The Brookings Institution
Washington, DC

Transportation Reform Series

Metropolitan Policy Program

# Principles for a U.S. Public Freight Agenda in a Global Economy

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*The changing nature of the American economy—particularly increased overseas manufacturing and "just in time" delivery supply chain operations—directly impacts America's infrastructure needs especially when it comes to the movement of goods by freight, be it by truck, train, ship, or plane. In this paper, the authors argue that, rather than the Balkanized approach of the past, a systems-based and multimodal agenda for the nation's freight needs, involving regional coordination, public-private partnership, and federal funding recognition of the same is necessary to maintain America's competitiveness and economic well-being. Their argument is also accompanied by a broad overview of the freight system as it exists today, the multiple stresses affecting it, and a set of guiding principles and policies to meet these challenges.*

## I. Introduction

All the products consumers use and all the products businesses use get to market via America's freight system. And though Americans are utterly dependent on the freight system and its carriers, there is little understanding of the system's impact on our daily personal and business lives on either the macro level—as the gateway to the global economy—or the micro level—as deliverer of e-commerce purchases.

Freight also affects the nation in other ways. U.S. Department of Transportation (U.S. DOT) statistics show that truck traffic makes up more than 30 percent of the traffic on about 20 percent of Interstate System mileage and is expected to grow substantially over the next 20 years.[2] And the dynamics related to some freight businesses have, in many locations, consumed inexpensive greenfields on the suburban fringe, lengthening trips, and exacerbating existing congestion problems.[3]

According to the U.S. Bureau of Transportation Statistics (BTS), 43 million tons of goods valued at about $29 billion moved nearly 12 billion miles on the nation's interconnected transportation network each day in 2002.[4] The figures translate into 300 pounds of daily freight valued at about $100 transported over 43 miles for each person in the U.S. Nearly two-thirds of the overall value, half of the tonnage, and one-third of the miles of the nation's total commercial freight are moved by trucks. About 40 percent of the ton-miles are moved by rail.[5]

Currently, converging trends in the U.S. are increasing the importance of cargo movement to the competitiveness and economic well-being of the nation and simultaneously taxing the capacity of the freight system. The globalization of trade, the emerging "import"

economy, and other factors are moving more cargo, exacting consequences on most elements of the nation's freight infrastructure. Physical capacity limitations, missing links, equipment shortages, and labor shortages are affecting the efficiency of the overall network.

The purpose of this paper is to summarize the key issues and trends affecting the nation's increasingly stressed freight system; provide examples of efforts to address these stresses and the land uses involved; and identify the current roles played by government agencies. The particular and important challenges in northern New Jersey are analyzed as a case study. In the end, this brief proposes a set of guiding principles and a policy framework for the federal government, states, and regions as they reformulate transportation legislation, programs, projects, and funding to meet the new challenges of freight transportation.

## II. Overview of the U.S. Freight System

Freight moves in response to the needs of customers and businesses. Goods may travel within the freight transportation system via a single conveyance or "mode" of transportation, such as trucks, freight railroads, maritime vessels, or cargo aircraft. More commonly, however, the various modes work together to move goods between origins and destinations. Appendix A provides a more detailed description of the modes.

Freight transportation is not a simple process. As shown in Figure 1, freight transportation involves specialized equipment, terminals and infrastructure, information flows, and warehouses and distribution centers. The freight transportation system encompasses the entire logistics supply chain, including all modes of transportation, commodities, and businesses. Also, elements of the system are shared with other users, such as passenger cars on roadways and commuter transit on some rail rights-of-way.

**Figure 1. The Elements of Freight Transportation System**

| FREIGHT EQUIPMENT | FREIGHT TERMINALS AND INFRASTRUCTURE | WAREHOUSING DISTRIBUTION CENTERS |
|---|---|---|
| Trucks, railroads, aircraft, vessels. Pipelines may also be included | Air cargo facilities on and off airports, marine terminals, rail yards, truck terminals, transload/Intermodal yards, roadways, rail track | Value added processes, such as final assembly and store-readiness, occur at these facilities. |

TRANSACTION AND INFORMATION FLOWS: Banking, freight forwarding, insurance customhouse brokers, transportation orders, transportation management systems, etc.

Substantial private sector investment underpins much of the nation's freight movement. Essentially all trucks, rail equipment, and the vast majority of rail lines and yards are privately owned. Private terminal operators generally handle waterborne cargo flows, and these terminal operators invest hundreds of millions of private dollars in their facilities. All cargo aircraft are privately owned or operated, as are many of the on-airport and off-airport cargo facilities used by these freight providers. Warehouses and distribution centers are privately owned and privately financed.

But public infrastructure is an essential element in our nation's movement of goods. Trucks use public-financed highway infrastructure. Rail freight businesses may use rights-of-way owned by transit lines. Air cargo operations generally operate at public airports, and

government-employed flight controllers manage their movements. Waterborne cargo is generally handled through ports and on waterways owned or managed by public agencies and dredged with public funds.

Within this framework, freight flows take a variety of forms. Products can move from origin to destination by a single mode or be handled by multiple modes. Origins and destinations can be local; within a region or state; across multiple states or North America; international; or a combination. Goods produced overseas can move through U.S. ports to nearby warehouses. At these warehouses, the final assembly and shelf readiness of the products may be undertaken, and the products may include domestically produced components. From the warehouses goods may be moved long distances or else sent directly to local end users.

Each type of freight flow has its own complexities and issues. International movements are subject to trade agreements and U.S. Customs requirements. Domestic flows have effects on communities along the route but provide little direct economic benefit to these places. In addition, longer distance movements can involve multiple jurisdictions, each with its own regulations and priorities.

The complexity of the system makes the role of public agencies even more critical. For well over a hundred years, the federal government's role in freight was first as regulator and then as a builder of roads, waterways, and airports. Although much of the strict regula-

**Figure 2. The Roles of Public Agencies in the U.S. Freight System**

* = Role X = Role at some organizations

| | Agency | Infrastructure Development, Operation or Maintenance | | | | | Regulatory and Oversight | | | | | System Planning | | | | | Funding | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R | T | A | O | W | R | T | A | O | W | R | T | A | O | W | R | T | A | O | W |
| Federal | U.S. Treasury/ U.S. Customs | | | | | | * | * | * | * | * | | | | | | | | | | |
| | Federal Highway Administration | * | * | | | | | * | | | | | * | | | | * | * | | | |
| | Federal Aviation Administration | | | * | | | | | * | | | | | * | | | | | * | | |
| | Maritime Administration | | | | | | | | | | | * | * | | * | | | | | | |
| | Federal Railroad Administration | * | | | | | * | | | | | * | | | | | * | | | | |
| | Motor Carrier Safety Administration | | | | | | | * | | | | | | | | | | | | | |
| | Economic Development Administration | | * | | | * | | | | | | | | | | | | * | | | * |
| | Transportation Security Administration | | | | | | * | * | * | * | | | | | | | | | | | |
| | Army Corps of Engineers | | | | * | | | | | * | | | | | * | | | | | * | |
| | Surface Transportation Board | | | | | | * | | | | | | | | | | | | | | |
| State | State Departments of Transportation | * | * | X | X | | * | * | X | X | | * | * | X | X | | * | * | X | X | |
| | State Economic Development Agencies | | | | | | | | | | | | | | | | | | | | * |
| Regional and Multi | Port and Airport Authorities | * | * | * | * | X | * | * | * | * | X | * | * | * | * | * | * | * | * | * | * |
| | Metropolitan Planning Organizations | | | | | | | | | | | * | * | * | * | * | * | * | | | |
| Local | Local and Municipal Governments | X | * | X | X | | * | * | X | X | * | X | X | X | X | X | | * | X | X | * |

**R** – Railroads
**T** – Trucking
**A** – Air Cargo
**O** – Ocean/Waterborne Cargo
**W** – Warehousing

tion of rail, truck, marine, and air industries has been repealed over the past 25 years (for example, through the Motor Carrier Act of 1980 and the Staggers Rail Act of 1980) many federal agencies concentrate today on safety regulation or infrastructure financing for specific modes or specific freight flows (See Figure 2).[6]

The transition of federal agencies from detailed, mode-specific regulators and financiers to facilitators of multimodal system level planning and funding is still in the early stages. Federal agencies are still largely organized along modal lines, with separate agencies for trucking, rail, maritime and air movements. This structure has not kept pace with the widely adopted multimodal business practices in today's freight movement business.

Recent federal transportation laws—the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), the Transportation Equity Act of 1998 (TEA-21), and the Safe, Accountable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users of 2005 (SAFETEA-LU)—have increasingly considered the connectivity among modes or intermodalism. However, even these laws maintain many aspects of the existing modal orientation and largely confine federal funding to specific modes. For example, the Federal Aviation Administration's Airport Improvement Program restricts spending to on-airport improvements or to access roads controlled by the airport authority. Federal Railroad Administration expenditures similarly focus on railroad initiatives, such as Local Rail Freight Assistance and Railroad Rehabilitation & Improvement Financing (which was established through TEA-21 and improved through SAFETEA-LU).[7]

Some notable efforts have been made at the federal level to begin to advance a more multimodal approach to the freight system. These efforts include financing options, such as the Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA), and can be used for projects involving multiple freight modes. TIFIA allows the U.S. Department of Transportation (U.S. DOT) to make three forms of credit assistance available—secured (direct) loans, loan guarantees, and standby lines of credit—for large surface transportation projects of national or regional significance. SAFETEA-LU expanded the TIFIA program and lowered the threshold of funding to $50 million. However, modal restrictions remain in TIFIA; SAFETEA-LU states that if the TIFIA project is located within the boundaries of a port, the mechanism includes "only such surface transportation infrastructure modifications as are necessary to facilitate direct intermodal interchange, transfer, and access into and out of the port."[8]

SAFETEA-LU also created a Freight Intermodal Distribution Pilot Grant Program. The program is for projects that "relieve congestion, improve transportation safety, facilitate international trade, and encourage public/private partnership and may include projects for the development and construction of intermodal freight distribution and transfer facilities at inland ports."[9] The current funding has been fully earmarked for five projects in Oregon, Alaska, Georgia, and North Carolina (two projects in North Carolina).

In addition, ISTEA directed the U.S. DOT to establish an Office of Intermodalism within the Office of the Secretary. The mission of the Office of Intermodalism, established in 1992, was to coordinate U.S. DOT projects, programs and policies involving more than one mode of transportation. In practice, the Office of Intermodalism focused on policy and data collection. It was not empowered, either through regulatory functions or funding capabilities, to advance intermodal or multimodal capital projects. In 2004, the office was transferred to the Research and Innovative Technology Administration in U.S. DOT to focus on research. A small staff remained in the Office of the Secretary to formulate intermodal policy.

Another recent development is the establishment of Intermodal Project Facilitation Teams to coordinate major freight projects through the U.S. DOT. While several teams have been established to assist with major projects or in key areas (such as the Ports of Los Angeles/Long Beach, rail projects in Chicago, the Seattle/Alaskan Way Viaduct, and the Port of Anchorage), the teams are not empowered, either through regulatory functions or funding capabilities, to advance multimodal projects. The teams can, however, coordinate and facilitate federal agency involvement in these projects.

At the state level, agencies have programming, regulatory, and funding responsibilities. Transportation agencies may invest in, operate, and maintain the facilities and infrastructure used by the freight industry. In many states, departments of transportation (DOTs) remain modally divided, driven by current federal regulation and funding. Some states have, however, progressed beyond the federal government in terms of multimodal structure, funding, and project development.

At the regional level, metropolitan planning organizations (MPOs) are mandated, through their enabling federal legislation, to consider freight and economic development in their planning, as well as funding responsibilities. Many MPOs, as required by the federal legislation, have taken a multimodal view of freight in planning. In several states, MPOs have contributed to the development of successful intermodal initiatives. Examples of initiatives are provided later in this paper.

Port and airport authorities have direct responsibility for these facilities and may also fund or build connecting roads, rail lines, and warehouses. Airport and port authorities, with their bonding capability, can take a multimodal approach and are increasingly called on to use their authority and financing capacity to address multimodal needs in their jurisdictions.

At the local level, municipalities and towns also can affect freight facility development and operation. For example, municipalities may regulate the hours when loading docks can be in operation, enforce zoning, noise ordinances, and redevelopment planning for warehousing and distribution centers, build and maintain local roads, and provide emergency response.

All public agencies consider the needs of freight against a full range of competing and complementary concerns, such as passenger transportation requirements, safety, security, quality of life, economic development, alternative land uses, and environmental considerations.

## III. Freight Trends and Issues

A clear understanding of the current and emerging trends and issues shaping goods movement is essential to a discussion about freight policy. This section summarizes the context and establishes the framework for defining principles for developing a public freight agenda. These trends and issues are system wide. They affect the overall movement of cargo from origin to destination without regard to whether a single freight conveyance or multiple modes are used to move the goods.

### *A. Changes in the Global Economy*

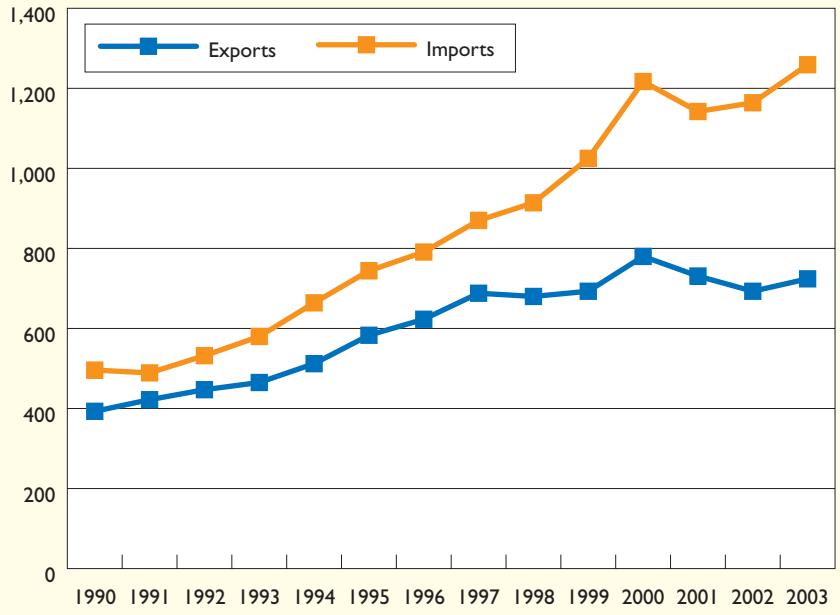
The global economy is currently going through a period of change as intense as the Industrial Revolution. Just as mechanization introduced large-scale production and redefined the location of commerce, the removal of trade barriers, improved transportation, and instantaneous communications have altered sourcing, production, and marketing on a global scale.

Goods are now sourced and largely produced at the lowest cost locations. Production has shifted to locations with the least cost labor, meaning that the U.S., in many cases, is no longer the site of manufacturing. Mexico, China, India and other countries have emerged as global production sites. China, in particular, has become a new world economic power.

Multinational firms are likely to locate their headquarters in one country, their research and development in another, and their production and distribution facilities in yet other locations. All operations are tied together by telecommunications and data exchange, along with improved passenger and freight transportation options.

The U.S. is now an "import economy"—far more reliant on goods produced overseas. Figure 3 shows the trends in imported and exported trade merchandise. From 1990 to 2003, the value of imported merchandise grew 154 percent. Merchandise exported from the U.S. also grew, increasing in value by 84 percent. However, imported merchandise,

**Figure 3. Trends in the U.S. International Merchandise Trade 1990–2003 in billions of dollars**




*SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, based on data from U.S. International Trade Commission, USITC Interactive Tariff and Trade Dataweb, September 2004.*

having grown faster, represents an increasing portion of the U.S. international merchandise trade, growing from 56 to about 64 percent. This growth in international trade puts pressure on the maritime system and its related facilities as most of the cargo moving internationally travels via ocean carrier. In 2003, 41 percent of U.S. international merchandise trade moved by water; 26 percent moved by air; and the remainder moved by truck and rail in terms of dollar value.[10]

The diverse locations of production and consumption have led to a vast increase in the amount of freight moving over longer distances, with even more cargo projected to move in the future. For example, the amount of cargo moving in maritime containers is forecasted to grow nearly three-fold by 2020, rising from 57 million twenty-foot containers worldwide in 2000 to 163 million in 2020.[11]

Freight movement is vital to the emergent global economy, and all elements of the freight system will likely experience growth. Based on work undertaken by the authors, as well as other freight researchers, all forms of freight movement are growing. The freight railroads, trucking industry, and domestic waterborne business will see increased demand for their services. International air cargo movements are also anticipated to grow. Domestic air cargo growth, however, is affected by the growing truck substitution for the service.

Because the ability to compete and thrive in the emerging global economy now depends on the strengths of a nation's freight system, this dynamic situation generates one crucial question: Can U.S. infrastructure handle the volumes and adequately extract economic value from goods movement? In this regard, the U.S. is not alone—all major areas of the world are finding their freight systems straining under the new loads placed on them. The congestion and delays in the U.S. freight system in 2004 would indicate that U.S. freight infrastructure is in crisis despite massive investment in certain elements.[12] Erik Autor, vice president and international trade counsel for the National Retail Federation, commented,

"The [freight transportation] system is really starting to crumble, and it's eventually going to find a way into consumer prices."[13] Jeffrey Shane, undersecretary for policy at the U.S. Department of Transportation, recently noted, "Maritime congestion is masking congestion on the rails and roads."[14]

### *B. Longer, more complex and leaner supply chains*

With the growing global production and marketing of goods, supply chains are now longer, more complex, and leaner. The increased length of the goods movement trip and the potential use of multiple freight conveyances during the journey can make the supply chains more vulnerable to disruptions caused by weather, congestion and other causes.

For over 20 years, companies have worked to make supply chains leaner by reducing the amount of goods kept in inventory, a cost that affected accounting balances and profitability. Goods are moved just-in-time (JIT) for use on production lines or in response to "real-time" demand by consumers based on analyses of purchasing patterns.

Originally, the use of the JIT practice meant that, through the employment of expedited freight transportation, inventory was reduced to an absolute minimum. As the practice has matured, companies have been able to reduce both inventory and transportation costs through the use of advanced telecommunications, data management, refined production planning, and increased "in-transit" visibility (which allows companies to know precisely the location of stock while in transit). Thus, companies have adjusted JIT practices by ordering stock further in advance but compensating by using less expensive transportation options. For example, instead of using overnight air, less expensive two- or three-day trucking service may be used.

Other private sector innovations focus on increasing capacity to gain economies of scale—longer truck trailers (the standard is now 53 feet in length), doublestack container trains (with each train platform able to carry two containers) and a new generation of vessels capable of carrying as many as 10,000 containers between countries.

### *C. Port and route diversification*

As previously noted, U.S. companies have already experienced problems caused by disruptions in the nation's freight system. Because customers will not wait, companies are not waiting for the governmental agencies to solve these problems. Instead, logistics professionals are developing strategies that work around the problems that, from a public sector standpoint, may not be optimal in terms of mode use, port and airport use, and vehicle miles traveled. Nevertheless, many companies are beginning to reorient their supply chains to minimize the potential impacts of disruptions.

An example of these strategies is using multiple and diverse entry points rather than a single port—such as using East Coast, West Coast, and/or Gulf ports for Asian imports. Because of rail capacity limitations and delays, shippers may also use trucks for long distance movements instead of rail freight. In addition, some companies may increase the amount of inventory kept on-hand to avoid costly downtimes, a trend contrary to JIT practices. Companies are also striving to gain greater flexibility and shift delivery destinations while goods are in transit.

Despite efforts by private sector companies to ensure that consumers and businesses receive the goods that they need, both modal companies and the highway system are being adversely affected by increased disruptions. The peak shipment season in the fall of 2004 exemplified the situation—vessels became backed up at the Ports of Los Angeles and Long Beach, and the western railroads were unable to handle the traffic loads. Thus, goods may not necessarily move in the optimal manner. When there are disruptions on the rail system, goods may be trucked long distances instead of moved on rail, increasing congestion on roadways.[15]

### *D. The rise of "value added" warehousing*

Despite the continued loss of traditional manufacturing jobs as production shifts overseas, new employment opportunities are becoming available in the U.S. These new employment opportunities are being created in warehouses and distribution centers, particularly near major points-of-entry to the country, such as Los Angeles, New Jersey, and Texas. These new jobs are being generated as a result of the bifurcation of the production process, i.e., goods are produced at the least cost location, but the final assembly and shelf-readiness is increasingly occurring near the point of consumption. This bifurcation allows companies to customize their products to better match real-time demand at consumer destinations. The work performed in warehouses and distribution centers, sometimes referred to as "value added" services, includes picking and packing for individual stores and customers (such as mail order and Internet customers), assembling furniture, inflating soccer balls, filling pillows and comforters, packaging and adding price tags, bundling products, and pressing garments.

To accommodate these functions, million square foot distribution centers serving major retail chains are being constructed throughout the U.S. These buildings can employ 900 to 1,100 workers and require a range of skills. These jobs can be a replacement for lost manufacturing positions. However, because warehouses tend to be classified based on the main business of their parent company (e.g., a Target or Wal-Mart warehouse may be considered a retail business), the employment figures collected and monitored by public sector agencies do not reflect the growing importance of these facilities. Some state economic development agencies, however, have recently begun to recognize the value of these facilities and are beginning to target them for their areas. For example, the Commonwealth of Pennsylvania has attracted distribution centers through its Keystone Opportunity Zone initiative.[16]

In New Jersey, the Portway Extensions Concepts Study identified much of the cargo moving through the port as headed for local warehouses and distribution centers—supporting thousands of jobs, where value added activities turned the imported goods into shelf-ready products that were then distributed throughout North America.[17] The report focused on better connectivity (both truck and rail) between the concentrations of warehouses and the port to reduce transport costs and road congestion and concentrate these activities on underutilized land near the port. The Portway Extensions study saw the potential for creating thousands of additional jobs in New Jersey as maritime volumes grow by better connecting port facilities with key existing and emerging nodes of distribution center activity.

Another form of logistics-related economic development initiative is the Integrated Logistics Center (ILC). ILCs are large manufacturing and distribution parks built around major rail yards and other modes, offering efficient transport connectivity. Goods are brought in by rail, value is added at buildings in the distribution park, and then goods are transported to end users in the market area. CenterPoint in Joliet, Illinois is an example of a successful ILC.[18]

### *E. Increasing community awareness*

The increased movement of goods, particularly on roads, on rail lines, and through the ports, has not gone unnoticed by affected populations. Communities are reacting more adversely to freight movement, voicing concerns that it interferes with the quality of life in their neighborhoods. The additional issues for communities, as identified in the Transportation Research Board (TRB) report, *Integrating Freight Facilities and Operations with Community Goals,* published in 2003, include traffic flow and congestion, safety and security, economic development, land use and value, communication, and environmental considerations.[19]

The report noted several causes for the growing public reaction to increasing freight movements and the facilities that serve them. For one, because of the decline in manufacturing employment people are less familiar with the role that goods production and delivery

plays in their daily lives. The disconnect between in the essentials of our daily personal and business lives and how we get it can color our thinking about freight movement. Despite the value to our lives, goods movement is less tolerated. Examples, illustrated in numerous news articles, include aversion to sharing the road with trucks, complaints about noise from loading docks, and opposition to increased rail freight movements on light-density lines or where service had been discontinued.

The reduced public familiarity with freight is a critical issue when considering the development of a public freight agenda. Elected officials and the general public need to be comfortable and supportive of public investments in the freight transportation system. This requires a clear, consistent, and frequent message to the public.

## IV. Principles for a Public Freight Agenda

In an "import economy," America needs a freight system that can reach globally, be efficient and effective domestically, and be responsive to community concerns about quality of life, safety, security, and the environment. The overall freight system involves multiple forms of freight conveyances using facilities built, managed by, or located in multiple jurisdictions. Currently, the nation's freight system is increasingly beset by congestion, capacity issues, and lengthy timelines for remediation. Communication to the general public about the value of the goods movement system and the changes it is undergoing has not been adequate.

This section outlines a recommended set of guiding principles for establishing and managing a freight agenda for public sector agencies. The recommended set of principles would:

- Use a systems approach to organize government's freight agenda; move away from single mode approaches and structure government funding sources to address intermodal projects.
- Promote meaningful coordination and cooperation among public agencies to advance the freight agenda.
- Encourage meaningful coordination and collaboration between among public agencies and private sector freight operators.

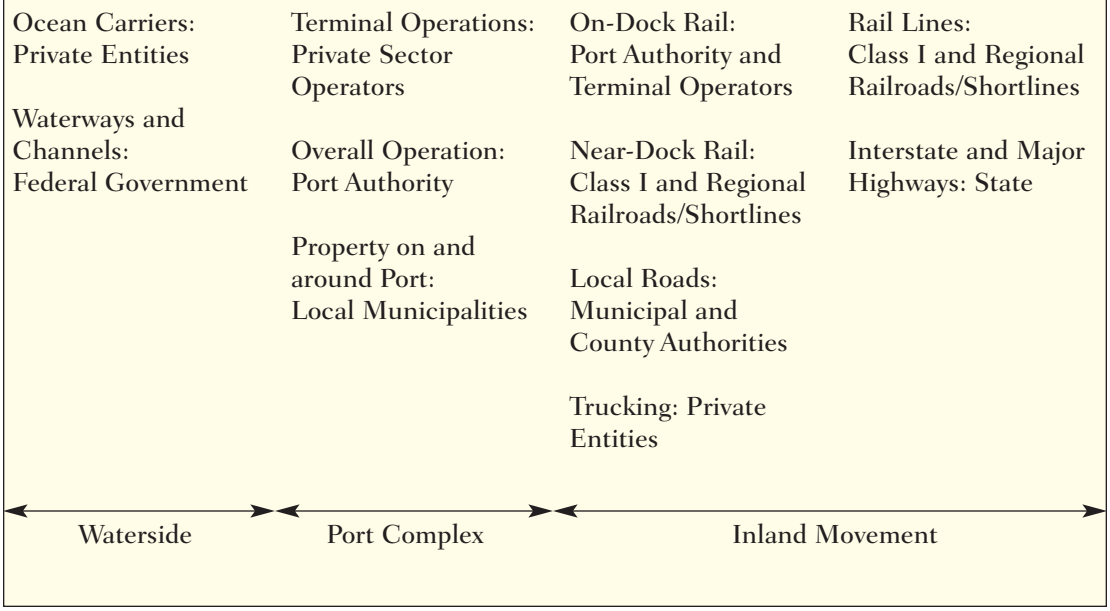
### *A. A systems approach is necessary*

The public sector has not caught up with the systems approach used by the private sector. Deregulation created opportunities for changed private goods movement practices, permitting businesses to take a systems approach, focusing on getting the goods from point A to point B, regardless of mode or whether the moves are within the U.S. or stretch internationally. Goods movement today is a pressurized environment with little room for error. Shippers and receivers generally do not focus on the modes used; they often hire third party freight providers and task them with getting the job done on time for the least cost. Those in charge of logistics will use the modes or combination of modes that best meet the customer's service requirements at the lowest cost. Companies will quickly replace freight companies that cannot provide the desired combination of a high level of service, most reliable transit time, and low cost, the selected price point.

Freight providers include multimodal firms, such as FedEx and UPS, which use a systems approach of fleets of trucks, aircraft and, rail-friendly trailers to handle the shipments tendered to them. Other freight providers, notably the rail freight industry, trucking industry, and ocean carriers, tend to specialize in one mode. However, these "modal specialists" either have multimodal or third party divisions or work diligently to ensure that their intermodal connections are cost efficient.

The facilities that providers employ are a mix of public and private infrastructure. Figure 4 illustrates the multimodal, multi-jurisdictional complexity of today's freight movement by showing the various public and private organizations involved in the movement of water-

**Figure 4. Multiple Organizations in the Public and Private Sector are Responsible for the Movement of International Maritime Cargo**




borne cargo from origin to destination.

On the waterside, private sector ocean carriers provide cargo movement, while the waterways and channels are maintained primarily by federal agencies. In general, public authorities manage port complexes, and the individual marine terminals are operated by private sector organizations. The port complexes are situated among other land uses, which increasingly compete for scarce waterside space.

Inland movement is even more complex. Local roads, which connect the port complex with major highways and the interstate system (intermodal connectors), are under the jurisdiction of local public agencies. The interstate and major highway systems are under the jurisdiction of state agencies, including toll road authorities. The inland rail system is generally under the jurisdiction of private rail freight carriers.

Even though federal reports and legislation have recognized the importance of intermodalism and a systems approach, the reality is that the federal and state agency structure, funding programs and regulation still tend to be segregated by mode. Projects that facilitate intermodal activity that involve more than one jurisdiction or agency have a greater tendency to not receive public investment priority by regional decision-makers.

Perhaps because the international movement of marine cargo has become so large and important, federal agencies have taken the lead and have begun to recognize the need for a systems approach in this area. The U.S. Maritime Administration (MARAD) has been monitoring the condition of inland connections through surveys at U.S. ports and terminals. In addition, a MARAD official, Randy Rogers, was selected to manage a new intermodal office established in California by the U.S. DOT dedicated exclusively to helping relieve freight congestion in the vicinity of the Ports of Los Angeles and Long Beach.[20]

When U.S. DOT organized in 2002 to formulate its approach to new federal surface transportation authorizing legislation, it formed an intermodal working group.[21] That group convinced the Secretary of Transportation that a special funding category for intermodal connectors was justified, and it was incorporated in the administration's proposed reauthorization bill. Ultimately, however, the intermodal connector funding mechanism was not incorporated into the enacted version of SAFETEA-LU.

### *B. Promote meaningful coordination and cooperation among public agencies to advance the freight agenda.*

The governmental jurisdictional overlaps of today's intermodal freight system make public interagency coordination and cooperation essential but difficult. Public agencies vary considerably in mandates, geographical and jurisdictional responsibilities, roles in freight movement, funding, and staff resources.

Within the complex relationships depicted in Figure 2, multi-agency collaborations appear to work best when there is a narrowly defined purpose for the collaboration agreed to by all parties, clear definition of responsibilities, defined roles and responsibilities, strong leadership, and, where funding and construction is involved, concise legal documents.

Successful multi-agency collaborations at the state level include:

- The ***Freight Action Strategy for Everett-Seattle-Tacoma*** (FAST) Corridor program is a joint planning activity of the Puget Sound Regional Council (PSRC, the Metropolitan Planning Organization, or MPO, for the area) and the Washington State DOT.[22] The corridor focuses on the points where goods are transferred between transportation modes, such as rail yards and ports, or where roads and railroad tracks intersect. These intersection points and intermodal nodes were often the bottlenecks in the corridor's freight transportation system.[23]

  The multi-organizational public/private coalition recognized early on that the bottlenecks and gaps in the region's freight system were not the responsibility of a single agency; rather, a partnership of agencies was needed to resolve these issues. Indeed, in the cover letter transmitting the memorandum of understanding for the FAST program, the need for partnerships is explicitly noted: "The FAST Corridor is a partnership, because the problems we are addressing are too large for any one agency to attempt to solve alone."[24] Fifteen projects were undertaken in Phase I of the program. In May, 2002, ten additional freight mobility projects were selected for Phase II funding. Further sets of freight mobility projects continue to be identified.

- The ***Alameda Corridor*** is a 20-mile integrated rail connection between the Ports of Los Angeles and Long Beach and the national rail freight network. The Corridor, a dedicated rail right of way built in a trench, replaced approximately 90 miles of rail track, eliminated numerous at-grade rail crossings, and created a direct route for the Union Pacific and Burlington Northern Santa Fe railroads to serve the port. The project cost approximately $2.4 billion and evolved over a 15-year period.

  In 1981, the Southern California Association of Governments (SCAG) established a Ports Advisory Group, which included local officials, ports, railroads, the California Department of Transportation, U.S. Navy, U.S. Army Corps of Engineers, and the Los Angeles County Transportation Commission. Other organizations, including trucking companies, participated in the discussions that led to the corridor concept. In 1989, the Alameda Corridor Transportation Authority (ACTA) was created and the planning process was handed over to it. With the creation of the ACTA, the cities affected by the corridor development became involved in the process. The Alameda Corridor has been noted as the model project for use of the federal Transportation Infrastructure Finance and Innovation Act (TIFIA), in this case a $400 million loan from the federal government. The other major funding for the project included $394 million from the ports and $1.2 billion in bonds issued by ACTA, with payments by the ports and rail freight users providing the revenue stream.[25]

- The ***Florida Seaport Transportation and Economic Development*** (FSTED) Council is a public entity created by statute and charged with implementing the state's economic development mission by facilitating the implementation of seaport capital improvement projects at the local level.[26] The council was created within the state DOT and consists of the port directors of the 14 publicly owned seaports and a repre-

sentative from the DOT, the Department of Community Affairs, and the Governor's Office of Tourism, Trade and Economic Development. In 1990, the state legislature created the FSTED Program to finance port transportation projects on a 50-50 state/local agency funding matching basis. The legislature established this alternative to the traditional state DOT program in recognition of the urgency of building the transportation capacity needed for the state's 14 public deepwater seaports to satisfy their customer's demands and compete in the fast-paced global marketplace. The $31.6 million Skypass Bridge Project is one example of a project undertaken through FSTED. The project connected the east and west portions of the Port of Palm Beach by replacing at-grade vehicular roadways with a 1,900 foot long bridge. The project was completed within 36 months and did not use federal funds. Not using federal funds allowed the process of planning and development to proceed at an accelerated rate.[27]

### *C. Encourage meaningful coordination and collaboration among public agencies and private sector freight operators.*

Public sector freight initiatives also need meaningful input from the ultimate users of the system—the private sector freight providers, along with their shippers and receivers. Similar to successful public agency collaborations, successful public-private partnerships are characterized by tightly defined objectives, strong long term commitments by all parties, strong leadership, and a well articulated management or action plan. Examples include:

- The ***Chicago Regional Environmental and Transportation Efficiency Project*** (CREATE) is a recent example of a successful public-private coalition. Chicago is one of the nation's leading hubs for goods movement, with the freight railroads providing crucial facilities and links in the metropolitan area that serve all of North America. The railroads recognized that, instead of planning and investing in only their own infrastructure, investment decisions needed to be made on what was best for the overall rail network in the Chicago area. The partners include the Association of American Railroads, the Chicago DOT, the Illinois DOT, and six railroads—Burlington Northern Santa Fe (BNSF), Canadian National, Canadian Pacific, CSX, Norfolk Southern, and Union Pacific.

  The CREATE project is designed to maximize the use of five rail corridors for a faster and more efficient rail network, eliminate the wait for motorists at 25 grade crossings by creating grade separations, and create six rail-to-rail "flyovers"—overpasses and underpasses that separate passenger trains from freight trains. The railroads pay for the benefits they receive under the project, and the city, state, and federal governments pay for the public benefits generated by the plan.[28]

- The ***Reno Transportation Rail Access Corridor*** (ReTRAC) project in Nevada consists of the construction of a 33-foot deep rail freight trench below grade to isolate train traffic from vehicular traffic in downtown Reno. The community and freight issues addressed by the project include public safety, improved rail and vehicular flows, and revitalization of Reno's downtown. While the city had considered for 60 years depressing the tracks as an alternative to the at-grade rail lines through the center of the downtown area, it was the merger of the Union Pacific and Southern Pacific railroads in 1995 that generated momentum for the project. In the merger documents submitted to the U.S. Surface Transportation Board (STB), the railroads noted that the line traversing Reno would see an increase in traffic from 14 to 24 or more trains daily.[29]

  In December 1998, the city of Reno finalized an agreement with the merged Union Pacific Railroad that provides for the ReTRAC project to eliminate 11 existing at-grade crossings within an approximately 2.25-mile segment substantially within the existing railroad right-of-way in Reno. Funding for the $218 million project includes a TIFIA loan, $20 million in federal grants, and $17 million in funding and in-kind services from the Union Pacific Railroad. The railroad provided all of the land along the right of

way. The project is also being financed through assessments of property owners in the area.

Sustained communication and sharing of perspectives are highly desirable goals in the relationships among private sector providers, users and the public sector. Collaborative efforts that have not fixed on attainable projects sometimes falter. Based on observations of several private sector freight panels and committees organized by federal agencies, state DOTs, and MPOs, the disconnect occurs for several reasons:

***Different objectives.*** Public sector agencies generally begin by educating themselves about the private sector freight industry. Unfortunately, when staff changes, the education process generally begins anew. Also, multiple agencies may contact private sector companies separately and set up different meetings, which can become a large time burden for private organizations. Private sector executives must justify their time commitment to public sector meetings. One of the common questions asked is, "What value can I take back to my shareholders from this meeting?"

***Different time frames.*** Public sector agencies tend to take the longer view, focusing on larger issues and projects that can take multiple years to study, design, and develop. Private sector freight companies must respond quickly to problems.

***Different agendas.*** Public sector agencies may seek to involve private sector organizations in meetings that bring together diverse stakeholders and interest groups, including some that may be hostile to freight. While such interaction can be useful, it must be managed carefully. In contrast, the private sector may be seeking priority solutions to pressing operational problems and may not be patient with adversarial interests.

## V. A Freight Case Study: Northern New Jersey

Northern New Jersey is one of the most dense and complex concentrations of goods movement facilities and activities in the U.S. Compounding the complexity of its goods movement issues is the fact that the area is an integral part of a multi-state economic region—greater metropolitan New York—the nation's largest consumer market. Figure 5 identifies port, airport, major roadways, and rail lines in the area and shows the unique concentration of major freight facilities. Additional roadway, rail, and significant warehouse and distribution center operations exist immediately outside the area depicted.

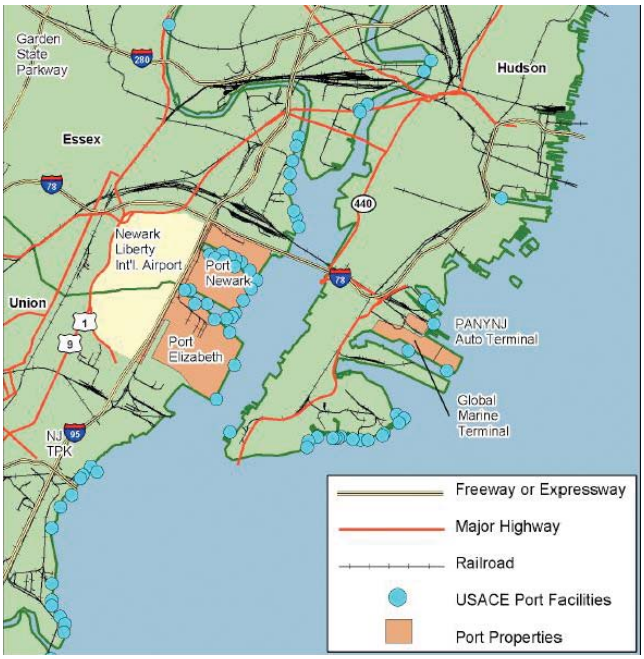
Northern New Jersey contains the leading port complex on the East Coast, the Port of New York and New Jersey (PANYNJ), which handled nearly 4.5 million twenty-foot equivalent containers (TEUs) in 2004.[30] The Port is also a leading gateway for automobiles and petroleum products. The area's numerous rail yards serve a variety of purposes including: serving local businesses, residents, and acting as the terminal for intercontinental "land bridge" traffic from the west coast ports that is distributed from the northern New Jersey railheads throughout the northeast. The area also includes a major air cargo gateway—Newark Liberty International Airport. The airport handled nearly 1.1 million tons of freight in 2004 and is ranked 21st in the world in terms of the tonnage handled.[31]

These facilities are served by a significant highway distribution network, which also acts as a conduit for cargo moving to other North American locations. A principal artery is the multi-lane New Jersey Turnpike, a financially self-sustaining toll road, nearby and linking the port, airport, railheads, and major concentrations of warehousing and distribution space.

Nearly 687 million square feet of warehousing and distribution space is located along the New Jersey Turnpike and other interstate highways,[32] one of the largest concentrations of industrial development in the U.S. These facilities, in turn, serve the nation's largest and wealthiest consumer market, as well as points in New England and the mid-Atlantic states.

However, while significant investments have been made, portions of the state's freight system are outdated and/or congested. Responsibility for freight system elements is frag-

**Figure 5. Northern New Jersey Area and Freight Facilities**




*Source: North Jersey Transportation Planning Authority, Freight System Performance Study, April 2004. Map sources: Port Authority of New York and New Jersey and U.S. Army Corps of Engineers*

mented across agencies and jurisdictions in two states. This governmental structure, not unlike most of the regions of the U.S., is marked by institutional fragmentation concerning goods movement research, policy, and investment. The non-federal agencies involved in the freight transportation system in northern New Jersey area include:

- The PANYNJ, a bi-state agency responsible for the port, airports, bridges and tunnels. This financially self-sustaining agency can issue bonds to support project investment.
- The New Jersey Department of Transportation.
- The North Jersey Transportation Planning Authority (NJTPA), the MPO for the northern New Jersey area.
- The New Jersey Turnpike Authority, which operates the toll roads serving the northern part of the State.
- NJ TRANSIT, the statewide transit agency, which both owns rights of way used by freight railroads and operates on rail owned by the freight railroads.
- The New Jersey Economic Development Authority and other state environmental and land use agencies.
- County and municipal transportation and economic development departments and planning boards.

However, individual government agencies at the state, regional and municipal levels have embarked on a variety of initiatives to improve the movement of goods. This has emerged against a backdrop where, for most of the past 84 years, Northern New Jersey's concerns about goods movement issues were delegated to the PANYNJ. During that period, the agency compiled a long and accomplished history as the financier and manager of the ports (including some rail connections), airports, trans-Hudson River bridges and tunnels, and truck terminals (which have long since closed). The PANYNJ still has, by far, the most extensive freight investment program in the region, but over the past 15 years, other agen-

cies at the state, regional and municipal levels have, often independently, increased their freight planning, and embarked on a variety of initiatives to improve the movement of goods, including investment recommendations and decisions.

For example, the region's MPOs—including the NJTPA—have responded to the federal directive to perform freight planning. NJTPA has established an active Freight Initiatives Committee and is completing a major study of freight activity in the port area. The state DOT has been actively engaged in freight planning and investment in rail improvements. It is separately completing a Comprehensive Statewide Freight Plan. The New Jersey Turnpike Authority, in managing one of the region's principal freight arteries, has invested extensively in expansion that serves the areas of greatest freight activity.

Pursuit of individual agency priorities without regional support and with mixed messages to the public continues. For example, the New York City Economic Development Corporation and a New York congressman have proposed the construction of a rail freight tunnel between New York and New Jersey to increase the use of the mode east of the Hudson River and reduce reliance on truck traffic. The project has been advanced at the federal level, having been earmarked in SAFETEA-LU for a $100 million authorization as a Project of National and Regional Significance (Section 1301), despite significant questions and concerns raised elsewhere in the bi-state region. Agencies and communities in New Jersey do not support the multi-billion dollar project; they contend that there are alternatives, such as freight ferries, that could be considered first; necessary improvements to New Jersey's rail freight system were not included; and local New Jersey communities could be adversely affected.[33] Further, the PANYNJ has questioned the need and available funding for the project, and the mayor of New York has publicly opposed the project.[34]

Some coordination and collaboration may exist for limited projects, but an overall framework of collaboration and funding does not. No formal arrangements exist to encourage collaboration among the respective New York and New Jersey government agencies and authorities to collect freight information and exchange it; conduct studies together rather than separately; raise funds dedicated entirely to multimodal freight initiatives; embark on freight investment programs in full consultation with each other; and deliver a clear, consistent message to the public about current goods movement trends and practices and their importance to the economy.

Achieving a freight investment and policy coalition should be a high priority to regional decision-makers. Without it, the region risks gaps in its data gathering and analysis; a lack of focus and consensus on investment policy; duplicative and potentially unproductive interactions with private sector freight providers and users; an unfocused and conflicted message regarding the importance of goods movement in the regional economy to the general public; and continued difficulties in securing funding. The examples of formal regional collaboration represented by CREATE, FAST and the Florida Seaport Transportation and Economic Development Council should be seriously examined by New Jersey and other agencies in the region.

### *An "Orphan" Intermodal Connector*

The Kapkowski Road Area, a TEA-21 High Priority project with some continued funding in SAFETEA-LU, is an important illustration of an intermodal connector project that has struggled to find its way into the region's investment agenda despite widespread support among affected stakeholders in the immediate area.[35]

The Kapkowski Road Area is located in Elizabeth, Union County, New Jersey, proximate to Port Newark/Elizabeth (the largest marine terminal complex on the east coast), Newark Liberty International Airport, three rail freight yards, large retail outlets, one of the largest malls in New Jersey, and several new hotels. The roadways in the area, composed of county and city roads, connect to a busy New Jersey Turnpike interchange. This local network represents one of only two access roads into the port complex, a means for customers to reach the non-port activities in the area, and a route used for air passenger and cargo activities. The roadway network is anticipated to become even more congested, as port traffic and

adjacent new retail and hotel development increase. These congested local roadways could both impede port inland movement and stifle the city of Elizabeth's economic development aspirations.

The Union County Economic Development Department took the lead in studying the issue, building an informal coalition of freight and non-freight interests, and developing an action plan that fully addressed the objectives, using funds obtained through its TEA-21 High Priority Project designation. The county's goal was to evaluate the existing roadway system to enable the continued growth of the hotel, retail and commercial development in the area, which is a major tax revenue and employment source for the city of Elizabeth. The County staff also worked to facilitate the movement of port traffic; separate port and non-port traffic for safety and circulation reasons; and keep the rail freight lines unimpeded so as to maximize use of that mode for goods movement.[36]

Union County's "bottoms up" planning involved creating coalitions among public agencies, such as the PANYNJ and the New Jersey Turnpike Authority, and public/private collaborations. The county has also actively involved property owners, retail operators, trucking organizations and the railroads in developing the solutions. Agreement on the proposed improvements was achieved, a rare accomplishment given the diverse nature of the stakeholders in the area.

Despite broad agreement that the improvements are needed, funding the solutions in the absence of specific federal and state programs for intermodal connectors has been complex, time-consuming and unorthodox. New Jersey does not have a funding mechanism dedicated to intermodal projects, such as the one created for ports in Florida, and the competition for New Jersey's Transportation Trust Fund financing is intense. Consequently, the county sought congressionally-earmarked federal funding for the improvement program, a follow up to its status as a TEA-21 High Priority project. While $5.56 million in High Priority Project funding for the project was included in SAFETEA-LU, the amount is insufficient to cover the cost of the proposed improvement program.

One alternative funding mechanism is to request that the PANYNJ entirely finance the project because of the benefits accruing to the port, an approach that would require negotiations among agencies. An alternative funding scheme—an *ad hoc* agreement among the region's governmental agencies and the private sector that pools multiple funding mechanisms—is far more arduous given the fragmented institutional arrangements for goods movement investment in northern New Jersey, the competition for state Transportation Trust Fund dollars, and the absence of separate statutory authority for freight related projects (such as the funding mechanism established in Florida). Such an *ad hoc* funding scheme could include federal funds, funds through the PANYNJ and the New Jersey Turnpike Authority, state funds, and funding from the private sector organizations that will most benefit from the project. Creating the required pool of funding sources can be done—this was demonstrated in the Washington state FAST project—but funding is more likely and less time consuming when there is a pre-existing mechanism for creating the funding pool. However with the passage of SAFETEA-LU and its provision of partial funding, Union County will most likely have to pursue structuring this tenuous funding coalition.

## VI. Policy Recommendations

While much needs to be done, the U.S. freight system is taking steps in the right direction. At the national level, strategic corridors are being identified on a modal or earmarked basis. In addition, newer federal funding mechanisms offer some promise for multimodal freight initiatives. Regions have used federal funds as well as TIFIA financing to advance initiatives. Examples include FAST and ReTrac. The federal roles in regulation, safety, and security continue to help ensure those aspects of the nation's freight system.

MPOs and state DOTs have begun examining freight issues, encouraged by the requirements of and funding available from the federal government. At least two states have developed new funding mechanisms for advancing their freight agendas. California created the Alameda Corridor Transportation Authority with bonding capabilities and Florida created its innovative FSTED program. Several successful multi-agency and public/private partnerships have developed on a regional level. Some economic development agencies have recognized the potential value of major warehouse and integrated logistics center development in their regions.

But while progress has been made, critical issues remain in achieving fuller acceptance of the principles for a freight agenda. Below are recommendations for strengthening a national agenda for freight, including elements at the federal, regional and local levels.

### *A. Take a Systems Approach*

Much has been said and studied regarding a systems orientation to the nation's freight system. However, with a history of single-mode thinking and structure, only limited progress has been made to truly plan and fund goods movement as a single system. Just as the federal government developed the Eisenhower Interstate System to support defense needs, the 21st century requires a multimodal national freight system that can keep the U.S. competitive as an economic entity and responsive to security needs. In this regard, the federal government should designate multimodal strategic freight nodes and corridors that encompass ports, airports, key rail yards, warehouse centers, connecting and arterial roads, rail lines and waterways. Through the U.S. DOT's Office of the Secretary, the federal government should upgrade its planning assistance for key regional global trade gateways, encourage multi-agency coordination and sustained private sector involvement, and provide funding for public education.

### *B. Increase Funding and Pursue Innovative Arrangements*

Since the way that the federal government dictates the use of funds for transportation projects shapes how the states react, federal funding mechanisms should be modified to recognize the need for a systems approach to goods movement. The designation of multimodal strategic freight corridors with multi-agency bodies as the preferred eligible recipients would encourage sound planning and investment at all levels of government.

***Increase federal funding for freight projects.*** Efficient, competitive freight movement should be a national priority and funded accordingly. The federal government, in particular, needs to identify intermodal corridors of national significance and give priority to investments in these corridors. Intermodal corridors would include cargo hubs and all modes used to convey freight in the corridor.

***Develop regional funding mechanisms.*** It is clear the there will be insufficient federal funding to support all of the freight initiatives that regions would like to undertake. Accordingly, regional funding mechanisms are needed. These can include use of agency bonding abilities, including the creation of special purpose authorities with bonding ability (such as the Alameda Corridor Transportation Authority); new mechanisms such as FSTED; and encouragement of public/private partnerships where private sector freight providers invest funds in a project or program.

### *C. Build and Reward Multi-Agency Relationships*

The formation of multi-agency coalitions can be undertaken but remain complex and potentially difficult to sustain. In addition, it still remains common to see public agencies in the same region undertaking parallel initiatives with minimal coordination. Particularly in fiscally constrained times, coordination among agencies could create regional repositories of freight data, encourage consensus on priority projects and their funding, generate focused public education on goods movement needs, and lead to financing from multiple agencies and broad-scale public support.

***Reward multi-agency collaboration.*** The federal government should encourage collaboration and coordination among public agencies within intermodal corridors of national significance and where major multijurisdictional projects are under consideration. Federal funding should be contingent on proof of local and state agency collaboration, coordination and agreement on key initiatives.

***Pursue greater interagency coordination within and between states.*** With budgets constrained and elements of the freight system under stress, agencies need to work together to identify and advance key strategic projects, address issues and implement solutions. This can start with developing a core set of information that each agency collects as part of data/ survey efforts. This would be a step toward establishing a regional freight planning and investment decision-making body that could lead to commitments for multi-agency funding of major freight system investments (as demonstrated by FAST and FSTED). Local government and MPO agencies may play a significant role in successful regional efforts. These agencies, among other abilities, identify locally critical freight issues which can include improvement of intermodal links; expansion of rail capacity serving ports; height and weight issues in rail lines and roadways; separation of freight and passenger activities on roadways and rail lines; replacement of at-grade crossings; and harvesting local opportunities for freight-related economic development, including reuse of brownfields.

***Coordinate better among transportation and economic development agencies.*** Economic value can be derived from freight operations. This has been demonstrated in the job generation capabilities of large value added warehouses and integrated logistics centers, such as the CenterPoint Complex in Joliet, IL. Coordination and collaboration among transportation and economic development agencies could leverage investments in the freight system. This was noted in the New Jersey Portway Extensions project and is the cornerstone of the Florida initiatives.

### *D. Encourage and Reward Private Sector Involvement*

While many efforts have been made, only a few efforts have successfully engaged the private sector in sustained, meaningful ways. The successful efforts are characterized by clearly defined objectives and well articulated action plans that directly relate to the business interests of the private sector stakeholders.

***Rewarding public/private coalitions and partnerships.*** The federal government should consider giving highest priority to those freight projects that emerge from regional multi-agency coalitions and public/private partnerships. Coalitions with well-articulated goals and projects, as well as broad based support, have surfaced some of the most meaningful and creative solutions to freight system issues. The federal government should make funds available to facilitate the formation and functioning of these bodies.

### *E. Enhance Outreach and Public Education*

Goods movement activities and needs have changed rapidly; but the public is both largely unaware of the changes and the activities' importance to local economies. A reflexive public wariness exists toward trucks and restoration of rail freight service. Concerted, consistent public education at the regional level is an important stage-setter to local support for governmental initiatives related to freight.

***Educate the public.*** Unless the public is made aware of the functioning of the global trading system, its economic importance to a region and their daily lives, the goods movement trends that have developed and the new operating practices, policies and projects that are needed to respond to these changes, the public will not have the background to assess these changes properly. A serious, sustained and consistent effort at public education is required.

## VII. Conclusion

The public sector continues to play catch up with the new global trading environment: faster growing volumes of freight and creation of new pressure points; new players and practices in the movement of goods; and volatile emerging issues. Whether the public sector reacts effectively or not, freight traffic will grow and customers will be served. Waterways are being deepened and maritime terminals have invested billions of dollars in their facilities to handle increasing volumes. Trucks and railroads continue to handle larger volumes. Yet, the growth of international commerce has created bottlenecks when cargo heads inland. For example, the transcontinental system built by the railroads in the 19th century and downsized in recent years is reaching its maximum handling capacity.

Without prompt strategic steps with a multimodal perspective and containing agreements among agencies and the private sector, continuing congestion and inefficiencies could adversely affect the nation's economy and its competitive status in the world market. Through the crafting of principles for a public freight agenda at the federal, regional, and local levels, the public sector could move from a reactive stance to an activist program—including consistent efforts to educate the public—geared towards maximizing the benefits and minimizing the impacts of changing and growing freight activities that are essential to our economy.

## Appendix A. Freight mode definitions

- ***Trucking.*** The trucking industry includes local movements in small trucks and long distance over-the-road movements with 53-foot trailers or two trailers in tandem. Trucking firms often interface with other types of freight movement, such as rail, water, and air cargo, to pick up and deliver shipments. Truck movements are usually divided into truckload, less-than-truckload (LTL), and private, dedicated movements. Trucks may be seen hauling ocean containers, as well as oversized loads. The truck category also includes vehicles belonging to the freight services most familiar to consumers and businesses, such as UPS, FedEx, DHL, and the U.S. Postal Service. Trucking firms range considerably in size, organizational structure and service area. Some trucking operations span the entire U.S., while other firms are more regionally or locally focused. Many trucks are driven by "owner-operators," whom are independent contractors working for trucking organizations.

- ***Rail.*** Railroads generally work with ports and trucking firms to move both domestic and international shipments. There are two major types of rail freight:
  - ***Containerized or "intermodal,"*** which consists primarily of containers or truck trailers moved on rail cars. Containerized rail traffic include containers that arrive on vessels at U.S. ports and are transferred to special rail platforms, as well as "domestic" containers that can hold as much as a truck trailer. When containers are stacked two-high on a specialized railcar platform, it is referred to as "doublestack;" and
  - ***Carload traffic,*** which includes boxcars, hopper cars, gondola cars and tanker cars. Boxcars move such commodities as paper, cocoa, and bulkier items. Hopper cars transport cargo such as flour. Tanker cars can carry corn syrup, food grade oils, petroleum products and chemicals. There are generally two types of railroads: North American or "Class I" railroads—Norfolk Southern (NS), CSX, BNSF, Union Pacific, Canadian National, and Canadian Pacific, that span large portions of the U.S and "short-line" or smaller railroads that move freight shorter distances and interface with the Class I railroads.

- ***Ocean/Waterborne Cargo.*** Ports contain terminals that handle cargo moved on maritime vessels. The waterways are the navigable waters that the vessels use. The ports and waterways serve as key gateways for the movement of international cargo, as well as conduits for the domestic movement of cargo on the nation's river and Great Lakes systems.
- ***Air Cargo*** – Air cargo refers to freight that travels in the bellies of commercial passenger aircraft, in cargo-only aircraft and in the aircraft of such "integrated carriers" as FedEx, UPS, and DHL. Air cargo operations typically interface with trucking operations to move the shipments at each end of the trip.

In addition to the modes, the freight system relies on:

- ***Warehouses and distribution centers.*** Warehouses and distribution centers are defined as structures that are primarily used for the receipt, temporary storage and distribution of goods en route from production sites to points of consumption. These facilities are often sites where value is added to the products moving through them. Examples of value added activities include final assembly and customization of products and final preparation for the sales floor (including tagging and packaging). Warehouses and distribution centers are increasingly the nexus between freight transportation and economic development – the element of the freight system that can generate the most jobs directly for the local economy.
- ***Support facilities.*** In addition to the infrastructure and terminals used, the freight system relies on support facilities. These support facilities include truck stops/rest areas, container storage facilities, and maintenance facilities.

## Appendix B. Four Mode Specific Issues

In addition to the trends and issues that affect goods movement in general, there are also situations that affect specific elements of the freight system and factor into the crafting of a public freight agenda. Following are examples of "mode-specific" issues, one each for rail, trucking, air cargo, and maritime movement.

### *1) Rail Freight—Can the Industry Handle the Freight that Businesses and the Public Sector Want to Move on it?*

Public agencies have suggested maximizing the use of rail freight as a means for reducing roadway congestion and pressures to expand highways. This is illustrated in the *Freight-Rail Bottom Line Report* issued in 2003 by the American Association of State Highway and Transportation Officials:

> "Today, trucks and the highway system carry 78 percent of domestic tonnage, the freight-rail system carries 16 percent, and barges and coastal shipping carry six percent. By 2020, the highway system must carry an additional 6,600 million tons of freight (an increase of 62 percent), and the freight rail system must carry an additional 888 million tons (an increase of 44 percent). However, the highway system is increasingly congested, and the social, economic, and environmental costs of adding new highway capacity are prohibitively high in many areas. State departments of transportation are asking if expanding the capacity of the freight-rail system in some cases might be a cost-effective way of increasing the capacity of the total transportation system."[37]

Just as the railroads opened up inland areas of the country in the 19th and early 20th century before the advent of trucks and automobiles, trucks along with the development of the Interstate Highway System extended the reach of businesses and the population in the mid to late 20th century. Meanwhile, by the mid 20th century the rail freight industry was in severe decline and the nation's rail freight system shrank along with it. Track was torn up and rights-of-way abandoned.

More recently, during the era of deregulation these consolidating trends accelerated. The authors' research on the state of rail freight in New Jersey five years after the Conrail

acquisition found that the railroads reduced both employee rosters and physical plant in an effort to concentrate on a few profitable lines of business. In addition, public sector action has transferred lines to operators of passenger services. The end result is a national rail freight system that, in some areas, does not have the capacity or control of strategic right-of-way to carry the amount of freight that businesses and the public sector would like; has severe labor and skill shortages that may take several years to fully resolve; and has a business mindset that may need to be challenged to maximize fully the use of rail freight as the public sector envisions it.

To meet their expectations about greater rail freight activity, some public agencies are proceeding with rail freight initiatives. Removal of bottlenecks, expansion of trackage, and encouragement of short-line reactivation/expansion are among the initiatives being pursued throughout the U.S. In some cases, an urgent need to improve rail freight has coalesced organizations and laid the foundation for public/private investments.

### *2) Trucking—How will a Growing Driver Shortage Affect the Industry and Freight Movement in the U.S.?*

The U.S. relies on the trucking industry to move the vast majority of its domestic freight. Yet, the industry is currently facing a driver shortage that can be measured in the tens of thousands of positions needing to be filled. This shortage shows no signs of abating. The federal government estimates that the number of truck drivers will rise by nearly 20 percent between 2002 and 2012, making the occupation one of the fastest growing in the U.S.[38] However, a BB&T Capital Research report predicts that "the demand for drivers will be three times as high as the available supply for the next few years, constraining growth and raising trucking rates."[39]

Driving can be a difficult occupation. Weeks are spent away from home. Wages are about average for blue-collar occupations. While trucking companies are enhancing their efforts to recruit and retain drivers through increased pay and benefits and shortening routes to allow more time with families, other factors are compounding the need to increase the number of drivers. These factors include increased congestion on the roadways, which limits the number of trips or distance that a driver can cover during working hours.

A continuing truck driver shortage can constrain freight handling capacity at a time when the nation needs to move more goods. The impacts could be felt throughout the economy. As Mark Zandi, chief cconomist of Economy.com recently noted, "If we don't have enough truckers, then the whole global transportation system bogs down and just makes life difficult and less lucrative for retailers and other businesses."[40]

### *3) Air Cargo—Where is the Industry Going?*

The air cargo industry plays and will continue to play a crucial role in moving time-sensitive and critical cargo, as well as providing capacity when other elements of the national freight system are disrupted. Air cargo, however, is the newest and most expensive freight transportation option, making the industry more susceptible to business trends and conditions. Indeed, the last several years have seen substantial changes occur. The trends and considerations that have affected air cargo, more often adversely, include:

**Truck Substitution:** Driven by competitive cost considerations, freight movement by truck has been increasingly used as a substitute for air cargo in the U.S. The increased use of trucking is having a profound impact on air cargo activities and airports. Use of "truck flights" by carriers to augment air routes in their cargo service areas. An increased demand for on- and nearby off-airport facilities that can handle both truck-air and truck-truck operations; and at least 20 percent of all cargo operations on-airport now involve truck-to-truck moves (no loading on aircraft).[41]

**Waterborne Substitution for International Cargo Movement:** Similar to the cost-driven substitution of trucks for domestic air cargo movements, for international shipments where shippers can accept lengthened transit times they are more often specifying mar-

itime cargo movements. The cost savings of using international waterborne freight services rather than air are significant.

**Security:** New federal regulations could redefine air cargo choices and facility requirements. Combined with the fewer security restrictions on truck-based movements, security can have a dampening effect on both air cargo demand and supply. Security measures are currently evolving; the industry will need to adjust to any new measures implemented, which could potentially cause short-term disruptions in service.

**Telecommunications Substitution:** The electronic movement of documents has been accelerating, reducing the need for mail service and time definite air service. Most recently, protocols have been developed to allow electronic transmission of checks, reducing the need to move paper documents.

**The Overall Condition of the Aviation Industry:** The financial condition of the overall aviation industry affects air cargo. Reduction in passenger routes and the resizing of aircraft (for example, using regional jets instead of 737 aircraft) can impact the availability and profitability of cargo operations.

**Unforeseen Industry Conditions:** During the 2002 West Coast port strike, air cargo capacity was used to keep goods flowing. Similarly, in 2004, congestion, labor shortages, and delays at West Coast ports, combined with operational issues on two of the four Class I railroads, led to increased use of trucking, direct waterborne trips to East Coast ports, and air cargo.

The complexity of these issues and uncertain durability of these trends make it difficult to assess the future role of air cargo in the nation's freight system.

### *4. Port/Maritime Cargo—With Investments Made in the Channels and Terminals, are the New Bottlenecks in the Inland Connections?*

The U.S. has moved ahead with significant investments in the waterways and channels, as have the nation's ports (both public and private sectors) in construction of expanded and more efficient cargo handling terminals. New bottlenecks, however, have appeared on the road and rail connections that link the port to inland locations.

A 2002 Report issued by the U.S. Maritime Administration (MARAD) noted:

> "The current state of the intermodal access system for U.S. ports is generally acceptable for handling the existing volumes of cargo flows. However, "acceptable" is a different condition than "optimal." Acceptable means that ports, freight transportation providers and shippers can work around problems and can tolerate a certain amount of delay and costs. Acceptable conditions can quickly become unacceptable as cargo volumes increase in the future or if a segment of the system becomes unusable."[42]

The 2002 MARAD report noted that the areas of concern included the capacity of local roads (or "intermodal connectors") accessing the ports, at-grade rail crossings, and rail access issues. The MARAD observation about the vulnerability of the infrastructure has turned out to be prophetic: As noted in a *New York Times* article, "Retailers gearing up for their annual sales push for the December holidays are being forced to wait longer than usual this year for Asian-made goods that—thanks to a backup of cargo ships, railroads, and truck lanes—are sluggishly making their way from ports to warehouse and ultimately, to shoppers."[43]

The potential Achilles heel of our "import economy" may be intermodal connectors, which have often been called the "orphans" of the freight transportation system.[44] The 2000 *National Highway System (NHS) Intermodal Freight Connectors: A Report to Congress,* issued by FHWA, found:

- Intermodal connectors that primarily serve freight terminals have significant mileage with pavement deficiencies and, in general, exhibit lower physical and operational characteristics than other NHS facilities of the same kind.
- An analysis of investment practices shows a general lack of awareness and coordination for freight projects within the MPO planning and programming process.

- Given the pressing needs for passenger-related projects, little incentive exists for investing in freight projects that appear to benefit primarily only a small segment of its constituent population.

The construction and improvement of intermodal connectors, despite their criticality, are currently hindered by an absence of a defined funding stream—at the federal, regional or state levels. In discussing the proposed set-aside for funding intermodal connectors in the administration's version of SAFETEA-LU, Undersecretary of Transportation Jeffrey N. Shane noted:

> "The administration's surface reauthorization bill looked dramatically different from anything we've seen before. For example, take intermodal connectors as a separate problem. There's nothing new about making intermodal connectors eligible for federal assistance. They have been eligible projects from the get-go. The problem is they've been getting pretty short shrift from state highway departments. We felt we needed a set-aside. Set-asides are not popular in this administration, but Secretary Mineta was persuaded that in this one case, we should make an exception to the rule."[45]

However, the enacted version of SAFETEA-LU did not include a set aside for intermodal connectors, continuing the orphan status of these elements of the nation's freight system.

## Endnotes

1. Martin E. Robins is director of the Alan M. Voorhees Transportation Center in the Edward J. Bloustein School of Planning and Public Policy at Rutgers, The State University of New Jersey. Anne Strauss-Wieder is the principal and founder of A. Strauss-Wieder, Inc. in Westfield, NJ.

2. U.S. Department of Transportation, "Status of the Nation's Highways, Bridges, and Transit: 2002 Conditions and Performance Report," (Washington: Government Printing Office, 2003) 23-3.

3. Federal Highway Administration, "Preparing Modern Intermodal Freight Infrastructure to Support Brownfield Economic Redevelopment Northern New Jersey," Transportation and Community and System Preservation Pilot Program Grant Proposal, North Jersey Transportation Planning Authority (July 21, 2004), available at **http://www.fhwa.dot.gov/tcsp/nj14.html**

4. Bureau of Transportation Statistics, "Freight," U.S. Department of Transportation. Undated, available at http://www.bts.gov/programs/freight_transportation/html/more_freight.html

5. U.S. Department of Transportation, "National Transportation Statistics," Table 1-46, 2004. Data for 2001 intercity truck is preliminary

6. Additional information on these two federal laws and other federal actions to deregulate transportation industries can be found at the Brookings Institution's project page for "Government's Greatest Achievements of the Past Half Century,", available at **http://www.brookings.edu/gs/cps/50ge/endeavors/competition.htm.**

7. See Code of Federal Regulations 49, sec. 260 and 266.

8. Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Public Law 109-59, section 1601.

9. SAFETEA-LU, Section 1306.

10. U.S. Bureau of Transportation Statistics, "2005 Pocket Guide to Transportation," (Washington: Government Printing Office, 2005) Table 23.

11. Nariman Behravesh, "The U.S. and Global Outlook: Storm Clouds on the Horizon?" (Global Insight, Port of New York and New Jersey Port Economic Briefing, October 29, 2004.)

12. For example, according to the American Association of Port Authorities public sector port entities anticipate spending $10.4 billion between 2003 and 2007. In 2002, port authorities invested $1.7 billion. This figure does not include the hundreds of millions of dollars invested by private sector maritime terminal operators and other entities in the maritime transportation system. See: American Association of Port Authorities, "U.S. Public Port Facts," Undated, available at **http://www.aapa-ports.org/industryinfo/portfact.htm.**

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14. John Gallagher, "Derailing the Economy," *Traffic World,* Volume 268, Issue 11 (2005) pp. 10–12.

15. Gallagher, 2005.

16. See: Pennsylvania Department of Community and Economic Development, "Keystone Opportunity Zones," Undated, available at **http://koz.newpa.com.**

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18. CenterPoint, a 2,200-acre complex, is located on the former Joliet Arsenal, a military facility that employed 8,000 people until it was decommissioned in 1976. The site is located approximately 40 miles from Chicago and is accessible by an Interstate highway, as well as by both the Union Pacific Railroad and the Burlington Northern Santa Fe (BNSF). BNSF also decided to build a 621-acre intermodal (truck/rail) yard at the site. At full build out, CenterPoint is anticipated to have 12 million square feet of warehousing, 2 million square feet of distribution space and 1 million square feet of light manufacturing, employing 8,000-to-12,000 workers and generate annual tax revenues of $27 million.

19. Anne Strauss-Wieder, "Integrating Freight Facilities and Operations with Community Goals," Transportation Research Board, National Cooperative Highway Research Program (NCHRP) Synthesis 320, (Washington: National Academy of Sciences, 2003) p. 5.

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23. Washington State Department of Transportation, "Freight Action Strategy for Everett-Seattle-Tacoma," 2004, available at **http://www.wsdot.wa.gov/mobility/FAST.**

24. Shafran and Strauss-Wieder, 2003, p. C-24.

25. Shafran and Strauss-Wieder, 2003, p. C-4.

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31. Port Authority of New York and New Jersey, "Airport statistics," undated, available at **http://www.panynj.gov.**

32. New Jersey data from CB Richard Ellis, 2004.

33. Benson, Josh, "Which Tunnel is that Again?" *The New York Times,* August 14, 2005, Section 14NJ; p. 6.

34. Sewell Chan, "$100 Million for a Tunnel. What Tunnel?" *The New York Times,* August 3, 2005, Page B1

35. The Kapkowski Road Area Improvements in Elizabeth (Items 2478 and 4542) is funded at $5.56 million. See SAFETEA-LU, section 1702.

36. "Kapkowski Road Area Transportation Planning Study," Union County, New Jersey, 2003, available at **http://www.unioncountynj.org/econdept/kapkoski.pdf**.

37. American Association of State Highway and Transportation Officials, "Freight-Rail Bottom Line Report," (Washington, 2003) p. 2.

38. Barbara Hagenbaugh, "Truckers Needed to Keep Economy Rolling," USA Today, October 12, 2004. p. 1B.

39. William Cassidy, "Spinning Wheels," *Traffic World,* Volume 268, Issue 44 (2004) pp. 19-20.

40. Hagenbaugh, "Truckers Needed."

41. The 20 percent figure is based on several airport and air cargo projects undertaken by A. Strauss-Wieder, Inc. throughout the U.S.

42. U.S. Maritime Administration, "Intermodal Access to U.S. Ports: Report on Survey Findings," (Washington: 2002).

43. Constance Hays, "Retail Stores Feel the Pinch of Cargo Caught in Transit Limbo," *The New York Times,* October 26, 2004.

44. U.S. Department of Transportation, "U.S. DOT Report Suggests Need for Improving National Highway System Connections to Freight Facilities," Press Release FHWA 130-00 (Washington: 2000).

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## Acknowledgments

The authors thank Mortimer L. Downey, former deputy secretary for the U.S. Department of Transportation, for his thoughtful insights and comments. The authors also thank Ralph Buehler, PhD candidate at Rutgers University, for his assistance in tracking down citations and SAFETEA-LU provisions. The Brookings Institution Metropolitan Policy Program would like to thank the following funders for their support of our work on transportation policy reform: the Ford Foundation, the Joyce Foundation, the John D. and Catherine T. MacArthur Foundation, the McKnight Foundation, and the Charles Stewart Mott Foundation. Brookings would also like to thank the Fannie Mae Foundation for its founding support of the program and its work.

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