



*Rules limiting the number of hours a truck driver may operate a vehicle before needing to stop are appropriately intended for public safety, but also increase demand for rest areas.*

Efficiency is the primary goal of goods movement for the private sector. Unlike people, freight does not take a recreational Sunday drive. There are many ways to describe efficiency, but it is ultimately about using scarce transportation resources wisely. This requires freight to move between two points at a speed and cost best suited for the shipment. The relative importance of speed and cost is determined by the type of freight and helps determine the most appropriate mode for a shipment. Shipment by plane or truck typically costs more than a slower shipment by ship or rail. For many heavy commodities, such as coal, a slower travel time is acceptable and rail is the preferred mode of travel. Meanwhile, high value medical supplies or produce may be moved more efficiently by truck or plane.

There are many challenges to moving freight quickly and at a low cost. Some of these may require the attention of public officials to fix. Meanwhile, some of the challenges are created through public policies that are designed to protect public health, safety, and welfare. These policies are implemented with an acknowledgement that they reduce the efficiency of freight transportation. A policy example is the hours-of-service regulations of the Federal Motor Carrier Safety Administration. These rules limit the number of hours a truck driver may operate a vehicle before needing to stop and rest. Such regulations protect public safety, but may also increase travel time and increase the cost of moving freight. The intent of this chapter is to raise awareness of some of the policy and infrastructure issues that reduce efficiency. These issues encompass topics such as infrastructure condition and capacity, regulations, market conditions, conflicting public and private goals, the lack of visibility for freight issues, and opposition to freight projects and land uses.

## INFRASTRUCTURE CONDITIONS

Highways, railroads, airports, and seaports are the circulatory system of freight transportation. The efficiency of freight movement depends on the health of this system. However, its condition is a growing concern throughout the United States. A building boom of new highway infrastructure was led by the federal government in the 1950s. Much of that infrastructure is now in need of repair. At the same time there are also capacity demands unrelated to maintenance that could be addressed through expansion and different operations policies. Simultaneously funding maintenance and expansion in an era of stagnant transportation revenue and rising material costs is a big challenge. Freight railroads, as private and profitable entities, have managed to maintain their most utilized lines well, but the nation's freight rail system could also be improved to handle more capacity.

The condition of the system reduces efficiency in several ways. Poor pavement condition increases wear and tear on trucks and passenger vehicles. Vehicles then require more frequent and costly repairs,

which takes vehicles out of service and raises costs for freight service providers and customers. Weight restrictions on highways and bridges also increase transportation costs. The transportation cost per unit or ton of freight increases for a delivery if a truck cannot utilize its full capacity. Additionally, bridge weight restrictions can force trucks to use circuitous routes that increase cost. One example is a key bridge between New York State and Vermont that was closed in 2009 due to its poor condition, forcing commuters to rely on slow ferries or take detours nearly 100 miles in length<sup>1</sup>.

Weight restrictions also affect freight railroads. The industry weight standard for tracks is to accommodate a loaded rail car weighing 286,000 pounds. However, some tracks and bridges cannot accommodate this weight standard due to poor maintenance, the age of the infrastructure, or even policy. Therefore freight must be distributed among more rail cars, which directly increases costs for customers, who may pay for services based on the number of cars necessary for a shipment. Speed restrictions are another problem on railroad tracks and bridges. These restrictions increase travel time and harm the ability of rail to compete with trucks in a highly competitive freight market.

Low overhead clearances are another condition that affects freight rail and trucks. Freight railroads can improve efficiency by double stacking on rail cars. Double stacking refers to placing a second container on top of a previously loaded container on a specialized railcar. This method is becoming more common as railroads compete with trucks for container transportation. Stacking containers reduces the transportation cost per container. However, this requires a greater vertical clearance above the tracks than was historically necessary. The desirable clearance for double stack rail is greater than 20 feet. Many railroads throughout the nation are in the process of increasing the clearance of bridges and tunnels in order to accommodate double stack rail freight. There are no height restricted clearances along Florida's main line rail corridors. Vertical clearance restrictions can also force trucks to take less direct routes to their destinations, which increases mileage and therefore cost.

Airports and seaports are also affected by infrastructure conditions. Freight commonly moves on large cargo jets and in the belly of passenger jets. Their access to an area can be limited by the airport infrastructure. For instance, the runway length restricts access to certain large aircraft at Hernando County Regional Airport and Zephyrhills Airport. Seaports must have modern equipment, such as cranes capable of handling containers on modern vessels, in order to maximize efficiency.



*Weight restrictions on highways, bridges, and rail lines are needed, but such restrictions may increase freight transportation costs when the full capacity of vehicles is not utilized.*



<sup>1</sup> Syracuse Post-Standard, Explosions bring down aging New York-Vermont bridge, Accessed July 18, 2012, [http://www.syracuse.com/news/index.ssf/2009/12/explosions\\_bring\\_down\\_aging\\_ne.html](http://www.syracuse.com/news/index.ssf/2009/12/explosions_bring_down_aging_ne.html)

## INFRASTRUCTURE CAPACITY

Closely related to infrastructure condition is infrastructure capacity, which is a concern as the volume of freight movements continues to increase. In 2007, the last year for which Commodity Flow Survey data are available from the Federal Highway Administration, nearly \$46 billion worth of freight weighing 52 million tons was moved daily in the United States. The Federal Highway Administration estimates that freight volume will increase by 1.4 percent per year through 2040<sup>2</sup>. As demand increases, capacity issues will grow more severe without policies or infrastructure improvements to address them.

The lack of a sufficient supply of transportation infrastructure also creates capacity problems. Congestion occurs when supply cannot meet demand. This can be a temporary situation brought about by peak periods of demand, or a long-running problem created by a bottleneck in the system or lack of infrastructure. Capacity constraints increase the amount of time it takes for a freight shipment to move through an area, therefore increasing cost.

Peak period highway congestion is a major problem on highways in urban areas. While freight movements are spread out more evenly throughout the course of the business day, passenger travel tends to experience peak travel during the morning and evening rush hours. Congestion increases time and delivery costs for companies, which has a ripple effect that increases prices for consumer goods. According to the Texas Transportation Institute, highways in the Tampa region are congested for more than four hours per day, draining more than \$1 billion per year<sup>3</sup> from the regional economy.

In addition to simple demand, the shared use of infrastructure by different types of users can cause congestion. For example, most rail infrastructure in the United States is owned by private freight rail companies. CSX Transportation owns a large share of the tracks in the Tampa region. Sharing these assets with passenger rail service can limit the windows available for freight deliveries. Passenger trains must run on tight schedules to attract passengers and often they have reserved windows when freight trains cannot access the rails. Delivery times may increase as flexibility decreases. If the commuter rail service is frequent throughout the day, freight trains may be forced to make deliveries at night, which may not be acceptable to some firms receiving or sending shipments. Rail congestion is due in part by the limited capacity (length) of passing sidings that restrict the length of trains to the length of the shortest passing siding along the corridor.



*Highways in the Tampa Bay region are congested for more than four hours per day, draining more than \$1 billion per year from the regional economy.*

<sup>2</sup> Federal Highway Administration, *Freight Facts and Figures 2011*, Accessed July 18, 2012, [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/nat\\_freight\\_stats/docs/11factsfigures/table2\\_1.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/11factsfigures/table2_1.htm)

<sup>3</sup> Texas Transportation Institute, *Annual Urban Mobility Report*, Accessed July 17, 2012, <http://mobility.tamu.edu/files/2011/09/tampa.pdf>.

Seaports and airports can also be hampered by infrastructure capacity. A looming issue in shipping is the expansion of the Panama Canal, which is set to open to larger ships in 2014 or 2015. Only a handful of ports in the eastern United States will be able to accommodate the new Panamax ships (the largest ships that can traverse the Panama Canal), which will have a draft of about 50 feet and be able to carry more than 12,000 twenty-foot equivalent containers<sup>4</sup>. Tampa is not among the ports that can accommodate the larger ships, but the port is well positioned to attract some of the increased Asian trade coming through the expanded canal in smaller vessels. Many ports in the United States are preparing for the larger ships that may use east coast ports rather than congested West Coast ports that require a cross-country trip by rail to reach East Coast markets.

Another capacity issue affecting seaports and airports is storage space for freight and the trucks, vessels, and airplanes that move it. Land-side storage space is not an issue for the Port of Tampa and Port of Manatee, which both have available land. This is a competitive advantage for the two ports, but a lack of space can be a major drag on efficiency at other East Coast ports.

### TRANSPORTATION REGULATIONS

Infrastructure is accompanied by regulations that govern its use. In transporting freight there are costs that are not reflected in the price of the service. These costs, such as air pollution or congestion, affect the entire population. Economists call these costs externalities. Government or private-sector regulations often intentionally reduce efficiency in order to reduce these externalities and protect public health, safety, and welfare. Public policies may also seek to help a freight service provider overcome a market obstacle that reduces efficiency, such as helping truckers pay the capital cost of new cleaner trucks through popular Clean Truck programs at many ports. However, this chapter is focused on challenges to efficient freight movement, and there are several regulations that reduce efficiency.

A much publicized set of regulations are those that limit the number of hours truck drivers may work without stopping for rest. These hours-of-service regulations, which are periodically updated, limit an operator from driving more than 11 hours after 10 consecutive hours off duty. They also place limits on the amount of time an operator may drive in a seven-day period. A trucking firm could be more efficient by forcing its drivers to put in more hours on the road, but this could have dangerous safety consequences for the drivers and the general public. The regulations are good for public safety considerations, but they also increase the demand for more truck parking along the interstates and other major highways.

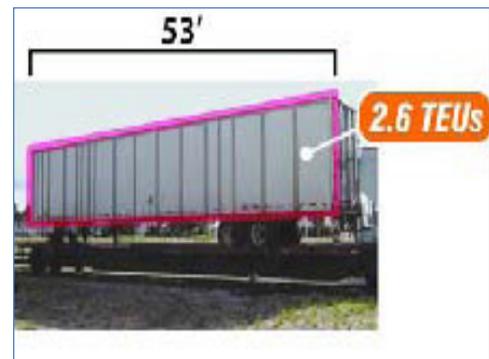
<sup>4</sup> Twenty-foot equivalent unit (TEU) is a common measure of container capacity for ships and ports.



A TEU is 20 feet long, 8 feet wide, and 8.5 feet tall.



A two TEU is 40 feet long and is equivalent to two single containers.



A 53-foot-long trailer is equal to 2.6 TEUs.

Federal limits are also placed on the weight of trucks operating on the Interstate Highway System in order to preserve its condition and safety. The current gross vehicle weight limit is 80,000 pounds. Bills were recently introduced in Congress to increase the weight limit. This would increase the efficiency of some shipments, such as heavy commodities, and reduce cost. But it would increase wear and tear on highways and bridges, which can have an adverse effect on the public and increase the maintenance costs of trucking firms. Likewise there are limitations imposed on trailer length (the maximum trailer/ domestic container length of a single unit is 53 feet) and the number of trailers that a single tractor may pull. Tandem and triple trailers can improve efficiency by reducing the need for multiple drivers, which are becoming more difficult to hire and retain. However, these multiple units are highly restricted and limited to only a few corridors in the United States.



*Stronger security measures put in place for public safety since September 11, 2001 are necessary but have created costly delays for freight coming into seaports and airports.*

Congress has also passed laws that have unintentionally reduced the efficiency of shipping. Recent attempts to reduce highway congestion have focused on the marine highway. These are federally-designated shipping routes between American ports that follow some routes of the Interstate Highway System. For instance, M-10 travels through the Gulf of Mexico between Tampa and ports in Texas, roughly following Interstate 10 and Interstate 75. The potential of these maritime routes is somewhat hampered by the Merchant Marine Act of 1920, which is also known as the Jones Act. This law requires ships transporting cargo between two American ports to use an American crew, an American-owned vessel, and an American-built vessel. While these laws have helped preserve the nation's ship-building capability, they increase the cost of shipping between American ports, and make it cost infeasible in many circumstances.

Another federal issue that has become more pressing since September 11, 2001 is security. Stronger security measures in the aftermath of September 11 can slow the passage of freight across the American border as well as into our ports and airports. The Transportation Security Administration now inspects all freight traveling in the belly of cargo planes, which also slows down the movement of freight and makes this efficient use of space on passenger jets less attractive. New infrastructure for these screening actions requires space and funding. These policies and equipment purchases improve public safety, but come at a cost.

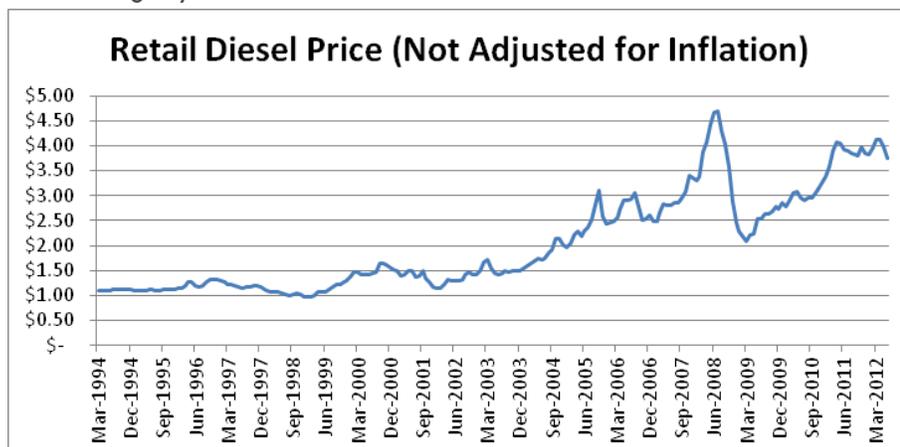
Regulations passed at the local level also affect freight efficiency. Cities and towns may seek to restrict trucks from certain areas in the interest of public health, safety, and welfare. However, this often increases the number of miles trucks must travel to make deliveries, which leads to more fuel consumption and higher costs. Cities and towns may also limit where trucks can park, or fail to provide enough space for loading and unloading, which can lead to truck drivers receiving many parking tickets. A study of off-hour deliveries in New York City found that delivery drivers often received more

than \$1,000 in parking fines each month<sup>5</sup>. FedEx and UPS drivers accumulate thousands of dollars in fines monthly and these companies and others figure these fines into their costs that are eventually passed on to consumers in the form of higher prices. Nighttime deliveries eliminated parking tickets and improved travel speeds by up to 75 percent.

## MARKET CONDITIONS

Market conditions are forces mostly outside the control and influence of freight service providers and government regulators. The efficiency of freight transportation is heavily influenced by market conditions, which affect the cost of labor, inputs such as fuel and materials, and infrastructure. For example, labor is becoming an important issue for trucking firms<sup>6</sup>. A shortage of qualified drivers is expected to substantially increase wages, which will lead to higher transportation costs and thus more expensive prices for consumers.

Fuel cost is also a factor that influences efficiency for all of the freight modes. Freight transportation relies heavily on diesel fuel, which has been increasing in price and experiences greater price volatility. The cost of a gallon of diesel fuel reached nearly \$5 during the summer of 2008 before falling to nearly \$2 per gallon during the winter of 2009 and eventually climbing back to more than \$4 per gallon in the spring of 2012. Data from the U.S. Energy Information Administration show that between May of 1994 and May of 2004 prices ranged only from \$0.95 to \$1.77 per gallon (in nominal dollars). Between May 2004 and July 2012 prices have ranged from \$1.70 to \$4.76 per gallon. Price volatility makes planning more difficult. **Figure 6-1** shows how volatility has increased during the last eight years.



**Figure 6-1: Retail Diesel Price**

Source: U.S. Energy Information Administration

5 New York City Department of Transportation, NYC DOT Pilot Program Finds Economic Savings, Efficiencies For Truck Deliveries Made During Off-hours, Accessed July 17, 2012, [http://www.nyc.gov/html/dot/html/pr2010/pr10\\_028.shtml](http://www.nyc.gov/html/dot/html/pr2010/pr10_028.shtml).

6 Bloomberg, Driver Shortage Shows Gain in U.S. Truck Cargo: Freight Markets, Accessed July 17, 2012, [http://www.nyc.gov/html/dot/html/pr2010/pr10\\_028.shtml](http://www.nyc.gov/html/dot/html/pr2010/pr10_028.shtml).



*Coastal cities, such as Tampa, have desirable waterfront locations that are attractive to mixed-use developments as well as port-related uses, which can create some political tension.*

Fuel price fluctuation is occurring in an environment in which goods are moving longer distances than several decades ago. Manufacturing in Asia has become more attractive because of low labor costs despite the long distance to American markets and the fuel consumption necessary to move goods to markets. However, fuel costs would need to rise much more to shift manufacturing closer to U.S. markets. Clearly, labor and land costs are more important than transportation costs in decisions about where to locate manufacturing. However, it is less efficient from strictly a transportation perspective to manufacture goods far from their point of consumption.

Closer to home land prices and uses, which are set by the market, also influence freight transportation costs. Many urban markets in the United States are experiencing renewed interest in people living closer to the jobs and entertainment options that exist in central cities. Housing, office space, and retail uses are often viewed by government officials and the general public as better uses of land than older manufacturing buildings, warehouses, and freight activity centers. Some freight companies are flexible and gladly relocate while taking advantage of rising land prices in the urban core. In coastal cities, such as Tampa, waterfront locations are especially desirable for new residential, commercial, and retail development, as well as seaport activities. It is much easier, politically, to convert land from a freight use to these uses. However, this problem is not as pressing in the Tampa Bay region as in other major eastern markets. The ports are a well established and vital component of the region's economy.

## NIMBYISM

While freight may lose ground in some urban core areas, there continues to be demand for freight activities. Conflicts between land uses may arise when a freight activity is planned for an area. Private property owners may fear that the construction or expansion of a freight use, such as a rail yard, truck terminal, distribution center, or warehouse will lead to traffic and cause property value to decline. While they may recognize the importance of these facilities, and feel that they contribute to the economy in a positive manner, they would prefer that the facility be located somewhere else. This phenomenon is known as "Not in My Back Yard" or "NIMBYism." While these fears may be warranted, they can make it difficult to site a freight-intensive land use. Efficiency of goods movement can be harmed when these facilities cannot be located in the preferred location.

## CONFLICTING PUBLIC AND PRIVATE GOALS

The potential for conflict between public and private goals is explained to some extent in the transportation regulations section. Private sector companies are responsible for maximizing their profits. Meanwhile, government's responsibility is to protect the public health, safety, and welfare. These different objectives can create conflicts between the public and private sector.

A private freight transportation provider, such as a railroad, may decide to take an action that is good for the company's financial health. For example, a railroad may decide to abandon a line that is carrying no traffic, or carrying so little traffic they are losing money. While this may be in the best interest of the railroad, other companies or public agencies may wish to keep the line operating because they feel it is in the public interest. Their rationale may be that more trucks will be on the highways as a result, or that companies along the line will be economically harmed. In this example the federal Surface Transportation Board is responsible for adjudicating the dispute.

Another example is the location of warehouses and distribution facilities. These were traditionally located close to centers of population. However, private companies have discovered that they can save money and make greater profits by centralizing their operations and moving them out of urban core areas. Land is cheaper on the periphery and there is more room to grow. Land in the urban core is also likely more valuable. However, relocating to the periphery may lead to more truck vehicle miles traveled as the distribution facilities are further from the points of consumption, such as large retailers. As is the case with manufacturing, decisions about where a company should locate are often made for a variety of reasons and transportation efficiency may not be the most important. The cost of labor and inputs are also major factors. Greater truck vehicle miles traveled will lead to more wear and tear on highways and increase emissions, which are external costs that do not affect the company's bottom line, but can have a negative effect on the public.

A third example with relevance in the Tampa area is the desire by government officials to use rail for commuter transportation. However, the desire to reduce commuter traffic is often at odds with the desire to reduce truck traffic by increasing rail shipments. Freight railroads may be leery of proposals to share tracks between freight services and commuter or passenger services. Sharing tracks may limit the flexibility of freight rail service, which is expected to increase once the economy improves and more long distance loads are transported into and out of the region by intermodal rail. However, it can give commuters an alternative to traffic congestion, which can increase the capacity of an urban area to accommodate commercial space and make an area more attractive to firms. There are many successful examples of commuter and freight rail sharing space, but it can



*Rail lines abandoned for company financial reasons may sometimes be negatively viewed by other companies and public agencies since they believe more trucks will be on the highways and companies along the former line will be economically harmed.*

also lead to a loss of freight rail capacity if not carefully planned. Each of these examples requires a dialogue between public and private sectors in order to find a balance between their objectives.

## LOCAL AND REGIONAL FOCUS OF TRANSPORTATION PLANNING

The last two sections of this chapter focus on the political elements of transportation decision making and how these can affect efficiency. The federal government plays a strong role in transportation planning and improvements. They provide a large amount of highway and transit funding, and establish design and planning rules. Through the power of the purse they are able to ensure we have a fairly uniform system of highways. However, the federal government does not actively plan or design facilities. These are responsibilities of metropolitan planning organizations and state departments of transportation. Understandably their focus is on regional and state mobility and other parochial issues. The Federal Highway Administration and Federal Transit Administration are largely responsible for oversight of the federal-aid programs. As a result, there is not a clear national freight policy.

In the past, the federal government did not apportion funding to implement projects that are of national significance for the freight system. Most funding was distributed to the states through formulas and congressionally mandated special projects referred to as “earmarks.” Additionally, there were no incentives in place for states to cooperate and share funding to solve transportation problems that affect or span more than one state. There are indications of change though. Congress passed a new surface transportation law, Moving Ahead for Progress in the 21st Century (MAP-21) in June 2012. The bill requires the United States Department of Transportation to develop a national freight plan. It also provides incentives to states for improving their freight network. Projects that are identified in a state freight plan are eligible for greater federal support. While the federal share of a project is typically 80 percent, identified freight projects are eligible for a 90 percent federal share, and those on the Interstate Highway System are eligible for a 95 percent federal share. This incentive may lead states to invest more funds in critical freight projects, which may improve freight travel time and reduce the cost of moving freight.



*In the United States, there has traditionally been no clear national freight policy. However, MAP-21, signed into law in June 2012, requires the USDOT to develop a national freight plan. Incentives provided to states to improve their freight networks are anticipated to lead to improved freight travel times and reduced costs.*

### FREIGHT DOES NOT VOTE

A final challenge, which encompasses several issues described in this chapter, is that freight transportation providers may have less of a voice in political debates about transportation than the general public. Clearly the transportation system is critical for moving both people and goods to the places they need to travel. However, only one of these groups – people – has a vote in their local, state, and federal government. People notice how transportation affects their lives and finances and are likely to pay attention to what political candidates say about the issue. Additionally, elected officials are people and they use the transportation system on a daily basis as well. They understand the major issues through their own experiences. While freight transportation providers and companies make political contributions and have a voice that is heard by elected officials, there may be a bias towards passenger transportation because people have more familiarity with it. Freight is often out of sight and out of mind until something bad happens.

There may also be a bias towards passenger transportation among urban planners. Much of their work entails public outreach and meetings with citizens and developers. Freight providers and transportation are sometimes an afterthought. For instance, improvements may be recommended for a street or area that improves travel for people, but impedes travel for freight. An example could be a road diet or curb extension. While these are important improvements for people, they are often designed without trucks and freight in mind. There are areas of intense freight activity where such improvements should be avoided.

These conflicts between passenger and freight transportation are not only a result of political influences. There is also a lack of understanding among the public and professionals alike as to the importance of freight transportation to economic strength. Freight is sometimes viewed as a nuisance and something to reduce or marginalize. However, the presence of trucks, trains, planes, and ships carrying freight are signs of a vibrant economy that is creating and trading goods and supplies. Improving the efficiency of freight transportation is one very clear way to improve the region's economy.



*The general public and elected officials may be more biased towards passenger transportation issues because they are more familiar with it and less familiar with freight issues.*