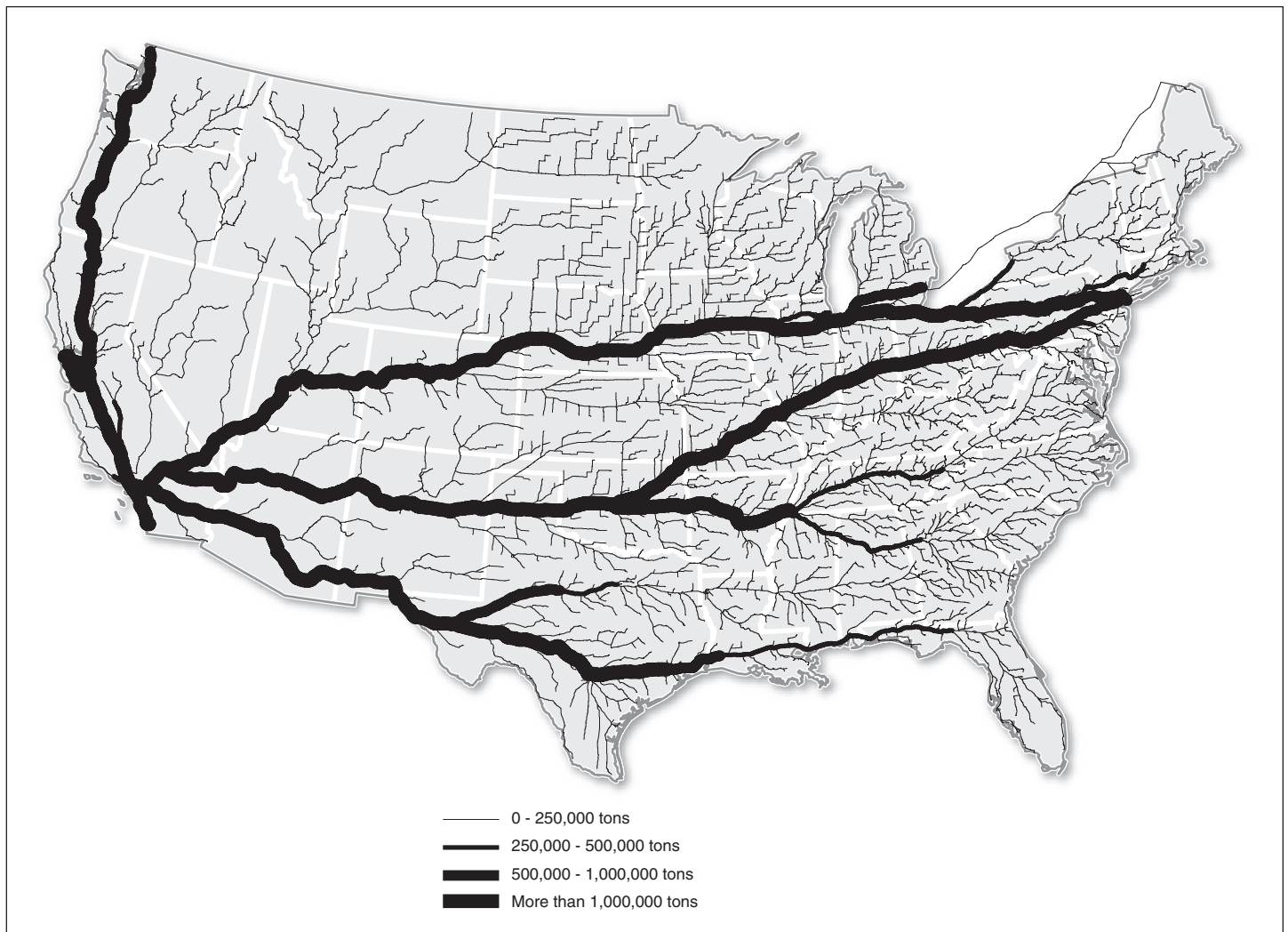
significance and determine the use of federal funds in those areas; establish the roles of nonfederal stakeholders; and use new and existing federal funding sources and mechanisms to support a targeted, cost-effective, and sustainable federal role. DOT did not comment on the recommendation; however, DOT officials did provide technical comments, which we have incorporated into this report, as appropriate.

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## Background

Freight movement is vital to the functioning of the national economy, and increases in freight volumes have closely coincided with increases in productivity and the gross domestic product. Domestic producers are increasingly reliant on suppliers from around the world and are finding global markets increasingly profitable for the sale of their products. Additionally, to control costs, domestic production often relies on prompt, timely shipments of materials in small batches. Domestic retailers have implemented inventory management systems that lower overall costs by relying on prompt shipping of needed goods, instead of more costly warehousing. In 2003, the nation's top 14 freight gateways handled more than 50 percent of total U.S. international merchandise trade by value, but, despite this concentration, the reach of this trade is nationwide. For example, the Port of Los Angeles handles cargo destined for the entire continental United States, as shown in the example in figure 1.

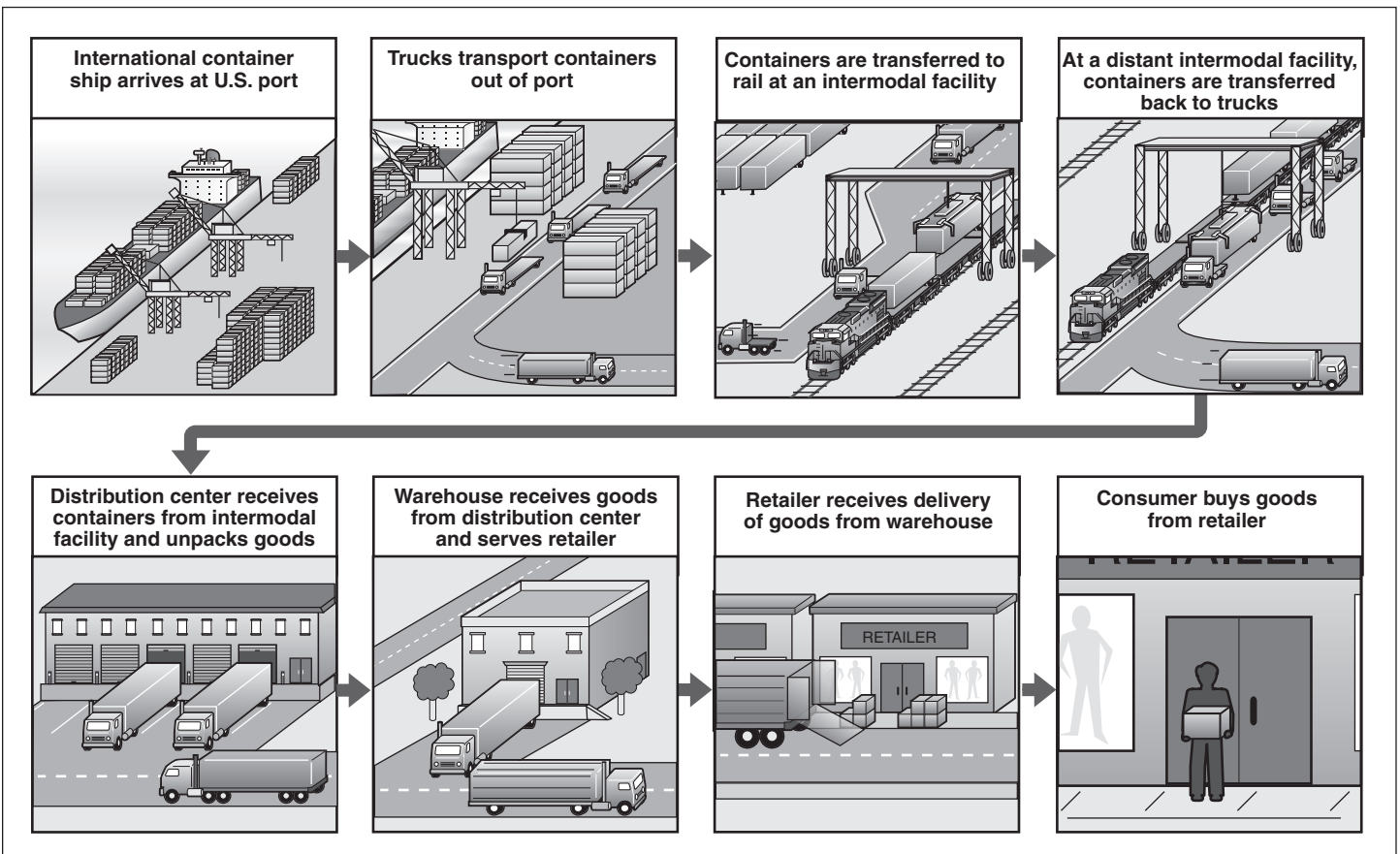
**Figure 1: Inland Movement of Maritime Cargo from Port of Los Angeles by Truck in 1998**



Source: Department of Transportation.

The movement of goods involves a wide array of public and private stakeholders, including all levels of government that plan and fund transportation projects, as well as the firms that use and provide freight transportation, such as railroads and trucking firms. Frequently, freight transportation is intermodal and crosses multiple jurisdictional boundaries within the United States. Figure 2 depicts an example of the movement of goods from a port to a consumer.

**Figure 2: Example of Goods Movement from Port of Entry to Consumer**



Source: GAO.

The many freight transportation stakeholders involved in maintaining and improving the freight transportation system have complex and varied roles, but none are responsible for the entire system. Public planning agencies, such as state departments of transportation and local metropolitan planning organizations (MPO) have principal responsibility for planning and funding new highway infrastructure and maintaining existing highways. Public planning agencies may also work with ports, shippers, and terminal operators to forecast freight volumes and plan needed system improvements to port infrastructure. The Army Corps of Engineers, too, provides technical information and harbor dredging. Rail and trucking firms transport goods out of ports to warehouses and distribution facilities, from which goods are routed to final destinations. While public sector agencies fund transportation improvements with

proceeds from taxes, railroad companies, which are largely private companies, make investments in their own networks to improve operations and expand infrastructure capacity.

DOT has also taken several actions in the past 5 years to address key impediments to freight mobility by developing programs and policies to address congestion in the United States. Specifically, it has drafted a framework for national freight policy, released a national strategy to reduce congestion, and created a freight analysis framework to forecast freight flows along national corridors and through gateways. In addition, DOT has provided guidance to simplify access to existing funding and recommended ideas for congressional consideration to make more funding available, created working groups to increase collaboration, and made data and analysis tools available.<sup>5</sup> (See table 1 for more detail regarding specific DOT actions to improve freight mobility.)

**Table 1: DOT Actions Taken to Improve Freight Mobility**

<b>DOT action</b>	<b>Description</b>
Finance Guidebook for Freight	Summarizes the potential funding available for freight projects.
Freight Analysis Framework	Quantifies existing freight flows and forecasts future freight flows along national corridors and through international gateways.
Intermodal Freight Technology Working Group	Cooperative effort of public and private stakeholders to identify and operationally test technology solutions to freight transportation issues.
Transportation Planning Capacity Building Program	Provides a source of information to state departments of transportation and MPOs. Through this program, information has been posted on how to include freight interests in the planning process.
Freight Professional Development Program	Offers training, education, technical assistance, and a resource library to assist state and local officials, as well as, private stakeholders in freight transportation planning and systems.
Guide to Quantifying the Economic Impacts of Federal Investments in Large-Scale Freight Transportation Projects	Helps to ensure that freight projects are appropriately considered in national, regional, and state decisions about the future of transportation system investments.
Freight Industry Roundtable and <i>Draft Framework for a National Freight Policy</i>	The Freight Industry Roundtable outreach effort led to the creation of the <i>Draft Framework for a National Freight Policy</i> , which is a new policy initiative to address freight transportation concerns. Viewed as a living document, the <i>Draft Framework</i> is intended to stimulate discussion and local responses.

<sup>5</sup>GAO-07-718.

DOT action	Description
Corridors of the Future congestion program	Encourages states to think beyond their boundaries to reduce congestion on some of the nation's most critical trade corridors. DOT plans to facilitate the development of these corridors by helping project sponsors reduce institutional and regulatory obstacles associated with multistate and multimodal corridor investments.
Freight performance measures	Measures travel speeds and travel time reliability for commercial vehicle traffic on 25 freight significant corridors, and measures crossing times and crossing time reliability on five U.S./Canadian border crossings.
New offices established by the Maritime Administration	The Maritime Administration (MARAD) established 10 offices in U.S. ports to help promote and coordinate solutions across jurisdictional lines and provide local, state, and regional stakeholders with a local link to MARAD. Additionally, MARAD established the office of Marine Highways and Passenger Vessel Services to focus efforts to relieve road and rail congestion by shifting some cargoes to coastal and inland waterways.

Sources: GAO analysis of DOT data and [GAO-07-718](#).

In 2006, DOT attempted to move beyond the traditional modal approach to freight transportation by developing a *Draft Framework for a National Freight Policy*. Due to the federal government's current limited role in freight transportation, the *Draft Framework* focuses on facilitating freight transportation through collaborative action between the public and private sectors. The *Draft Framework* outlines a vision and objectives, then details strategies and tactics that both public and private sector transportation stakeholders can pursue to achieve those objectives. DOT describes its *Draft Framework* as a living document and emphasizes that the nation's freight transportation challenges are of such a nature and magnitude that governments at all levels and the private sector must work together to address them.

In May 2006, DOT also released the *National Strategy to Reduce Congestion on America's Transportation Network*.<sup>6</sup> The primary goal of the plan is to encourage states to explore innovative financing as a tool to reduce congestion on some of the nation's most critical trade corridors, improve the flow of goods across our nation, and enhance the quality of life for U.S. citizens. It outlines a six-point plan to address both freight and passenger congestion, including (1) creating Urban Partnership Agreements with "model cities" to implement demonstration projects, such as congestion pricing, tolling, express bus services, telecommuting,

<sup>6</sup>DOT, "Moving the Economy: National Strategy to Reduce Congestion," (Washington, D.C., Nov. 15, 2007). See <http://www.fightgridlocknow.gov> (accessed on Oct. 25, 2007).

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and flex-scheduling; (2) removing barriers to private sector investment in the construction, ownership and operation of transportation infrastructure; (3) working with state and local stakeholders on reducing freight congestion in Southern California, a major gateway for international freight coming into the United States; and (4) establishing a Corridors of the Future program to help identify and fund six major growth highway corridors in need of long-term investment, among others.<sup>7</sup>

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## Constrained Freight Mobility Could Have Negative Economic, Environmental, and Health Implications

The volume of domestic and international freight moving through the country has increased dramatically, and continued growth is expected in the future. Concurrently, the capacity of the nation's freight transportation infrastructure has not increased at the same rate as demand, and the infrastructure in many areas that handle nationally significant freight flows is constrained by geographic and land-use development patterns. Inefficiencies in the use of freight infrastructure also limit the system's capacity. All of these factors have contributed to increasing freight congestion, which, in turn, has led to a number of adverse effects, including (1) higher direct economic costs for producers and consumers; (2) higher indirect costs, such as passenger traffic congestion costs that affect the quality of life of all transportation users; and (3) aggravated environmental impacts, such as air pollution, and associated health risks, such as respiratory illness.

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## Increasing Demand for Freight Transportation Services Is Straining the Nation's Supply of Transportation

Increasing demand for freight transportation services to provide efficient goods movement strains the nation's available capacity, or supply, of infrastructure. This increased demand is reflected in the growing volume of international and domestic freight moving across the transportation system. On the supply side, the capacity of the nation's transportation system has not increased with increased demand. Exacerbating this problem, many freight corridors and major destinations for freight are located in areas that are constrained due to geographic barriers, such as waterways and mountains, and have patterns of land-use development that do not easily accommodate growth in freight transportation. Finally, some infrastructure is not used as efficiently as possible because of operational

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<sup>7</sup>These corridors are I-95 from Florida to the Canadian border; I-70 in Missouri, Illinois, Indiana, and Ohio; I-15 in Arizona, Utah, Nevada, and California; I-5 in California, Oregon, and Washington; I-10 from California to Florida; and I-69 from Texas to Michigan.

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## Constrained Freight Mobility Linked to Increasing Volume of International and Domestic Goods Movement

inefficiencies and pricing mechanisms that do not charge users the full cost of their infrastructure use, among others.

The volume, by value and weight, of international and domestic goods movement has increased significantly in recent years, and this increase is a factor contributing to constrained freight mobility. According to the Bureau of Transportation Statistics (BTS), the value of U.S. international trade merchandise imported and exported through the nation's ports and borders increased by approximately 6 percent per year in dollar terms, on average, from \$889 billion in 1990 to about \$2 trillion in 2003.<sup>8</sup> According to another BTS study, domestic freight moved by rail and truck increased from 2.4 trillion ton-miles to approximately 3 trillion ton-miles between 1996 and 2005.<sup>9</sup> These increases are partly linked to changes in supply-chain management as increasing volumes of goods are moved over the system in smaller, more frequent shipments to more distant destinations.<sup>10</sup>

The freight volume handled by ports, railways, and highways is expected to continue to grow. While domestic and international freight are both expected to increase in the future, international freight volumes are expected to increase at a faster rate than domestic freight volumes. According to a DOT study, freight moving through the nation's largest international gateway ports may quadruple by 2025.<sup>11</sup> Volume growth is expected across all major modes of surface transportation—truck, rail, and water—and intermodal shipments are expected to be a larger proportion of the value of total shipments than today. (See table 2.) This trend was also evident at the sites we visited. For example, according to the Houston-Galveston Area Council, the regional planning organization, freight tonnage hauled on the area's railways is projected to increase from

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<sup>8</sup>Dollars are in year 2000 inflation-adjusted terms as calculated by BTS. DOT, BTS, *America's Freight Transportation Gateways* (Washington, D.C., 2004).

<sup>9</sup>A ton-mile is defined as 1 ton of freight shipped 1 mile. As such, changes in ton-miles reflect trends in both volume (tons) and distance (miles). BTS, *A Decade of Growth in Domestic Freight: Rail and Truck Ton-Miles Continue to Rise* (Washington, D.C., July 2007).

<sup>10</sup>Changes in supply chains have increased the volume and frequency of freight moving across the transportation system and dramatically increased the reliance of U.S. businesses on transportation. For example, "just-in-time" production processes enable businesses to lower inventory carrying costs and add flexibility and adaptability to their decision-making timelines by closely controlling the quantities and arrival of source materials.

<sup>11</sup>Cambridge Systematics, *An Initial Assessment of Freight Bottlenecks on Highways*, prepared for the Department of Transportation, October 2005.

124 million tons in 2004 to over 200 million tons in 2035. In addition to this growth, freight traffic patterns may also shift between ports. For example, according to the Maritime Administration, the expansion of the Panama Canal and the increased use of the Suez Canal could shift some container traffic from ports on the west coast to new and existing east coast ports.

**Table 2: Shipment Volumes by Mode in 2002 and 2035 Projections**

(Millions of tons)			
	2002	2035	Percent increase
Truck	11,539	22,814	98
Rail	1,879	3,525	88
Water	701	1,041	49
Intermodal <sup>a</sup>	1,292	2,598	101

Source: GAO analysis of FHWA's *Freight Facts and Figures 2006* data.

<sup>a</sup>Intermodal includes U.S. Postal Service, courier shipments, and all intermodal combinations except air and truck.

**The Relative Shortfalls in New Transportation Infrastructure Capacity Have Constrained Freight Mobility**

According to studies on transportation infrastructure investments<sup>12</sup> and several of the stakeholders with whom we spoke in conducting this review, the capacity of the nation's freight transportation infrastructure is not keeping pace with the increasing volumes of freight moving on the system. This is particularly evident with respect to rail and highway modes.

- *Rail capacity has not kept pace with recent increases in demand.* According to the American Association of Railroads (AAR), since 1980, total track miles have declined, but the number of tons moved per mile has tripled. Though AAR estimates that overall capacity is currently adequate on 88 percent of the nation's rail system, it notes that the system is beginning to reach its capacity limits.<sup>13</sup> Some railroad corridors between major markets do not have double tracked right-of-ways; adequate passing areas, intermodal yards, or switching facilities; or bridges or tunnels that

<sup>12</sup>Cambridge Systematics, *An Initial Assessment of Freight Bottlenecks*; DOT, *Freight Performance Measurement: Travel Time in Freight-Significant Corridors*, December 2006; Armando Carbonell et al., *Global Gateway Regions*, September 2005; and David Schrank and Tim Lomax, *The 2007 Urban Mobility Report* (College Station; Texas Transportation Institute, Texas A&M University, September 2007).

<sup>13</sup>Cambridge Systematics, *National Rail Freight Infrastructure Capacity and Investment Study*, prepared for the Association of American Railroads (Cambridge, Mass., 2007).



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can simultaneously accommodate multiple trains on different routes. For example, the 1.7-mile Howard Street rail tunnel in Baltimore, which is on a major corridor linking the mid-Atlantic with Chicago, has only one track, does not accommodate double stack intermodal container trains, and the curves near the tunnel limit speeds to only 25 miles per hour. As we and others have found, it is uncertain whether private rail companies will be able and willing to make the necessary infrastructure investments to keep pace with projected demand for rail capacity.<sup>14</sup>

- *Highway capacity, too, has not increased as fast as demand.* For example, according to the Texas Transportation Institute (TTI), road use increased 15 percent or faster than capacity between 1982 and 2005 in 80 out of the 85 urban areas that TTI studied. As a result, TTI estimated that in 2005, one in three trips took place in congested conditions, whereas only one in nine did in 1982.<sup>15</sup> Funding to expand the road system, at both the federal and state levels, is also limited, and much of the current funding available goes toward maintenance and repair instead of capacity expansion projects.<sup>16</sup>

Intermodal connections have also failed to keep pace with demand. As we have previously reported, the nation's transportation system lacks adequate intermodal connections to efficiently move freight across modes.<sup>17</sup> Intermodal infrastructure improves the connections between modes, which, in turn, can improve freight mobility. In some cases, however, current intermodal infrastructure constrains freight mobility. For example, the roads that connect ports to highways are heavily used by trucks but are often in poor condition, creating freight bottlenecks.

In some regions with nationally significant freight flows, geography and patterns of land development constrain freight mobility, making it difficult to cost-effectively increase infrastructure capacity. Geographic constraints include water barriers and mountain ranges that can be crossed only at a

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<sup>14</sup>GAO, *Freight Railroads: Industry Health Has Improved, but Concerns about Competition and Capacity Should Be Addressed*, [GAO-07-94](#) (Washington, D.C.: Oct. 6, 2006) and Cambridge Systematics, *National Rail Freight Infrastructure Capacity and Investment Study* (Cambridge, Mass., 2007).

<sup>15</sup>Schrank and Lomax, *The 2007 Urban Mobility Report*, September 2007.

<sup>16</sup>[GAO-05-325SP](#); [GAO-07-310](#); and GAO, *Highway Trust Fund: Overview of Highway Trust Fund Estimates*, [GAO-06-572T](#) (Washington, D.C.: Apr. 4, 2007).

<sup>17</sup>[GAO-07-718](#).

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limited number of points. For example, the New York City metropolitan region is divided by waterways that can only be crossed at a limited number of bridges and tunnels, and building additional bridges or tunnels can take billions of dollars and years to complete.<sup>18</sup> Because of the difficulty of adding highway capacity in densely populated, developed urban areas, these bridges and tunnels must handle increasing volumes of freight traffic, even though they are not designed to handle current and projected volumes. Additionally, some bridges can be used by trucks only under special restrictions, and one—the Brooklyn Bridge—prohibits trucks entirely. Once in Manhattan, trucks have a difficult time navigating narrow roadways and finding adequate parking to make deliveries. Trucks also compete with passenger vehicles on these routes, particularly during peak travel periods, further decreasing freight mobility on roadways, bridges, and tunnels. Though these problems are particularly dramatic in lower Manhattan, other large, urban areas in the country also experience similar problems.

Freight movement in population centers and along major corridors is also constrained by the physical barriers created by urban land-use development patterns and the built-up urban environment, such as buildings and other facilities that are adjacent to ports, rail yards, and highways. According to several shippers, the areas surrounding critical freight infrastructure are increasingly dense with development, making it more difficult and expensive to build or expand centrally located freight facilities. For example, land near the Port of New York that was previously vacant or used for freight warehouses has recently been redeveloped into high-value commercial and residential property. Consequently, freight distribution centers have moved away from the urban core to the New Jersey suburbs and eastern Pennsylvania where land values are comparatively lower, but where access to ports is more difficult. Major transportation corridors are also increasingly squeezed by development and population density, and freight infrastructure expansion along these corridors is difficult to implement or simply does not occur. For example, the Alameda Corridor—a rail project designed to help move freight from the Ports of Los Angeles and Long Beach to the transcontinental rail facilities near downtown Los Angeles—took 18 years to complete, in part,

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<sup>18</sup>The proposed cross harbor tunnel project is one such example in the New York/New Jersey region. The project study began in 1998, and the project remains in a planning phase with the earliest estimate for completion 7 years after approval and funding. The proposed freight rail tunnel would link New Jersey with Brooklyn, New York, and the current estimated project costs range from \$4.8 to \$7.4 billion.

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## Inefficient Use of Existing Infrastructure Constrains Freight Mobility

because the project had to be built underground to bypass highly developed and populated urban areas. In addition, the development patterns of cities are increasingly dispersed across wide-geographic areas. The Transportation Research Board (TRB) reports that this urban land-use pattern disadvantages rail and favors trucking, which better accommodates smaller, relatively short-distance shipments.<sup>19</sup> However, as a result of this land-use pattern, trucks must travel farther from ports to distribution centers and from distribution centers to final destinations.

Freight mobility in areas with nationally significant freight flows is further constrained because, in some instances, existing port, road, and rail infrastructure is not used efficiently.<sup>20</sup> A number of factors can contribute to inefficiencies in freight movement, including operational constraints and infrastructure pricing mechanisms.<sup>21</sup>

A variety of operational inefficiencies occur in the daily movement of goods. For example, at ports, operational inefficiencies are caused when port operators must adjust their work practices because empty containers occupy valuable acreage. At the Port of Los Angeles, fewer than 2 percent of the containers that arrive at the port are empty, but approximately 60 percent are shipped out of the port empty because there are not enough exported goods to fill all available containers.<sup>22</sup> Consequently, as port operations take place amid stacks of empty containers, the time it takes to move freight through the port increases, and the ability of the port to handle increases in freight volumes declines. The rail network, too, experiences some operational inefficiency that can constrain freight mobility. As we have reported in the past, private rail companies might be

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<sup>19</sup>Joseph Bryan, et al., *Assessing Rail Freight Solutions to Roadway Congestion: Final Report*, Transportation Research Board, National Cooperative Highway Research Program Report 586 (Washington D.C., November 2007) and Transportation Research Board, *Short Haul Rail Intermodal: Can It Compete with Trucks?* (Washington, D.C., 2004).

<sup>20</sup>GAO, *Surface Transportation: Strategies Are Available for Making Existing Road Infrastructure Perform Better*, [GAO-07-920](#) (Washington, D.C.: July 26, 2007).

<sup>21</sup>Global supply chains and domestic freight are vulnerable to terrorist attack, and heightened security measures could also constrain freight mobility. Although a number of the stakeholders with whom we spoke noted their concern that imposing new security requirements would cause significant new delays, they generally agreed that security measures are not currently a major factor contributing to freight delays. In this report, we did not evaluate security measures and programs.

<sup>22</sup>Containers are standardized shipping containers that can be loaded directly from ships to trains or trucks.

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able to serve their customers more efficiently if they instituted collaborative operational processes, such as sharing terminal facilities for a fee, which could allow more rail companies access to customers near specific terminals or reciprocal switching. For example, one rail company could deliver, for a fee, railcars to another rail company's customers.<sup>23</sup> Inefficiencies in roadway use include daily management and operations practices that do not maximize existing roadway capacity, such as uncoordinated timing of traffic signals and inefficient incident response capabilities.

In a number of ways, current pricing of freight transportation infrastructure can result in inefficient use by failing to align the capital and operational costs of infrastructure with the fees paid by users. First, the financing mechanisms that collect fees from the users—freight carriers—of freight transportation infrastructure do not consistently collect revenues in direct relation to the full cost of providing the infrastructure these carriers use. Consequently, prices often do not provide the correct signals to carriers as they make decisions about their use of transportation infrastructure and the prices they charge their customers. Second, the extent to which carriers bear the full cost of their infrastructure use varies across modes, sometimes distorting the competitive position between them. As a result, a mode that is more costly to society might be used for some shipments if the fees charged to users only reflect a portion of the full cost of the selected mode. For example, according to DOT's most recent calculations, the revenues generated from federal fuel taxes levied on smaller trucks that weigh less than 25,000 pounds cover 150 percent of their cost impact, but larger trucks weighing over 100,000 pounds pay only 40 percent of their costs.<sup>24</sup> From an economic standpoint, this relationship between revenue and cost distorts the competitive environment by making it appear that heavier trucks are a less expensive shipping method than they actually are and puts other modes, such as rail and maritime, at a disadvantage.<sup>25</sup>

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<sup>23</sup>GAO-07-94.

<sup>24</sup>DOT, *Addendum to the 1997 Federal Highway Cost Allocation Study Final Report* (2000), <http://www.fhwa.dot.gov/policy/hcas/addendum.htm> (accessed on Oct. 25, 2007).

<sup>25</sup>GAO, *Freight Transportation: Strategies Needed to Address Planning and Financing Limitations*, GAO-04-165 (Washington, D.C.: Dec. 19, 2003) and GAO, *Railroad Bridges and Tunnels: Federal Role in Providing Safety Oversight and Freight Infrastructure Investment Could Be Better Targeted*, GAO-07-770 (Washington, D.C.: Aug. 6, 2007).

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If Present Trends Continue,  
Freight Congestion Is Likely to  
Increase

The combination of increasing demand for freight transportation infrastructure and capacity limitations has contributed to increased congestion and constrained freight mobility. Many of the highways used heavily by trucks to move freight are already congested today. For example, as shown in figure 3, Interstate 710, a principal route leaving the Port of Long Beach, is routinely congested with port and passenger traffic. Such congestion on many freight significant corridors is expected to worsen in the future.<sup>26</sup> Likewise, congestion is expected to become a regular occurrence on many intercity highways in addition to congestion on urban highways, where congestion is already common. For example, according to FHWA projections, without any additional capacity, congestion during peak periods occurring on highways comprising the National Highway System will increase from 10,600 miles in 2002 to 20,000 miles in 2035.<sup>27</sup> Similarly, congestion could worsen on the nation's rail lines as freight volumes continue to grow. For example, a recent AAR study predicts that, without system improvements, the expected increases in rail volume by 2035 will cause 30 percent of primary rail corridors to operate above capacity and another 15 percent at capacity. This congestion, the AAR report states, might affect the entire country and could shut down the national rail network.<sup>28</sup> Ports are also likely to experience greater congestion in the future as more and larger ships compete for limited berths.

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<sup>26</sup>DOT, *Freight Performance Measurement: Travel Time in Freight-Significant Corridors* (December 2006).

<sup>27</sup>DOT, *Freight Facts and Figures, 2007* (Washington, D.C., pending).

<sup>28</sup>Cambridge Systematics, *National Rail Freight Infrastructure Study*, (Cambridge, Mass., September 2007).

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**Figure 3: High Volume of Trucks Servicing the Port of Long Beach Are Routinely Delayed by Congestion on I-710**



Source: Port of Long Beach.

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### **Constrained Freight Mobility Results in Higher Economic Costs and Environmental and Health Risks**

Congestion caused by constrained freight mobility has led to negative effects that impact both the direct users of freight services—producers, shippers, and receivers—as well as passenger traffic and individuals living in congested areas. These impacts include higher direct economic costs for freight services and indirect economic costs borne by passenger traffic impacted by freight congestion. Furthermore, constraints on freight mobility cause negative environmental impacts, such as air pollution, and their associated health risks, particularly to vulnerable populations living next to congested areas.

### **Constrained Freight Mobility Has Negative Direct Economic Effects**

Transportation costs impact the total cost of many goods and services and affect all the stakeholders in the supply chain, as these costs are factored into the prices they charge their customers. For example, one shipper told us that deliveries to a congested urban area cost about five times more than those to noncongested areas. One study estimates that roadway congestion delays cost shippers approximately \$10 billion per year and notes that although the freight sector experiences about 27 percent of congestion costs, truck traffic represent only 5 percent of total vehicle

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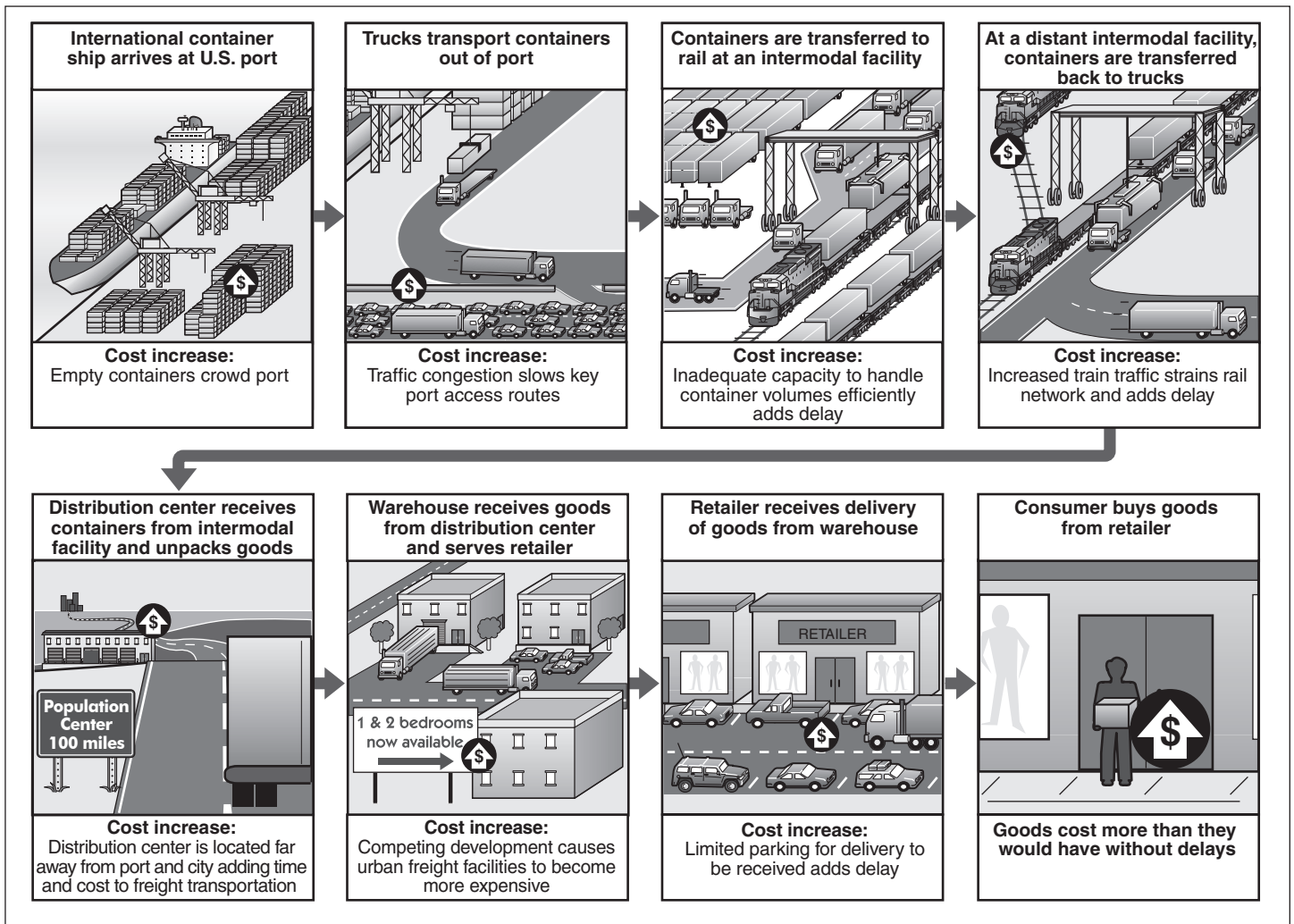
miles.<sup>29</sup> According to a study conducted by the Texas Department of Transportation, every hour of delay costs private rail companies operating in the Houston area approximately \$300.<sup>30</sup> As shown in figure 4, when freight costs increase due to constraints on freight mobility, prices also are likely to increase.

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<sup>29</sup>Cost calculation is in year 2000 dollars. Clifford Winston and Ashley Langer, "The Effect of Government Highway Spending on Road Users' Congestion Costs," *Journal of Urban Economics*, vol. 60 (May 2006).

<sup>30</sup>Texas Department of Transportation, *Houston Region Freight Rail Study* (Houston, Tex., July 2007), <http://www.houstonrailplan.com> (accessed Nov. 8, 2007).

**Figure 4: Example of How Constrained Freight Mobility Increases the Cost of Transportation and Consumer Goods**



Source: GAO.

Transportation costs affect businesses' capital investments and marketing strategies and, in turn, these decisions affect consumers. In some industries, transportation costs largely define the markets served and prices offered by individual companies. For example, one stakeholder told us that rising transportation costs and decreasing reliability in the Northeast could result in the company adding a new production facility closer to a major northeastern market that is currently served by a facility in Virginia. Transportation costs also can limit the geographic size of the markets in which firms operate. As the costs of transportation to a given



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area increase, fewer producers will ship products to that market. Consequently, a narrower selection of goods will be available in the market, and goods that are available could be more expensive due to less competition in that market.

Constraints on freight mobility that reduce the reliability of the transportation network can play an important role in many business supply-chain management and production processes. Reduced freight reliability can cause businesses to take extra steps to work around the unpredictability of the transportation system. Adjustments could include carrying higher inventories in warehouses to meet production needs, planning for longer than normal transit time, and not serving specific markets that cannot be reliably accessed.<sup>31</sup> In cases in which a solution cannot be found, customers may experience unforeseen delays and complications in fulfilling their orders. Industries that use “just-in-time” production processes—and, therefore, rely on the timely and predictable arrival of goods—are likely to be especially affected by reductions in the reliability of the freight transportation system. While supply-chain processes such as “just-in-time,” developed in response to the reliability and low cost of the transportation system, such supply-chain strategies may not be economically beneficial in the future should freight mobility decline. In all of these scenarios, users experience direct economic costs in the form of higher transportation costs, higher warehousing and operational costs, or missed opportunities for other investments or production.

### Constrained Freight Mobility Has Negative Indirect Social Costs

Freight congestion also adds to the social costs of congestion experienced by passenger traffic. In some cases, the strategies implemented by freight movers in response to chronic congestion and poor reliability of the roadways may make congestion worse. For example, in one congested market, an official from a freight transportation company explained that the company will sometimes send multiple trucks for deliveries that it previously completed with only one truck because it is more likely that at least one truck will complete its delivery on time. In this instance, though the carrier minimizes the risk of missed or delayed pick-ups, it incurs increased operational costs and all users of the roadway experience increased roadway congestion resulting from the extra truck traffic. The

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<sup>31</sup>Glen Weisbrod et al., *Economic Implications of Congestion*, Transportation Research Board, National Cooperative Highway Research Program Report 463 (Washington, D.C., 2001).

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Constrained Freight Mobility  
Results in Environmental  
Pollution and Increased Health  
Risks

indirect social costs of such congestion negatively affect the quality of life of the nation's citizens. The hours already wasted inching along clogged roads and highways will increase as congestion continues to worsen. As the transportation system becomes less reliable, people will have less access to recreation, shopping, and other activities that are an important part of everyday life. While the cost of added congestion is dispersed widely across individuals and businesses, the collective magnitude is high and is likely to increase if freight mobility decreases in the future.

While unconstrained freight movement also causes environmental pollution, constrained freight movement significantly increases pollution. According to FHWA data, freight transportation is a major source of nitrous oxide pollution, accounting for 27 percent of all U.S. nitrous oxide emissions and about one-third of particulate matter emissions from mobile sources.<sup>32</sup> In fact, all four regions we visited in conducting this study have air quality below EPA standards.<sup>33</sup> Further, the California Air Resource's Board (CARB) has identified freight movement as the dominant contributor to transportation pollutants in the state. For example, according to CARB estimates, freight movement causes approximately 75 percent of the diesel particulate emissions in California. In some instances, pollution can be most severe when congestion or another localized bottleneck slows freight, as large volumes of slow moving truck traffic cause more air pollution per mile traveled than freely moving trucks would. These emissions, especially the particulate matter and the constituent components that form smog, can remain highly concentrated in a local area.

The environmental pollution that results from constrained freight mobility, particularly when it occurs in areas proximate to residential neighborhoods, can cause people to suffer acute negative health issues, such as respiratory illness. According to public health research, children and the elderly can be most acutely affected by these emissions. For example, CARB attributes 2,400 premature deaths statewide to freight emissions and estimates that health costs of freight pollution could be

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<sup>32</sup>Particulate matter emissions refer to particulate matter 10 microns, or smaller, in diameter or PM-10 emissions. DOT, *Freight Facts and Figures, 2006* (Washington, D.C., 2006).

<sup>33</sup>The EPA designates nonattainment areas based on the regularity with which the air in the area exceeds criteria pollutant standards. Nonattainment areas are required to have plans to lower air pollution.

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\$200 billion by 2020. Further, CARB estimates that, each year, freight emissions result in almost 3,000 hospital admissions due to respiratory or cardiovascular causes and that 1.1 million days of school are missed.<sup>34</sup> While it is difficult to estimate the extent to which these impacts are attributable to freight movement generally versus specific freight bottlenecks, in some cases, it is clear that freight delays exacerbate the problem.

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## Although Freight Transportation Stakeholders Have Advanced Various Approaches to Improve Freight Mobility, Planning, Coordination, and Funding Challenges Impede Progress

Freight transportation stakeholders have advanced varied approaches to improve freight mobility. These have included projects and proposals both to build new physical capacity within the system and to increase the efficiency of existing infrastructure. However, state and local transportation planners still face challenges when attempting to advance freight improvements. Challenges typically involve three central issues: (1) securing support for freight improvements within a public transportation planning process that puts emphasis on modally-oriented projects that produce more obvious public benefits, such as highway projects that enhance passenger mobility; (2) reaching agreement on specific freight improvements among multiple freight stakeholders, each with their own perspectives and agendas; and (3) accessing funding sources that are generally modally focused for freight projects that are often intermodal in nature.

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## Freight Transportation Stakeholders Have Implemented or Proposed Capacity-Enhancing Approaches to Improve Freight Mobility

Through our review of studies on transportation issues and our discussions with freight transportation stakeholders in the four regions we visited, we identified two broad approaches that are currently being implemented or considered by state and local freight transportation stakeholders to improve freight mobility. The first approach entails adding new physical capacity to the transportation network, and the second approach aims to increase the efficiency of existing infrastructure.

### Adding New Physical Capacity in the Freight Transportation System to Enhance Freight Mobility

One approach that freight stakeholders are using to improve freight mobility involves projects and proposals designed to create new physical capacity. This approach includes building new facilities, such as intermodal yards, roads, and bridges, and adding more capacity to existing

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<sup>34</sup>California Environmental Protection Agency, Air Resources Board, *Emission Reduction Plan for Ports and Goods Movement in California* (Sacramento, Calif., March 2006).

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transportation networks, such as dedicating roads for trucks or adding new railroad tracks.

In areas that are not as constrained by space or geography to build new capacity, such as some areas of southern California and Texas, various projects and proposals are being advanced to build new facilities. These types of projects and proposals include building new rail infrastructure, such as tracks and intermodal rail yards; building new roadways; and replacing bridges with inadequate capacity. (See table 3 for some examples of capacity-adding capital projects.)

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**Table 3: Examples of Capital Projects to Enhance Freight Mobility**

<b>California</b>	<p>(1) <b>Alameda Corridor.</b> Completed in 2002, the Alameda Corridor is a 20-mile freight rail line linking the Ports of Los Angeles and Long Beach to the transcontinental rail yards and railroad mainlines near downtown Los Angeles. The corridor consists of a below-ground-level rail corridor that eliminated 200 at-grade crossings, thereby doubling rail speeds.</p> <p>(2) <b>State Route (SR) 47 Expressway.</b> The primary goals of this project are to replace an aging bridge, which is too small to accommodate high truck volumes, and to build an expressway that bypasses a maze of local, extremely congested roads, which would allow trucks to quickly haul their loads from the port of Los Angeles and Long Beach to the Intermodal Container Transfer Facility located three miles away.</p> <p>(3) <b>Freight railroad improvements.</b> Railroad improvements include building new intermodal facilities and adding tracks to the rail network to relieve capacity constraints and enhance freight mobility. For example, the railroads serving southern California have added or are beginning to build new double track lines into and out of Los Angeles to accommodate the growing freight traffic.</p> <p>(4) <b>Gerald Desmond Bridge replacement.</b> This project involves rebuilding this bridge at the Port of Long Beach, making it wider to accommodate growing traffic and higher to allow larger ships to pass underneath.</p>
<b>Texas</b>	<p>(1) <b>Proposed freight rail improvements.</b> In Houston, transportation planners have proposed several projects to relieve congestion along busy freight rail corridors, including construction of new mainline track and a new bridge to relieve congestion in bottlenecked sections, construction of grade separations to allow for trains to stop without causing delays or safety hazards to the public, and construction of new rail corridors that bypass populated areas. These transportation planners must coordinate with the railroads to implement these projects because rail infrastructure is owned by the railroads.</p> <p>(2) <b>Trans Texas Corridor.</b> This is a large-scale, multimodal, tolled transportation project that will span the state from Mexico to Oklahoma and will be financed, constructed, operated, and maintained by a combination of public and private sector investors. As envisioned, each route's road section will include separate freeway lanes for passenger vehicles and large trucks. The rail section will include freight and passenger lines. In addition to addressing current trade flow needs, this project would create some of the future roadway capacity needed to accommodate increased port-related freight traffic, especially container traffic. Funding for this project will comprise a combination of Texas Department of Transportation funds and tolls.</p>
<b>Illinois</b>	<p><b>Chicago Region Environmental and Transportation Efficiency (CREATE)</b> project is an example of a project advanced by public agencies and private investors to ease freight and passenger rail traffic through the largest rail hub in North America.<sup>a</sup> When completed, the CREATE Program is expected to reduce congestion on area roadways, improve air quality, and improve freight and passenger mobility in part by creating 25 new roadway overpasses or underpasses to eliminate many grade crossings, creating 6 new rail overpasses to separate passenger and freight tracks, and upgrading tracks, switches and signal systems.<sup>b</sup></p>

Source: GAO and interviews with various transportation stakeholders.

Increasing Efficiency of Existing Infrastructure to Improve Freight Mobility

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<sup>a</sup>CREATE project partners include the AAR, the Chicago Department of Transportation, the Illinois Department of Transportation, Metra, and six Class I freight railroads—Burlington Northern Santa Fe (BNSF), Canadian National, Canadian Pacific, CSX, Norfolk Southern, and Union Pacific.

<sup>b</sup>[GAO-07-718](#).

Two areas that we visited—Atlanta and New York City—have less space to build new infrastructure and are investing in other improvement projects that are intended to add more physical capacity to the existing roadway and rail networks. For example, the Georgia Department of Transportation is proposing to dedicate a number of existing highway lanes to truck-only lanes to separate truck traffic from commuter traffic. If combined with a tolling scheme, this approach would also provide a revenue source to pay for additional infrastructure improvements. Furthermore, the New York State Department of Transportation is considering a project that would entail a series of road ramp reconfigurations along the Van Wyck corridor, near John F. Kennedy International Airport, that would ease the flow of operations in moving air cargo out of the airport.

A second approach that freight stakeholders use to improve freight mobility involves advancing projects and proposals designed to increase the efficiency of existing infrastructure. Although the projects and proposals are varied, stakeholders are using two broad strategies. The first strategy is to improve traffic flows or accommodate increased freight volumes on existing transportation networks. The second strategy involves influencing driver behavior and demand.

The first strategy—improving traffic flows within the transportation system or making maximum use of transportation system capacity—involves a variety of activities focused on existing roadway and rail networks. These activities include implementing incident management programs, deploying transportation technology, and improving truck routes. The state of New York serves as an example of how public sector stakeholders have employed this strategy. Incident management programs are designed to rapidly deploy vehicles that remove accident vehicles and debris to quickly restore traffic flow after accidents. The New York State Department of Transportation has implemented this strategy by dispatching better towing equipment to an accident scene to provide a faster response to traffic incidents. Transportation technologies are also used to improve the flow of traffic and better manage the highway system. The New York State Department of Transportation has invested hundreds of millions of dollars in equipment that will give motorists advance information about traffic delays and incidents to better inform their travel decisions. While incident management programs and transportation

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technologies are intended to improve freight and passenger traffic alike, other initiatives focus specifically on enhancing freight mobility. Recognizing that New York City is heavily dependent on trucks for goods movement, the New York City Department of Transportation initiated the *Truck Route Management and Community Impact Reduction Study*. This study revealed several negative effects of truck traffic on local communities, including traffic congestion, damage to residences and roads, and safety concerns for pedestrians and passenger traffic. In response to these findings, the New York City Department of Transportation has started to implement a number of solutions to mitigate these negative effects. For example, in some areas of the city, routing changes were implemented that improved access into the area by taking truck traffic off of some residential streets and putting it onto wider streets.<sup>35</sup>

As we have reported previously, railroads typically try to improve their processes before enhancing infrastructure to mitigate congestion.<sup>36</sup> Process improvements and other strategies generally cost less and are more cost effective than infrastructure enhancements. Process improvements such as double stacking intermodal containers on rail cars, where the rail infrastructure allows, or increasing the number of cars per train enable more freight to move on rail lines without increasing rail congestion. Other railroad process improvements have included updating operating plans to reflect changes in business volume and traffic mix, increasing the number of fully loaded cars per train, decreasing car cycle times, increasing service, and hiring more train crews.

Other proposals aimed at increasing overall freight transportation capacity involve diverting freight traffic from one mode to another, less congested mode or using technology to improve efficiency. A 1996 DOT study evaluating the status of intermodal freight in the United States reported that diverting freight traffic away from highways reduces congestion. The study found that for every ten containers carried by rail, a minimum of seven trucks are taken off highways.<sup>37</sup> Regions serving as international

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<sup>35</sup>New York City Department of Transportation, *New York City Truck Route Management and Community Impact Reduction Study* (New York, N.Y., March 2007).

<sup>36</sup>GAO-07-770.

<sup>37</sup>ICF Consulting, HLB Decision Economics, Louis Berger Group, *Freight Benefit/Cost Study: Compilation of the Literature*, prepared for the Federal Highway Administration, Office of Freight Management and Operations, February 2001.

gateways are investing in alternative modes for transporting goods short distances, including short sea shipping and short haul rail, and creating virtual container yards through the internet that better match empty containers with freight transportation companies to reduce the number of truck trips to and from the port area. (See table 4 for examples of proposals to maximize the use of existing capacity.)

**Table 4: Examples of Proposals to Maximize the Use of Existing Capacity**

<b>Short sea shipping</b>	Short sea shipping encompasses waterborne transportation of commercial freight between domestic ports through the use of inland and coastal waterways. Moving freight in this manner could potentially relieve some highway and rail congestion while increasing freight mobility. <sup>a</sup> For example, the Port Authority of New York and New Jersey has proposed to expand the Port Inland Distribution Network (PIDN) system to include service to water-accessible ports further north, such as Bridgeport, Conn.; Providence, R.I.; and Boston, Mass. PIDN is a planned system for distributing containers moving through the Port of New York and New Jersey by barge and rail.
<b>Short haul rail</b>	Proposals have been advanced by transportation stakeholders in the New York and New Jersey region to divert truck traffic to rail for short hauls. Transportation decision makers in New York suggest that if rail capacity could be expanded to allow for short hauls from the port to 15-30 miles out, then trucks would not have to go into the congested urban areas. <sup>b</sup>
<b>Virtual container yards</b>	In 2006, the ports and the Alameda Corridor Transportation Authority in southern California implemented a virtual container yard—an internet-based matching service for empty containers—which reduces the number of empty containers being transported back to the port after goods have been delivered to a destination. Instead, containers are delivered to an exporter who needs empty containers for goods going to the port for shipment overseas. This reduces truck trips to and from the port area. It has been estimated that approximately 2 percent of the import containers are currently taken directly to exporters. The goal of the virtual container yard is to increase that percentage to at least 10 percent. <sup>c</sup>

Source: GAO.

<sup>a</sup>GAO, *Freight Transportation: Short Sea Shipping Option Shows Importance of Systematic Approach to Public Investment Decisions*, [GAO-05-768](#) (Washington, D.C.: July 29, 2005).

<sup>b</sup>The Port Authority of New York and New Jersey, *The Port Authority Strategic Plan: Transportation for Regional Prosperity* (New York, N.Y., August 2006).

<sup>c</sup>Southern California Association of Governments, *Southern California Regional Strategy for Goods Movement: A Plan for Action* (February 2005, amended March 2005).

The second strategy—influencing user behavior and managing demand—typically involves charging fees during peak hours to encourage users to shift to off-peak periods, use less congested routes, or use alternative modes, thereby spreading out demand for available transportation infrastructure. Even though some of these approaches have been applied only to passenger traffic, the congestion reduction could benefit freight transportation through those areas. Congestion pricing strategies include incorporating the use of high-occupancy toll (HOT) lanes and implementing a cordon pricing scheme in crowded urban areas. HOT lanes are priced lanes that offer drivers of lower occupancy vehicles, often people driving alone, the option of paying a toll to use lanes that are

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otherwise restricted to vehicles with a greater number of passengers. HOT lanes are beneficial in that they offer drivers a choice of paying a charge to reduce their travel time or continuing to take longer to make their trips on uncharged roadways. In addition, they can channel traffic into underused lanes and decrease congestion in non-HOT lanes, thereby increasing the overall throughput of a corridor. HOT lanes can also shift traffic to less congested times by charging a lower toll just before and after peak period.<sup>38</sup> Cordon pricing is a form of congestion pricing whereby drivers are charged a fee to enter a certain area during peak hours. Congestion pricing can be applied to various modes and has the potential to create other benefits, such as generating revenue to help fund additional transportation investments. Another approach that has been used to influence user behavior and manage demand involves working with businesses to extend their hours to accept deliveries during non-peak hours. This approach has the potential to reduce peak hour congestion by giving delivery drivers a wider delivery window and avoiding traffic delays. In some cases, congestion pricing is also applied in setting fees that are charged for peak hour transportation and deliveries, providing an incentive for users to shift deliveries to off-peak periods. (See table 5 for examples of projects and proposals to influence user behavior and manage demand.)

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<sup>38</sup> [GAO-07-920](#).



**Table 5: Examples of Projects and Proposals to Influence User Behavior and Manage Demand**

<b>Congestion Pricing</b>	<p><b>HOT lanes.</b> Drivers willing to pay to use the HOT lanes in California and Texas saved an average of 12-20 minutes per trip in the peak period.<sup>a</sup> A previous GAO evaluation of the State Route 91 HOT lane project in Orange County, California, showed that, although the HOT lanes represent only 33 percent of the capacity of State Route 91, they carry about 40 percent of the traffic in peak hours.<sup>b</sup></p> <p><b>Cordon Pricing.</b> New York City has been selected by DOT as an urban partner to implement a cordon pricing pilot. Pending state legislative approval, a congestion pricing scheme would be implemented in Manhattan to encourage more efficient freight deliveries to retailers. For example, truck drivers would have to pay a \$21 fee to enter the cordon during peak hours but, in turn, would have greater access to curbside parking and thereby decrease overall trip time. The pricing plan would also encourage off-hours deliveries.</p>
<b>Freight Transportation Demand Management</b>	<p><b>Extending business hours.</b> Some businesses in New York City have opted to extend hours of operation to reduce peak daytime traffic congestion. As a result, these businesses receive special incentives from the City to receive deliveries late in the day. For instance, some retail stores have arranged to have employees stay late to receive deliveries after 9:00 p.m. The City, in turn, has provided special approval of curbside parking to these businesses and has agreed not to ticket delivery vehicles during off-peak hours. In addition, City officials are considering expanding the hours that curbside space is available to delivery vehicles (typically 4-7 p.m.).</p> <p><b>PierPass.</b> The PierPass program in southern California was created to alleviate port congestion at the ports of Los Angeles and Long Beach. In an effort to encourage cargo owners to arrange transport during nights and weekends, the program imposes a \$50 per twenty-foot equivalent unit Traffic Mitigation Fee on loaded containers that are moved during peak hours. According to a PierPass official, the program has resulted in approximately 36 percent of traffic moving at night, taking thousands of truck trips out of daytime freeway traffic patterns, thus alleviating daytime congestion.</p>

Source: GAO.

<sup>a</sup>GAO, *Reducing Congestion: Congestion Pricing Has Promise for Improving Use of Transportation Infrastructure*, [GAO-03-735T](#) (Washington, D.C.: May 6, 2003).

<sup>b</sup>GAO-07-920.

## The Current State and Local Transportation Decision-Making Structure Impedes the Advancement of Freight Capacity-Enhancing Solutions

Although stakeholders have advanced a variety of approaches to improve freight mobility, state and local public planners face three broad challenges when attempting to advance freight projects. First, public planners face challenges in advancing freight projects within a public transportation planning process that is not well suited to the identification and advancement of freight projects. Second, public planners face challenges reaching agreement among the various freight stakeholders on freight needs and solutions. Finally, due to the modal structure of transportation funding, public planners face challenges in accessing funding, even when freight projects merit public sector involvement.

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## Challenges Associated with Advancing Freight Projects within the Planning Process

Within the state and local transportation planning process, freight projects often have difficulty competing with other transportation projects, such as passenger related projects, for limited public funds and community support. Although the public transportation planning process includes freight transportation improvements, in practice, freight projects have difficulty competing with other projects because (1) public planners, as well as the communities they represent, tend to favor projects that produce more apparent local public benefits, such as passenger-oriented projects, rather than projects that are seen as providing direct benefits to private companies or yield benefits to other jurisdictions; (2) public planners often lack the tools and data to evaluate freight projects, putting those projects at a disadvantage when compared with other transportation projects; and (3) in the absence of proper evaluation to quantify potential costs and benefits of a project, public planners are not able to articulate the merits and costs of freight improvements, which could hinder the advancement of some freight projects where there are community-based concerns about air pollution and public health effects, for example.

First, within the public transportation planning process, freight projects have difficulty competing with nonfreight projects for limited public funds because public planners are more likely to focus on projects that clearly produce local public benefits, such as projects that improve passenger mobility. Although freight improvements may also produce public benefits, the benefits are not always immediately obvious to the public. For example, a project that adds lanes to a crowded freeway is likely to benefit both passengers and freight haulers, while a road that enhances freight access to a port facility would likely be perceived as having only limited public benefit, even though it could improve freight mobility, and therefore, ease congestion for passenger vehicles. Public planners are wary of spending public funds on improvements to privately-owned freight infrastructure, such as the freight rail network. These types of projects have difficulty competing with other transportation projects in the public planning process because of the direct benefits that such improvements provide to private companies. Because the private railroad companies lack incentives for investing in projects that yield primarily public benefits and the public sector is wary of providing support when private benefits are apparent, some freight rail projects that produce public benefits may be disregarded. For example, some of the freight stakeholders with whom we spoke said that freight rail improvements are often overlooked when competing against commuter rail projects. One stakeholder stated that many of the rail corridors in the New York City area are owned by public agencies and are dominated by passenger traffic, putting freight rail traffic at a disadvantage.

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The public planning processes also focus on projects that produce local public benefits, whereas freight improvements can produce benefits beyond local jurisdictions. In general, many decisions in the transportation planning process are left to state DOTs and regional MPOs, which operate within defined jurisdictions. Although state DOTs work to address freight mobility challenges on a statewide basis, many freight transportation corridors cross state boundaries, and unless states are part of a multistate coalition, they usually do not address projects that involve these corridors. Rather, public planners tend to focus on the transportation needs that will directly benefit their constituencies, which can result in significant national freight needs going unaddressed. Stakeholders we spoke with in the four areas we visited confirmed that it is difficult to expend public funds on projects that clearly benefit other jurisdictions. For example, in Houston, public officials who oversee multiple jurisdictions said that local governments tend to give higher priority to their own favored projects and it can be difficult to get local governments to adopt a system wide perspective.

A second challenge state and local planners face in securing public support for freight improvements is that tools to evaluate freight projects are often lacking. FHWA and TRB have noted that, in making freight-related investment decisions, public planners are not applying appropriate evaluation elements, such as criteria by which to choose freight projects versus alternative projects, impeding the progress of freight-related projects.<sup>39</sup> In our past work, we noted that state and local planners have not developed the tools to evaluate freight projects with nonfreight projects.<sup>40</sup> Without tools to quantify the costs and benefits of various proposals, public planners may find it difficult to determine the extent to which public investment is required and to understand the trade-offs and relationships between alternative solutions involving different transportation modes. Moreover, in the absence of proper evaluation, public planners are unable to adequately judge the relative merits of freight improvement proposals, as opposed to passenger projects.

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<sup>39</sup>Transportation Research Board, *Special Report 252: Policy Options for Intermodal Freight Transportation* (Washington, D.C., 1998); Transportation Research Board, *Special Report 271: Freight Capacity for the 21st Century* (Washington, D.C., 2003); and Federal Highway Administration, *Addressing Freight in the Transportation Planning Process* (Washington, D.C., October 2001).

<sup>40</sup>[GAO-04-165](#).

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In addition to the lack of planning tools, the data necessary to conduct proper evaluations and make sound decisions are often lacking. TRB and FHWA studies have identified two possible explanations for the difficulty in acquiring freight data.<sup>41</sup> First, state and local planners are unable to obtain the data needed to sufficiently evaluate freight infrastructure proposals because public agencies may not have the necessary staff or resources to collect the data. Second, freight data on smaller geographical areas, which are necessary for effective freight planning, are not available, and as a result, some state and local agencies find it necessary to obtain data from costly private sources. Moreover, some companies that have data on private freight movement consider the information to be proprietary and are unwilling to share these data with public agencies.<sup>42</sup> For example, in Houston, a consortium of four local transportation agencies collects and provides information on the Houston area's major roadway system, including interstates, toll roads, and some highways. While the consortium has the capability to extend its tag-reading technology to track overall freight rail traffic, the railroads do not allow this practice because they consider that information proprietary. However, such data can often be used to identify heavily traveled highways and intersections and possible measures to mitigate intermodal freight bottlenecks. The lack of complete freight data necessary for freight improvement projects to compete with other transportation projects was also apparent in Atlanta, where a public planner told us that there are plenty of passenger data available to make sound investment decisions, but this same kind of data are missing for freight traffic.

Third, public planners also face challenges in advancing freight projects when affected communities oppose the advancement of certain projects. The public planning process requires transportation agencies to provide the public with meaningful opportunities to provide input on transportation decisions, and planners are expected to consider the full range of financial, social, economic, and environmental consequences of all proposed transportation projects. However, without the tools and data to adequately evaluate proposals, public planners are not able to articulate

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<sup>41</sup>Transportation Research Board, *Special Report 276: A Concept for a National Freight Data Program* (Washington, D.C., 2003) and Federal Highway Administration, *Addressing Freight in the Transportation Planning Process* (Washington, D.C., October 2001).

<sup>42</sup>In an attempt to address this, FHWA has developed a Freight Cost Benefit Analysis Additive Benefits tool that provides a calculation for estimating a highway improvement project's benefits to the private sector by calculating the savings to shippers and manufacturers.

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Coordinating Among Multiple  
Public and Private  
Stakeholders Presents  
Challenges to Implementing  
Freight Proposals

the merits and costs of freight improvements, which could hinder the advancement of some freight projects. Community resistance to freight improvements was evident in all of the locations that we visited, but was most apparent in California where community-based concerns about air pollution and public health effects were raised in opposition to projects for expanding freight transportation capacity. Many local communities directly affected by freight transportation have opposed new freight projects citing environmental and health hazards that these projects might produce. However, freight improvements may be able to address some of these concerns by reducing congestion or unblocking a bottleneck. In the absence of proper evaluation to quantify the potential costs and benefits of a project, affected communities may continue to oppose the advancement of freight improvements.

When freight proposals are advanced in the public planning process, planners are faced with the challenge of coordinating among various public and private stakeholders. To elevate freight improvements in the public planning process, planners must take into consideration the views of local elected officials, public agencies involved in transportation planning, and the private sector, including rail and trucking companies. Agreement among all parties is often desired before a project can be advanced.

Obtaining cooperation among numerous public sector transportation stakeholders on freight proposals that extend across multiple jurisdictions is difficult and can deter advancing freight projects that cross jurisdictional boundaries. The public planning process involves public agencies that vary in terms of mandates from their constituencies, geographical and jurisdictional responsibilities, funding capacities, and staff resources. Given these factors, each agency often develops its own mission, agenda, studies, and processes; also, its decisions will often reflect political, as well as transportation, concerns. Given the unique characteristics of each agency, obtaining cooperation among these different officials can make the planning and implementation of multistate and multiregion freight projects difficult, as the following examples describe:

- In southern California, a number of public entities play a role in setting freight transportation priorities—4 district offices of the California DOT, 14 subregions, 6 county transportation commissions, and 184 city governments. Prior to the last California state transportation bill, the Alameda Corridor Transportation Authority (ACTA) developed a project list that they believed represented the projects that were in the best

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interest of southern California as a whole.<sup>43</sup> The Los Angeles Metropolitan Transportation Authority disagreed with their list and proposed a different set of projects and priorities, creating competition—instead of cooperation—for the limited funds available.

- Public planners we spoke with in New York State explained that planning freight projects in the New York and New Jersey region is particularly challenging to manage because of multiple agencies in each state, as well as each state's separate government. For example, completion of the Staten Island lift bridge, a railroad project to connect Staten Island with the national freight rail network, was especially challenging because it required the approval of 26 federal, state, and local planning bodies.
- Officials in Atlanta said that Georgia, along with four other states, submitted an application for proposed improvements to Interstate 95 through DOT's Corridors of the Future program. A public planner that we spoke with said coming to a consensus on the proposed improvements was difficult because each state had competing demands. For example, one state wanted truck-only lanes, while another state wanted to increase the number of lanes for all vehicles.

While reaching agreement among public sector entities about freight projects can be very challenging, securing the participation and support of the private sector can also be difficult. Private entities—mainly manufacturers, railroads, trucking companies, marine terminal operators, overseas shipping lines, logistics providers, wholesale distribution centers, and retailers—can provide meaningful input in freight transportation planning. According to FHWA, private sector participation can help local planners identify and address needed freight transportation improvements and provide expertise and data to make informed decisions.<sup>44</sup> However, obtaining private sector participation in the public sector transportation planning process has been difficult, due to the lengthy public planning process. Many transportation planning agencies have planning horizons that extend over long periods compared to the private sector and are

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<sup>43</sup>ACTA adopted an Expanded Mission in January 2004 to address cargo growth at the ports and to optimize use of the existing rail and highway network while larger scale projects are planned and funded. See <http://www.acta.org> (accessed on Oct. 4, 2007).

<sup>44</sup>Federal Highway Administration, *Addressing Freight in the Transportation Planning Process* (Washington, D.C., October 2001) and Federal Highway Administration, Office of Freight Management and Operations, *Freight Financing Options for National Freight Productivity* (Washington, D.C., April 2001).

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required to develop and update a long-range transportation plan covering a planning horizon of at least twenty years. This long time period is necessary for the public sector to complete impact studies and to obtain necessary funding, but may result in the private sector losing interest or becoming frustrated with the process. For example, the Atlanta Regional Commission's Freight Advisory Task Force includes public and private sector freight representatives who inform the regional planning process on freight issues. However, some private sector freight stakeholders with whom we spoke in the Atlanta area expressed frustration that, while there has been much discussion of freight issues affecting private companies, the public sector has yet to implement any change.

Even if public planners are successful in securing private sector participation in the planning process, getting them to support and help fund freight projects may be hindered by the lack of sufficient benefits for the private sector. In prior reports, we found that limited participation by the private sector stems from the fact that freight projects proposed through the transportation planning process do not offer sufficient benefits to warrant their involvement.<sup>45</sup> For example, the railroads that serve the west coast have been reluctant to support the Alameda Corridor East project, which connects the Alameda Corridor and the Ports of Los Angeles and Long Beach to the transcontinental rail network. According to public planners, although the project would yield substantial public benefits, such as safety and reduced pollution, it would do little to help the railroads in terms of increasing capacity.<sup>46</sup> In another case, an official from a Class I railroad operating in the southwest said that company officials were wary of the Texas DOT's freight rail plan for Houston because the agency had not met with railroad officials during the planning process to discuss the private benefits that would accrue to the railroad from projects that were in the plan. Railroad officials said that it seemed as though Texas DOT attributed more private benefits to those projects than would actually accrue and that Texas DOT would want higher contributions from the railroad than the railroad would be willing to pay toward those projects.

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<sup>45</sup> [GAO-04-165](#).

<sup>46</sup> The Alameda Corridor project involved significant collaboration and investment from the private sector, namely railroads, and was successfully completed in 2002. The Alameda Corridor East project is located in a different geographic area but extends the partnership idea from the first project.

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## Funding for Freight-Specific Projects is Difficult to Secure

When freight improvements have been identified within the public planning process, public planners face a number of challenges in securing funds to advance those improvements. The limited federal, state, and local funding available for freight improvements and restrictions built into existing programs; the modal stovepiping of funding programs; and the complexity of funding multimodal, multijurisdictional projects all contribute to the difficulty of advancing freight improvements.

The limited availability of funding sources specifically targeted to freight projects was cited as a challenge by freight stakeholders in each of our four case study regions. Only one federal program—the Freight Intermodal Distribution Pilot Grant Program—offers federal funding specifically for intermodal freight projects. Congress has authorized \$30 million for projects in five states through this pilot program. Other federal programs, such as Projects of National and Regional Significance and National Corridor Infrastructure Improvement Program, can also provide funding for intermodal freight projects. However, some funding for all of these programs has been congressionally directed to specific projects. According to a recent DOT Inspector General report and a prior GAO report, the congressional direction of funds for particular projects may not result in the highest priority projects being funded.<sup>47</sup> For example, a public planner with whom we spoke in New York City said that, although federal money in the form of congressional directives were given to New York City, the funds were directed at projects that were not included in any city plans. In addition, freight-specific funding sources are also lacking at the state and local levels. For example, according to local transportation officials with whom we spoke in southern California, an estimated \$26.2 billion will be needed for regional infrastructure enhancements to promote efficient goods movement. Although a \$20 billion bond measure to fund transportation projects was recently passed in the state, only \$2 billion has been set aside for freight-specific projects throughout the state. In Houston, a freight stakeholder said that Houston area public planners cannot rely on Texas DOT to provide a share of state funds needed for local interstate, highway, and freight projects. Area governments have,

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<sup>47</sup>DOT, Office of the Inspector General, *Review of Congressional Earmarks Within Department of Transportation Programs* (Washington, D.C., September 2007) and [GAO-07-718](#).



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therefore, pursued several alternative means of funding projects, including toll roads and a freight rail district.<sup>48</sup>

Aside from the lack of freight-specific federal programs dedicated to improvements, freight projects can be especially difficult to fund or finance because of restrictions built into existing federal programs. Rail projects, in particular, are difficult to fund even when considered a priority in the public planning process because rail infrastructure is privately owned. Although two federal credit programs—the Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA) and the Railroad Rehabilitation and Improvement Financing (RRIF)—can be used to finance freight rail projects, these programs have eligibility criteria that may limit some projects. For example, to qualify for TIFIA assistance, the project must generate a revenue stream from user charges or other nonfederal funding sources. The RRIF program includes an up-front fee applicants must pay in order to receive the loan, and applications must be approved by both the Federal Railroad Administration and the Office of Management and Budget.<sup>49</sup> According to one short line railroad representative with whom we met, the program only benefits those companies that can generate enough money to pay back the loan principal and interest. In other cases, freight projects can be difficult to fund because only specific types of projects are eligible for program funds, such as with the Congestion Mitigation and Air Quality (CMAQ) program. In the case of CMAQ, unless a project has a positive effect on air quality in certain nonattainment or maintenance areas, it would not be eligible for CMAQ funds.

The modal structure of funding programs and of public transportation bodies also affects the funding of intermodal freight improvement projects. Reflecting the separate federal transportation funding programs, many state and local DOTs are generally organized into several operating administrations with responsibilities for particular modes. According to our previous work and other published studies, this modal focus can impede the funding of freight projects, which tend to be intermodal in

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<sup>48</sup>The freight rail district is tasked with improving railroad capacity and operation, filling a gap where there has been limited expertise and focus outside of the rail industry. The district's mission is to better incorporate rail lines, both freight and commuter, into the region's transportation network.

<sup>49</sup>According to a DOT report, a typical time estimate for an RRIF loan to be processed is 1.5 to 2 years.

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nature.<sup>50</sup> Because different operating administrations oversee and manage separate funding programs, these programs often have differing timelines, criteria, and matching fund requirements, which can make it difficult for public planners to plan and implement these intermodal freight projects. Moreover, because federal programs are often structured such that they dedicate funds on a modal basis, state and local decision makers may choose projects based on the mode eligible for federal funding, which puts freight projects at a disadvantage.<sup>51</sup> For example, a traditional project, such as a project to widen a highway, typically involves only one mode. The planning and development of this type of project involves a single sponsor (such as a local transportation agency) and one clearly defined funding source (such as the federal-aid highway program). In contrast, freight improvement projects tend to be more complicated because they are frequently intermodal (such as a rail-to-truck transfer site), which means that a clear sponsor for the project may not exist, discussions among multiple sponsors are usually required, and consideration of multiple funding sources may be necessary. A public planner in Atlanta said that modal stovepiping of funds presents challenges for public transportation planners when attempting to make improvements on nonhighway modes, as well as on infrastructure that has a private component.

Finally, public planners are often faced with the challenge of funding freight improvements that reap national benefits. As noted earlier, the public transportation planning process leaves infrastructure improvement decisions to state and local planning bodies without considering the national or global nature of freight transportation. Although freight transportation is international and national in nature, state and local planners control the planning and project identification process for improvements to enhance freight mobility. Since these local communities have limited funds for transportation projects and federal funding sources are limited, projects that provide benefits that are more readily discernable to immediate localities—such as highway projects that

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<sup>50</sup>GAO-07-718; GAO-05-325SP; GAO-04-165; The Brookings Institute, *Principles for a U.S. Public Freight Agenda in a Global Economy*, (Washington, D.C., January 2006); Transport Canada, *Literature Review on Intermodal Freight Transportation*, (Ottawa, Ontario, January 2004); and Transportation Research Board, *Global Intermodal Freight: State of Readiness for the 21st Century, Report of a Conference* (Washington, D.C., 2001).

<sup>51</sup>When public planners make infrastructure decisions based on the mode eligible for federal funding, this can potentially result in funding a project for one mode, even when benefit-cost or cost-effectiveness criteria may favor a project on another mode.

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address passenger transportation—are often given priority for funding. For example, a public planning official in Atlanta noted that 36 percent of the freight tonnage and 46 percent of the value of freight traveling on Georgia’s transportation system has neither an origin nor a destination in the state. Public officials in Atlanta told us that it is difficult for Atlanta and Georgia to pay the high costs of improving the freight transportation system when much of the freight is not benefiting Atlanta or the state of Georgia. In addition, according to a paper released by the Southern California Association of Governments, while the ports of Los Angeles and Long Beach handle one-third of all waterborne freight container traffic entering the United States, the region is not compensated for the public or external costs associated with moving this freight, such as traffic congestion, air pollution, noise, public health effects, visual blight, and freight-related safety incidents.<sup>52</sup> In the absence of a national strategy and nationally established criteria by which to choose critical freight projects, public officials at the state and local levels will continue to invest federal funding on projects that most benefit their constituencies.

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## Federal Government Faces Challenges in Resolving Freight Mobility Issues

The ability of the federal government to help address freight mobility issues is constrained for several reasons. First, as we have previously reported, there is no strategy or clearly defined federal role in transportation generally and in freight transportation specifically, despite a clear federal interest in freight transportation stemming from Congress’ constitutional role to regulate interstate commerce and freight transportation’s effect on the national economy. While DOT’s *Draft Framework for a National Freight Policy* takes a step forward in developing a national freight transportation policy, we have found that it does not comprehensively guide the implementation of a federal role in freight transportation investments. It assumes a federal role without indicating whether federal involvement is appropriate or, when appropriate, what the goals of federal involvement should be, what specific roles the federal government and other stakeholders should play, and what federal revenue sources and funding mechanisms should be used to support freight-related investments.<sup>53</sup> Without a clearly defined federal role in the planning and funding structure, federal officials are limited in their ability to promote broad, regional solutions to freight mobility that

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<sup>52</sup>Southern California Association of Governments, *Southern California Regional Strategy for Goods Movement: A Plan for Action* (February 2005, amended March 2005).

<sup>53</sup>[GAO-07-770](#).

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transcend state and local jurisdictions to yield national benefits. Additionally, until the federal role is more clearly defined, the current system, in which an average of over \$38 billion per year in federal gas tax revenues<sup>54</sup> are allocated to states by formula, will likely continue. As we have found previously, most federal highway grant funds are apportioned to state and local governments by formula, without regard to the needs, performance, capacity, or level of effort of recipients and with no assurance that they are dedicated to projects that best meet mobility needs of either freight or passengers.<sup>55</sup>

Another factor constraining the federal government from helping address freight mobility issues is that the government is still trying to do business in ways that are based on conditions, priorities, and approaches that were established decades ago and are not well suited to addressing 21st century challenges. For example, the current federal transportation structure is stovepiped around individual modes with their individual funding sources, leaving little room for flexibility in a transportation network in which many modes work together to provide for freight transportation.

Finally, federal action is constrained because the main transportation funding mechanism—the Highway Trust Fund—is at risk at a time when the federal government faces a long-term fiscal imbalance that threatens the financial viability of the government. Although, as we have previously reported, private entities, such as railroads, are investing in their own transportation infrastructure,<sup>56</sup> the federal government faces serious challenges to its ability to invest in transportation. In terms of the Highway Trust Fund, the Office of Management and Budget has stated that absent any changes, the Highway Trust Fund will reach an estimated \$4 billion negative balance by fiscal year 2009,<sup>57</sup> seriously limiting the amount of federal resources to invest in the nation’s infrastructure. With regard to the governmentwide fiscal imbalance, unless changes are made, balancing the

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<sup>54</sup>This amount is the average authorization from the Highway Trust Fund from fiscal year 2005 to fiscal year 2009. Most of these funds are specifically for highway projects.

<sup>55</sup>[GAO-07-545](#).

<sup>56</sup>[GAO-07-770](#).

<sup>57</sup>Office of Management and Budget, *Mid-Session Review, Budget of the U.S. Government, Fiscal Year 2008* (Washington, D.C., July 11, 2007).

federal budget by 2040 could require actions as large as cutting all federal expenditures by 6 percent or raising federal taxes to twice today's level.<sup>58</sup>

These challenges—the lack of a clearly defined strategy and role, an outdated modal-focused structure, and the current transportation funding shortfall combined with an unsustainable federal fiscal situation—not only hinder the ability of the federal government to help address freight mobility challenges, but also contribute to the broader transportation challenges facing federal decision makers at all levels. Any efforts to address these freight mobility challenges must be done in the context of broader transportation challenges facing the nation. Table 6 summarizes the key transportation challenges and considerations that have been raised in our prior work.

**Table 6: Key Transportation Challenges and Considerations Facing Federal Decision Makers**

Key challenges	Considerations
Focusing federal transportation policy	Define national transportation goals with targeted areas or corridors of national interest and a clear federal role in achieving those goals in those areas and corridors.
Creating performance criteria for federal transportation investments	Establish criteria to ensure federal funds invested achieve the highest national public benefits.
Aligning roles of state, local, and private stakeholders	Create partnerships that maintain a level of effort by other transportation stakeholders that aligns their costs and contributions with their respective benefits.
Reestablishing user based financing for transportation programs	Ensure revenue sources take into account all economic and social costs of each mode.
Ensuring federal funding sources can meet future national transportation demands	Reduce modal stovepipes for federal funding; allow for more multimodal flexibility in federal investments; increase sustainability by increasing capability to adjust to reductions in demand or consumption.

Sources: [GAO-05-325SP](#), [GAO-07-310](#), [GAO-07-770](#), [GAO-07-1210SP](#).

We have previously reported that these challenges and considerations highlight the need for the federal government to reassess the appropriate federal role and strategy in funding, selecting, and evaluating transportation investments, including those for freight transportation.<sup>59</sup> Conducting this type of reassessment could better position the federal government to work with state and local decision makers to address the challenges to freight mobility and lead to a more efficient transportation

<sup>58</sup>GAO, *Saving Our Future Requires Tough Choices Today*, [GAO-07-1164CG](#) (Washington, D.C.: July 26, 2007).

<sup>59</sup>[GAO-05-325SP](#), [GAO-07-1210SP](#), [GAO-07-770](#), [GAO-07-310](#).

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system. We have also reported that critical factors and questions can be used as criteria for determining the appropriateness of a federal role and a framework with components that we believe would be helpful in guiding future federal freight transportation investments. Implementing this framework would include setting national goals for federal investment in freight-related infrastructure, clearly defining federal and other stakeholder roles, and identifying sustainable revenue sources and cost-effective funding mechanisms that can be applied in order to maximize the national public benefits of federal investments. (See app. II for critical factors and questions as well as components of GAO's framework.)

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## Conclusions

The nation is at a crossroads regarding the future of the freight transportation system. The current federal role in surface transportation is unclear and unfocused, and the federal government does not maximize opportunities to promote the efficient movement of freight. Federal surface transportation programs also lack assurance that the federal transportation funds granted annually to states are being dedicated to projects that best meet the mobility needs of either freight or passengers. This structure functions as an impediment to meeting freight mobility challenges. Solutions to these challenges require strategic, multimodal, and economically sound strategies that local, state, and regional governments and planning organizations are fundamentally limited in addressing. Moreover, finding solutions to these challenges by reframing and focusing the federal role in freight transportation is complicated by the increasingly unsustainable federal fiscal condition that makes it imperative to maximize the national public benefits of any federal investments.

DOT and Congress, which have important oversight roles in regulating interstate commerce, should both play key roles in bringing about needed changes to address the challenges we have identified in order to increase the efficiency and capacity of the nation's freight transportation system. Given the clear interstate and international character of many freight challenges, the federal government has a distinct and important role in bringing a national scope and vision to the problems that now face localities, states, and regions that have national freight flows. By promoting and coordinating solutions across jurisdictional lines, the federal government could increase the effectiveness of localities, states, and regional governments and planning organizations in overcoming their freight-related challenges. The federal government could also more effectively direct national resources towards those freight investments and solutions that have nationwide influence.

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While DOT has made some progress in enhancing the nation's freight transportation system through its *Draft Framework* and the Corridors of the Future program, more fundamental changes will be required to address challenges and meet anticipated freight flows. In developing and implementing ways to address freight transportation needs, Congress and DOT face a challenging and complex job. There is no quick and easy solution for addressing the freight transportation challenges; rather, a fundamental reassessment of the federal role in addressing the nation's freight transportation challenges as part of a larger reexamination of national transportation programs is needed. Essential to this reexamination is developing a federal strategy to achieve national freight policies that both embodies basic economic and management principles; provides a base from which to determine an appropriate federal role in funding, selecting, and evaluating freight transportation investments; and seeking and allocating alternative sources of revenues.

DOT must begin to work in earnest with the Congress in formulating these fundamental changes because, ultimately, Congress will have to make difficult choices—especially in finding funding solutions—that may please some stakeholders, but will likely generate opposition by sectors or regions who anticipate being disadvantaged. As the projected revenue shortfall in the Highway Trust Fund rapidly approaches and as freight congestion increases, time to forge a meaningful freight strategy and policy is running out.

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## Recommendation for Executive Action

In order to improve freight mobility by more clearly defining the federal role in the freight transportation network and to begin to align federal investments with economically significant national benefits, we recommend that the Secretary of Transportation develop with Congress and public and private sector stakeholders a comprehensive national strategy for freight transportation. This national strategy should include:

- defining the federal role and national interests in freight transportation, including economically-based and objective criteria to identify areas of national significance for freight transportation and to determine whether federal funds are required in those areas;
- establishing the roles of regional, state, and local governments, as well as the private sector; and

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- using new or existing federal funding sources and mechanisms to support a targeted, cost-effective, and sustainable federal role in freight transportation.

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## Agency Comments

We provided a draft of this report to DOT for review and comment prior to finalizing the report. DOT officials generally agreed with the information in this report, and they provided technical clarifications, which we have incorporated into this report, as appropriate. DOT did not comment on the recommendation.

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We are sending copies of this report to congressional committees with responsibilities for transportation issues and the Secretary of Transportation. We will also make copies available to others upon request. In addition, this report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-2834 or [heckerj@gao.gov](mailto:heckerj@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix III.

Sincerely yours,



JayEtta Z. Hecker  
Director, Physical Infrastructure Issues



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# Appendix I: Objectives, Scope, and Methodology

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The objectives of this report were to examine (1) factors that contribute to constrained freight mobility in areas with nationally significant freight flows and the effects of this constrained mobility and (2) approaches that are being used to address impediments to freight mobility in selected regions with nationally significant freight flows and the challenges that freight transportation stakeholders face in implementing solutions. For this report, we considered areas with nationally significant freight flows to be those that are either a major seaport, international border, freight distribution hub, or areas that combine some or all of these characteristics.<sup>1</sup> We also primarily focused on overland surface transportation from ports to markets and on intermodal freight, as these demonstrate freight movement between modes and across multiple jurisdictional lines. To address these objectives, we conducted a literature review and completed four case studies in regions with nationally significant freight flows.

Our literature review included Transportation Research Board publications, U.S. Department of Transportation (DOT) studies, academic studies, and consulting firm reports. Using these sources, we analyzed the content to categorize freight mobility issues related to our objectives. Though we did not independently verify the accuracy of the analyses and data presented in the literature, the result of this limitation is minimal because we relied on a broad array of literature to generally describe the key factors that cause impediments to freight mobility and their associated effects, as well as the approaches that are being used to enhance freight mobility and challenges associated with advancing solutions.

We also completed four case studies to illustrate the range and complexity of the factors that constrain freight mobility and their effects, in addition to the approaches and associated challenges, used by stakeholders to implement solutions to these challenges. To select regions with nationally significant freight flows for our case study analyses, we relied on information available from the Federal Highway Administration's (FHWA) Freight Analytic Framework database regarding freight volumes and values and used that information to judgmentally select at least one seaport, land border, and major distribution center. Finally, we chose sites that provided geographic diversity. At each of these locations, we conducted multiple interviews with a wide variety of public and private

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<sup>1</sup>We also concentrated on surface transportation modes, such as, highways, rail and marine freight modes, in this engagement.

sector freight transportation stakeholders. However, the results of our case study analyses are not generalizable because the locations selected are not necessarily representative of other types of international gateways and distribution hubs.

The four case study regions were: New York and New Jersey, Atlanta, Houston and Laredo, and Los Angeles and Long Beach. To understand the dynamics of freight movement in case study regions, approaches used in freight planning and operations, and what transportation stakeholders are doing in response to challenges faced in implementing freight projects, we conducted interviews with public and private freight transportation stakeholders in these areas. In addition to our site visits, we interviewed other stakeholders in the national freight transportation network. We also analyzed documents provided to us by the stakeholders pertaining to their transportation planning efforts. For a complete list of all entities interviewed, see table 7.

**Table 7: Names and Locations of Organizations Contacted**

<b>Name</b>	<b>Location</b>
<b>Class I freight railroads</b>	
Burlington Northern Santa Fe	Los Angeles, Calif.
CSX Transportation	Newark, N.J.
Kansas City Southern	Laredo, Tex.
Norfolk Southern	Atlanta, Ga.
Union Pacific Railroad Company	Houston, Tex. Washington, D.C.
<b>Class III freight railroads</b>	
New York & Atlantic	New York, N.Y.
<b>Federal agencies</b>	
U.S. Army Corps of Engineers	Houston, Tex. Washington, D.C.
U.S. DOT	Washington, D.C.
Office of Intermodalism	Washington, D.C.
Federal Railroad Administration	Washington, D.C.
Offices of Freight Operations and Policy	Washington, D.C.
Maritime Administration	Los Angeles, Calif.
U.S. Department of Homeland Security	Laredo, Tex.
Customs and Border Protection	San Diego, Calif. Washington, D.C.

**Appendix I: Objectives, Scope, and Methodology**

<b>Name</b>	<b>Location</b>
<b>State agencies</b>	
California DOT	Los Angeles, Calif.
Georgia DOT	Atlanta, Ga.
New Jersey DOT	Newark, N.J.
New York DOT	New York, N.Y.
Texas DOT	Houston, Tex. Laredo, Tex.
<b>Local organizations and authorities</b>	
Alameda Corridor East Construction Authority	Irwindale, Calif.
Alameda Corridor Transportation Authority	Carson, Calif.
Atlanta Chamber of Commerce	Atlanta, Ga.
Atlanta Regional Commission	Atlanta, Ga.
Bi-State Motor Carriers Association	Newark, N.J.
Georgia Motor Trucking Association	Atlanta, Ga.
Georgia State Road and Tollway Authority	Atlanta, Ga.
Greater Houston Partnership	Houston, Tex.
Gulf Intracoastal Canal Association	Houston, Tex.
Houston-Galveston Area Council	Houston, Tex.
Houston TranStar	Houston, Tex.
International Longshoremen's Association	New York, N.Y.
International Longshore and Warehouse Union	Los Angeles, Calif.
Laredo Metropolitan Planning Organization	Laredo, Tex.
Laredo Truckers Association	Laredo, Tex.
Los Angeles Chamber of Commerce	Los Angeles, Calif.
Los Angeles Economic Development Corporation	Los Angeles, Calif.
Nation's Port	Newark, N.J.
Natural Resources Defense Council	Los Angeles, Calif.
New Jersey Shortline Railroad Association	Newark, N.J.
New York City DOT	New York, N.Y.
New York City Economic Development Corporation	New York, N.Y.
New York Metropolitan Transportation Council	New York, N.Y.
New York/New Jersey Freight Forwarders Association	Newark, N.J.
North Jersey Transportation Planning Authority	Newark, N.J.
PierPass	Long Beach, Calif.
Port Authority New York New Jersey	New York, N.Y.
Port of Houston Authority	Houston, Tex.
Port of Los Angeles and Long Beach	Los Angeles, Calif.

**Appendix I: Objectives, Scope, and Methodology**

<b>Name</b>	<b>Location</b>
Port Terminal Railroad Association	Houston, Tex.
San Diego Regional Planning Agency	San Diego, Calif.
Southern California Association of Governments	Los Angeles, Calif.
Triangle Network Trucking Association	Newark, N.J.
Private transportation companies	
ABF Freight Systems	Atlanta, Ga.
APL Limited Eagle Marine Services Ltd.	Terminal Island, Calif.
APM Terminals/Maersk Shipping	Terminal Island, Calif.
Cal Cartage (drayage services)	Los Angeles, Calif.
Cal State Xpress (drayage services)	South Gate, Calif.
Coca-Cola Enterprises	Atlanta, Ga. Elmsford, N.Y.
Exxon Mobil Chemical Company	Houston, Tex.
Genesis Intermodal Delivery & Nordic Logistics	Houston, Tex.
Kinder Morgan Terminals	Houston, Tex.
Lyondell Chemical Company	Houston, Tex.
Maher Terminals	Newark, N.J.
Marine Terminals Corporation	Los Angeles, Calif.
Mattel	Los Angeles, Calif.
Modalgistics	Atlanta, Ga.
New York Container Terminal	New York, N.Y.
Pacific Harbor Line	Wilmington, Calif.
Pacific Maritime Association	Long Beach, Calif.
Pacific Merchant Shipping Association	San Diego, Calif.
Seaside Transportation Services	Terminal Island, Calif.
Southern Counties Express	Rancho Dominguez, Calif.
United Parcel Service	New York, N.Y. Washington, D.C.
Werner Enterprises	Laredo, Tex.
Academic institutions and consultants	
American Transportation Research Institute	Smyrna, Ga.
Mike Meyer, Professor Civil and Environmental Engineering, Georgia Institute of Technology	Atlanta, Ga.
George R. Fetty, Principal, George R. Fetty and Associates, Inc. (Rail Consultant)	Los Angeles, Calif.
METRANS Transportation Center/ Center for International Trade and Transportation	Long Beach, Calif.
Leigh Boske, Associate Dean and Professor of Economics, LBJ School of Public Affairs, The University of Texas at Austin	Austin, Tex.
Texas Transportation Institute	College Station, Tex.

Source: GAO.

To identify the factors that constrain freight mobility and the impacts of this immobility, we reviewed and analyzed the content of relevant literature. Our analysis categorized the factors and effects found in the literature in order to identify the major areas of agreement among experts regarding the factors that cause, and the effects of, constraints on the mobility of nationally significant freight flows. We supplemented our analysis of this literature by interviewing key freight transportation stakeholders in four regions with nationally significant freight flows.

To identify approaches that have been proposed or implemented by transportation stakeholders and challenges associated with advancing solutions, we interviewed officials in the four case study regions, as well as DOT officials in Washington, D.C., and collected documents from these officials about their efforts to implement freight mobility solutions. This information covered topics such as the planning process, both at the state and local levels; each organization's role, including the extent to which each organization provides funding for freight projects; private sector participation, including the extent to which private sector stakeholders contribute to funding freight projects; and perspectives regarding collaboration between public and private sector stakeholders. In addition, we identified approaches that can be used to enhance freight mobility and the challenges associated with advancing freight improvements through the literature review; we confirmed this information through our interviews with key freight stakeholders in case study regions. We did not independently assess the relative success of the various approaches identified. Given that each approach was applied in areas with regional and geographic differences, comparisons between approaches cannot be inferred. We also relied on perspectives obtained from our past work in transportation and infrastructure systems and federal investment strategies.

To identify challenges that decision makers face in implementing solutions, we reviewed pertinent literature, including past GAO reports on freight transportation, and confirmed this information through our interviews with key freight stakeholders in case study regions. Through our interviews with transportation stakeholders in local, regional, and state governments, as well as private shippers and freight transportation companies, we sought information on the transportation planning process, the collaboration of various stakeholders during that process, and various mechanisms used to fund and finance freight-related transportation projects. These interviews focused on challenges that are specific to freight transportation solutions. To identify federal challenges to implementing freight transportation solutions, we integrated perspectives

gained from our prior reports on various aspects of freight transportation and freight infrastructure. We also relied extensively on our past work in transportation and federal investment strategies to elaborate on the key components of a comprehensive federal freight investment strategy.

We conducted this performance audit from July 2006 through January 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

# Appendix II: Critical Factors and Questions and Components of a Federal Role in Freight-Related Transportation and Infrastructure Investments

**Table 8: GAO's Critical Factors and Questions for Determining an Appropriate Federal Role in Freight-Related Transportation**

Factors	Questions
Relevance and purpose of the federal role	Are some freight transportation issues of nationwide interest? If so, is a federal role warranted based on the likely failure of private markets or state and local governments to address underlying freight problems or concerns? Does current federal involvement in freight infrastructure encourage or discourage the private and other public sectors from investing their own resources to address the problem?
Measuring success	Do current federal funding mechanisms and programs for freight-related infrastructure have outcome-based performance measures, and are all applicable costs and benefits considered?
Targeting benefits	Are current funding mechanisms for freight-related infrastructure targeted to generate national benefits in areas with the greatest needs and the least capacity to meet those needs?
Affordability and cost-effectiveness	Do current revenue sources and funding mechanisms for federal freight-related infrastructure encourage state and local governments and the private sector to invest their own resources? Are these revenue sources sustainable, and are the funding mechanisms affordable in the long term? Do these funding mechanisms use the most cost-effective or net beneficial approaches when compared to other tools and program designs?

Sources: [GAO-05-325SP](#) and [GAO-07-770](#).

**Appendix II: Critical Factors and Questions  
and Components of a Federal Role in Freight-  
Related Transportation and Infrastructure  
Investments**

**Table 9: Three Components of GAO’s Framework to Guide Federal Involvement in Freight-Related Infrastructure Investments**

<b>Component</b>	<b>Description</b>
Set national goals	These goals, which would establish what federal participation in the freight transportation system is designed to accomplish, should be specific, measurable, achievable, and outcome-based.
Establish and clearly define stakeholder roles, especially the federal role relative to the roles of state and local governments and private railroads	The federal government is one of many stakeholders involved in freight-related investments. Others include state and local governments, port authorities, shippers, and the railroads themselves. Given the broad range of beneficiaries, it is important to gain consensus on what the transportation system is to achieve and to help ensure that the federal role does not negatively affect the participation or role of other stakeholders.
Determine which revenue sources and funding mechanisms will maximize the impact of any federal expenditures and investment	This component can help expand the ability to provide funding resources and to promote cost sharing responsibilities. Given the current budgetary environment and the long-range fiscal challenges confronting the nation, federal funding for future freight-related transportation projects will require a high level of justification and should be prioritized to maximize national public benefits.

Sources: [GAO-02-1033](#), [GAO-05-727](#), [GAO-07-15](#), and [GAO-07-770](#).



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# Appendix III: GAO Contact and Staff Acknowledgments

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## GAO Contact

JayEtta Z. Hecker, (202) 512-2834 or [heckerj@gao.gov](mailto:heckerj@gao.gov)

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## Staff Acknowledgments

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