

NCFRP

REPORT 1

NATIONAL
COOPERATIVE
FREIGHT
RESEARCH
PROGRAM

Public and Private Sector Interdependence in Freight Transportation Markets



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Public and Private Sector Interdependence in Freight Transportation Markets

IHS GLOBAL INSIGHT
Lexington, MA

Subject Areas

Planning and Administration • Aviation • Rail • Freight Transportation • Marine Transportation

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TRANSPORTATION RESEARCH BOARD

WASHINGTON, D.C.
2009
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NATIONAL COOPERATIVE FREIGHT RESEARCH PROGRAM

America's freight transportation system makes critical contributions to the nation's economy, security, and quality of life. The freight transportation system in the United States is a complex, decentralized, and dynamic network of private and public entities, involving all modes of transportation—trucking, rail, waterways, air, and pipelines. In recent years, the demand for freight transportation service has been increasing fueled by growth in international trade; however, bottlenecks or congestion points in the system are exposing the inadequacies of current infrastructure and operations to meet the growing demand for freight. Strategic operational and investment decisions by governments at all levels will be necessary to maintain freight system performance, and will in turn require sound technical guidance based on research.

The National Cooperative Freight Research Program (NCFRP) is a cooperative research program sponsored by the Research and Innovative Technology Administration (RITA) and administered by the Transportation Research Board (TRB). The program was authorized in 2005 with the passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). On September 6, 2006, a contract to begin work was executed between RITA and The National Academies. The NCFRP will carry out applied research on problems facing the freight industry that are not being adequately addressed by existing research programs.

Program guidance is provided by an Oversight Committee comprised of a representative cross section of freight stakeholders appointed by the National Research Council of The National Academies. The NCFRP Oversight Committee meets annually to formulate the research program by identifying the highest priority projects and defining funding levels and expected products. Research problem statements recommending research needs for consideration by the Oversight Committee are solicited annually, but may be submitted to TRB at any time. Each selected project is assigned to a panel, appointed by TRB, which provides technical guidance and counsel throughout the life of the project. Heavy emphasis is placed on including members representing the intended users of the research products.

The NCFRP will produce a series of research reports and other products such as guidebooks for practitioners. Primary emphasis will be placed on disseminating NCFRP results to the intended end-users of the research: freight shippers and carriers, service providers, suppliers, and public officials.

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FOREWORD

By **Michael Salamone**

Staff Officer

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NCFRP Report 1: Public and Private Sector Interdependence in Freight Transportation Markets is a primer into the complex relationships between public sector and private sector stakeholders in the freight transportation industry. The report introduces the reader to the freight industry through the use of examples, case studies, and a broad-based presentation of the mutually dependent issues facing public and private investment decision makers. This report will be most useful to public agency decision makers who may not have a background in freight yet are involved in freight planning issues. In particular, the report will describe differences between the public and private sector in freight transportation, as well as discuss approaches to overcome them.

Decisions about the future of the U.S. freight transportation system should be based upon a thorough understanding of freight markets, trends, and the relationships between public and private sector organizations. There is a perception that the public sector and private sector are two distinct cultures and possess different socioeconomic decision drivers. This report intends to shed light upon each of these perspectives so that both can improve communication and freight policy planning.

Fundamentally, investment decisions affecting the future U.S. freight transportation system should be based on an understanding of the market, a clear vision of trends, and a thoughtful awareness of the relationships that exist between public investment decisions and private investment decisions. This report intends to show readers from both sectors that there are real differences in criteria when making important investment decisions and even in how the other sector conducts its “due diligence” or fact-finding investigation prior to making decisions. These differences are often unrecognized by the other sector, and one sector’s response to decisions made by the other may puzzle or confuse. This report provides information on areas where these two groups have worked well.

Under NCFRP Project 1, the research team was asked to investigate and report on current practice and accumulated knowledge of the investment decision interdependencies shared by the public and private sectors. Through a structured workshop discussion, the research team and project panel heard disparate perspectives from each sector on common issues facing the freight industry, as a whole. This valuable step helped shape the presentation of the research results, adding value, utility, and significance.

This primer was prepared by a research team led by IHS Global Insight, with Cambridge Systematics, Inc., the American Transportation Research Institute (ATRI), and Atherton, Mease & Co., as subcontractors.



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Public and Private Sector Interdependence in Freight Transportation Markets

This primer is intended to provide a basic understanding of private sector decision making and the interdependence between public and private sector decision making in freight transportation. It is intended primarily for employees of public agencies who have responsibility for transportation programs, planning, and policy that includes freight transportation. This primer is for the public sector to better anticipate private sector responses to public sector decisions, so that the public sector can better formulate policies that affect private behavior, and so that the public sector can better communicate with their private sector freight transportation partners.

This primer contains three sections:

Section 1 provides a description of the importance of freight to the economy. The roles of trade and freight transportation in creating jobs and consumer benefits are described. Public and private cooperation is essential for the smooth movement of goods along the freight transportation system and for the many jobs in the United States that depend on this movement of goods. The projected growth in freight volumes will pose challenges for the U.S. transportation network and for public officials.

Section 2 provides information on the characteristics of decision-making processes from both public and private sector perspectives. The roles of the private and public sectors in freight transportation, as well as the interdependency between the public and private sectors are introduced. Both the diverging and the common interests of the two sectors are explained. Areas where the two groups have worked well or poorly together are identified.

Section 3 describes initiatives and actions that can be taken to better align public and private decision making. Despite diverging interests between the two sectors, public officials can take actions to improve public and private cooperation by improving communication and education, by benchmarking progress, and by pursuing financial partnerships with private entities.

Four appendices are included:

1. A glossary of terms and definitions,
2. Frequently asked questions,
3. Reference resources, and
4. Case studies to illustrate public-private relationships.



SECTION 1

U.S. Economy Depends on Freight Transportation

Introduction to the Freight Transportation Industry

- Every product purchased must be transported.
- The nation's freight system faces increasing challenges.
- These challenges involve both the public and private sectors and the decisions they make.
- Interests and priorities in decision making in the public and private sectors are not always aligned, leading to inefficiencies in meeting the country's freight transportation needs.
- However, public sector officials can take concrete steps to increase public and private cooperation.
- If the United States does not fully meet its demand for the efficient movement of goods, the consequences will include lost jobs and a lower standard of living.

Free Flow of Goods Essential to Economic Competitiveness

The freight transportation and logistics industry is of growing importance to the U.S. economy. As the U.S. economy is increasingly linked to the economies of other countries, supply chain and transportation networks become more complex and more critical to commerce and to workers whose jobs depend on these linkages.

In the United States, the transportation and supply management industry is complex, containing public sector elements such as the road network and waterways and private sector elements such as freight railroads, trucking companies, and private warehouses. All of these elements are interdependent.

The growing role of goods movement in the U.S. economy also reflects profound changes at work across the nation where the agricultural and manufacturing economy of the twentieth century has evolved, changing the mix of jobs held by the U.S. workforce. Services are now the fastest-growing portion of the economy. The freight transportation and logistics sector has the second fastest rate of growth and supports the integration of all other sectors.

The efficient movement of goods is essential to the competitiveness of the U.S. economy. A competitive economy needs efficient freight services to move goods reliably at minimum cost. Adequate freight infrastructure supports continued growth in export-related jobs as well as provides affordable consumer products. It also supports export manufacturing and agriculture jobs by making producers more competitive with those in foreign countries.

Without an adequate freight system, the prices of all goods we consume will increase, reducing what we can afford to buy and lowering our standard of living.

Freight transportation is fundamental to our way of life.

Table 1. Growth of freight dependent sectors of the U.S. economy.
(Value in \$Billions, Compound Average Annual Growth Rate 1997–2007)

	Agriculture	Manufacturing	Mining	Retail	Wholesale	Construction	Total
1997	\$86.6	\$1,205.4	\$124.3	\$569.9	\$506.8	\$406.6	\$2,899.6
2007	\$122.1	\$1,618.6	\$111.4	\$887.5	\$698.0	\$356.4	\$3,834.4
CAGR %	3.5%	3.0%	-1.1%	4.5%	3.3%	-1.3%	2.8%

Source: IHS Global Insight, Bureau of Economic Analysis.

Users and Beneficiaries of Freight Transportation

Freight transportation is so important to the U.S. economy because any industry that produces or sells transportable goods relies on the freight transportation and logistics sector. Together, the industries that rely on freight transportation to function make up a significant portion of the U.S. economy. These industries account for over one-third of value-added and over three-quarters of the revenue generated in the U.S. economy¹. A non-exhaustive list of sectors in Table 1 shows that the industries that rely on freight transportation have grown an average of 2.8% per year for the last 10 years. These sectors generate more than 3.8 trillion dollars of economic value and all except mining and construction are growing.

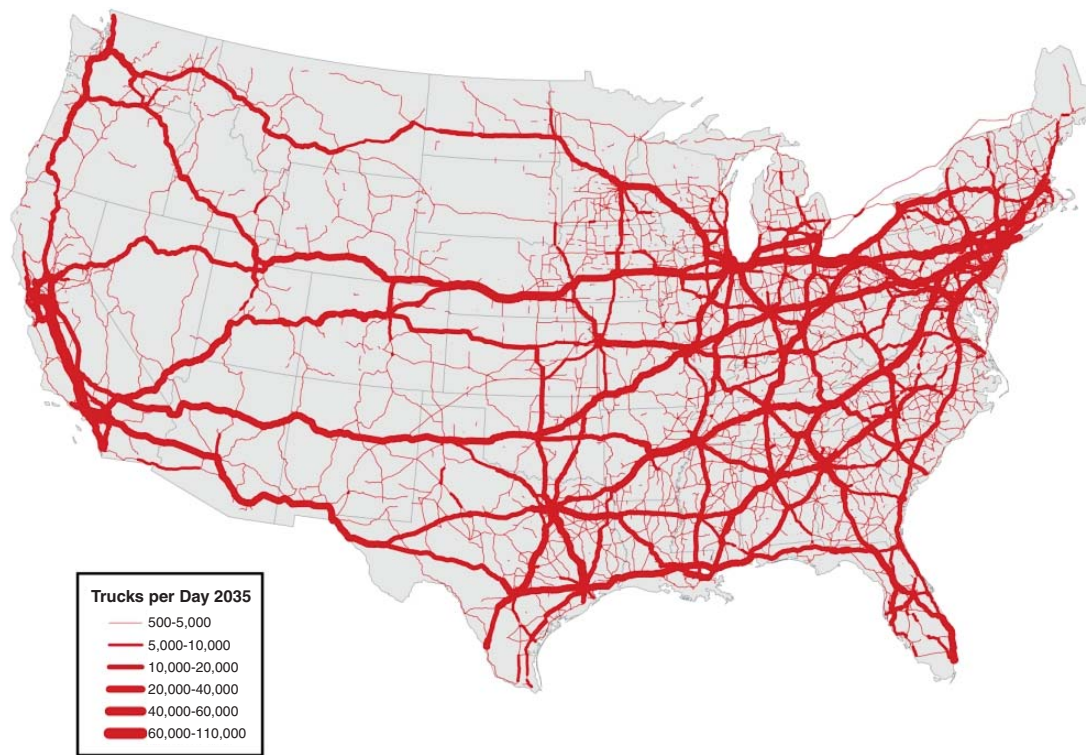
Trends Behind Fast Growth in Freight Transportation

1. Freight volumes increase with the increased consumption accompanying economic and population growth
2. Manufacturing output continues to grow, despite a decline in manufacturing employment
3. Freight activity increases with the efficiency of America's just-in-time inventory and supply strategies
4. International trade stimulates growing import and export volumes

Globalization, Growth in Trade, and Increases in the Volume of Goods Shipped on U.S. Freight Infrastructure

U.S. freight infrastructure is expected to face many challenges as the volume of goods transported on it increases due to both domestic growth and growth in international trade. Long-term freight demand growth is a reflection of a healthy, expanding economy. Because goods-related economic activity in agriculture, manufacturing, construction, oil and gas drilling, mining, and wholesale and retail trade is so significant to the economy, accommodating the increased traffic demand is in the national interest. Both the public and private sectors should work together to ensure that U.S. infrastructure and transportation policy will be able to efficiently transport the predicted increase in volumes.

¹ Value-added is the contribution of each sector to the total revenue it is paid for what it sells. Total revenue across sectors double counts the net contributions of each sector as products move from being a collection of raw material inputs through manufacturing/assembly to wholesale distribution and ultimately to final retail sale. Value-added is the measure preferred by economists. These calculations are based on U.S. GDP in 2007.



Source: IHS Global Insight TRANSEARCH Insight Truck Traffic Forecast 2008.

Figure 1. Growth in freight demand nationwide—forecast of daily truck traffic 2035.

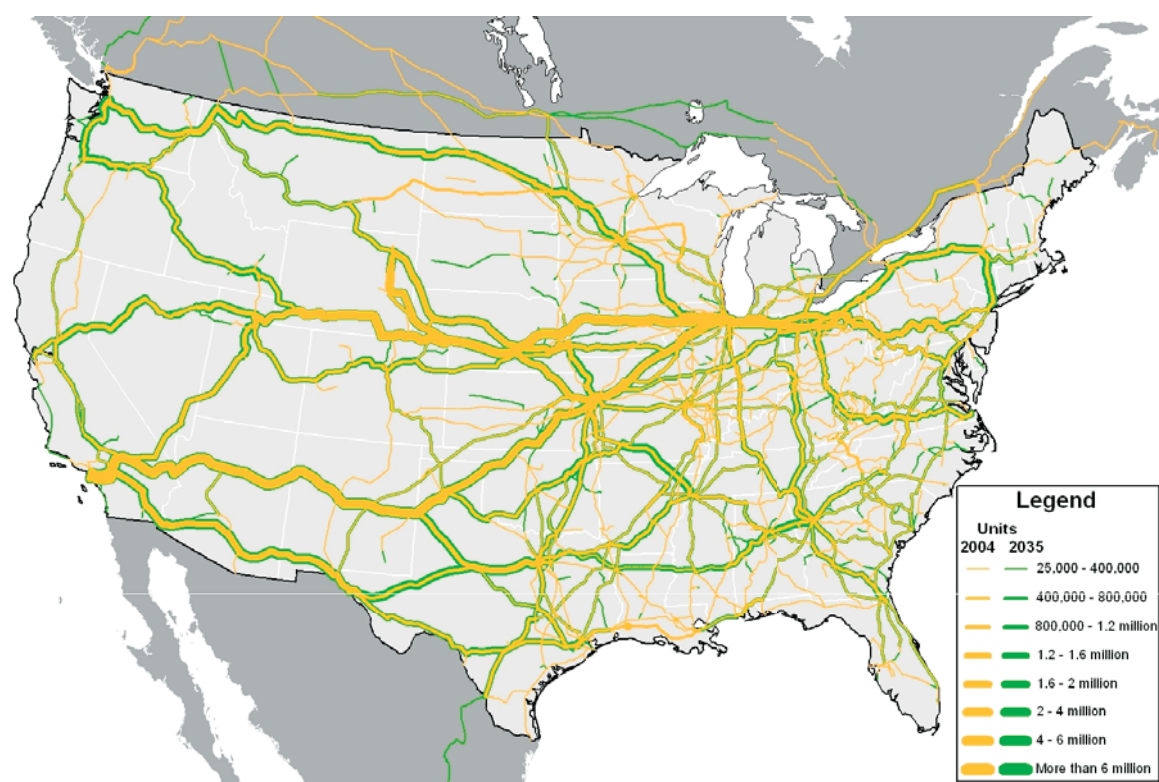
Freight Volumes Are Forecast to Continue to Increase

Population, economic growth, and increasing trade will result in additional freight shipments. Freight volumes are projected to nearly double from current levels by 2035. As U.S. supply chains become more global and service-sensitive in scope, the overall demand for U.S. freight transportation will increase 90% between 2004 and 2035. This growth represents the research team's forecast for U.S. freight transportation (i.e., U.S. domestic freight transport and the U.S. portion of imports and exports) increasing from 15 billion tons in 2004 to 29 billion tons in 2035². Measured in ton-miles, growth is even greater, from 6.1 trillion ton-miles in 2004 to 11.7 trillion ton-miles in 2035, or a 92% increase.

The growth in freight traffic will affect all modes of transportation. As Figures 1 and 2 show, the amount of freight transported by rail will likewise increase, although not to the same extent as by truck. The following graph (Figure 3) shows the projected increase in the volume of goods moved by water. Waterborne shipments of goods moving along domestic waterways including coasts, lakes, and rivers, are projected to increase from about 870 million short-tons in 2007 to about 1,080 million short-tons by 2035, or by 24%. Shipments of petroleum products and other liquids through the U.S. pipeline network are projected to increase as well, although slowly

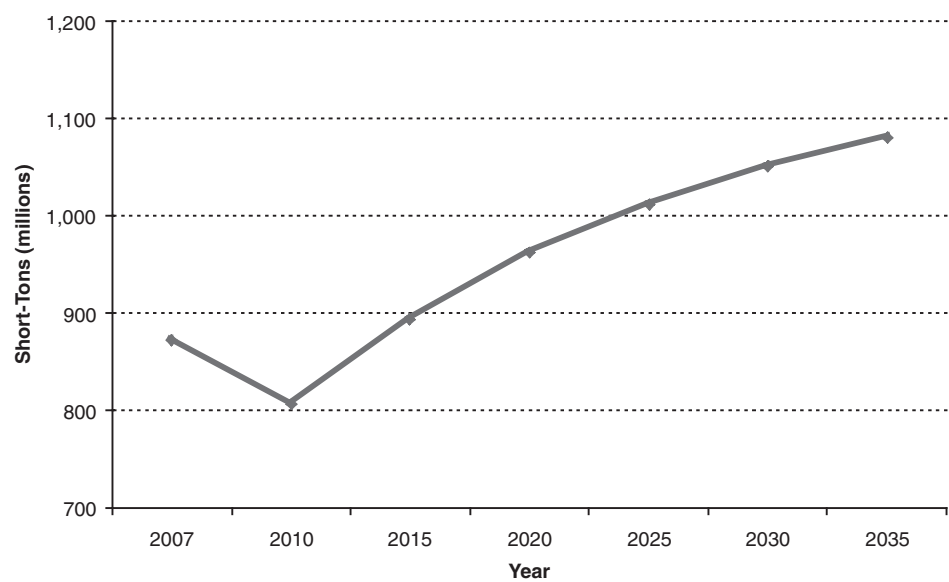
National Freight
Truck Traffic Demand
Doubles by 2035

² Forecast of Global Insight's TRANSEARCH freight flow database. This database includes most movements of raw materials and finished goods to, from, and within the United States. The database excludes small packages, some bulk commodities, and municipal wastes, as well as products transiting the United States. At the total level, there is also some double counting of tons (but not ton miles) of goods that use multiple modes of transport or are reshipped.



Source: IHS Global Insight TRANSEARCH Insight 2035 Rail Traffic Forecast.

Figure 2. Growth in freight demand nationwide—forecast of daily rail traffic 2035.



Note: Includes all domestic and foreign cargo shipped on domestic waterways including inland waterways, lakewise, and coastwise. Excludes foreign cargo entering or exiting ports but transported to/from ports by modes other than water.
Source: IHS Global Insight TRANSEARCH database.

Figure 3. Growth in freight demand nationwide—total waterborne traffic 2007–2035.

because pipeline capacity is difficult to add given right-of-way acquisition challenges and requirements for advance regulatory approval processes.

The growth in the movement of goods will be felt throughout the country. Even rural regions of the country with slow population and economic growth will see substantial freight traffic increases where there are highway, rail, or waterway routes that connect faster growing regions elsewhere.

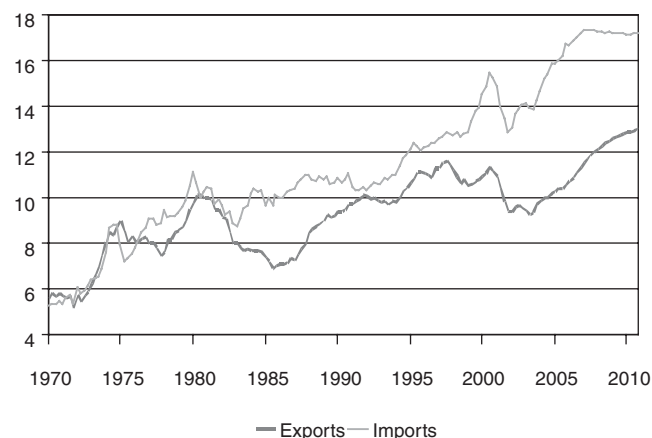
Rapid Growth in International Trade

Over the past 25 years, international trade volumes have increased even more rapidly than the volumes of domestic freight. As a result, the share of imports and exports out of the total amount of goods being transported over U.S. infrastructure has doubled (see Figure 4). Trade-related freight is projected to continue to increase in the long term as a share of all freight and in its relative importance to the economy.

Shipping domestic goods within the country usually involves moving goods a shorter distance than when goods move across the border or through ports to overseas destinations. Consequently, increases in trade-related freight transportation mean that the distances goods are shipped are increasing as well. Longer shipping distances imply the use of a greater proportion of the transportation network for each product moved. This added use of the system is an extra demand, adding to the pressure on freight system capacity.

The nation's top 10 freight gateways for imported and exported goods—measured by value of trade—are spread around the country's borders and serve several different modes of transportation (see Figure 5).

Among the top 10 are 3 airports (JFK, LAX, and Chicago), reflecting the high value of air cargo in international trade; 3 NAFTA border crossings (Detroit, Michigan; Laredo, Texas; and Buffalo-Niagara Falls, New York); and 4 marine ports (Los Angeles, Long Beach, New York/New Jersey, and Houston). These gateways do not all serve imports and exports equally. The seaports handle much more import value than export value, while the airports and most land border crossings are more equally split between imports and exports. Much of the imported cargo that arrives at ports is then transported around the country in containers or as bulk cargo by rail and by truck.



Note: Share of U.S. real GDP in percent; forecasts after 2007
Source: IHS Global Insight, Inc.

Figure 4. International trade accounts for an increasing share of U.S. GDP.

RANK	PORT	MODE	\$ BILLIONS
1	JFK International Airport, NY	Air	134.9
2	Los Angeles, CA	Vessel	134.3
3	Detroit, MI	Land	130.5
4	New York, NY	Vessel	130.4
5	Long Beach, CA	Vessel	124.6
6	Laredo, TX	Land	93.7
7	Houston, TX	Vessel	86.1
8	Chicago, IL	Air	73.4
9	L.A. International Airport, CA	Air	72.9
10	Buffalo-Niagara Falls, NY	Land	70.5

International Trade Gateways Serve the Nation



These top 10 gateways account
for over 50% of the value of
U.S. goods trade.

Figure 5. Top 10 U.S. trade gateways, in value.

The most significant characteristic of most of these top international trade gateways is that they are located in already congested urban areas, where the pressures on the local transportation system capacity are high even without international trade. This indicates that the challenges of handling growing international trade will be concentrated in areas where adding more capacity is difficult. Bottlenecks at gateways will also result in goods taking a longer time to arrive at inland destinations. (See Table 2.)

Globalization Affects the Entire Country

International trade touches every state and region in the United States. As Figures 6 and 7 demonstrate, almost every U.S. county is an importer and/or an exporter of goods. The efficiency of global supply chains affects the costs of goods and our standard of living across the country.

Globalization of trade extends to goods moving across the United States. Many inland locations are important for handling traded goods.

Supply Chains Are More Complex and Sophisticated

Today, goods move along complex supply chains that connect our economy. Supply chains provide raw commodities for the manufacturing process and ultimately move parts and final goods to warehouses and distribution centers, to retail stores, and to the homes of American consumers.

Supply chains include both the physical movement of goods and the information and financial links to manage and pay for the goods movement. Although there is no government entity identified as an element of a typical supply chain, the public sector has a crucial role in the chain as a provider of transport infrastructure and regulator of both freight carriers and freight shipping industries.

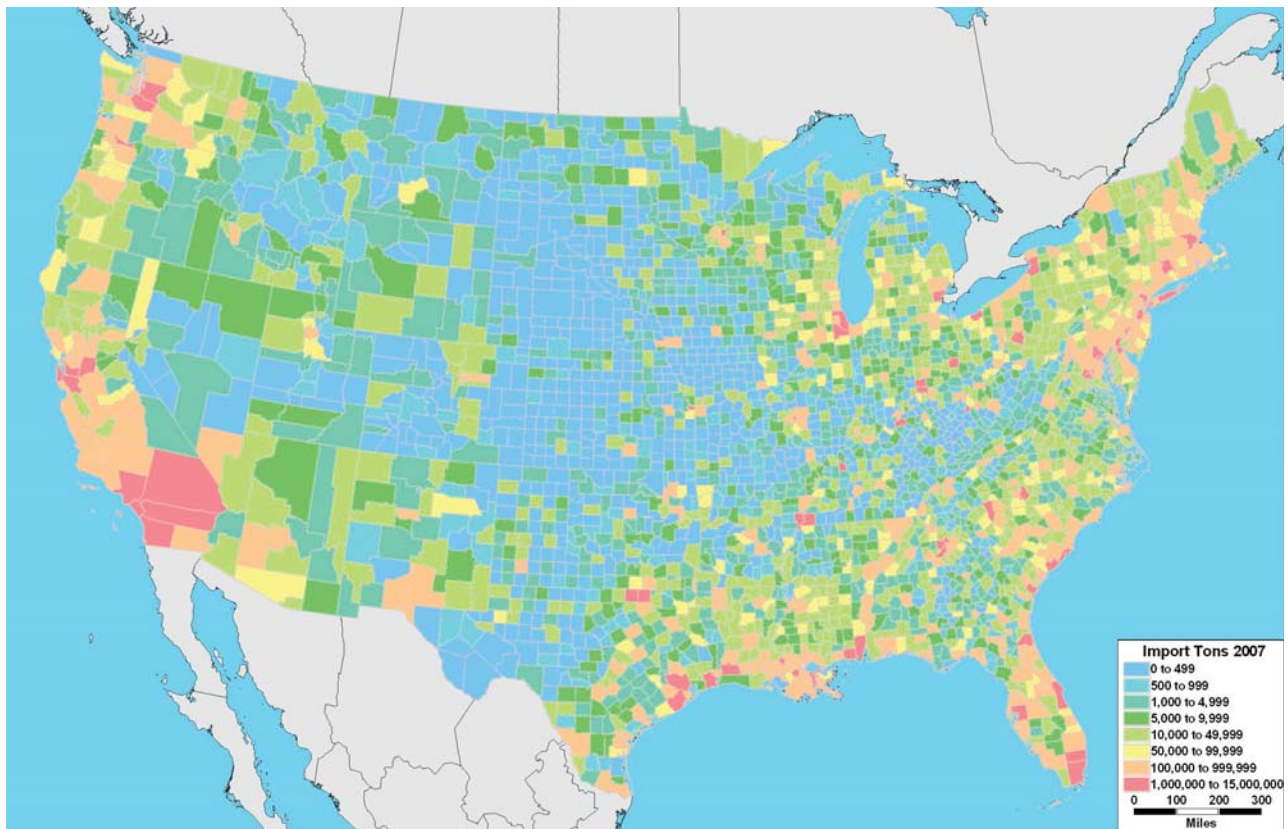
Table 2. Top 10 U.S. ports by TEUs¹ 2007.

U.S. Custom Ports	TEUs
Los Angeles, CA	5,700,231
Long Beach, CA	4,961,416
New York, NY	3,893,491
Savannah, GA	2,017,255
Norfolk, VA	1,568,112
Oakland, CA	1,422,585
Charleston, SC	1,400,806
Houston, TX	1,393,554
Seattle, WA	1,276,508
Tacoma, WA	1,132,961

¹ Twenty-foot equivalent units.

Source: U.S. Maritime Administration.

Trade issues intersect with public policy in states and regions. Become aware of goods sources and flows in the community.



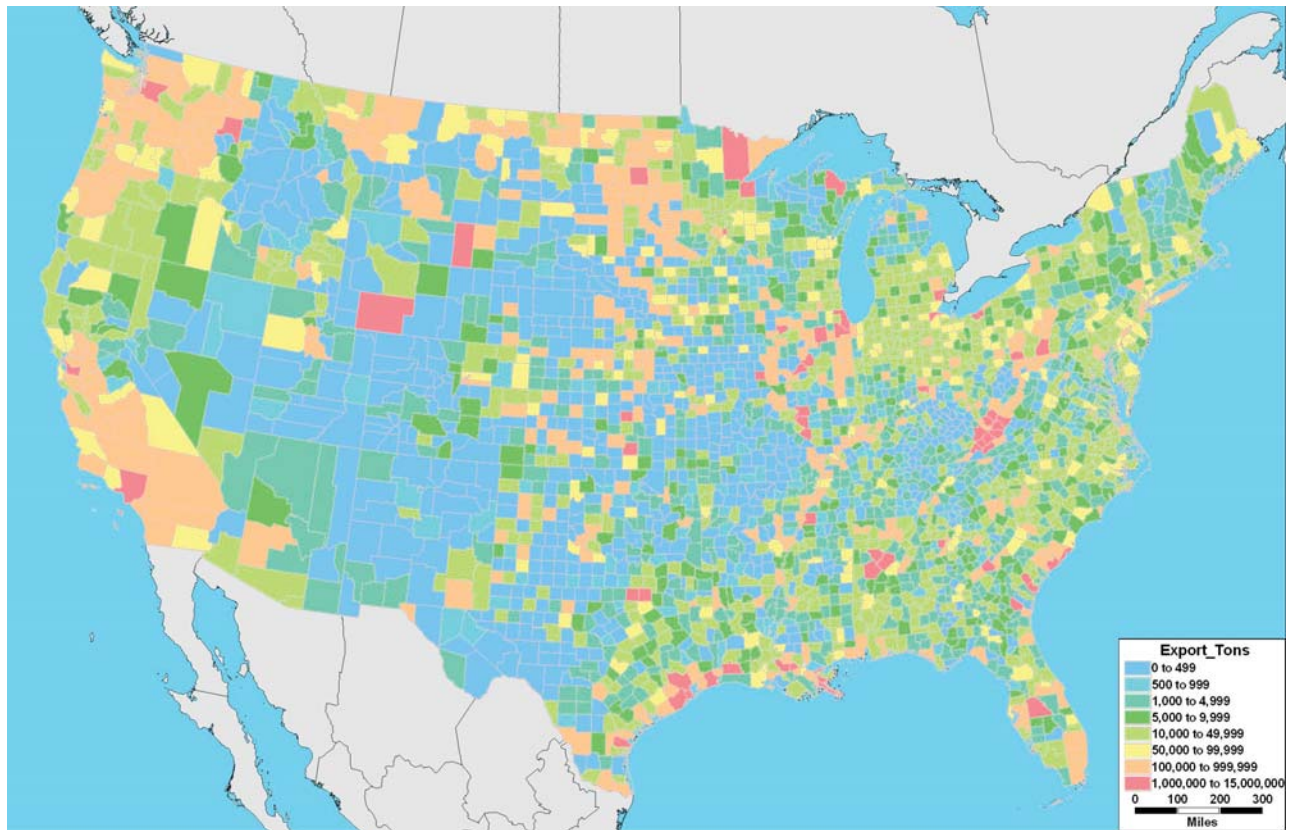
Source: IHS Global Insight U.S. Inland Trade Monitor County Destination of Import Tons 2007.

Figure 6. U.S. import tons by county.

Efficient goods movement depends on the capacity and performance of both the public and private portions of the freight transportation system. Coinciding with the growth in freight volume has been the increasing interdependency between the public and private sectors in providing essential freight system services to the population. As freight transportation networks become more sensitive to performance, the capacity and conditions of the publicly provided elements of the system become more critical to the functioning of the private sector's supply chains. With excess capacity on public portions of the system used up and increasing security and environmental regulations, the public sector-related constraints on freight have become more important for the private sector's operations and planning.

Globalization has meant increasing trade in more types of goods and adding complexity and distance to the transportation of goods to market. Supply chains have thus evolved into far reaching and intertwined supply networks. U.S. producers are increasingly able to sell more to overseas customers. U.S. consumers are able to enjoy a greater variety of products at lower prices through imports.

The complexity of supply chains and associated freight transportation services is also growing. Sophisticated technology has allowed global supply chains to be linked and managed more effectively. At the same time, the purposes of U.S. freight system facilities are changing to play more specialized roles within distribution networks. The variety of approaches to warehouse management and distribution center use is increasing, with companies tailoring their facilities to match the specific product mix and market geography served by each location. Control is



Source: IHS Global Insight U.S. Inland Trade Monitor County Origin of Export Tons 2007.

Figure 7. U.S. export tons by county.

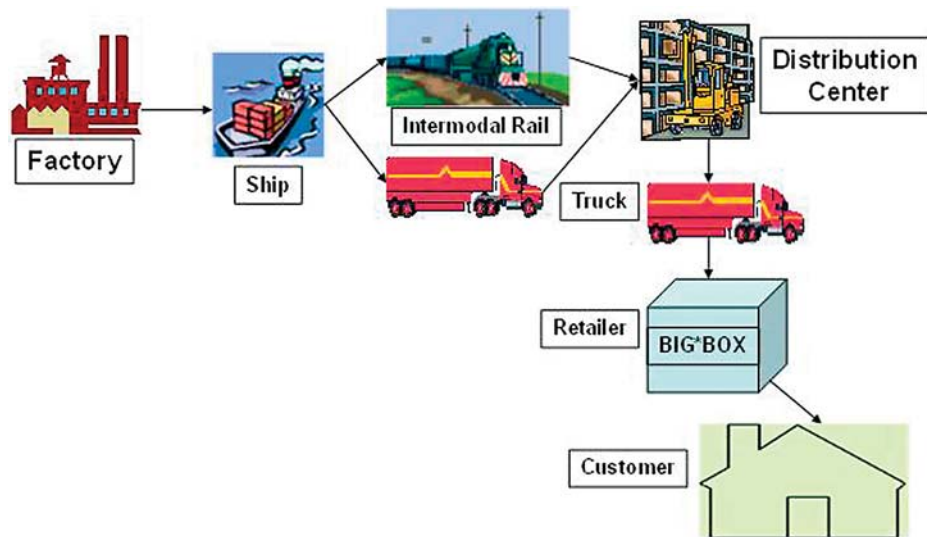


Figure 8. Global intermodal supply chains involve many businesses and transportation providers.

increasingly outsourced to third parties who sometimes combine the goods of different companies to achieve economies of scale across interlaced freight networks. Decision-making control can be far away from the physical locations that make up a network. Where decisions are made continues to evolve over time. These shifts are changing local and regional influence over the freight transportation system.

Purpose of Facilities Is Changing

In the past, freight facilities such as terminals and warehouses were less sophisticated than today. Modern-day logistics practices have transformed the function and purposes of freight facilities. Freight facilities are now much more automated and computerized to meet the needs of just-in-time delivery practices for many manufacturers. Other facilities are organized for storing goods whose final destination is not decided until as late as possible, governed by market demand.

The high-volume supply chains of large retailers that extend to overseas manufacturers have facility requirements that permit segmentation of freight flows along geographic lines and by the product life cycle of the individual products. Because consumer products can vary greatly in how long they are viable as products in the market place (contrast the product life of digital cameras with that of graphite pencils), retailers of both have a financial incentive to treat the products differently in their supply chains and distribution centers.



Photo courtesy of Cargo Agencies
Diplomat Kft.

Figure 9. Distribution center.

Many warehouses are now more commonly referred to as distribution centers (see Figure 9). The emphasis of these facilities is more oriented toward being an intermediary in the movement of the goods than in the storage of goods. The operational goal for many of these facilities is to increase the velocity of goods moving through them rather than manage product storage.

Distribution center networks are modified on a regular basis by companies trying to minimize costs through optimization of space requirements and facility locations. They try to achieve a balance between focusing on their own supply networks versus focusing on the need to serve their customers. Distribution center locations and sizing decisions are specific to the company's own business network, which is made up of suppliers, stores, factories, and/or customer locations with which it does business. Consequently, the market geography served by a distribution center can be as large as the entire continent or as small as a portion of one metropolitan area, depending on the size, density, velocity, and other operational characteristics of the shipper's business.

Many freight facilities and distribution centers are used by multiple companies. Involvement of specialty "third-party logistics" companies that manage transportation services on behalf of others has increased the shared use of facilities. The cost savings from economies of scale of larger shared facilities benefits shippers and their customers, but it increases the complexity of the freight networks serving each facility.

Manufacturing and freight distribution facilities located away from prominent public view have far reaching impacts on U.S. consumers, jobs, industry, and the transportation network.

Most Freight Activity Happens Outside of Public View

Although freight transportation and supply chains affect every community, most freight activity occurs outside of the public view. Every urban area has extensive freight transportation activity. Large-scale freight activity tends to be concentrated in industrialized sections of urban areas. Freight deliveries are concentrated at night and early morning, to minimize exposure to congestion and to have goods ready for sale on shelves during regular business hours.

The following three examples illustrate freight handling that is largely unnoticed by the public.

1. **Port of Wilmington, Delaware.** This Atlantic seaport on the Delaware River is the largest import port for fresh fruit, bananas, and juice concentrate in North America. It is located in

an industrial area close to Interstate 95, hardly noticed by the thousands of motorists who pass by the port every day. Because the port is located away from downtown Wilmington, even local residents do not necessarily think of their city as an important port city (see Figure 10).

2. **CenterPoint Intermodal Center, Joliet, Illinois.** The public–private redevelopment of the former Joliet Arsenal outside Chicago into a major intermodal rail and distribution center relieved pressure on downtown Chicago rail yards. This facility combines a rail yard that handles cargo containers from the West Coast with distribution centers and warehouses that store goods. These goods are then distributed by truck to stores throughout the Midwest. The facility is about 1 mile from heavily used roads and therefore is not seen by most of the population of the greater Chicago region (see Figure 11).

This facility includes distribution centers and warehouses for several companies that use it to supply a diverse set of customers. Customers served by the location include businesses that buy goods for use in their own operations as well as retailers that buy a large volume of manufactured imports for resale to end consumers.

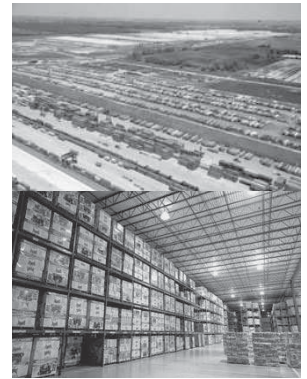
3. **Montgomery, Alabama, Auto Plant.** The opening of a new Hyundai automobile assembly plant in Montgomery, Alabama, has created a demand for inbound shipments of automotive components and outbound shipments of finished vehicles. This large plant is located in a previously undeveloped area just east of Interstate 65 and adjacent to CSX railroad, both of which are used for freight shipments to and from this facility (see Figure 12).

A \$1.4 billion investment by Hyundai funded the construction of the engine manufacturing and automobile assembly plant. The plant receives parts from more than 70 suppliers located elsewhere in North America in order to produce up to 300,000 vehicles per year. This plant has resulted in increased trade through the port of Mobile, Alabama, as well as more demand for rail and trucks to move auto parts and finished vehicles.



Photo courtesy of the Port of Wilmington, Delaware.

Figure 10. Port of Wilmington, Delaware.



Photos courtesy of CenterPoint Properties.

Figure 11. CenterPoint Intermodal Center, Joliet, Illinois.

Operation of Freight Systems

The performance of the U.S. freight transportation system is remarkably good given the scale and volume of what is physically moving every day. In spite of increasing highway congestion, so far the entire system has continued to operate smoothly without much public notice. There are exceptions, for example, when the freight system is brought to the attention of the public by the media during infrequent incidents of severe disruptions due to weather events or operational or infrastructure failures. However, there are a few areas, such as in Southern California, where the local environmental and traffic impacts of freight activity are so significant they have drawn ongoing attention from the public.

Though direct comparisons are difficult, U.S. freight efficiency is believed to compare favorably with that of other countries as a result of prior investments in national freight transportation infrastructure and the economies of scale achievable in a market the size of the United States. Though not true in every case, it is generally less costly to move a unit of goods within the United States than it is to move a unit of goods over the same distance in other countries.



Photo courtesy of Hyundai.

Figure 12. Hyundai Motor Manufacturing Plant, Montgomery, Alabama.

The good performance of the freight sector has been possible because the system ultimately has some flexibility, and, importantly, the portions of the nation's infrastructure that are already severely capacity-constrained are still limited. With a few exceptions, this smooth functioning has been the status quo. This performance has been achieved in the era following the economic deregulation of trucking and rail at the beginning of the 1980s. Prices charged by carriers were driven down by competition and services offered could be more easily created to match customer needs. This has led to complacency about freight system performance that may put decisions to take needed action to forestall future problems at risk.

Consequences for Public Sector Officials

Given the growing challenge to public sector officials in upholding the public's role in America's freight system, it is important to understand where and how these officials can have an impact on this crucial part of the economy. Part of this understanding involves learning about the types of decisions that affect the freight industry, the role of the private sector in freight transportation, and how to work together with the private sector to meet the future challenges facing the freight system.

Freight Transportation Decisions and Considerations

Decisions That Affect Freight Transport and Which Sector Makes the Decisions

There are many areas of decision making that affect the freight transportation industry. Decisions must be made regarding infrastructure planning and maintenance; economic, safety, security and environmental regulations; operations of equipment and personnel; mode of shipment; choice of carrier; and other operations and investments.

Different Types of Decisions

The public sector is responsible for planning, owning, and maintaining infrastructure. The one exception is railways, which are privately owned and operated. The public sector also creates the economic environment in which private entities operate by issuing various regulations. The private sector, in turn, largely makes operating decisions as well as company-specific investment decisions. Which sector leads is a function of ownership, incentives, and organizational objectives.

Decision Type	Typical Lead Sector
(1) Policy and Regulation	Public sector led
(2) Technology	Private sector led
(3) Infrastructure	Public sector led
(4) Operations/Maintenance	Public sector/private sector shared
(5) Non-transportation (behavioral)	Public sector led

Public policy making is by definition a public function, though the private sector has incentive to influence some policies to its advantage. The division of policy making across national, state, regional, and local agencies is ultimately determined by the political process. The multiple levels of policy making can add to the challenges faced by both public and private sector decision makers.

Technology in transportation is typically led by the private sector, which invests to develop it, adopt it, and expand markets for it worldwide. Government regulation or funding sometimes influences the development and adoption of technology by the private sector.

Infrastructure decisions, with the exception of most of the freight rail system, are made by the public sector, as the owner and principal funding source. Innovation in infrastructure finance and operations by the public sector has drawn more private participation but the overall framework is still led by the public sector as the ultimate owner.

Operations and maintenance of infrastructure is chiefly performed by the public sector (again with the exception of freight railroads) but the private sector leads decisions affecting the operations and maintenance of equipment, subject to government regulation.

Non-transportation decisions affecting the behavior of freight system users, such as environmental or land use regulations, are public sector led.

Public Sector Decision Making

Public sector freight decision making requires the consideration of many factors that can influence or constrain the course of action. The factors that affect public decision making reflect the fact that there are many competing demands on public agencies for attention and funding.

Policy, planning, and regulatory decisions made in the public sector today have important consequences for the freight system tomorrow. The public sector also influences freight system operating decisions related to highways, waterways, and airways directly, and other modes through the regulatory impacts on operating decisions made by private firms.

Drivers Affecting Public Sector Decision Making

Critical freight decisions that have great impact on the private sector include those involving safety, the environment, land use, economic concentration within the industry, and the operation of the system.

Investment and Financing: Taxes, Fees. Financing public sector programs and projects is always a primary concern of public officials, and almost all decisions have a financial aspect to them. Obtaining funding required for public sector investment is a recurring problem for public officials. Sources of public revenue include local, state, and federal taxes and fees assessed on companies and system users. The ability to collect revenue and the behavior influenced by assessing fees are fundamental in influencing public sector decisions. Taxes and fees also influence private sector decision making, which is therefore a consideration in public sector financing decisions.

Economic Regulation. Economic regulation of freight transportation can strongly influence the use of the freight transportation system. Federal and state law gives the public sector great power over the character of the private portions of the freight transportation system.

Providing and Maintaining Infrastructure: Highways, Tracks, Ports, Air. The provision, operation, and maintenance of infrastructure are the most basic of public sector functions with respect to freight transportation. With the exception of most railroad infrastructure, the freight network is largely a result of decisions made by the public sector. The connectivity of the infrastructure system is also almost entirely a result of public sector decisions. The adequacy of capacity and the condition and performance of infrastructure are key to public freight transportation decisions.

Land Use: Facility Location and Access. The availability, location, and access to land for freight facilities are critical to the freight system's long-term ability to adapt to changes in demand. Local public agency control of land use and policy objectives can have significant consequences for transportation decision making. Local land use issues are complicated at times by federal issues such as military base closures or national initiatives like the "rails-to-trails" right-of-way preservation program.³

Environmental Issues. The public sector employs a combination of regulations, mitigation programs, fees, and taxes to protect the environment. All these rules and programs affect freight

³ A federal program to encourage the banking of abandoned rail right-of-way through conversion to trail use.

transportation decision making and planning. The National Environmental Policy Act and other federal and state laws have significant impacts on decisions about the operation and expansion of the freight transportation system.

Safety. Public sector protection of worker and traveler safety extends from construction and operation of transportation infrastructure to the regulation of the manufacture and sale of equipment used for freight transportation. There are financial and operational consequences from government safety regulations. The regulations can even affect the structure of the freight transportation system by influencing the relative cost of operations between modes of transportation.

Operations. Public sector operation and maintenance of infrastructure such as highways serves demands from passengers as well as from freight transportation. Since so much of the infrastructure for freight transportation is shared with passenger transportation, operational and cost assessment considerations unrelated to freight can affect freight transportation decisions. Public sector decisions concerning operations extend beyond the roadway network to airports and waterways.

Jobs and Employment. In the public sector, most political leaders understand the importance of jobs related to trade and transportation but they do not always recognize the importance of freight in protecting jobs in other sectors of the economy. This partial appreciation of the role of freight transportation in the economy has led to decisions that give less attention and support for policy and program development of freight transportation than are warranted by the actual importance of this sector to the economy.

Regulatory Decision Making

Public regulation of freight transportation impacts the system comprehensively. Agencies at different levels affect transportation modes differently. Trucking, the most pervasive mode of transportation, is impacted in more areas by the greatest number of agencies (see Table 3).

Cutting across the various factors affecting decision making are the existence of several different levels of government, each with its own priorities, constituencies, revenues, and budgets. Apart from differences with the private sector, public agencies also frequently must make decisions in the context of conflicts with other jurisdictions.

The U.S. freight industry is subject to regulation across many aspects of the business at federal, state, and local levels.

Conflicts between different levels of government affect decision making and outcomes.

Table 3. Primary government level of responsibility by function and mode.

	Pipeline	Rail	Truck	Inland Water	Deep Sea	Air
Safety	Federal	Federal	Federal	Federal	Federal	Federal
Economic	Federal	Federal	Federal/ State/ Local	Federal	Federal	Federal
Environmental	Federal	Federal/ State	Federal/ State	Federal	Federal	Federal
Land use	Local	Local	Local	Local	Local	Local
Operations	Federal	Federal/ Local	Federal/ State/ Local	Federal	Federal	Federal

Private Sector Decision Making

Private sector decision making for freight is driven by several factors, some of which are more related to the public sector than others. The factors that affect private sector decision making reflect the fact that companies ultimately need to survive in a competitive marketplace, generate a return for their owners, and satisfy their customers, all while operating under the law.

Drivers of Private Sector Decision Making

Market and Shipper Demand. Transportation carriers want to operate where and when their customers want them to be—employing the workers, equipment, and technology to best meet these demands. Investment follows market demand. For example, the implementation of tracking technology is now a requirement for some freight markets.

Financial Performance Metrics. Return on investment (ROI) and other measures of profitability are primary considerations, particularly for publicly traded businesses. Market share and revenue growth are also key performance factors.

Efficient Management of Volumes, Schedules, and Costs. Ground-level operating decisions respond to these tactical management factors.

Regulatory Issues. Compliance with regulations in a way that minimizes costs and disruptions to operations influences other management decisions. An example is the influence of toll rates on the routing of trucks.

Decision-Making Categories

To better understand private sector decision making, it helps to categorize private sector decisions and to group them by type of activity. Among the most important decision categories are investment decisions and operational decisions. Other categories of decisions include those for marketing and technology.

Investment decisions ultimately determine how companies deploy their limited financial resources. They are the key to the long-term survival and success of these businesses. Freight transportation company investments can be made in infrastructure and in operations. The mix of infrastructure and operations investments varies widely by mode of transportation depending on how much of the infrastructure used is provided by the public sector. The best example is to contrast the very high investment in private track network infrastructure by the railroads with the very small truck terminal infrastructure investments by truckload trucking companies who rely heavily on the public highway system infrastructure. Investment decisions are made in the context of public tax policy where higher taxes will usually reduce the level of private investment while tax credits can encourage higher levels of private investment.

Operations (and maintenance) decisions for equipment and facilities are also driven by financial considerations. The time horizon used to make operating decisions is typically shorter than that for investment decisions. Factors such as maintaining system performance and regulatory compliance also influence operating decisions. Costs are generally the most important factor in private sector operating decisions, and private companies are usually very good at assigning costs to every part of their operations.

Private sector decisions can also be classified broadly as tactical or strategic in nature. Tactical decisions are commonly those with short-term impacts, often of an operational nature. Strategic decisions are those made to achieve the longer-term objectives of companies. Financial decisions,

such as investments, are in this category. The difference between these two types of private sector decisions is important to understand because it affects the decision-making timeframe.

Levels of Decision Makers

Within the private sector, there are many levels of freight transportation decisions made every day. Decision making in freight transportation businesses commonly extends down from the Board of Directors and the CEO all the way to the individual equipment operator (e.g., the truck driver or boat captain). Responsibilities and authority for decisions are ideally optimized for the most efficient operation and cost minimization.

Immediate operational decisions are those delegated as close as possible to the transportation activity of individual equipment operators. As the timeframe, scale, and consequences of decisions increase, the decisions are made at a higher level in the management structure.

Different types of public and private decisions are made at different points in time and at different points in the management hierarchy (see Table 4).

The private sector's interaction with the public sector for each type of decision follows the pattern of bigger-consequence decisions. They are made at a higher level in the management structure of the organization.

Intersection of the Public and Private Sectors

Public and private decisions relating to freight transportation overlap in many areas. At times, the interest and responsibilities converge and facilitate cooperation. However, at other times, the responsibilities and interests can diverge, creating conflicts and inefficiencies. This section will further explore the differences and the commonalities between private and public decision

Table 4. Timeframe and hierarchy of decision making in each sector.

Timing	Responsibility	Mode	Decision Example	Public Interaction
Short-Term: Hourly, Daily	Drivers, Local Terminal Staff	Primarily Truck	Congestion, Avoidance of Traffic, Construction, Events, Physical Access to Customer	Traffic Centers, Local Planning and Scheduling, Construction Permits and Scheduling
Mid-Term: Weekly, Monthly, Annual	Local, Regional, Some Corporate	All Modes	Repeat Routing and Scheduling, Fuel Routing, Technology Use, Customer Access Hours	Local, State, Federal, Planning, Operations, Regulatory
Longer Term: Annual 3–5 Years	Corporate	All Modes	Facility Location, Fleet Size, Schedules	Local, State, Federal, Planning, Policy, Regulatory
Very Long Term: Annual Beyond 3–5 Years	Corporate	All Modes	Equipment Purchases, Market Entry, Facility Ownership	Local, State, Federal, Planning, Policy, Regulatory

making. Steps that can be taken by public officials to further facilitate cooperation will be discussed in Section 3.

Overlapping Roles and Responsibilities

Public and private sector decision processes intersect at many critical points in the nation's freight system. The intersection of decision making reflects the joint ownership and provision of freight transportation services in the country as well as in areas such as safety regulations. The roles played by the public and private sectors vary by mode of transportation though the public sector always sets the regulatory environment and the private sector always operates the freight equipment (see Table 5).

Comparison of Decision-Making Drivers and Processes

A comparison of freight decision-making issues between the public and private sectors reveals differences in the drivers of decisions between the two sectors. A list of areas for improvement between the two sectors can be derived directly from the checklist in Table 6.

Given the differing emphasis on decision making between the two sectors, the current gaps between the decision-making processes can be better understood.

There are significant differences between the private and public sectors with respect to freight transportation that can make the relationships between the two sectors difficult. There is a divergence in attitudes, processes, scale, geography, timing, and objectives that affect how decisions are made. This is due to fundamentally different roles and responsibilities and differing objectives between the two sectors. This situation leads to conflicts in working toward the common purpose of improved freight transportation for the nation (see Table 7).

The scale of investments by the private sector is limited to the resources companies can assemble, either individually or collectively, but can span political boundaries and geographies in search of markets. Government agencies can look more broadly at investments at a state or national level that benefit all participants within the economy, but are generally limited geographically to political boundaries.

Table 5. Sector responsibility or ownership by function and mode.

	Pipeline	Rail	Truck	Inland Water	Deep Sea ¹	Air
Infrastructure – Road/Rail “Line Haul” Network	Private	Private	Public	Public	None/ Public ²	None/ Public ³
Infrastructure – Terminals	Private	Private	Private	Public/ Private ⁴	Public/ Private ⁴	Public/ Private ⁴
Equipment/ Operations	Private	Private	Private	Private	Private	Private
Regulatory Environment	Public	Public	Public	Public	Public	Public

¹ Also applies to U.S. Coastal and Great Lakes shipping.

² Public component includes aids to navigation, channel maintenance, and safety.

³ Public component includes the air traffic control network.

⁴ Frequently represents privately developed terminals on publicly owned property.

Source: Association of American Railroads 2008.

Table 6. Comparison of freight decision-making issues.

Freight Decision Issue	Driver of Public Decisions	Driver of Private Decisions
Land use planning/zoning that accommodates ports, rail yards, and distribution centers	✓	✓
Investing in capacity to ensure profitability and efficiency		✓
Investing in or addressing voter concerns	✓	
Investing public funds in social, equity, and environmental justice issues	✓	
Implementing cost saving technology as soon as practical		✓
Managing budgets and priorities that dramatically and rapidly shift	✓	
Managing budgets with strict performance criteria accompanied by steady capital plans	✓	✓
Managing investments to ROI and hurdle rate standards		✓
Pricing transportation to fully cover all costs and benefits		✓
Managing executive turnover that coincides with national, state, local elections	✓	

Private sector decision making is often hierarchical with one decision maker or a small board making final decisions with large impacts. Decisions with smaller financial and operational impacts are made further down the hierarchy. Public decision making is primarily collaborative. It takes into account many stakeholders and interests that have influence over those making public funding and policy decisions between executive and legislative branches of government. The public sector process is thus more time consuming.

Private sector decision making is often more focused than public sector decision making on the near term with short-run operating and financial decisions complementing longer-term strategic decisions. The near-term focus is driven by the fundamental objective of earning returns for the company owners through a combination of business revenue growth and higher profits. At the same time, strategic investments in infrastructure can focus on the future. The public sector, with its multiple objectives and functions for society, works in an environment that takes into account many stakeholder concerns including social and political issues in addition to the business aspects of decisions. Political power ultimately controls public decisions regardless of whether the consequences for business or the economy are fully understood or considered.

Table 7. Key public and private sector differences in freight decision making.

Differences	Public Sector	Private Sector
Scale of investment	Entire system within its jurisdiction	One company at a time but international
Geography	U.S. political boundary	Global market
Process of reaching decisions	Collaborative	Hierarchical
Planning horizon and timing	Longer-run, slower	Shorter-run, quicker
Objectives of decisions	Social and political as well as economic development	Increase shareholder value through higher profits/revenues
Attitudes	Attempts to address all stakeholder concerns	Satisfy owners, customers and employees

Comparison of Decision-Making Areas

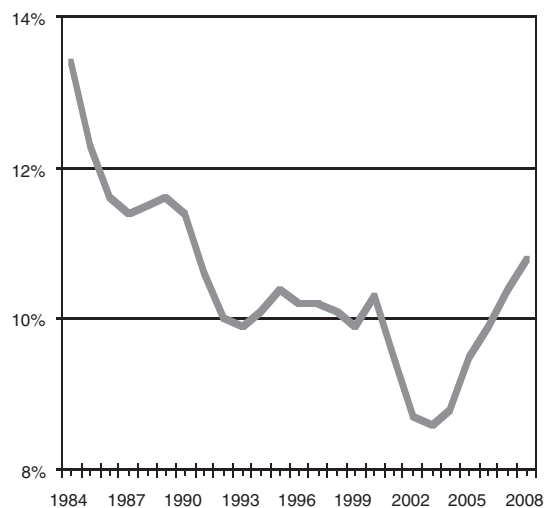
The nature of the intersection between the public and private freight interests influences how successful the two sectors are in working together. When objectives are closely aligned and there are managers on both sides frequently interacting, the two sides can work well together and take actions that improve the overall system. When the interests and objectives of the two sides diverge, or when the private freight system is not a high priority for public agency decision makers, the relationship between the two sectors has suffered.

Areas Where Public and Private Interests Align

Two areas of alignment of public and private sector interests that are illustrative are (1) safety and security issues and (2) economic regulation. These are not the only areas of common interest.

Though there are differences between the two, safety and security issues regarding the private portions of the freight system are generally of common interest to the public and private sectors. Increasing security is desirable for both government and business, even if process details can lead to disagreements about the approach and who pays for security. Safety regulation and enforcement by the public are backed up by safety requirements for private companies so that they can obtain insurance. Industry improvements in these areas achieved to date are partly a result of public agencies interacting regularly with the private sector freight system users to achieve objectives. Both sectors want to protect people, property, and infrastructure.

Economic regulation of freight transportation has largely worked well in the last quarter century because the industry was mostly deregulated by the early 1980s. While some shipper groups object to aspects of the remaining regulations, or the lack thereof, the overall real costs of freight transportation and logistics in the economy have fallen over this time period as shown in Figure 13. The remaining economic regulatory functions are carried out within the bounds of the regulatory status quo by public agency staff dedicated and focused on the private freight transportation sector.



Source: Council of Supply Chain Management Professionals, 18th Annual State of Logistics Report Value of U.S. Logistics (Transportation plus Warehousing) Costs as Percent of U.S. Gross Domestic Product; IHS Global Insight's forecast after 2006.

Figure 13. *Cost of logistics as a share of U.S. GDP.*

Areas Where Public and Private Interest Diverge

In areas where public officials are responding to broader social and equity issues, the narrower profit motive of the private sector can drive the two sides apart.

Environmental and land use planning issues regarding the private freight system have been the source of many disagreements between the two sectors because objectives and incentives differ. Public sector agency resources dedicated to freight transportation in these areas have been limited, because freight transportation has not generally been a high priority. The mismatch between public sector jurisdictional geography and the need to operate across global supply chains in the private sector leads to conflicting objectives.

Operations of the freight system by the public sector have not always adequately taken into account the needs of the private sector. For example, truck use on the roadway network has been constrained, which increases costs and, in some cases, exposure because of circuitous routing. This has especially been the case in congested urban areas with severe passenger transportation and environmental challenges. In these difficult situations, the accommodation for private freight operational needs has often been limited, at times without the full consequences of these operational limitations being understood.

Consequences for Public Sector Officials

The interdependencies and overlapping responsibilities highlight the importance of decision making in both sectors. Decisions cannot be made truly independently and there are limits on each sector's ability to pursue its own objectives. Compromises must be achieved between the public sector's goal to provide infrastructure to help reach the potential of the entire economy and the private sector's goal to use publicly provided infrastructure to optimize time and cost functions for its own gain.

In the private sector, profitability and efficiency drive internal decisions, but costs are not solely in the private sector's control because some costs are driven by public policies and regulations. Conversely, public sector costs for infrastructure operations and maintenance depend in part on how much the private sector uses that infrastructure.

When there are conflicts between the two sectors, a common public sector misperception is that "freight doesn't vote" and that consequences from acting against private freight desires will be limited. Frequently, the public sector does not fully understand that there are instances when freight *does* vote. This voting does not take place at the ballot box but rather through the shrinking, removal, and relocation of facilities and the jobs associated with them. The end result in such jurisdictions is a curtailment in services and loss in revenue.

Freight Does Vote:
Loss of access to cost-effective freight transportation can chase business away—costing jobs, reducing tax revenues, and resulting in adverse selections of alternative freight facility locations and route choices.



SECTION 3

What Can Be Done to Better Align Public and Private Freight Interests

There are actions public officials can take that help better align public and private freight interests. This section describes these mechanisms and contains the answers to the question: “What can the public sector do?” If these actions are implemented by public agencies, the enormous challenges the country faces from the demand on its freight transportation system may be more easily solved.

Summary of Lessons for Successful Cooperation from Case Studies

Freight projects involving both public and private sectors were evaluated for this study. The case studies are described in greater detail in Appendix D to this report. Key lessons for successful cooperation between public and private entities were gathered from these case studies. Among these lessons are the following:

- Building and maintaining communication and cooperation among the many private and public stakeholders is an absolute necessity.
- Educating the public on the benefits of freight projects through public outreach and in the media is important to overcome any opposition to freight activity.
- Being aware of how a joint public and private process works is important at the start;
- Maintaining key companies and officials who have undertaken an initiative is essential. It is important to keep institutional memory.
- Managing new multijurisdictional freight infrastructure projects through a governing agency with responsibility for the design and construction of the project is important.
- Clearly identifying the public and private project benefits to cement the desire for both sides to make a project work is essential.
- Public sector understanding of the private requirements for funding and the timing of financial flows to make public–private partnerships work better is critical.

Hire Qualified Public Agency Decision-Making Support Staff

Public agencies need to have staff able to support the decision-making process in order to fulfill their roles in the freight system. These staff should have training and experience to participate in the decision-making processes, with specialized skills for each type of decision making as appropriate for the agency.

Though maintaining staff capability for freight can be especially challenging for local and metropolitan area-level public agencies, there are federal training programs to support employee development in such areas as freight transportation planning and policy making.

Having qualified staff that understands the private sector decision-making process will facilitate interaction with the private sector.

Improve Communication and Education

Communication and education are keys to success, and steps that improve them are fundamental to achieving better results. The objective is to reach the point where there are engaged and educated senior leaders in both sectors that understand the other sector and maintain relationships with managers in that other sector. Public sector agencies can lead by example in the following ways:

1. **Develop Focused Staff Expertise.** Assign professional staff, experienced in understanding freight dynamics and in the associated private and public relationships to dedicated freight-oriented positions. Agencies that can develop or hire freight industry specialists will be better able to be effective in addressing freight-related issues.
2. **Nurture Freight Advisory Groups.** Metropolitan planning organizations (MPOs) and state and regional agencies can organize and sponsor Freight Advisory Councils consisting of freight transportation providers, transportation intermediaries, and shippers, who can provide feedback and perspective on impacts and consequences of public sector actions.
3. **Invest in Leadership Exchanges.** Executives and managers from MPOs and state and regional agencies can exchange jobs with individuals in the private transportation sector to gain an appreciation for and a perspective on private freight decision makers. While organizing temporary exchanges formally between public agencies and companies is difficult, informal exchanges (by hiring individuals at different stages of their careers with experience in the other sector) can achieve some of the same benefits.
4. **Joint Task Forces.** Formal joint task forces can be established between companies and government agencies where executives and managers from companies can have significant impact on MPOs and state and regional agency decisions with respect to the freight system. Whether these groups are called goods movement or freight task forces, they need to be given real power of input in public decision making.

Benchmarking Progress

Benchmarking is an established management practice applicable to improving the outcomes of public and private sector freight decision-making facilitation efforts. Use of benchmarking as an approach to measuring the performance of policies, programs, and projects can lead to quick redirection and reprioritization of efforts to best achieve desired results. Commonly, this requires information on results achieved by one agency in comparison with results achieved by similar agencies elsewhere or results achieved from parallel efforts within the same agency. The objective is to be able to make changes or set priorities so that an optimal combination of effort is reached over time. Those efforts that are underperforming are either modified or resources are redirected toward those that are working better. Circumstances are unique to each agency and there are no set standards that can guarantee success everywhere. Each agency can thus tailor its set of benchmarking metrics to its needs and projects.

Public-Private Task Teams Develop Project Milestones

In the 1990s, the federal government commenced an extensive effort to introduce and expand systemic performance measurement for its programs. Use of performance measurement will support attempts to apply more private sector approaches to the implementation of public sec-

tor decision-making practice. Public–private task teams can bring their combined experience and knowledge to develop realistic project milestones for project evaluation and monitoring. Prior efforts to obtain input from the private sector have shown positive results for public agencies in areas of improved operations (such as asset management and maintenance practices) as well as quantification of activities and processes. Invaluable to better public sector management has been the improved availability of performance data for benchmarking, comparing, and demonstrating improvements for the public.

Forge Public–Private Financial Partnerships

Mutually established cost and benefit sharing plans in projects can be developed for the benefit of both public and private sectors. New public-private investment mechanisms have been developed at the state and local levels. Federal program funding is being leveraged for freight applications as well.

Examples of new public–private freight investment tools include the following:

- Florida intermodal freight investment priority list,
- California goods movement bond funding,
- Intermodal investment credits leveraged by public funding for infrastructure, and
- Congestion mitigation air quality credits.

Each of the examples requires participation by both public and private sectors in

- Identifying opportunities for improvements to the freight system,
- Agreeing on cost and benefit sharing from the projects,
- Setting priorities, and
- Executing selected projects.

In each case, the engagement of senior officials from both private sector and public sector organizations has led to success in making the partnerships work. These partnerships have worked to bring billions of needed dollars to the freight system, generating jobs and helping the economy.

Conclusions

The purpose of this primer was to foster understanding about the respective roles of the public and private sectors in freight transportation. Such understanding is crucial because the decision-making roles of the two sectors are intertwined but not always aligned. By better understanding the differences and commonalities in roles and interests, both sectors can take steps to facilitate cooperation on freight issues. Public sector officials can take a leading role in fostering such cooperation by (1) establishing communication channels and partnerships with the private sector, (2) creating joint task forces, and (3) training staff in specialized freight areas.

Public–private cooperation becomes even more important because the amount of freight moved on U.S. infrastructure is projected to increase. Truck volumes alone will double. By working together on investment and operating decisions, the two sectors can ensure that goods will move through the economy in an efficient and effective manner.

Glossary of Terms and Definitions

This glossary of terms and definitions covers some of the language commonly found in the private sector freight industry with respect to types of services, terms used to describe operations, and mode-specific units of measure for financial and operating performance. This glossary is not meant to cover the fundamentals that may be encountered in dealing with the private freight industry.

3PL: (see Third Party Logistics Provider).

Accessorial Charges: fees for services in addition to the physical transportation of goods, such as storage, intermediate routing, or other special services.

Aggregate Shipments: multiple shipments from different shippers to one consignee that are consolidated and treated as a single consignment.

Axle Load: maximum load permitted to be carried on each axle of a truck or railcar.

Axle Weight: amount of weight carried by one axle of a tractor or trailer or railcar.

Bill of Lading: a commercial shipping document that serves three distinct purposes in connection with the carriage of goods. An itemized list of goods contained in a shipment. It is a receipt from the carrier for the goods, represents the contract for carriage, and serves as a document of title.

- **Order Bill of Lading:** a negotiable document by which a transportation line acknowledges receipt of a shipment and contracts for its movement. The surrender of the original straight bill of lading, properly endorsed, is required by transportation lines upon delivery of the shipment, in accordance with the terms of the bill of lading.
- **Straight Bill of Lading:** a non-negotiable document by which a transportation company acknowledges receipt of a shipment and contracts for its movement. The surrender of the original straight bill of lading is not required by transportation lines upon delivery of the shipment, except when necessary for the purpose of identifying the consignee.

Blocking or Bracing: wood or metal supports used to keep shipments in place or on containers, trailers, railcars, or aboard vessels.

Bonded Warehouse: a warehouse approved by the U.S. Treasury Department, used for storage of goods until customs duties are paid or goods are otherwise properly released.

Breakbulk: composite loads made up of identical individual commodities shipped together but not in containers. Often classified as general cargo.

Bulk Shipment: commodities shipped not in packages or containers, either dry or liquid.

Capacity: amount of cargo or freight that can be carried in a piece of freight equipment or through an individual freight facility, expressed in terms of weight and measurement either for one shipment or over a fixed period of time.

Capacity Utilization: the percentage of physical capacity, either measured in weight or volume terms, actually used for the transport of cargo, over a defined period of time.

Cargo: freight; goods being transported.

Carrier: an individual, partnership, or corporation engaged in the business of transporting goods or persons, for a fee.

Cartage: traditionally the short-distance shipment of goods between locations in the same city, town, suburb, or local area.

Certificate of Weight: an authoritative statement of the weight of a shipment.

Classification (rating): the standardized identification of a type of commodity for declaration to customs or for the purpose of applying transportation charges.

Container-on-Flat Car (COFC): transportation of a container by railroad flat car.

Commodity: any physical material being shipped; the type of goods being shipped.

Common Carriers: transportation companies required by the government to serve the general public on demand, at reasonable rates without discrimination.

Connecting Carrier: a carrier that has a direct physical connection with another or forms a connecting link between two or more carriers.

Consignee: the person or organization to whom a shipment is shipped.

Consolidation: the act or process of assembling freight shipments together for physical shipment jointly over the same route, usually taking advantages of economies of scale in shipping rates.

Consolidator: the consolidation service provider.

Containerization: shipping system based on standard-sized cargo-carrying rectangular containers that can easily be interchanged between trucks, trains, and ships without rehandling of contents.

Contract Carriers: a company that engages in for-hire transportation of property under an individual contract or agreement with one of a limited number of shippers.

Cubic Capacity: the volumetric carrying capacity of a piece of freight equipment measured in cubic feet or cubic meters.

Cubic Foot: 1,728 cubic inches.

Cubic Ton: 40 cubic feet.

Dead Head: movement of a piece of freight equipment without cargo (empty).

Delivering Carrier: the transportation line by which a shipment is delivered to the consignee.

Delivery: the act of transferring possession, such as the transfer of property from shipper to carrier, one carrier to another, or carrier to consignee.

Destination: the location to which a shipment is consigned.

Detention: a charge made for a piece of transportation equipment held by or for shippers or consignees for loading, unloading, or any other purpose.

Dispatching: the scheduling and control of trucks and trains for pickup and delivery or travel between points on the network.

Distance Rates: rates that are applied according to distance.

Diversión: any shipment relinquished to the shipper, consignee, or his agent at point of origin or intermediate point or change in routing before the shipment has reached its ultimate destination.

Dock: the platform where ships, barges, railcars, or trucks are loaded and unloaded.

Drayage: movement of shipments via truck between terminals or terminals and local freight facilities, usually in conjunction with container transportation, often at ports.

Exchange Bill of Lading: a bill of lading issued in exchange for another bill of lading.

Exempt: traditionally, those trucks hauling certain commodities exempted from economic regulation. Most exempt commodities are agricultural commodities or seafood.

Expediting: accelerated transportation. Expedited shipment service is usually faster than normal service.

Export: goods (or services) being transported across a U.S. border to a foreign country.

FEU: forty-foot equivalent unit, common volumetric measure of container shipping. An FEU is two TEUs.

Freight All Kinds (FAK): the acronym applied to a pooling of different types of commodities for shipment together or for simplification in pricing.

Fixed Charges: charges that do not vary with an increase or decrease in traffic.

Flat Bed: a truck or truck trailer with no sides and with the floor of a standard height from the ground.

Free Time: the time period given to the owner for taking delivery of freight before storage charges accrue at a freight facility, often a port or intermodal terminal.

Freight: merchandise hauled by a transportation carrier; cargo.

Freight Bill: document for common carrier shipment. Gives description of the shipment, amount of charges, fees, and taxes.

Freight Broker: a third-party who arranges pick up and delivery of a shipper's goods by a carrier without having physical control of the shipment. Also called a property broker, truck broker, freight agent, transportation broker, or agent.

Freight Claim: a demand on a transportation carrier for the payment of overcharge or loss or damage sustained by the shipper or consignee.

Freight Forwarder: typically an intermediary who assembles small shipments into larger shipments that are then tendered to for-hire carriers. On reaching their destination, the shipments are separated back into the smaller shipments.

Gateway: a point at which shipments moving from one territory to another are transferred between transportation lines or carried between modes across a border.

Gross Ton: 2,240 pounds, commonly called a long ton.

Gross Weight: the weight of an article, together with the weight of its container and the material used in packing. As applied to a truck or container, the weight of the truck or container, together with the weight of its entire contents.

Hazardous Material (Hazmat): a substance or material that has been determined by the U.S. DOT to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, typically requiring special handling and documentation procedures for transportation. A complete list of hazardous materials can be found in 49 CFR 172.101.

High Cube: a container, truck, or railcar with above average cubic content.

Hub: terminal serving as a centralized connection for shipments across many transportation routes. The hub of a "hub and spoke system" is the interchange location where cargo shipments are brought together for interchange before being carried to their final destination.

Import: inbound freight that has crossed the border, originating outside the country.

In Bond: shipments moving under U.S. Customs Bond.

Inland Carrier: a transportation line which hauls export or import traffic between ports and inland points.

Interchange: transfer of shipments from one carrier to another.

Interline: transportation provided by two or more carriers.

Interline Freight: shipments moving from point of origin to destination using two or more transportation providers.

Intermediate Carrier: a transportation line over which a shipment moves but on which neither the point of origin nor the destination is located.

Intermodal Rail: transportation of containers or truck trailers by railroad.

Intermodal Terminal: physical area for interchange between two modes of transport, most commonly between truck and rail.

Interstate: traffic having origin in one state and destination in another state.

Intrastate: traffic having origin, destination, and entire transportation within the same state.

Land Bridge: a term associated with international freight, where the freight arrives by ocean carrier on one coast (Atlantic or Pacific), is transported across the country by rail or truck, and is then loaded back on an ocean carrier for carriage to a third country.

LTL (Less-than-Truckload): a quantity of truck cargo less than that required to fill a truck trailer.

Line haul: the movement, typically long distance, of shipments between cities, excluding pickup and delivery service.

Line haul truck: vehicles used to carry shipments long distances, usually a tractor-trailer combination of three or more axles.

Local Delivery: shipments of a short distance to final destination point.

Log Book: a federally required record maintained by truck drivers containing their daily records of hours of service, routes, etc.

Long Ton: 2,240 pounds.

Low Boy: a semi-trailer with no sides and with the floor of the unit close to the ground. Often used in transporting heavy machinery or large objects, some times requiring special permits. Can imply higher than average transportation costs for special handling.

Merchandise Traffic: rail traffic other than intermodal, typically made up of mixed railcar types within one train.

Mileage Pay: truck driver pay tied to the distance driven, not the time driving.

Mileage Rates: transportation rates applied according to distance shipped.

Mini Land Bridge: a term associated with international freight, where freight arrives by ocean carrier on one coast (Atlantic or Pacific) and is then transported by rail (or truck) to destinations near the other coast (as opposed to an “all-water” transport through the Suez or Panama Canal).

Mixed Truckload: a truckload of different articles combined into a single shipment.

Mode: means of transportation by one of the following methods: air, water, road, rail, or pipeline.

Net Ton: short ton of 2,000 pounds.

Net Weight: the weight of an article clear of its packing.

Operating Ratio: the ratio between operating expenses to gross receipts of a carrier.

Pallet: a small wooden, paper, plastic, or metal platform usually with top and bottom, on which packaged goods are placed to facilitate movement by some type of cargo handling equipment, typically to permit movement by fork lift truck.

P&D: pickup and delivery of shipments, typically locally by truck.

Peddle Run: pickup or delivery route traveled by a city truck.

Perishable shipment: cargo shipment subject to decay or deterioration.

Piggyback: transportation of a truck trailer on board a railroad flat car.

Point of Origin: the location where a shipment begins its journey.

Private Carrier: a transportation line not engaged in the for-hire transportation business as its primary purpose. Typically the trucking operations of a company in another business.

ROI: return on investment. Measure of profitability of invested capital over a period of time. Often a threshold level is established as a minimum for investment approval.

Route: the course or direction that a shipment moves from origin to destination.

Shipment: one or more pieces of product transported with the same shipper or consignee.

Shipper: company or individual who initiates the transport of goods.

Split Pickup or Delivery: in trucking, picking up or delivering volume shipments at more than one place within confines of origin or destination points.

Spotting: in trucking, the placing, detaching, and leaving in possession of a trailer unaccompanied by a tractor or power unit at a specific site designated by the customer or within a terminal.

Storage: a charge made on goods or equipment stored.

Storage-in-Transit: storage of property at a point other than the origin or destination of a shipment.

Store Door Delivery: the movement of goods to the consignee's place of business.

Supply Chain: a system of supplier-customer relationships between companies or across functional groups within companies that together design, produce, transport, and distribute wholesale and retail products. It is often international, at least in part.

Surcharge: a charge above the usual or customary charge, such as for fuel used.

Tare Weight: the weight of a container and the material used for packing.

Terminal: a physical area, potentially including a building with truck loading docks, for the handling and temporary storage of shipments pending transfer between locations.

TEU: twenty-foot equivalent unit, standard volumetric measure of container shipping.

Third Party: an intermediate party responsible for a shipment that is neither the shipper or consignee.

Third Party Logistics Provider (3PL): a provider performing transportation and logistics services on behalf of another company. 3PLs provide management skills along with the physical assets, labor, and systems technology to provide transportation and logistics services for other companies.

Ton-Mile: the movement of 1 ton of cargo over the distance of 1 mile. This unit is used in comparing shipment earnings and expenses.

Tonnage: the number of tons of freight handled or the total cargo capacity of deployed equipment.

Trace/Track: to follow the movement of a shipment along its route.

Traffic: property carried by transportation carriers.

Trailer-on-Flat Car (TOFC): transportation of a truck trailer by railroad.

Truckload (TL): shipment in quantity to fill a truck trailer, typically qualifying for lower rates than in smaller shipment sizes. Also refers to carriers offering truckload service.

Volume Rate: commodity rates subject to a minimum weight of 10,000 pounds or more.

Warehouse: a place for the receipt and storage of goods.

Warehouse Velocity: time for goods to enter, be stored, and be shipped from a warehouse; a measure of the productivity of the warehouse facility.

Waybill: the description of goods sent along with a shipment (same as freight bill).

Wet Goods: liquids.



APPENDIX B

Frequently Asked Questions

What public benefits are there from implementation of private freight projects?

There are often several types of public benefits from public investment in private freight projects. The three major types are as follows:

1. Regional benefits. The local region benefits from reduced demand on the existing infrastructure through increased efficiency of operations. These can take the form of reduced truck vehicle-miles-traveled (VMT), which also leads to reduced truck engine emissions. The region benefits from the added capacity to handle freight demand.
2. Benefits from enhanced freight access. Businesses and consumers in the local region will benefit from improved freight system connectivity with the rest of the country, which can result in improvements in delivery cost and reliability.
3. Benefits from reduced congestion. Communities adjacent to the transportation investment will benefit directly from more efficient freight productivity, minimizing the use of the network, including those portions of the network (e.g., the roadway system) that are shared by passengers and freight equipment.

What factors affect freight company service offerings?

Fundamentally, it is supply and demand, in terms of the number of customers and the cost of offering the service matter. Short-run and long-run cost estimates are crucial, which can fluctuate depending on many factors:

- Expected shipment sizes and volumes
- Pick-up and loading time components of operations (congestion and delay costs)
- Border/freight facility wait times (congestion and delay costs)
- Distribution of distances to end markets (fundamental market geography)
- Weather patterns during the year
- Choices of mode of transport at a specific location
- Employee workforce availability and costs
- Regulatory compliance costs

What is the equivalent of the average automobile cost per mile for freight shipments?

Unlike passenger automobile transportation, the costs and pricing of freight transportation exhibit much more variation and are a complex function of varying factors such as the following:

- Distance traveled
- Route traveled
- Mode(s) of transportation used

- Commodity density
- Commodity volume
- Product value
- Special service requirements

Realistic freight costing models can only be determined when more about these factors are known.



APPENDIX C

Reference Resources

The references for the NCFRP Project 01 were selected from a very large body of literature covering the broad topics of public and private sector organizational behavior and decision making as well as transportation sector-specific research. There is a considerable amount of literature on public and private sector decision making; however, the literature that deals directly with decision making in the context of freight transportation issues is less extensive.

These references contain excerpts from a bibliographic literature database prepared as part of the research project. The full database is available as part of the project materials on the NCFRP website.

The references in the general literature have been grouped as follows:

- General public and private sector decision-making comparisons
- Literature focusing on public transportation agency decision making
- Literature focusing on transportation decision making and relationships
- Other associated literature

The identified references include research and documentation of comparisons of public and private sector decision making from the 1970s, 1980s, and 1990s. Much of the research compares organizational issues as well as decision-making aspects of processes and relationships. Contemporary and later studies (especially Nutt 2006) bring more focus and detail to this complex topic.

Many of the references that focus just on freight transportation were published within the past 5 years. They address transportation issues around the world as well as different aspects of decision making including political aspects of the relationships between the public and private sector. A very important source in this context is *The Geography of Transport Systems* by Jean-Paul Rodrigue, Claude Comtois, and Brian Slack, published in 2006.

Other references cover very specific issues within single industries with respect to public and private sector decision making.

A vast amount of literature is available through the Internet for free, but some of these references are copyrighted publications available only for a fee or through a subscribing library.

General Public-Private Sector Comparison References

Beenhakker, H. *Investment Decision Making in the Public and Private Sectors*. Quorum Books, Westport, CT, 1996.

This book comprehensively describes the multifaceted approach to investment planning which involves the interactions among various disciplines.

Brettschneider, S. Management Information Systems in Public and Private Organizations. *Public Administration Review*, Vol. 50, 1990, pp. 536-545.

This study demonstrates differences in information system management between public and private organizations. A public organization's environment reflects greater interdependence and accountability. Differences in the criteria used for purchasing hardware and software, planning processes, and placement of the top data processing manager reflect reasonable adjustments to management strategies and actions for coping with these different organizational environments.

Coursey, D., and Bozeman, B. Decision Making in Public and Private Organisations: A Test of the Alternative Concept of Publicness. *Public Administration Review*, Vol. 50, 1990, pp. 525-535.

This study examines the influence of publicness on types of strategic decisions encountered by managers. Two different concepts of publicness are examined. Drawing upon data from a mail survey, the analysis indicates that (1) publicness has a small influence on the types of strategic decisions addressed; (2) publicness is associated with greater decision participation but not smoothness; and (3) the ownership concept of publicness is important in accounting for differences in strategic decision making.

Nutt, P. Comparing Public and Private Sector Decision-Making Practices. *Journal of Public Administration Research and Theory*, Vol. 16, No. 2, April 2006, pp. 289-318.

This article compares public and private sector decision making preferences and practices of mid-level managers working in the two sectors. The study finds that private sector managers are more apt to support budget decisions made with analysis and less likely to support them when bargaining is applied. Public sector managers are less likely to support budget decisions backed by analysis and more likely to support those that are derived from bargaining with agency people.

Nutt, P. Public-Private Differences in the Assessment of Alternatives for Decision Making. *Journal of Public Administration Research and Theory*, Vol. 9, No. 2, 1999, pp. 305-50.

Public and private sector decision making is studied and decision making in a tax-supported general purpose governmental agency is compared with that done by a business firm selling to a market, using a simulation to capture differences in the preferences and practices of mid-level managers working in the two sectors. The study finds that private sector managers are more apt to support budget decisions made with analysis and less likely to support them when bargaining is applied. Public sector managers are more likely to support those that are derived from bargaining with agency people.

Nutt, P. Decision-Making Success in Public, Private and Third Sector Organizations: Finding Sector Dependent Best Practice. *Journal of Management Studies*, Vol. 37, No. 1, 2000.

Strategic decisions in public, private, and third sector organizations were examined to isolate and compare the practices used to uncover alternatives. The approaches applied to uncover alternatives in these organizations and decision outcomes were identified from a systematic examination of 376 strategic decisions. The preference for and success of innovation, benchmarking, search and existing solution approaches applied to uncover alternatives by decision makers in each sector is discussed. Some prescriptions are offered.

Rainey, H., Backoff, R., Levine, C. Comparing Public and Private Organizations. *Public Administration Review*, Vol. 36, 1976, pp. 233-44.

This paper presents a number of propositions about differences in public and private organizations, which have implications for their management.

Williams, W. A. Tools for Decision Making: A Practical Guide for Local Government. In *Analytics in Public Sector Decision Making*, Congressional Quarterly Press, Washington, D.C., 2003.

Public managers and finance professionals are often pressed for time and resources. As a consequence, they often make decisions based on their own intuition, the availability of information, and political palatability. While this rather haphazard approach to decision making may have been considered adequate in the past, the complexity of government operations and mandates for increased accountability to stakeholders now demands otherwise.

Public Transportation Agency Decision-Making References

The references for public sector transportation agency decision making include publications addressing how public agencies define their mandate to address freight transportation; how they organize themselves to carry out their mandate; the processes they use in setting freight policy, planning for freight systems, regulating freight activities, and investing in capital improvements; and the resources available to support decision making and investment.

These elements are summarized in the following table and put in bold type in the references in this section. The references are grouped by their main focus (e.g., mandate, organization, etc.).

Mandate	Declaration	Literature describes what the public agency is to do.
	Purpose	Literature describes why the mandate is necessary.
Organization	Roles	Literature describes how the agency is organized to carry out the mandate.
	Responsibilities	Literature describes the responsibilities of groups within the agency.
Process	Procedures	Literature describes the procedures for implementing the mandate (e.g., supporting decision making in setting policy, planning, issuing regulations, making capital improvements, etc.).
Resources	Funding	Literature describes the funding available to the agency to carry out its mandate.
	Staffing/Skills	Literature describes the number, type, skills, and level of expertise of staff deployed by the agency.
	Technology	Literature describes the technology (broadly defined) that is deployed by the agency.

Mandate for Public Sector Involvement in Freight

Cambridge Systematics, Inc. *Freight Transportation Bottom Line Reports*. American Association of State Highway and Transportation Officials, Washington, D.C., 2003, 2007, and additional reports forthcoming.

Description: AASHTO commissioned a series of reports on the condition and performance of the nation's freight systems. The first report, the Freight-Rail Bottom Line Report, was published in 2003. It examined the state of the nation's freight-rail system and its capacity to meet the anticipated demand for freight transportation. The report argued that freight rail was not keeping pace with economic growth, and that without public investment in the rail system, the railroads would likely shift tonnage from rail to the already congested highway system. The second series has four reports, addressing Freight Demand and Logistics, Highway Freight Transportation, Rail Freight Transportation, and Waterborne Freight Transportation. The reports examine the current condition and performance of the transportation systems, discuss the key issues facing each, and outline the policies recommended by AASHTO and the state DOTs to address freight needs.

Relevance: The AASHTO Freight Bottom Line Reports primarily address the issues of **mandate** and **purpose** in public decision making about investment in freight infrastructure. The initial Freight-Rail Bottom Line Report provided an estimate of funding needs, but the more recent

series of demand and modal reports focuses on defining the purpose and benefits of public sector investment in freight transportation systems. These include supporting economic growth and competitiveness, and balancing the costs and impacts of highway, rail, marine, and waterway transportation on shippers, carriers, states, and communities. The major contribution of these reports is to provide a relatively uniform and national overview of the condition of the nation's freight systems. The work grew out of an earlier Federal Highway Administration initiative (the Freight Analysis Framework program) and represents the first attempt by the states (and, indirectly, the U.S. DOT) to paint a comprehensive picture of freight needs and the public sector's role in the delivery of freight systems. The reports argue that investment in freight infrastructure should be tied directly to national and state economic development goals. The reports also call for stronger federal government leadership in freight planning and recommend federal funding support for projects of national and regional significance. However, the reports do not specify public sector roles, responsibilities, and procedures for decision making.

Cambridge Systematics, Inc. *National Rail Freight Infrastructure Capacity and Investment Study*. Association of American Railroads, Washington, D.C., 2007.

Description: The study estimates the rail freight infrastructure improvements and investment in the continental U.S. rail network required to accommodate the U.S. Department of Transportation's projected demand for rail freight transportation in 2035. The U.S. DOT estimates that the demand for rail freight transportation—measured in tonnage—will increase by 88% by 2035. The study finds that an investment of \$148 billion (in 2007 dollars) over the next 28 years is required to keep pace with economic growth and meet the U.S. DOT forecast demand.

Relevance: The study addresses the issues of **purpose**, **process**, and **funding** in public decision making about investment in rail freight infrastructure. The study is the first national effort by the major Class I railroads to make a comprehensive statement about what is needed (e.g., additional rail capacity and investment) and why the improvements are needed (e.g., deteriorating rail service, congestion, and potentially the inability on the part of the freight railroads to meet freight demand). It lays out a process for comparing current and future train volumes to rail capacity, quantifies the need for rail capacity, and estimates the cost of the improvements. It translates the needs into volume-to-capacity ratios similar to the level-of-service grades used in national highway planning, making it possible to compare—very generally—freight rail and freight highway needs and returns on investments. Finally, the study provides an initial estimate of additional (and potentially public) funding needed, which is estimated at about \$1.4 billion per year over and above what the railroads are currently investing. The study provides a national snapshot of rail capacity needs; it does not address rail capacity needs by state and local area.

Gordon Proctor and Associates. *America's Freight Challenge*. American Association of State Highway and Transportation Officials, Washington, D.C., May 2007.

Description: This document draws upon the findings of the AASHTO Freight Transportation Bottom Line Reports to summarize the condition and performance of the nation's freight systems and outline the consequences of increasing congestion and underinvestment for the nation's economic growth and competitiveness. The report provides a select number of "best practices" case studies to demonstrate how investment in intermodal facilities and better integration of freight operations can streamline freight services. The focus of the report is AASHTO's policy recommendations, which are addressed to the National Surface Transportation Policy and Revenue Study Commission and to Congress as it takes up reauthorization of the nation's surface transportation programs.

Relevance: America's Freight Challenge advocates a stronger **mandate** for public action on freight transportation, a leadership **role** by the federal government, **reorganization** of state

DOTs to deal with freight planning and investment, and greater **funding** for freight improvements. The policy recommendations were adopted by the AASHTO board of directors, representing the fifty state DOTs, so that the document is significant as an indicator of the emerging interest and role of state DOTs in freight decision making.

U.S. Department of Transportation. *Framework for a National Freight Policy*. Washington, D.C., April 2006.

Description: The draft framework lays out a vision and objectives, then details strategies and tactics that the U.S. DOT and its partners—both public and private sector—can pursue to improve freight transportation systems. The framework details seven objectives and accompanying strategies: (1) improve the operations of the existing freight transportation system; (2) add physical capacity to the freight transportation system in places where investment makes economic sense; (3) use pricing to better align all costs and benefits between users and owners of the freight system and to encourage deployment of productivity-enhancing technologies; (4) reduce or remove statutory, regulatory, and institutional barriers to improved freight transportation performance; (5) proactively identify and address emerging transportation needs; (6) maximize the safety and security of the freight transportation system; and (7) mitigate and better manage the environmental, health, energy, and community impacts of freight transportation.

Relevance: The draft framework was an attempt by the U.S. DOT at a **declaration** of national-level policy to define what public agencies can do to improve freight transportation. Since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, transportation planners have had a federal requirement to consider freight transportation when developing transportation plans and making investment decisions. The framework marked a cautious first step at helping to address this requirement.

Public Sector and Freight Issues

Cambridge Systematics, Inc. *Freight Transportation: New Roles for State DOTs—Responding to New Missions*. American Association of State Highway and Transportation Officials, Washington, D.C., 2008.

Description: This research examines current state DOT practices in organizing and managing freight transportation policies, programs, and projects. The study describes and compares the organizational structures and the assignment of roles and responsibilities for freight policy, planning, program management, and project delivery in 13 state DOTs. The study reports that 8 of the 13 states concentrate their freight activities within a planning division; 3 states conduct all freight activities within an operations or modal division; and 2 states have an integrated or hybrid approach. Most but not all the states have an additional management layer or mechanism such as a freight advisory committee or executive-level office that coordinates the efforts of freight planning, operations, and engineering. The study finds that states are most effective in addressing freight issues when they establish secretarial- or director-level freight offices but only where the freight office has the power to shape freight policies and hold division groups accountable for implementing state DOT freight transportation programs, projects, and initiatives.

Relevance: The study is one of the few studies specifically addressing the question of how state DOTs should assign **roles and responsibilities** for freight planning and investment. Most state DOTs were established in the early 1900s as Bureaus of Public Roads, then reorganized in the 1960s and 1970s as DOTs to carry out the planning and construction of the Interstate Highway System. Most DOTs have since expanded to incorporate some role and responsibility for public transit planning and program management, but very few have an organizational capability for

freight planning beyond truck size and weight regulation offices and programs to manage rail-road grade crossings and the preservation of local short line railroads. The study reflects an increasing awareness on the part of state DOTs that their business has expanded past the highway construction mandate of the post-World War II era.

Cambridge Systematics, Inc., and Regal Decisions. *Multistate Corridor Planning Transportation*. American Association of State Highway and Transportation Officials, Washington, D.C., Nov. 2005.

Description: Using a backdrop of relevant federal legislation, this report outlines the historical development of multistate corridor planning initiatives in the U.S. Successful efforts are demonstrated in a number of case studies. The report offers a framework for analyzing multistate corridor planning successes as well as a synopsis of critical success factors for corridor planning.

Relevance: The report documents several viable examples of multistate corridor planning efforts, and pays particularly close attention to issues of **organization** and **procedures** for decision making in multistate transportation coalitions.

Condition and Needs of the National and Northeast Transportation System. Testimony of Neil J. Pedersen, Chair, I-95 Corridor Coalition, before the National Surface Transportation Policy and Revenue Study Commission, Field Hearing, New York City, November 16, 2006.

Description: The testimony discusses the problems of maintaining and expanding transportation capacity in the 16-state (Maine to Florida) I-95 Corridor Coalition region. It advocates for an asset management approach to ensure that preservation needs are understood and investments are made in a way that ensures maximum long-term return on investment in system preservation. It points out that over the next 50 years many major transportation facilities in the Corridor will be reaching the end of their useful life and must be replaced, not just rehabilitated. This will be very costly, especially where existing traffic must be maintained while reconstruction takes place. In the case of many transportation facilities, and especially in the case of major structures such as bridges and tunnels, the cost of funding infrastructure replacement will be beyond the capability of the jurisdiction which owns the facility. The paper illustrates these issues with case studies of two major freight transportation facilities: the Woodrow Wilson Bridge, which spans the Potomac River between Maryland and Virginia, just southeast of downtown Washington, D.C., and is part of the I-95/I-495 beltway around Washington; and the Howard Street Tunnel, which is a single-track railroad tunnel in the heart of Baltimore City, serving freight lines operated by the CSX railroad. Built in the 1890s, the tunnel connects Cincinnati and Chicago with Philadelphia, New York, and the Northeast, and it connects the coastal cities of the Southeast to Philadelphia, New York, and New England.

Relevance: Pedersen used the testimony to address the problems of mega-projects that create multistate freight transportation bottlenecks and whose reconstruction would generate benefits across multiple states, but fail to get funding because there is no **mandate** to address nationally and regionally significant projects; no institutional or **organizational** mechanism that allows states to readily coordinate and pool funding across states; and no federal **funding** to leverage state and private sector investments. The paper is a concise statement of the problems of decision making across multistate corridors and projects.

Public Sector Assessment of Freight Investments

Bryan, J., Weisbrod, G., and Martland, C. *NCHRP Report 586: Rail Freight Solutions to Roadway Congestion—Final Report and Guidebook*, Transportation Research Board of the National Academies, Washington, D.C., 2007.

Description: The report examines the potential for use of rail freight as a way to relieve roadway traffic congestion by shifting some freight movement from trucks to railroads. It reviews the economics of truck and rail freight transportation, then reviews the literature on intermodal planning techniques, the costs of congestion, the benefit-cost assessment as applied to truck/rail studies, and the investment dynamics of public-private partnerships. The report summarizes and examines case studies of recent truck/rail studies. It concludes that it is feasible to justify public-private projects that result in moving more freight by rail, and ample methods are available for evaluating them. In the accompanying guidebook, the authors provide detailed guidelines for analysis of project feasibility and assessment of the impacts of shifting freight from truck to rail, including a listing of data sources and a description of calculation methods.

Relevance: The report documents the **procedures** for public sector analysis of rail freight solutions to roadway congestion. It lays out a general structure for decision making, focusing on the development of alternatives and the assessment of effectiveness, benefit-cost, and social and economic impacts. The report represents a comprehensive examination of public sector decision making in projects that involve trade offs between investment in truck and highway capacity services and investment in rail capacity and services.

Cambridge Systematics, Inc. Developing Selection Criteria for Strategic Intermodal Systems: Other States' Experiences. Technical Memorandum prepared for the Florida Department of Transportation, Tallahassee, FL, 2002.

Description: In preparation for designating a statewide "strategic intermodal system," Florida DOT commissioned this review of other states' experiences in identifying a multimodal transportation system (that is, identifying the most economically important highways, rail lines, ports, airports, waterways, etc.) and prioritizing investments in those facilities. The paper focuses primarily on the experiences of Wisconsin, North Carolina, Washington, Oregon, and Ohio.

Relevance: The case studies address the **mandate, organization strategies, and procedures** used to designate multimodal freight systems. A key outcome of these efforts has been the elevation of the importance of freight transportation and freight systems in state policy and investment.

Cambridge Systematics, Inc. *Best Practices in Statewide Freight Planning*. American Association of State Highway and Transportation Officials, Washington, D.C., Oct. 2003.

Description: This guidebook discusses how the role of statewide freight planning has changed to address the freight planning requirements in federal surface transportation program legislation (e.g., ISTEA, TEA-21, SAFETEA, and most recently SAFETEA-LU). The study describes common elements of freight planning programs, identifies issues and problems with current planning processes, highlights examples of best practices for effective freight planning programs, and specifies key considerations that promote successful freight planning programs.

Relevance: The study and accompanying guidebook were the first of a recent series of studies documenting and recommending best practices and **procedures** for statewide planning.

Cambridge Systematics, Inc., Economic Development Research Group, Inc., and Boston Logistics Group, Inc. *Guide to Quantifying the Economic Impacts of Federal Investments in Large-Scale Freight Transportation Projects*. U.S. Department of Transportation, Washington, D.C. Aug. 2006.

Description: The report developed guidelines for evaluating large-scale freight projects that span the interest of multiple modal agencies (e.g., Federal Highway Administration, Federal Railroad Administration, Federal Aviation Administration, and Federal Maritime Administration). Large-scale freight projects are capital improvement projects that focus on improving the flow and capacity of moving goods, and typically cost between \$100 million and several billion dollars. They may involve rail, roadway, air, or marine modes of travel. They can be right-of-way

(or corridor) projects such as new or expanded railroad lines, truck roadway routes, tunnels, or overpasses. They can also be terminal projects such as expansion of airport freight facilities, marine port facilities, rail terminals, or intermodal truck/rail terminals. The report examines and recommends analysis steps, impact measures, and available tools for use by the U.S. DOT. The report focuses on assessment of the benefits that accrue to the chain of private and public sector parties involved in major transportation projects—carriers, shippers and receivers, logistics supply chains, industries and markets, the economy, and society. The report gives particular attention to the use of economic and benefit-cost analyses, providing a framework and step-by-step guidelines for the assessment of large projects.

Relevance: The report documents the **procedures** for public sector analysis of major transportation investment projects. It builds on procedures and analysis techniques developed to support decision making for major public works projects, especially the Interstate Highway system, but it is significant because it reflects an understanding by the Office of the Secretary that major freight projects will become increasingly important in future years. The work on this study is closely related to other U.S. DOT efforts, including initiatives to reorganize DOT capabilities to oversee very large projects and to streamline environmental planning and oversight of complex projects.

Cambridge Systematics, Inc. *NCHRP Report 594: Guidebook for Integrating Freight into Transportation Planning and Project Selection Processes*. Transportation Research Board of the National Academies, Washington, D.C., 2007.

Description: This guidebook recommends procedures for integrating freight planning and decision making into existing statewide and metropolitan transportation planning processes. It addresses needs identification, plan development, project programming, and project development. It discusses data needs, outlines strategies for integration of freight planning analysis with traditional planning processes, and provides a toolbox of references on methods. The accompanying research study provides eighteen detailed case studies demonstrating various approaches to freight planning integration from the municipal to the state level.

Relevance: The guidebook and accompanying research report address the procedures for freight planning, programming, and project development within state DOTs and metropolitan planning agencies.

Freight Transportation—Improvements and the Economy, U.S. Department of Transportation, Federal Highway Administration, Washington, D.C., 2004.

Description: This report summarizes the results of the FHWA's work on the economic benefits of transportation improvements. In addition to this summary, two analytical reports are included as appendices: (1) *Economic Effects of Transportation: The Freight Story* and (2) *Transportation Infrastructure, Freight Service Sector and Economic Growth: A Synopsis*. Three methods, macroeconomic and microeconomic research, and general equilibrium approaches have been employed to study the linkages between transportation and the economy. Each of these is described in this report.

International and National Benchmarking for Urban Transportation Corridor Development, FTA-MN-26-7004, U.S. Department of Transportation, Federal Transit Administration, Washington, D.C., 2003.

Description: As transportation and transit corridors have become increasingly common as focal points for urban design, corridor development has emerged as one of the more interesting and complex issues in transportation planning. Issues with corridor development are always large because corridors ensure access to transportation, provide high quality transportation, help develop livable communities, and provide for economic development. These issues are exacer-

bated and new ones are created when a corridor crosses jurisdictional boundaries. There is a need for a model that addresses the major issues in corridor planning and management. This report develops such a model that is based on 5 major areas of the corridor development process: governance, economic impacts, financing, design, and citizen preferences. Lessons are drawn from several case studies of corridors. The prescriptive abilities of this model are then tested through analysis of local transportation corridor improvements.

The Nation's Freight Rail Challenge. American Association of Railways, Washington, D.C., 2006.

Description: The study provides an overview of recent policy studies and is concerned with investments needed in the future to meet rail transportation demand. It describes where investment is needed and the consequences for the economy when investments are not made.

Special Report 271: Freight Capacity for the 21st Century. Transportation Research Board, National Research Council, Washington, D.C., 2003.

Description: This report considers the long-term implications of trends in freight transportation markets and how government policy can allow more efficient provision of freight transportation system capacity. The report found that capacity additions have been lagging traffic growth in a number of freight transportation areas, resulting in increasing congestion, rising costs, and deteriorating reliability. The study noted that the freight system was compensating for these pressures by adding capacity, redistributing businesses and homes to less congested regions of the country, and adjusting to the additional costs. However, it concluded that these adjustments, while tolerable, were far from the economic optimum. It examined transportation projects as case studies of project-level decision making, finding that government evaluations of projects were often not broadly enough conceived, did not employ proper analytical techniques, and were not subjected to expert review. It also found that public agencies did not usually evaluate or make best use of alternative funding mechanisms. The study called for a comprehensive national freight program and policy agenda that recognize that freight transportation is a joint venture of government and the private sector. It also called for adherence to four guiding principles: projects should be selected based on economic efficiency; government should become involved in freight transportation only when market-dictated outcomes would be economically inefficient; government participation should not automatically entail government investment or subsidy; and investment in freight should rely primarily on user fees and direct local government matches.

Relevance: The report is most notable for its findings about the strengths and weaknesses of government decision making about freight programs and investments. It argues that the **procedures** for determining when the government should intervene or invest in freight transportation are inadequate, calling for stronger benefit-cost analysis and more careful assessment of the longer-term economic impacts of government actions.

Resources for Public Sector Investment in Freight

Cambridge Systematics, Inc., Mercator Advisors, LLC, and Pisarski, A. *Future Highway and Public Transportation Finance Study*. U.S. Chamber of Commerce, National Chamber Foundation, Washington, D.C., 2005.

Description: The study examines the funding available to meet the nation's highway and transit needs for the period 2006 through 2030. The study finds that current revenues provided by all levels of government—federal, state, and local—are not sufficient to maintain the condition and performance of the nation's highway and transit systems or to improve the condition and performance of these systems to levels that best serve the nation's economy. The study recommends that the federal government take action immediately to narrow the revenue gap and prevent the

Highway Trust Fund from going into deficit in 2009. Indexing federal motor fuel taxes is recommended as having the most immediate and substantial impact. For the longer term, the study recommends that states and local areas implement two mileage-based transportation revenue systems: a state vehicle-miles of travel (VMT) fee charged to all users as a supplement to and perhaps eventual replacement for state motor fuel taxes; and a local-option VMT fee implemented at state and local discretion to address urban congestion and local transit needs.

Relevance: The study is one of several major studies examining the **funding** available for transportation improvements, including freight system improvements. The findings of this study and similar reviews by the Hudson Institute, AASHTO, and TRB point to the need for greater federal revenue and investment, but also underscore the importance facilitating and leveraging private sector investment in freight systems. The findings emphasize the growing importance of understanding the objectives, procedures, and criteria used by the public and private sectors in decision making about freight investments.

Cambridge Systematics, Inc. *Financing Freight Improvements*. U.S. Department of Transportation, Federal Highway Administration, Washington, D.C. 2007.

Description: The report is a guidebook for FHWA, states, metropolitan planning organizations (MPOs), and others involved in the identification of freight needs, developing financing plans to fund projects designed to address these needs, and involved in the actual delivery of projects. The report describes the palette of existing federal funding programs and financing tools for freight projects and provides two dozen detailed case studies of freight projects that have been funded by the public sector alone or jointly with private sector partners.

Relevance: The report documents the diverse and expanding number of approaches to public and public-private **financing** of freight projects. It does not describe the public sector decision making behind the case studies, but illustrates the range and complexity of freight projects to which decision-making guidelines and tools must be applied.

Institute of Transportation Studies and ICF Consulting. *Metropolitan-Level Transportation Funding Sources*. American Association of State Highway and Transportation Officials, Washington, D.C., Dec. 2005.

Description: This report documents current funding techniques and funding allocation methods used by metropolitan planning organizations (MPOs) and local governments. Historically, regional transportation projects have relied heavily on federal- and state-level funding and financing mechanisms. The report examines using local-option sales taxes and other mechanisms to fund projects deemed important to local economic development, including some freight projects. It provides information on MPO operating expenditures and project costs, and a summary of state and potential regional sources of revenue for MPOs. Case studies from small to large-sized MPOs highlight examples of various revenue generation techniques.

Relevance: This study provides one of the few overviews of the **resources** available to MPOs and local government and provides insight into the issues shaping MPO decision making.

Urban Land Institute. *Infrastructure 2007: A Global Perspective*. Washington, D.C., 2007.

Description: This report summarizes the findings from four multi-disciplinary forums and parallel research on infrastructure capacity and investment trends. This paper explores the roles of public and private finance in infrastructure investment. Using global examples as a measuring stick, the report describes the U.S. transportation system. Freight infrastructure investment is identified as a critical need to keep the economy viable as well as combat overall congestion trends. This report targets a number of institutional improvements as well as potential funding

options to assist public and private decision makers in finding solutions to current and predicted transportation investment budget shortages. Privatization is discussed at length, as well as public funding tools such as TIF, taxation, and tolls.

Relevance: The report provides a broad overview of the **resources** for investment in freight, reviewing infrastructure investment trends and issues against which to evaluate current planning and investment in freight transportation infrastructure.

References Focusing on Transportation Decision Making

General Information References

American Transportation Research Institute. *Top Industry Issues*. 2004, 2005, 2006. http://www.atri-online.org/2007_top_industry_issues.pdf

Over the last several years the American Trucking Associations Federation has commissioned ATRI to conduct a survey that identifies critical issues facing the trucking industry. The final result is a “top ten” list of the high-level issues that are most pressing within the trucking industry. Because the survey is conducted annually, results for particular issues can be tracked longitudinally to determine changes in the relative importance to industry stakeholders.

American Transportation Research Institute (ATRI). *Trucking 101*. To be published as a TRB Circular.

Trucking 101 originated in the TRB Trucking Industry Research Committee and was developed primarily by ATRI. This circular will serve as a primer on trucking industry issues for those in both the public and private sector whose work has some nexus to the trucking industry, particularly those who are largely unfamiliar with the major operational definitions, constraints, and considerations facing the industry. The primer will include information on the different trucking industry statistics, sector descriptions and issues, and the predominate challenges facing the trucking industry. It is intended to provide a basic, high-level view of the industry.

American Trucking Associations. *American Trucking Trends 2005-2006*. Arlington, VA, 2006.

American Trucking Trends is produced by the American Trucking Associations and provides a broad range of information and high-level statistics regarding the activities of the trucking industry. This publication uses information from government-maintained datasets including the Motor Carrier Management Information System and Federal Highway Statistics, as well as data from original surveys. This publication includes industry demographics, major market segments, fuel and operational costs, driver demographics, and the type and amount of taxes paid by the trucking industry.

Costello, B. *Trucking Economic Review*, American Trucking Associations, Washington, D.C., Vol. 6(4), 2004. <http://www.truckline.com>

The American Trucking Associations produces a quarterly newsletter that covers a variety of topics related to trucking industry operations and economics. The newsletter also covers international commerce and shipper issues that result in secondary and tertiary impacts on the trucking industry. It also includes information on truck capacity, fuel use, and other industry-specific costs.

Council of Supply Chain Management Professionals, State of Logistics Report, 2007. <http://cscmp.org/Resources/SOL.asp>

This annual report published by the Council of Supply Chain Management Professionals estimates annual logistics expenditures across all modes, based on carrying costs, transportation spending, logistics administration, and shipper costs.

Intermodal Association of North America. *Intermodal Freight Transportation*, 4th ed., IANA, Calverton, MD, 1999.

This publication contains a broad range of information on intermodal freight transportation including technology trends, equipment, operations, containerization, and government agencies.

Rodrigue, J.P., Comtois, C., Slack, B. *The Geography of Transport Systems*, Routledge, London and New York, 2006.

The book provides an excellent overview on transportation and covers nearly all relevant issues regarding freight transportation that is of relevance in today's political climate.

Freight Forecasting

American Trucking Associations. U.S. Freight Transportation Forecast to 2017. Arlington, VA, 2006.

U.S. Freight Transportation Forecast to 2017 is developed by Global Insight under the sponsorship of the ATA. It uses trend analyses and other tools to forecast the performance of the trucking industry in the future. Although there is some emphasis on trucking industry issues and demand, the publication includes information on all modes.

Freight Transportation Research Associates. *U.S. Freight Outlook by Mode*. Nashville, TN, 2004.

The U.S. Freight Outlook by Mode is a quarterly report that includes data from all modes of freight movement by commodity. The data are collected on a quarterly basis and date back to 1992. The report also forecasts freight demand 7 to 10 quarters out.

International Air Transport Association. Freight Forecast, Washington, D.C., 2001. <http://www.iata.org/ps/publications/9266.htm>

IATA's report is a 5-year forecast of freight activity in the air transport sector. The report is based on an industry survey of major air transport professionals. The report includes global, regional, and country-specific forecasts.

Academic Resources

Adams, T., et al. Upper Midwest Freight Corridor Study—Phase II, Midwest Regional University Transportation Center, University of Wisconsin-Madison, 2007.

This publication is based on 11 white papers that were written on factors relating to freight movement and public policy throughout the Upper Midwest region of the United States. These papers provide a wide range of information on factors critical to the performance of freight transportation in the region. Thirteen key initiatives are identified as being necessary to respond to increased freight demand.

Cambridge Systematics, Inc. *NCHRP Report 388: A Guidebook for Forecasting Freight Transportation Demand*. Transportation Research Board, National Research Council, Washington, D.C., 1997. <http://pubsindex.trb.org/document/view/default.asp?lbid=483009>.

NCHRP Report 388 serves as a tool to assist public sector transportation officials with freight planning. The report includes information for planners in all modes of transportation. It also includes references to other relevant resources, information on factors that impact freight

demand, data sources, and information on developing surveys, case studies, and information needs for the public sector.

MIT Center for Transportation and Logistics. Freight Transportation Infrastructure Survey: Causes and Solutions to the Current Capacity Crisis. Massachusetts Institute of Technology, Cambridge, MA, 2006.

This survey report investigates the perception gap among freight transportation stakeholders in order to discover the root causes of congestion and the capacity crisis, the resulting effects on business and the solutions that are or should be used to assuage these impacts. Following a discussion of the findings, recommendations for short- and long-term strategies to enhance communication among stakeholders are offered.

Robins, M., and Strauss-Wieder, A. Principles for a U.S. Public Freight Agenda in a Global Economy. Transportation Reform Series, The Brookings Institute, Washington, D.C., 2006. http://www.uppermidwestfreight.org/files/Brookings_freightsystems.pdf.

The objective of this research is to summarize the key issues and trends affecting the nation's increasingly strained freight system, provide examples of efforts to address these strains and the land uses involved, and identify the current roles played by government agencies.

Shafran, I. *NCHRP Report 421: Economic Trends and Multimodal Transportation Requirements*, TRB, National Research Council, Washington, D.C., 1999.

This report includes an analysis of economic trends impacting the performance of the multimodal freight transportation system. In addition to these trends, it includes information on business responses to these trends. The intended audience is state transportation departments and MPOs.

Special Report 271: Freight Capacity for the 21st Century. TRB, National Research Council, Washington, D.C., 2003. Available at <http://onlinepubs.trb.org/onlinepubs/sr/sr271.pdf>.

This report identifies constraints in the freight planning process that have limited the efficiency and productivity of the transportation system. The report suggests changes in government policies that will contribute to better planning through more rational investments that will ultimately improve the efficiency of freight transportation.

Upper Great Plains Transportation Institute. North Dakota Strategic Freight Analysis: Regional Strategic Freight Study on Motor Carrier Issues. North Dakota State University, Fargo, ND, 2007. <http://www.ugpti.org/pubs/pdf/DP184.pdf>.

The UGPTI report describes many of the impacts that truck size and weight regulations have on the efficiency of the transportation system. The need for states to cooperate to develop uniform regulations is highlighted, along with the economic and system efficiency effects of making changes to truck size and weight regulations.

Government Resources

Federal Highway Administration. Federal Highway Cost Allocation Study. U.S. Department of Transportation, Washington, D.C., 1997. <http://www.fhwa.dot.gov/policy/hcas/final/index.htm>

There have been many discussions about the financial equity of highway use among the different classes of vehicles. This cost allocation study is an analysis of the costs of using the highways by various vehicle classes, as well as the amount of funding contributed by each vehicle class. Although this report is not specific to freight planning, it does highlight the economic responsibility of freight as it is transported along the nation's highways compared with other vehicle classes.

Federal Highway Administration. Freight Technology Story, Freight Management and Operations. U.S. Department of Transportation, Washington, D.C., 2005. <http://ops.fhwa.dot.gov/freight/intermodal/index.htm>.

As demand for goods movement continues to increase, technology can be used to ensure that the freight system works as efficiently as possible. Technology is currently being used for asset tracking, traffic system monitoring, onboard shipment status, and facilitating non-intrusive inspections, which all contribute to a smoother flow through the freight networks. This report includes information on various technologies available to freight stakeholders and some of the benefits they help achieve for both the private and public sectors.

Oregon Department of Transportation. Oregon Transportation Plan Update Background Paper: Transportation and the Economy, Salem, OR, 2004. <http://www.oregon.gov/ODOT/TD/TP/docs/otpPubs/EconPolRev.pdf>

Oregon DOT completed this study on how the economy is interrelated with the transportation system. When the transportation system is congested, deliveries are delayed and delivery times are unreliable. The economy is additionally impacted because highway congestion correlates directly to increases in labor costs and decreased interest in economic development by businesses. As a result, Oregon has developed a policy framework that includes linking economic development growth opportunities with major transportation planning decisions, emphasizing the importance of passenger transportation, and using a multimodal freight network.

Sedor, J. Improving Freight Transportation, *Public Roads*. Federal Highway Administration, Vol. 69(4), 2006. <http://www.tfhr.gov/pubrds/06jan/06.htm>

This article summarizes findings from a survey conducted among federal, state, and local freight industry stakeholders between 2000 and 2002. The survey respondents emphasized a variety of needs including better cooperation between the public and private sector during the planning process, innovative financing mechanisms, and improved data. The respondents additionally cited the need to improve stakeholder knowledge of existing databases and resources, and fostering the development of skills among key stakeholders that would assist with forecasting and planning processes.

Security Issues

American Association of State Highway and Transportation Officials. Transportation Security Task Force. National Needs Assessment for Ensuring Transportation Infrastructure Security, AASHTO, Washington, D.C., 2002.

This study focuses on traffic system security to prevent terrorist attacks. It identifies three key security planning program areas: (1) protecting critical mobility assets, (2) enhancing traffic management capabilities, and (3) improving state DOT emergency response capabilities.

National Transportation Safety Board. Most Wanted List: Transportation Safety Improvements 2009, Washington, D.C., 2008. www.nts.gov/Recs/brochures/MostWanted_2009.pdf

This brochure deals with safety issues in all transportation modes.

Other References

Abouchar, A. *Transportation Economics and Public Policies: With Urban Extensions*. John Wiley & Sons, New York, NY, 1977.

This book provides the economic and political calculus as well as background knowledge for the public and private sector for decision making in transportation economics and points out the differences.

Banister, D. Chapter 5: Contemporary Transport Policy. In *Transport Planning (Transport, Development and Sustainability)*, 2nd ed., Spoon Press, New York, NY, 2002.

The chapter concerns the recent policy debates on the environment and sustainable development as well as the implications that regulations have for transport in the United Kingdom. The chapter contains several tables that present a clear overview of different policy measures.

Golob, T., and Regan, A.C. Impacts of Highway Congestion on Freight Operations: Perceptions of Trucking Industry Managers. *Transportation Research, Part A—Policy and Practice*, Vol. 35, Issue 7, Aug. 2001, pp. 577-599.

The article investigates the congestion at ports in the states and describes when congestion is likely to occur. It then provides samples of different ports in California and concludes that congestion and waiting times could be lowered if intermodal operations increased private-public collaboration, which in turn would create more sustainable growth.

Haynes, K.E., Gifford, J.L., and Pelletier, D. Sustainable Transportation Institutions and Regional Evolution: Global and Local Perspectives. *Journal of Transport Geography*, Vol. 13, Issue 3, Sept. 2005, pp. 207-221.

This article is concerned with the gap between sustainable transport policy and the implementation problems when the traditional patterns of political organizations are not reasonable. It evaluates the problems different organizations face and describes the European regional, the NAFTA regional, and the Mercosur regional experience as examples of harmonization and deregulation.

Holguin-Veras, J, and Lopez-Genao, Y. Truck Trip Generation at Container Terminals: Results from a Nationwide Survey. In *Transportation Research Record: Journal of the Transportation Research Board*, No. 1790, Transportation Research Board of the National Academies, Washington, D.C., 2002

Research conducted on truck-trip generation at marine container terminals based on a nationwide survey that gathered data from 21 container terminals in the United States. The analyses of both trip-generation rates and the regression models indicate that there are statistically significant differences in the regional patterns of trip generation.

MDS Transmodal Ltd. Great Britain Freight Model (GBFM) Methodology. Chester, UK, 2004. http://www.mdst.co.uk/gbfm_doc_d10.pdf

The GBFM forms part of the DfT National Transport Model and has been applied within the DfT's Ten-Year-Plan, the Rail Authority's Freight Strategy, and a number of other studies. This paper documents the project as well as the multimodal model.

Regan, A.C., and Golob, J.M., Trucking Industry Demand for Urban Shared Use Freight Terminals. *Transportation: Planning, Policy, Research, Practice*, Vol. 32, No.1, 2005, pp. 23-36.

The article suggests the need for public-private partnership and examines the intermodality of freight and the enhanced efficiency of urban shared freight terminals. While inter-urban freight movements were becoming increasingly efficient, there were significant diseconomies in the movement of freight via truck within urban areas. In the past few years, the concept of "Urban Ports" to provide a place near the urban center for truckers to wait out peak traffic periods has gained increasing attention. This article examines trucking company interest in such facilities.

Review of Research on Freight Transport and Logistics (Alan McKinnon ed.). Federal Transit Administration, U.S. Department of Transportation, Washington, D.C., 2004.

This is a collection of papers covering a broad variety of freight transportation issues: Supply chain management; benchmarking and best practice; energy efficiency; environment; traffic

growth and congestion; safety issues and traffic accidents; transport infrastructure; city logistics; regulatory policy and taxation; rail freight; shipping, ports, and ferries; information technology and communication; outsourcing/third party logistics; air freight; regional development issues; vehicle design and technology; and employment and training.

Robinson, R., 2002, Integrated and Intermodal Freight Systems: A Conceptual Framework. IAME Conference, Panama, 2002.

This work introduces a fully integrated, value-driven freight model and determines how firms can create superior value by involving different sets of low cost activities. It explains port-oriented value-driven chains, supports graphics and argues for economies of scale. It discusses market and policy settings. It concludes that value is a function of the degree of integration of business processes.

Tavasszy, L.A. Freight Modelling—An Overview of International Experiences. Presented at the TRB Conference on Freight Demand Modelling: Tools for Public Sector Decision Making, Washington, D.C., September 25-27, 2006.

This paper provides key policy issues for the European market and a summary of international experience in 3 different areas of innovation (see pages 5 to 9), that is, freight economics, logistic behavior, freight trips, and networks. Policy issues and modeling needs are presented in a table. The paper summarizes the international state of the art in freight modeling, with a focus on developments in Europe.

Train, K., and Wilson, W.W. Shippers' Responses to Changes in Transportation Rates and Times. The Mid-American Grain Study. Report No. 04-NETS-R-02. U.S. Army Corps of Engineers, Alexandria, VA, 2004.

A survey of grain shippers was conducted to obtain information about the mode and origin/destination (O/D) of their shipments, the next-best alternative mode and O/D, as well as factors that might induce the shipper to switch to the next-best alternative. The share who would switch rises with the magnitude of the transportation rate increase, though less than proportionately. While many shippers are bound to respond to fairly small changes in rates or transit times, a large share of shippers are found to be essentially insensitive to large changes in rates and times.

Transportation Research E-Circular E-C088: Economic Geography of Food Distribution in the United States. Transportation Research Board of the National Academies, Washington, D.C., 2006.

Information resulting from the Commodity Flow Survey (CFS) provides a cornerstone for existing freight planning activities. As a national survey with limited resources, the CFS has been pushed to its limits by stakeholders attempting to meet their national, regional, state, and to some extent, local freight planning needs. This conference was designed to engage these stakeholders in a dialogue to understand the survey better, see how other data sources are being used to supplement it, and explore ideas to improve its future iterations.

TR News, No. 221, Inland Waterways—Opening the Channels, Transportation Research Board, National Research Council, Washington, D.C., July–August 2002.

This issue highlights the importance of inland waterways and illustrates the history of the Erie Channel and all related activities regarding the development of the Erie Channel. Furthermore, it contains some more examples like the Ohio and the Lower Mississippi River in the United States and the Rhine River in Europe.

Tsamboulas D., and Kapros, S. Decision-Making Process in Intermodal Transportation. *Transportation Research Record: Journal of the Transportation Research Board*, No. 1707. TRB, National Research Council, Washington, D.C., 2000.

A methodological framework with models is provided that correlates behavioral and perceptual issues related to the use of intermodal transportation. Three decision patterns and their respective actor groups' profiles are identified. The first group consists of actors who decide almost exclusively according to the cost criterion; these actors are intensive users of intermodal transportation. The second group's actors decide according to both quality and cost criteria, using less intermodal transportation. The third group's actors are influenced in their decisions by specific logistics needs. The application of the model defines the extent to which changes in the values of relevant variables may shift a decision toward the use of intermodal transportation.

Wilson, G.W. The Relative Importance of Regulation of Transportation vis-a-vis Everything Else. In *Economic Regulation: Essays in Honor of James R. Nelson* (Kenneth D. Boyer, and William G. Shepherd, eds.). Institute of Public Utilities, Division of Research, Graduate School of Business Administration, Michigan State University, East Lansing, 1981.

This essay is in a collection of essays on freight transportation issues.

Case Studies

The example projects analyzed for best practices in public-private sector relationship building are described in detail in this appendix.

Alameda Corridor—California

1. **Description of public-private partnership initiative:** The 20-mile Alameda Corridor connects the ports of Long Beach and Los Angeles with downtown Los Angeles rail yards. While the construction of the Corridor began in 1997, its inception was about two decades earlier. The Corridor reduced the miles of rail in the area by about one quarter, cut out about 200 rail-highway crossings, and has reduced the need for cross town truck movements of cargo. In addition to easing freight and passenger congestion, there are reductions in air and noise pollution compared with those under the baseline traffic conditions.
2. **Timing of project:** Construction on the first of the series of Corridor projects began in 1997. The Corridor opened to rail traffic in spring 2002.
3. **Beneficiaries:** The region, local residents, carriers, and general public all benefit. Significant changes are less congestion, far fewer grade crossings, expedited freight movements between ports and rail yards, lower air and noise pollution, construction on-the-job training. The website for the Alameda Corridor lists several benefits. These include greater efficiency of cargo distribution; removal of 200 highway rail crossings; reductions in rail, truck, and auto emissions; reductions in noise from rail; creation of thousands of jobs over the course of the project; an achieved goal of 22% participation by disadvantaged business enterprises (DBEs); and outreach and job training programs.
4. **Financial:** The Alameda Corridor was completed within its budget of \$2.4 billion. Half the money was raised by issuing bonds; the remainder came from government or quasi government sources (from ACTA website):
 - \$1.2 billion from revenue bonds issued by Alameda Corridor Transportation Authority;
 - \$394 million from ports of Long Beach and Los Angeles;
 - \$347 million in grants from Los Angeles County Metropolitan Transportation Authority (LACMTA);
 - \$400 million 30-year loan from U.S. DOT;
 - \$154 million in other state and federal sources plus interest income.

According to ACTA, debt is being repaid through use fees levied on the railroads. Over 30 years, these fees are to increase annually, from a minimum of 1.5% up to 3% per year, depending on inflation. Current charges are \$19.00 per loaded container (20 ft); \$37.00 (40 ft); \$42.00 (45 ft). Empty containers are charged \$5.00 for 20 ft; \$9.00 for a 40 ft; and \$11.00 for 45 ft.
5. **Participants:** ACTA, a joint powers authority, created in August 1989, built the corridor. ACTA comprises members of the LACMTA, a member from each city council (Carson,

Compton, Huntington Park, Long Beach, Los Angeles, Lynwood, South Gate, and Vernon), and representatives from the ports of Long Beach and Los Angeles. More than 124 engineering and construction firms participated in the series of projects that make up the Alameda Corridor.

As of now maintenance and operations are the responsibility of a committee made up of people appointed from Burlington Northern Santa Fe Railway, Union Pacific, Port of Long Beach, and Port of Los Angeles.

6. **Political issues:** ACTA is a joint powers authority created in 1989 for the project. It was responsible for outreach to both the public and government agencies at all levels and for coordinating all aspects of the project. ACTA, each of the eight cities along the route of the Corridor, and the County of Los Angeles signed Memorandums of Understanding that outlined administrative details such as procedures for building permits. The cities are Carson, Compton, Huntington Park, Long Beach, Los Angeles, Lynwood, South Gate, and Vernon. ACTA also facilitated cooperation among other players—the contractors and construction companies, ports of Long Beach and Los Angeles, Union Pacific, and Burlington Northern Santa Fe. A member of LACMTA is part of the Authority.
7. **Source of idea:** A history of shared ideas, concerns, and relationships in the region preceded the initiation of the series of projects that make up the Alameda Corridor. From informal debates and meetings, the process went forward to initiating research studies, pinpointing possible objectives, and forming a governing body to oversee the project.
 In 1981 Southern California Association of Governments (SCAG) created the Ports Advisory Committee (PAC), which undertook both highway and rail access studies. The PAC included representatives from local and federal (U.S. Navy and U.S. Army Corps of Engineers) governments, from the ports of Los Angeles and Long Beach, and rail and trucking industries. In 1985, the Alameda Corridor Task Force (ACTF) was created. Its membership was also made up of concerned public and private organizations, and it was expanded to include the California Public Utilities Commission and the cities along the corridor. ACTF recommended creation of a joint powers authority to have design and construction responsibility. ACTA was created in August 1989.
8. **Administration:** Currently, ACTA is a joint powers authority. It has design and construction authority. Members of ACTA come from LACMTA, from each city council (Carson, Compton, Huntington Park, Long Beach, Los Angeles, Lynwood, South Gate, and Vernon) along the Corridor, and representatives from the ports of Long Beach and Los Angeles.
9. **Best practices:** The most important elements in the process were cooperation and coordination among a diverse set of public and private constituencies. A history of informal and formal conversations provided a foundation on which to build. Many of the organizations involved are competitors for customers, for funding, for scheduling and sequencing of projects, but they were able to work together as partners on a project to benefit a wider set of interests. ACTA was created specifically for this project, as a joint powers agency. It is this agency that has overseen the process of design and construction of the Corridor.
10. **Challenges:** Lack of funding and buy-in by the private sector might have killed the project. The critical \$400 million dollar loan from the U.S. DOT made it possible to gain adequate funding from other sources. The initial reluctance of the railroads to become involved in such a complex project was overcome by the dire financial condition of the Southern Pacific Railroad, which helped force them to step up and participate because they were so in need of support for their continued operations. (The Southern Pacific was subsequently merged into the Union Pacific Railroad.)
11. **Application:** The Alameda Corridor program has been recognized by the U.S. DOT as an example of a successful, large-scale public works freight infrastructure program, in part for its public benefits, and because it was on time and on budget. Staff who have been part of

the project make these recommendations for other public sector agencies trying to replicate the elements of success achieved in this project:

- Create a governing agency with responsibility for the design and construction of the project (in the case of the Alameda Corridor this was ACTA);
- Build and maintain communication and cooperation among many jurisdictions (an absolute necessity);
- Sell the public on the benefits of the project through public outreach and the media.

Shellpot Bridge Rehabilitation (Delaware)

1. **Description of public-private partnership initiative:** An out-of-service freight rail bridge was restored to operation by a joint effort between the Delaware DOT (DelDOT) and the Norfolk Southern Railroad.⁴ As part of the state of Delaware's Freight and Goods Movement Plan, restoring rail service over this bridge was identified by the DelDOT as one action that could be taken to improve freight movement in the state. Rail service over the bridge had ceased in 1995 under prior owner, Conrail, when it judged the bridge had deteriorated and the cost to rehabilitate the bridge was too high to justify the expense by the private railroad for the available traffic.
2. **Beneficiaries:** With the state's assistance, financial aid was made available so that the new rail owner, Norfolk Southern, could be convinced to restore to operation the old movable rail bridge (the Shellpot Bridge) over the Christina River, which provides direct access to the Port of Wilmington. The Port of Wilmington, Delaware, is a seaport at the confluence of the Delaware and Christina Rivers, 65 miles from the Atlantic Ocean. The port is owned and operated by a state public entity, the Diamond State Port Corporation. The port is served by truck via Interstate 95 as well as by rail service provided by two Class I carriers, the Norfolk Southern and CSX railroads. The Port is a major Mid-Atlantic import/export gateway for maritime cargo and trade. It is the leading port in North America for the import of fresh fruit, bananas, juice concentrate, and meat. The port also handles import/export automobiles and roll-on/roll-off (ro/ro) cargo through the port as well as traditional bulk cargo, such as lumber, steel, paper and pulp, and petroleum products. The Port Authority, the port customers, and the state all stood to benefit from bridge service restoration.
3. **Source of idea:** Virginia Port Authority (VPA) was searching for ways to increase its market share of U.S. waterborne commerce. Members of VPA went to Rotterdam and England with a representative of Norfolk Southern to learn how and with what success marketing and operations of European transfer facilities and inland ports were accomplished. In tandem with this effort, it was necessary to quantify Virginia's potential market for freight traffic. Results of an earlier study (1980s) had shown that Virginia was not a large consumer or producer state by itself (due to low population density and lack of manufacturing).
4. **Opportunity:** When the bridge closed, rail service to the port degraded as port-related traffic was rerouted on Amtrak's Northeast Corridor (NEC), increasing transit times and decreasing reliability. Following the 1999 takeover of the bridge by Norfolk Southern as a result of the split up of Conrail, the potential for traffic over the bridge increased as Norfolk Southern was more interested in East Coast north-south rail traffic than Conrail had been. However, at the time, the infrastructure improvements needed and the poor cash position of Norfolk Southern following the Conrail take-over meant the railroad itself did not have the capital to make the investment.

⁴ Case study adapted from NCHRP Report 594, "Guidebook for Integrating Freight into Transportation Planning and Project Selection Processes," Transportation Research Board of the National Academies, 2007.

5. **Context:** DelDOT had created a Freight Rail Plan in 1999, just before the Conrail merger was completed that had examined the state's rail system and identified key issues affecting rail service into and out of the state. One of the primary goals of the 1999 DelDOT Freight Rail Plan was to increase rail's mode share for freight in Delaware, to which re-established rail service across the bridge could contribute. As Norfolk Southern provided service to key industries and their facilities in the state, restoration of the Shellpot Bridge and associated infrastructure was identified as an important strategy in meeting these goals. Because Norfolk Southern had separately recognized the Shellpot Bridge as a desirable project (even including the bridge rehabilitation in its long-term capital investment plan), the company was interested in discussing options with the state for advancing the project.
6. **Challenges:** The state and the railroad overcame their hesitancy to work together on the project. From the public side, DelDOT was hesitant to expend money and effort on a freight project. This project is another example of when states conduct freight planning activities and develop freight improvement projects, there can be uncertainty associated with spending public money on a privately owned infrastructure where the public cannot be sure that the public benefits will be fully realized (i.e., "what if we build this and they do not come?" Can the railroad generate the business to justify the public investment?). The railroad was hesitant to invest at that time because the expected ROI did not justify going forward when they had so little capital available after the Conrail purchase and when taking on additional debt would negatively affect its credit rating and therefore its ability to access additional capital for other purposes.
7. **Financial:** The solution developed jointly between the DelDOT Secretary and Norfolk Southern management to address these issues was a part grant, part loan financing. The restoration of the Shellpot Bridge was estimated to cost \$13.9 million, with DelDOT providing a \$5 million grant to the railroad and the remaining \$8.9 million provided as a loan. The loan was structured with a sliding-scale payback agreement in which the bridge is essentially operated as a toll facility (a sliding per-car tariff is charged based on overall volume) that guarantees DelDOT a minimum payback each year while encouraging the railroad to develop traffic over the restored line. This form of agreement allowed both parties to share the risks and rewards of restoring the bridge. DelDOT was guaranteed that it would make back its money from the loan with the minimum payback guarantees. While, with successful expansion of the rail business, DelDOT could make back more than the original loan outlay, essentially repaying some of the grant and permitting funds to be invested in other projects.
8. **Best practices:** This project worked because of a clear mix of public and private benefits and the desire of both sides to make the project work. An understanding on the part of the public sector of the business requirements for funding and the timing of financial flows made negotiations possible to complete. There was high-level advocacy for the project both from within the office of the Secretary of DelDOT as well as within the senior management of the railroad based on an understanding of each organization's respective needs. The bottleneck elimination aspect of this project helped narrow the scope of potential public and private benefits to be described to potential stakeholders and therefore helped gain acceptance from both sides for the deal.

Freight Action Strategy for Seattle-Tacoma Corridor (FAST)

1. **Description of public-private partnership initiative:** The FAST corridor comprises about 25 separate projects. One, the SR 509 Port of Tacoma Road, has been completed and seven others are under construction. The purpose of the FAST Corridor is to move freight from

the ports to the mainlines more safely and efficiently. The emphasis in this project is to replace grade crossings with grade separations.

2. **Timing of project:** Efforts on the part of multiple groups to understand the changes and congestion in the region began in 1994 and 1995. The Puget Sound Regional Council (PSRC) and the Ports were concerned that mobility issues were affecting the ports' competitive stance. Then, in 1994-1995, Burlington Northern Santa Fe (BNSF) Railway decided to open an abandoned line that went through the City of Auburn. The acrimony caused by this decision turned into a court case that went to the U.S. Supreme Court over the issue of whether a city had a say in the re-opening of long abandoned rail. During this time both the railroad and the city were discussing mutual concerns about grade separations. In 1995, the State Legislature created a Freight Mobility Committee. Thus, by 1995, various people and levels of government were discussing their concerns about mobility, congestion, and safety. At the Port of Tacoma, a leader in the Intermodal Department was beginning to talk about the "big picture," that is, integrating local concerns into regional ones.

In 1997, Texas Transportation Institute (TTI) was hired to develop a matrix to prioritize projects that the different agencies and jurisdictions had identified. Here again the emphasis was on how a given project would work not only locally but also regionally. There was still no funding for these projects. However, based on the TTI report, there were 20 signatories (ports, railroads, and state, regional, and local organizations) to a Memorandum of Understanding that outlined a funding strategy and recognized the sequencing of possible projects. Although the agreement expired in the fall of 1998, the intent and content continued to be followed.

Applications for funding were submitted under the conditions of TEA-21 in 1998. Original estimates were for \$360 million. The state DOT agreed to contribute 50% of the cost, the federal government 25%, BNSF agreed to a corridor wide contribution of 5%, and the ports and other local and state bodies to the other 20%. The federal grant awarded allowed for fungibility—money could be moved around among the projects and the Port of Tacoma also agreed to that. BNSF, however, refused.

The state's share of the funding bill was to be \$4 million. Unfortunately, in fall 1998, when there was to be a referendum for bonds to raise the money, a counter initiative, Initiative 695, won at the polls and at least half of the expected FAST funding disappeared. At this point, FAST was at some risk. The fungibility clause was an enormous help in getting some projects off the ground to show federal and local people that the FAST organization could work through the funding issues and successfully complete one project. Some contractors even agreed to delay their starts (based on the earlier TTI study). The SR-509 was deemed a significant start to the effort, because it would not only free mainline capacity, but it also had high visibility in the area.

Construction for SR 509 began June 5, 2000 and was completed in October 2001. The cost was \$19.3 million.

3. **Completion status:** The SR-509 project is complete. The FAST Corridor comprises 25 projects, of which 15 have been designated FAST Phase I. Many of the Phase I projects have been completed and ground was broken on some Phase II projects in 2007. Phase I work with the city of Seattle and the ports of Seattle and Tacoma has yet to be completed, but the cities of Everett, Auburn, Kent, Tacoma, and Tukwila have seen most of the planned work completed. Individual projects were prioritized and approximate start dates were assigned over the initial 3-year period.
4. **Beneficiaries:** The region's problems with congestion will be ameliorated. Benefits will go to the Ports of Seattle and Tacoma, BNSF, and Union Pacific Railroads. Shippers can expect more efficient movements of their cargo and lower charges for container use. According to Dan Pike, since 70% of all the imports into the two ports are transshipments to the Midwest and beyond, receivers in the Midwest and east will benefit from faster delivery, as well.

5. **Financial:** FAST projects are funded by federal entities (27%) and a combination of public and private sources (73%). Total expected cost would be \$400 million. Sources of funds are the Port of Tacoma, PSRC, FHWA, U.S. DOT, and the BNSF and Union Pacific Railroads. The SR 509 project was \$19.3 million.
6. **Participants:** A number of agencies were involved in planning and design. These include Office of Urban Mobility; Washington DOT; PSRC; Seattle Tacoma region MPO; and Freight Mobility Roundtable. The roundtable is a committee of public and private sector representatives that provides a mechanism for collaboration and input.
 There is a contractor and an engineer. There are about 45 subcontractors, subconsultants, and suppliers, including engineering firms, trucking companies, and materials vendors.
 Ongoing maintenance and operations for each project are the responsibility of the city that has jurisdiction.
7. **Political issues:** Many agencies—local, regional, state, and federal—are involved, as well as two rail carriers and a committee especially created for the course of the project. These are
 - Port of Tacoma,
 - PSRC,
 - FHWA,
 - BNSF and Union Pacific Railroads,
 - Office of Urban Mobility, Washington DOT, and
 - Freight Mobility Roundtable, a committee of public and private sector representatives that provides a mechanism for collaboration and input. The group is co-sponsored by the PSRC and the Seattle Economic Development Corporation.
8. **Source of Idea:** Efforts to understand the changes and congestion in the region began in 1994 and 1995. PSRC, railroads, and the Ports were concerned that mobility issues were affecting the ports' competitive stance. In 1995, the State Legislature created a freight mobility committee. At the Port of Tacoma, a leader in the Intermodal Department was talking about the "big picture," that is, integrating local concerns into regional ones. Although no funding existed to resolve these issues, in 1997, several of the concerned parties agreed to hire TTI to develop a matrix to prioritize the projects that different agencies and jurisdictions had identified. While the basic ideas about solutions have not changed, changing circumstances in funding availability altered or delayed the start of individual projects.
9. **Administration:** There are representatives from 12 cities, 3 counties, PSRC, and Washington DOT, plus a trucking association, representatives from the railroads, and from the Freight Mobility Board. They have met monthly for almost a decade, but can meet more or less often depending on the need. Agendas for the meetings are structured to try to keep on track, with emphasis on focusing on the larger picture and reaching consensus. When the prioritization of grant requests is considered, the meetings are especially well attended. Participants are known to each other and various crises faced together over the years have cemented relationships.
10. **Best practices:** The most important element of success is to allow time to develop personal trust among members from the different organizations. When things go wrong or agreed on priorities have to change there is enough flexibility to isolate and resolve the issues. Making expectations realistic has been key to success, not promising more than can be delivered.
11. **Challenges:** The state's share of the funding bill was to be \$4 million. In late 1998, there was to be a referendum for bonds to raise the money; however, a counter initiative, Initiative 695, won at the polls and at least half of the expected FAST funding disappeared. At this point, FAST was at some risk. The fungibility clause in the federal grant was an enormous help in getting some projects off the ground to show federal and local people that the FAST organization could work through the funding issues. Some contractors even agreed to delay their starts to get at least one successful completion. The SR 509 project was deemed a significant start to the effort, because it not only freed mainline rail capacity, but also had high visibility in the area.

12. **Application:** The following broad observations can be made from the experience with the FAST project that may increase the effectiveness of other public-private partnership projects. These are
- Awareness of how the process can work is important at the start.
 - Understanding what combinations of organizations and people will be effective is important to setting up the initial structure of relationship mechanisms.
 - Once the right people have been brought to the table, it is important to provide incentives to keep them, or at least ensure that turnover is small enough so that the institutional memory continues.
 - A solution needs to be developed before the search for funding starts (one advantage is that the solution probably results in a cooperative effort.) Consensus can be a strength.

Neomodal—Northeast Ohio

1. **Description of public-private partnership initiative:** The Northeast Ohio Intermodal Terminal is a 28-acre intermodal transfer facility located in Navarre, Ohio. At the time it was planned, the area was served by three Class I railroads. Built with federal funds in 1995 and owned by Stark Development Board (SDB), it faced difficulties when Conrail was sold and traffic diverted elsewhere. In summer 2000, the Wheeling and Lake Erie Railroad (W&LE) and Canadian National (CN) railroads signed an agreement to supply train service to and from the terminal. Neomodal is also a designated Foreign Trade Zone (#181).
2. **Timing of project:** The process began in the early 1990s when a large manufacturer in the region became frustrated in its efforts to expand. To assist it in moving a rail spur, the state was instrumental in gaining funding. Construction of the facility occurred in 1995 and took about 6 months to complete. The project was on time and on budget.
3. **Completion status:** The intermodal transfer facility was built in 1995.
4. **Beneficiaries:** Local and regional economy benefited with the preservation of jobs and the creation of new jobs when Fleming Foods undertook its major expansion. The Neomodal Terminal, which is part of a designated Foreign Trade Zone, was expected to act as a magnet for new business.
5. **Financial:** The state of Ohio applied for an ISTEA grant and the state made a non-recourse loan to SDB to build Neomodal. In turn, SDB had the responsibility to run Neomodal efficiently and to market it. After operations start up, any profits (net toll fees) were to go back into a revolving loan fund that was set up by the state of Ohio. Those funds were designated for three agencies, a local (NE Ohio) transportation agency, the Ohio Erie Canal Corridor, and a third agency. The facility was built within budget. Financial arrangements took about 2 years from start to finish.
6. **Participants:** While the state of Ohio retained oversight, SDB hired the engineers and architects. They had help with the design of the terminal from Norfolk Southern and CSX railroads, who at the time wanted to gain a presence in the Cleveland area.
 When the project began, the area was served by three Class I railroads; Conrail, Norfolk Southern, and CSX. However, when Conrail was broken up, its Collinwood Terminal was taken over by CSX, which moved its business there, and the Neomodal terminal languished. A turning point came in 2000 when W&LE and CN signed an agreement to use Neomodal. W&LE has a lease to operate the facility. A subsidiary of the Wheeling Corporation, Intermodal Operators, Inc., runs Neomodal on a day-to-day basis.
7. **Political issues:** Ohio DOT and a senator from Ohio worked together to apply for (federal) ISTEA funding for the project.
8. **Source of idea:** In the early 1990s, a large manufacturing firm in Stark County wanted to expand its operations, but it was unable to do so because a rail line was at the edge of its property and the firm did not wish the expense of moving it. If the firm were to leave, 400 jobs would be lost. On the other hand, if it undertook its expansion, it would be adding another

200 jobs. In part because of the size of the economic impact involved, the Ohio DOT investigated the issues and brought in an Ohio senator. They decided to apply for an ISTEA grant to move the rail spur to allow expansion of the company (Fleming Food Co.). When this project was successfully completed, Ohio DOT applied for and received full funding—\$11 million—for a demonstration project to build an intermodal transfer facility. Existence of the facility was to relieve congestion and lower emissions and noise pollution.

9. **Administration:** Once the funding was available SDB, a private developer, received a non-recourse loan. Stark had primary jurisdiction over the course of the project.
10. **Best practices:** The innovative financing was a major key. The money was made available for the project from ISTEA funds by the federal government via the state government. Then, a non-recourse loan was provided to a private corporation, SDB, to design, build, and operate the terminal.

The Neomodal Terminal is a Foreign Trade Zone site (#181).

11. **Challenges:** The project was conceived in an environment where three Class I railroads served the area. Norfolk Southern and CSX Transportation (CSXT) were both eager for a presence in the Cleveland region to be able to compete with Conrail for traffic. However, when Conrail was broken up Norfolk Southern and CSXT went from being partners with Neomodal to being competitors. Conrail's nearby Collinwood (Cleveland) Terminal was taken over by CSXT, which moved its business there, and the Neomodal facility languished. Prior to the acquisition of Conrail, Neomodal had been handling about 6,000 containers per year from CSXT, which was trying to develop an intermodal traffic market in the region.

When the traffic was shifted to Collinwood, Neomodal was left with a business base of about 600 lifts.

SDB undertook several major actions to try to offset these events. During the acquisition process it filed with the Surface Transportation Board to protect Neomodal, but was unsuccessful. The Stark Development Board also remained in contact with CSXT and Norfolk Southern and continued to negotiate for their business, but no offers were made or taken. The enterprise has continued its active search for customers and has been able to survive in a bare bones mode. The original budget for the project had made provision for some extra funds, which had not been spent. In addition, SDB asked for and received additional money from Ohio (about \$250,000).

A turning point came when W&LE Railroad gained trackage rights from the Surface Transportation Board into Toledo, Ohio. There it could interchange traffic with CN. In 2000, W&LE signed an agreement with CN to provide domestic and international service, and both carriers are now marketing their services and rates and the Neomodal facility. SDB is also expanding its marketing efforts, to take advantage of the CN system.

12. **Application:** The financing arrangements developed for the facility were of great significance to the completion of the project. The state of Ohio received ISTEA funds from the federal government. In turn, the state set up a revolving loan fund. It made a non-recourse loan to SDB to build and operate the terminal. Once the terminal was operating, toll revenues were to be used for operating and other expenses. Any profit was to go back into the revolving loan fund to be used for other projects. In the Neomodal instance, these profits were to be designated to three specific agencies.

Virginia Inland Port at Front Royal⁵

1. **Description of public-private partnership initiative:** Virginia Inland Port, an intermodal container transfer facility, opened in 1989. It is a U.S. Customs designated port of entry and

⁵ Source: Bray, J. Robert. Virginia Inland Port: The Case for Moving a Marine Terminal to an Inland Location. American Association of Port Authorities, Alexandria, VA, Sept. 1996.

a Foreign Trade Zone located by an interstate highway and about 220 miles west of Norfolk and Hampton Roads, Virginia, where much of its container traffic originates and terminates. After its opening, the population of this rural area spoke out about its expectation that the port would be treated as an opportunity for regional economic development. Therefore, Virginia Port Authority (VPA) hired a firm to develop a strategic plan and hired marketing and sales personnel to create a campaign to sell the facility.

2. **Timing of project:** The immediate driving force behind development of Virginia Inland Port was competition for cargo, especially that from Baltimore. Norfolk was apparently missing out on winning traffic because transportation costs were higher to move freight by truck from Norfolk. VPA had to come up with a way and then a site that would answer these issues.

According to VPA, active research on the potential of Virginia Inland Ports began in 1984 with meetings in Rotterdam and England to discuss operations and marketing of intermodal terminals and inland ports. Over time, VPA began expanding its vision to promote and increase maritime commerce. While it had started by marketing the Port of Virginia to shippers, it moved into marine terminal development, actually constructing and operating facilities, thereby gaining rental and leasing income. VPA generates net income.

Plans for an inland port were announced in summer 1987, and the port opened March 1989.

3. **Beneficiaries:** The project began as a way to increase revenues for VPA, which is a public agency in the Commonwealth of Virginia.

Because of local interest, the concept was widened into a regional economic development project. According to James Davis of the Virginia Inland Port, results of a questionnaire to recently arrived manufacturers and other facilities indicated that Virginia Inland Port has been one element in the decision to move into the area. This decision "... has spurred nearly \$400 million in private sector capital investments." Most of the new business is in warehouse and distribution facilities, but there is some manufacturing activity as well. VPA does have a community liaison person in place at Front Royal to ensure an ongoing dialogue with the local infrastructure and economic development people.

4. **Financial:** Financing of the inland port came from the Commonwealth Port Fund and VPA port revenues. The original cost was estimated at \$7.3 million for acquisition and development of the site. Soil conditions and rocky terrain (underground caverns) required an additional \$6 million for completion.
5. **Participants:** The VPA and its creation, Virginia International Terminals, Inc., were seeking ways to increase their revenues by increasing market share of the Ports of Virginia. They were the agencies that initiated financing and construction of the facility.

As of 1998, the Virginia International Terminals, Inc., operates the facility. It is a private not-for-profit company. It broke even in the fiscal year ending June 30, 1994. The revenues are what pay for the day-to-day operations of the VPA. Virginia International Terminals, Inc., links the operations of the inland port with its own and is thereby able to coordinate container movements with rail availability and ship line departures and arrivals, and can track moving cargo. This also allows Virginia International Terminals, Inc., to monitor the volume of business for particular customers. Virginia International Terminals, Inc., is responsible for maintenance on equipment at the port, but VPA is responsible for the grounds and buildings.

VPA fosters outreach to local economic development officials.

6. **Public agency roles:** VPA, the state's port authority, was created in 1952 by the Virginia General Assembly. It is responsible for gaining business for the Port of Virginia and income for the Commonwealth and was the immediate driving force behind development of Virginia Inland Port. Today, VPA owns Newport News Marine Terminal, Norfolk International Terminals, Portsmouth Marine Terminal, and Virginia Inland Port.

Virginia Inland Port's Mission and Strategic Plan (1995) recommended VPA create an economic development center to aid in regional economic development. As a mechanism to foster relationships between the private customers of the facility and the public agencies, the VPA created the Virginia Inland Port Advisory Conference, which has members from business and rail and ship lines. This advisory group acts as an information-sharing center for the facility.

7. **Source of idea:** VPA was searching for ways to increase its market share of U.S. waterborne commerce. Members of VPA went to Rotterdam and England with a representative of Norfolk Southern Railroad to learn how and with what success marketing and operations of European transfer facilities and inland ports were accomplished. In tandem with this effort, it was necessary to quantify Virginia's potential market for freight traffic. Results of an earlier study (1980s) had shown that Virginia was not a large consumer or producer state by itself (due to low population density and lack of manufacturing).

VPA moved to address other aspects of the project. It developed and maintained relationships with carriers, did market research, investigated equipment issues, demonstrated possible cost savings for alternate container handling methods, and improved its cargo-handling facilities. However, it also needed to expand them. Norfolk Southern had been investigating ways to increase its market penetration in marine cargo, as well. Consequently, VPA commissioned a market study to focus VPA and Norfolk Southern efforts to locate an inland port. A later report concluded that the growth potential was in the Midwest and Southeast; and that most freight traffic moved through the state rather than originating or terminating there. The market study showed that the Ohio Valley area offered potentially an additional 100,000 container moves. Additional telemarketing and sales efforts revealed almost double that—190,000 containers per year. The goal was to capture 8 to 10% of the market. Virginia Inland Port now has about 19,000 lifts per year.

While the marketing plan originally envisioned international traffic, early in the port's existence, traffic was a 50/50 domestic and international mix. VPA and Norfolk Southern worked together to implement the domestic service. It is now 100% international traffic.

8. **Best practices:** According to Mr. Robert Bray of VPA, the Europe Combined Terminal recommendation was always to control the inland port rail and run the train on schedule at all costs.

Mr. Jim Davis of the Virginia Inland Port staff credits a hard-working visionary market department for much of the success of the port. A number of the port's larger customers are not from the area and were brought in by the marketing department's efforts.

Outreach and education were and remain active elements of VPA strategy. For example, there are contacts with importers and exporters, as well as ship lines, trucking companies, and freight forwarders and brokers. Currently, active outreach also includes local business leaders and rail and ship carrier personnel. There is also a full time economic development person who travels throughout the United States.

Virginia Inland Port is a U.S. Customs designated port of entry and has Foreign Trade Zone status.

9. **Challenges:** VPA was fortunate in having the backing of the Virginia state government. The local community was skeptical and resistant at the beginning of the process. Continuing efforts at public education and providing mechanisms for opening lines of communication helped to allay fears.
10. **Application:** With the proviso that each situation and project is unique, a spokesperson from VPA did say that the port had current inquiries about its creation and operations from organizations in South Carolina and Pennsylvania. One suggestion for agencies looking into the possibilities of an inland port is to bring local opponents to view the Virginia Inland Port's facilities and operations.

Chicago Area Consolidation Hub

1. **Description of public-private partnership initiative:** In Hodgkins, Illinois, near Chicago, United Parcel Service (UPS) initiated building a 1.9 million sq ft operating facility, called Chicago Area Consolidation Hub (CACH), as a national distribution center to expedite its east-west traffic. UPS located its facility by the BNSF's Willow Springs Yard. Once construction began, it became clear that infrastructure changes had to be made to allow optimum access and use of the facility. UPS paid for the 1.25-mile feeder road/interchange that led to/from I-294, and improved signals in the area. It and a consortium including BNSF Railway, two municipalities in the Chicago area, Illinois DOT, and other government authorities shared the cost of improved interchanges (UPS paid for one-third of the interchange).
2. **Timing of project:** Conceptually, the project began in the mid 1980s, as UPS began thinking about its need for a national consolidation point of sufficient size to make the project worthwhile, in a geographically accessible area, near a major arterial interstate, with adequate rail connections and with an available, sizable labor force. The building began in July 1991, and the first package moved in March 1995.
3. **Beneficiaries:** UPS, local population, and commuters were the anticipated beneficiaries of the project. UPS built the facility to improve its ability to deliver packages. Service levels are up. The company was given incentives by the state. In return, UPS guaranteed 2,700 full time equivalent jobs (80% part time, 20% full time). There are a total of 9,000 employees. Part time employees do get medical, dental, and optical benefits and, if they send for their prescriptions by mail, part of this cost is reimbursed. There are also education assistance programs and courses provided onsite. Working with two of the public transit entities, UPS got bus service for its employees out to the facility, and it reimburses its employees for part of their fares. UPS agreed to build a connector road—75th Street—to connect Willow Springs Road at one end of the property to Santa Fe Drive at the southeast tip of the property. The road is 1 mile long. The road was then turned over to the village of Hodgkins, which maintains it. The existence of the road has ancillary benefits because it allows emergency vehicles an easier path to get from one part of town to another. The access road and interchanges aided both the company and the commuters by expediting freight shipments and relieving congestion. UPS underwrote costs for signalization and turning lanes to aid traffic flow. A highway rail grade separation, rail over road (cost shared by UPS and BNSF), and highway access (costs shared with UPS, state, and the toll authority) to the rail terminal were provided. UPS gained some property and sales tax abatements. UPS pays real estate taxes to Hodgkins, and the town in turn has been able to lower taxes to its residents. Residents pay no property tax (there are taxes for education and so forth).
4. **Financial:** The UPS facility cost \$150 million and was paid for entirely by UPS. For transportation costs, public funding was 71% and UPS was 28%. Grade separation cost was \$15.3 million. IDOT and BNSF shared the cost, with IDOT providing \$8 million and BNSF the remainder. Interchange cost was \$10.8 million. IDOT paid \$2.5 million, Hodgkins Municipality paid \$5.5 million, and Illinois State Toll Highway Authority paid \$2.8 million. The total cost of transportation was \$26.3 million
5. **Participants:** A number of parties were involved in the process. Design and construction of the building revolved around the 65-mile conveyor system, which was designed by UPS engineers. There was a general contractor for the project. UPS is responsible for the ongoing maintenance and operation of the building, although some contractors assist the company.
6. **Political issues:** The site of CACH was originally the site of General Motors' Willow Springs Fisher Body Plant. The factory had been in existence for about 40 years. It was the Illinois Department of Commerce and Community Affairs that contacted UPS about purchasing the land and buildings. The governor at the time was aggressively seeking to enlarge the business base in the state. The state also offered funds to build an off ramp from I-294.

In turn, the Department of Commerce and Community Affairs involved other agencies: IDOT and the Illinois State Toll Highway Authority, an independent body responsible for maintenance and operation of the interstate funded by tolls collected.

There were some strong objections on the part of local citizens who were concerned about noise, vibrations, and traffic. One of the decisions made by UPS to allay fears was to build a one-half mile berm and to plant 100 trees to soften the effect of the construction.

7. **Source of idea:** The idea for the project began in the mid 1980s, when UPS began thinking about its need for a national consolidation point of sufficient size to make the project worthwhile, in a geographically accessible area, near a major arterial interstate, with adequate rail connections and with an available, sizable labor force. The land and building purchased was the site of the General Motors' Fisher Body Plant. The Illinois Department of Commerce and Community Affairs contacted UPS about the site. The state offered funds to assist UPS. UPS built its facility, but recognized other improvements were necessary to make it viable. It also had received incentives from the neighboring towns of Willow Springs and Hodgkins to build there.
8. **Administration:** UPS was the driving force behind the project. The company developed and maintained ties with the major players—local citizens, municipal and state government, and BNSF Railroad, and negotiated transportation-related funding.
9. **Best practices:** One entity (UPS) worked closely with all partners (villages, state, and railroads) and maintained those contacts so that all had input.
10. **Challenges:** Negotiations with the governor's administration had been smooth. The state government had been seeking businesses to augment the state's revenues. However, the state was facing some serious financial troubles in the early 1990s and fiscal restraints were going to be necessary. As a result of a change in governor, all financial agreements came up for review, including those for UPS, and all agreements had to be re-negotiated. Re-negotiation took approximately 1 year. In late 1990, UPS and the state of Illinois also signed a formal private-public written agreement.
11. **Application:** Much of the process involved working with unique local issues. However, UPS would use the practices it developed if it were to build another facility. The most significant advice is to start working immediately on building relationships with local and state governments.
12. **Most important advice:** Communication was key to the project, with transparency in terms of plans and ability to adapt to the changing political environment while the process was underway.

Abbreviations and acronyms used without definitions in TRB publications:

AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI-NA	Airports Council International-North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	Air Transport Association
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation