The Value of Rail Intermodal to the U.S. Economy

by

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Executive Summary

An efficient freight transportation system is a necessary element for a healthy economy. Today, the United States enjoys the most efficient freight transportation system in the world, providing a major competitive advantage for us in the global economy.

Maintaining that advantage in the face of an expected doubling in demand for freight transportation by the year 2020 will require significant investment in transportation capacity. Indeed, our transportation networks are already challenged in many areas by congested and decaying infrastructure. We must determine which future transportation infrastructure investments will generate the greatest economic and public benefits, and then make those investments. The alternative is declining economic productivity and a cap on the growth of our economy.

At present, the U.S. freight transportation system is characterized by a high level of dependence on highway-based carriage. It is highly unlikely — because of the enormous cost involved, environmental and land use concerns, and other factors — that sufficient highway capacity could be built to handle expected future freight growth. Indeed, recent research published by the U.S. Federal Highway Administration (FHWA) makes it clear that if we continue to rely inordinately on trucks and highways, the demand for freight transportation over the next two decades will far exceed infrastructure capacity.

Fortunately, there is a viable alternative. Freight rail in general, and intermodal rail specifically, represent a far more efficient and socially beneficial alternative. Today, rail intermodal takes millions of trucks off our highways each year, and its potential to play a much larger role in the future is enormous, both in traditional transcontinental markets and in new short- and middle-distance lanes. Greater intermodal use would generate massive societal benefits, including reduced highway congestion, a reduced need to build more highways, enhanced highway safety, and significant environmental benefits including lower harmful emissions and reduced fuel use.

A productively growing economy requires an efficient logistics system based on sufficient transportation infrastructure to meet growing demand. However, our nation’s privately owned and financed freight railroads cannot generate on their own all the capital required to take full advantage of intermodal’s potential; nor should they be expected to, given that so many of the benefits of expanded intermodal use would flow to the general public.

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public rather than directly to the railroads themselves. Consequently, a dramatic expansion of rail intermodal, and the enormous public benefits it would provide, can occur only through the use of innovative public/private partnerships that should become an integral part of national transport policy. If we fail to make this choice, we will face a crisis of mobility and reduced economic growth in the years to come.

I. Transportation Infrastructure Investment and Economic Growth

Mature economies such as ours are heavily dependent on productivity gains to spur economic growth and to improve the standard of living. As ICF Consulting recently pointed out in a report for the FHWA, “The American economy can grow and deliver improved living standards through one of two means, more workers or more productivity. With an aging population and net birth rates in decline, the nation is heavily dependent on productivity growth to achieve its economic goals.” Research has shown conclusively that investments in transportation infrastructure have a major positive effect on productivity, and therefore help spur efficient economic growth. Conversely, factors that reduce productivity, such as inadequate transportation capacity, will slow, or cap, economic growth in the United States.

Today, we already face severe and growing problems handling existing volumes of freight and passenger traffic, especially on our highways. According to the 2002 Urban Mobility Study published by the Texas Transportation Institute (TTI), the aggregate cost of highway traffic congestion in just the 75 urban areas the institute studied is $67.4 billion, representing the cost of 3.6 billion hours of extra travel time and 5.7 billion gallons of fuel wasted while sitting in traffic. The cost of congestion is up approximately 400 percent in inflation-adjusted terms since 1982. According to TTI, the level of congestion today is “undesirable” in 42 of the 75 (56 percent) urban areas studied, up from 7 percent in 1982 and 29 percent in 1990.

Moreover, because the freight transportation system is a network of interrelated and interdependent components, the effects of capacity limitations and gridlock spread throughout the system and have multiple system-wide impacts. As noted at a recent hearing of the U.S. House Subcommittee on Highways and Transit, “No matter how functional the individual parts of the system may be, the effectiveness of the overall system depends on the

\[\text{Estimated Costs of U.S. Highway Congestion (Billions of Constant 2000 Dollars)}\]

Source: Texas Transportation Institute

interconnectivity of the different parts and modes. … Connections now must reach beyond a single mode, to foster an integrated and efficient transportation system.”

For example, our deep water ports — the gateways to much of our international trade — are negatively impacted by the limited capacity of our freight transportation infrastructure: “If no landside improvements are made to our port and intermodal system, in ten years, North America will experience a …50% shortfall in capacity with the associated severe degradation of national economies and (in) the associated quality of life. (Furthermore), (i)f landside access to the North American ports and intermodal terminals…(is) not significantly improved, the cost of cargo delivery could double or triple by the end of the decade.” This is neither an isolated nor extreme view of the potential severity of the freight infrastructure capacity shortfall that we face. At a September 9, 2002 joint hearing of the Senate Commerce Subcommittee on Surface Transportation and Merchant Marine and the Senate Environment and Public Works Subcommittee on Transportation, Infrastructure and Nuclear Safety, Admiral Rick Larrabee, the Director of Port Commerce at the Port Authority of New York and New Jersey, testified on the importance of improving landside access to U.S. ports and the desirability of shifting the flows of traffic to and from ports away from motor carriers and to railroads and barges.

Historically, investment in highway infrastructure and dependence on motor carriers has been the cornerstone of national transport policy. Our nation currently has the world’s most highly developed highway network, built and maintained at enormous public cost over the years. According to the U.S. Bureau of Transportation Statistics, in just the ten years from 1990 through 1999, our nation spent more than $770 billion in combined local, state, and federal funds on highways.

Even this huge level of spending, however, is widely considered inadequate to meet present-day, much less future, needs. As the American Trucking Associations noted in recent testimony before Congress, “According to the Department of Transportation’s 1999 Conditions and Performance Report, even with the high levels of funding authorized by the Transportation Equity Act for the 21st Century (TEA-21), there is still a shortfall in federal funding of over $25 billion each year just to maintain current conditions on our highways and bridges.” Furthermore, the traditional highway-based solution is failing as we experience diminishing returns from the traditional transportation initiatives of past decades.

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5 Bureau of Transportation Statistics, Government Transportation Financial Statistics 2001, Table 1-A.

6 Testimony of David Manning, President, TCW/Tennessee Express, for the American Trucking Associations, before the House Subcommittee on Highways and Transportation, June 18, 2002.
Given current and future financial constraints, it is highly unlikely that sufficient funding could be found to continue to address our freight transportation needs through a continued excessive reliance on motor carriers and highways.

Perhaps the biggest problem is that highways have become incredibly expensive to construct. A recent FHWA document indicates that in 1996 dollars, the “weighted rural and urban combined” costs per mile of constructing interstate highways…(is) $20.6 million, including $9.84 million per rural mile and $44.13 million per urban mile.”\(^7\) Even just adding lanes to existing highways is incredibly expensive — almost $10 million per lane mile in urban areas, according to an FHWA official.\(^8\)

Moreover, beyond the enormous costs involved in building more highways, pervasive resistance by the public for environmental and social reasons make it clear that we will not be able to “build our way out” of the highway congestion problem. For example, in many cases, additional urban land is, for all intents and purposes, simply not available for highway construction without lengthy and divisive battles with local communities that argue against additional highways because of their negative impacts on air quality, increased noise, and deterioration of the urban landscape.

Making matters worse, the FHWA projects that demand for freight transportation will double by 2020, while projected infrastructure spending for all modes is planned to increase only minimally.\(^9\) Given that our freight transportation system is a complex, interdependent network and that networks decline in service quality, efficiency and throughput as theoretical maximums are approached, future traffic growth will only exacerbate the existing problems of congestion and delay that we are experiencing today. In fact, in the near future we will likely face a crisis of mobility that will force shippers and freight carriers to bear higher operating costs and declining productivity.

Unless we address our infrastructure problem, we will find ourselves seriously disadvantaged by our reliance on congested and gridlocked roadways — instead of enjoying the gains and advantages derived from the world’s most efficient logistics system. In the near term, the resultant increased costs for carriers, shippers and the public will represent an “inefficiency tax” on the economy. In the long term, the situation will become much more threatening. Since, as discussed earlier, it is neither likely nor desirable that we will be able to build sufficient highway capacity to accommodate projected freight growth, policymakers face two choices: commit to using available infrastructure investment dollars more efficiently, or accept that worsening congestion and declining productivity will seriously constrain national economic growth.\(^10\)


\(^9\) FHWA Long Range Freight Forecast, November 2000.

\(^10\) At the same time that it is important for policy makers to choose to invest in the most efficient freight infrastructure, it is also important for them to recognize that an efficient freight market is one in which the users bear the full marginal costs of their shipments. An emphasis on simply reducing direct costs to users for one
The solution to the serious transportation and congestion problems outlined above is to broaden our existing policy focus away from an almost single-minded concentration on trucks and highways. This does not mean that we will stop building highways or that we should no longer recognize the importance of trucks and highways in meeting our nation’s transportation needs. However, we must redistribute infrastructure spending and restructure national transportation policy to make more effective use of all modes. Assistant Secretary of Transportation Emil Frankel put the concept of making the most efficient use of each transport mode into perspective recently before the House Subcommittee on Highways and Transit when he testified, “In order to have an effective intermodal transportation system, all modes must be utilized to their full potential and integrated into a seamless system.”

II. Rail Intermodal as a Compelling Alternative to More Highways

Freight railroading in general provides substantial benefits to our economy. Railroads account for more than 40 percent of our nation’s intercity freight in terms of ton-miles — including huge quantities of coal, grain, chemicals, automotive products, forest products, ores, and countless other commodities — but receive just 9 percent of intercity freight revenue. The growth of the U.S. economy over the past two decades coincides with dramatic improvements in freight rail’s productivity, the gains from which have been passed on to shippers in the form of lower rail transportation rates. On average, rail rates (as measured by revenue per ton-mile) are 29 percent lower today than they were in 1981, and 60 percent lower in inflation-adjusted terms. These rate reductions have saved U.S. shippers and consumers tens of billions of dollars.

While freight railroading in general is clearly indispensable to our economic well-being and offers substantial advantages over other modes, a subset of freight railroading — rail intermodal — offers a particularly appealing means to combat highway congestion and enhance the efficiency of our nation’s overall freight transportation system. Indeed, intermodal rail may be the most efficient and socially beneficial means of providing freight capacity.

Defined as the movement of containers or trailers by rail and at least one other mode of transportation, rail intermodal is both more cost effective and environmentally desirable than continuing our present over-reliance on motor carriers and highways. A national transport policy must be formulated that encourages the conversion of freight traffic from over-the-road truck to rail intermodal.

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11 Statement of the Honorable Emil H. Frankel, Assistant Secretary for Transportation Policy, U.S. DOT, before the House Committee on Transportation Infrastructure, Subcommittee on Highways and Transit, June 18, 2002, p. 2.
As Lakshmanan and Anderson point out in a report for the FHWA, “Policy formulation must address not only the question of whether to invest in infrastructure, but also the question of which among an array of projects will yield the greatest economic return.”

Ironically, rail intermodal has been undervalued by transportation planners and policy makers as an alternative to a reliance on highways and motor carriers for freight transportation. Perhaps this is because transportation planning has historically been preoccupied with highway planning, and until very recently transportation planning placed little emphasis on freight and on modes other than highway. The passage of ISTEA and TEA-21, along with the recent research and public outreach focused on freight issues and conducted by the FHWA, has made important contributions to correcting this perspective and to bringing freight issues into focus.

Overview of Intermodal

Intermodal freight transport has been the fastest growing major segment of traffic for the U.S. freight railroad industry over the past decade. U.S. intermodal traffic has grown from 3.1 million trailers and containers in 1980 to nearly 9.0 million in 2001, and now accounts for approximately 20 percent of revenue for major railroads, placing it second only to coal among all commodities carried by rail. Approximately half of U.S. intermodal traffic is international — i.e., U.S. exports or imports — and intermodal traffic moves throughout the North American rail network.

There are several reasons why intermodal transport has become such a vital part of the U.S. freight transportation mix. These include its cost effectiveness; its environmental and social benefits13; its quality of service; and its ability to combine the most compelling aspects of long-haul rail and short-haul truck.

Some of the specific benefits of rail intermodal are summarized in Exhibit 1, originally prepared for the Cross Harbor Freight Movement Project. The data in the table compare overall rail to truck, but rail data are a useful surrogate for intermodal statistics. A comparison of the relative fuel efficiency, infrastructure capacity (and, therefore, land use), cost to users, and safety makes the public benefits of increased reliance on rail intermodal versus truck quite clear.

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13 For example, according to the most recent data compiled by the Oak Ridge National Laboratory for the U.S. Department of Energy, the energy intensity (measured in Btu per ton-mile) of railroads was 362, compared with 457 for waterborne commerce and 3,307 for trucks.
Exhibit 1: Comparison of the Relative Efficiencies and Safety of Rail and Truck

<table>
<thead>
<tr>
<th>Mode</th>
<th>Fuel Consumption</th>
<th>Infrastructure Capacity</th>
<th>Cost (to Users)</th>
<th>Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Railroad</strong></td>
<td>455 ton-miles per gallon</td>
<td>216 million annual tons per mainline</td>
<td>2.7 cents per ton-mile</td>
<td>0.61 fatalities per billion ton miles; 12.4 incidents per billion ton-miles</td>
</tr>
<tr>
<td><strong>Truck</strong></td>
<td>105 ton-miles per gallon</td>
<td>37.8 million annual tons per lane</td>
<td>5.0 cents per ton-mile</td>
<td>1.45 fatalities per billion ton-miles; 36.4 injuries per billion ton-miles</td>
</tr>
</tbody>
</table>

Source: Cross Harbor Freight Movement Project materials prepared by Cambridge Systematics.

Rail intermodal’s economic value and contribution to the economy today resides primarily in the long-haul corridors with origin-destination pairs more than 750 miles apart. As intermodal service has improved, it has attracted long-haul cargo from shippers with higher service requirements, such as parcel and postal shippers, less-than-truckload motor carriers, and others. While rail intermodal’s current share of the total freight market is generally considered to be about 3 percent, its share of specific markets can be very high. “In lanes with high volumes, such as Los Angeles-Chicago, which permit frequent trains, and with a good route and service …capture rates (i.e., conversion from truck to intermodal) have been reported as high as 80 percent of available traffic.” This provides a clear indication of rail intermodal’s ability to handle a much higher percentage of intercity freight and even to become the dominant mode in a given shipping lane.

Beyond the clear efficiencies that rail intermodal has over truck, the capacity-related costs of rail are significantly less. Consider that a rough equivalent in capacity to a four lane highway is a double track railroad mainline which requires perhaps one-fourth of the land of the four lane highway and, while the cost of building railroad mainlines varies according to a number of factors, the typical range in cost-per-mile is between $1 and $2 million. As pointed out earlier, even just adding a lane to existing urban highways costs an average of $10 million per mile. Given even this rough comparison, it becomes readily apparent that the lowest incremental cost of expanding freight capacity will reside with rail intermodal.

Railroad Intermodal Investments

Today’s U.S. intermodal network — the most advanced, most efficient such network in the world — was developed largely over the past couple of decades by more fully utilizing latent and available rail network capacity. In many cases, railroads converted underutilized carload facilities to modern intermodal terminals and utilized track capacity made available as

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14 Incidents include all non-fatal injuries and property damage accidents.


conventional carload trains declined in volume. However, even though facilities and land were converted by the freight railroads to intermodal use, it was not without considerable investment on their part. Intermodal investment alone by Class I railroads between 1980 and 2000 totaled approximately $34 billion. This investment has gone into a variety of equipment and infrastructure projects such as:

- New, or expanded, inland intermodal terminals to facilitate the transfer of containers and trailers between rail and truck;
- New on-dock, or near dock, intermodal terminals to facilitate the transfer of containers between ship and rail;
- Introducing a variety of new intermodal car types throughout the national intermodal network;
- Raising clearances along certain routes to accommodate the additional height required to operate doublestack trains;
- Adding track capacity and advanced signaling systems to accommodate faster, more frequent trains of all categories in the rail network; and
- Modernizing the locomotive fleet resulting in greater reliability for customers.

In the last year alone, U.S. and Canadian railroads have announced or completed a number of major intermodal investments focused on expanding service offerings, increasing reliability, and lowering costs. The investments include new intermodal terminals across the United States, the opening of a new multi-billion dollar connector route between the Ports of Long Beach and Los Angeles and the transcontinental rail network, and major improvements to the intermodal terminal infrastructure in the Northeast.

Nonetheless, a fundamental problem remains with respect to intermodal infrastructure investment. The freight railroads are investing as much as their competitive and financial realities will allow. However, the current level of investment is not enough to finance and drive the truck-to-intermodal conversion that will be critical to meet national economic and social needs in the coming decades.

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17 Investment provided for: 1) The replacement of virtually the entire intermodal car fleet and the introduction of new doublestack technology; 2) The locomotive fleet devoted to intermodal was replaced and significantly expanded; 3) A national, mechanized intermodal terminal infrastructure was created; 4) Route capacity was added and line clearances were improved to accommodate doublestack trains; 5) New signaling systems were installed; and 6) Information technology to manage intermodal terminals and support shipper information requirements was developed and implemented. The $34 billion represents 12 percent of the total rail investment of $290 billion and is roughly the percentage that intermodal revenue represents of total rail revenue during this period.
Intermodal Growth and Internationalization

The key role rail intermodal plays today and can continue to play in the future is illustrated by intermodal’s current importance in international trade and the globalization of our economy. Over the past 30 years, U.S. international trade in goods and services has grown from 10.7 percent of GDP to 26.9 percent. This growth has been greatly facilitated by efficient intermodal transportation.

Indeed, as manufacturing has become more global and as supply chains have become longer and more complex, the railroads’ intermodal service has come to play a critical role in making the supply chains of a wide variety of shippers efficient — particularly for those that depend on imported or exported materials and goods.

These efficiency gains would not have been economically viable without the efficient integration of ocean, rail, and short-haul truck services. New technologies, new service networks, and new business architectures have been developed by the railroads and their partners to efficiently serve these critical international supply chains through rail intermodal.

Large retailers like Wal-Mart, whose profit margins depend on optimal supply chain management, rely heavily on intermodal to cost-effectively transport consumer goods to its distribution centers nationwide. For similar reasons, United Parcel Service, the world’s largest shipping company, is a heavy user of intermodal. In 2001 alone, UPS spent more than $750 million on intermodal transportation, making it the industry’s largest customer. Intermodal is no less beneficial in business-to-business environments. For example, automakers in Detroit and elsewhere — many of which have streamlined their inventories using just-in-time delivery — use intermodal transportation to deliver auto parts to their assembly plants.

The development of doublestack intermodal is representative of the ways that intermodal has evolved over time in ways that have brought tremendous benefits to shippers, ultimate consumers, and our economy at large. Doublestack refers to the process of stacking one container on top of another in specially designed rail flat cars. Doublestack essentially doubles the number of containers moved in each train. Doublestacking changed not only the economics of rail intermodal service, but also dramatically improved the quality of cargo handling because it reduces the amount of dead weight required to deliver a pound of freight and reduces the amount of “slack action” in the rail cars as they move along the rail line. These and other effects have led to improved ride quality, lower fuel consumption per pound of freight handled, and reduced the amount of line capacity required to move a train through the network. In sum, doublestack has meant lower costs and higher quality service for rail customers.


19 Due to the nature of the way in which rail cars are connected to one another, a certain amount of longitudinal movement is possible between cars at the connecting point. Such motion is referred to as slack and is undesirable as it can, in an extreme situation, lead to damage to cargo. New car technology minimizes such slack action and provides a damage-free ride to cargo.
At the same time, new relationships and ventures between the railroads and steamship companies were developed to operate and market doublestack container networks — some within the railroad’s organization structure and some outside of it. This provided for innovation and efficiency, the development of new expertise, and for new sources of capital and technology.

The example of manufactured goods from Asia is illustrative. As ICF Consulting explains,

“(T)he benefits of low-cost double-stack service were fully realized because the trans-Pacific container lines were able to contract with rail carriers for fast and reliable service — service that adheres to the precise schedules set by the steamship companies. Because of this…large volumes of imported consumer goods move speedily and reliably from West-Coast ports to the Midwest at low rates (e.g., railroads are hauling containers from Los Angeles to Chicago at 30 cents a mile, while the average trucking rate is…in excess of $1.00 a mile). Freight service of this quality and price allows major distributors and retailers to keep a tight rein on their logistics costs to the benefit of their customers and the overall economy…intermodal transportation exemplifies the types of changes that have led to improvements in the reliability and quality of the nation’s freight system.”

Containerization and doublestack intermodal services have spread rapidly throughout the United States, facilitating the development of increasingly efficient supply chains for a wide variety of customers. Doublestack networks are truly national and international in scope, integrating eastern and western U.S. railroads, railroads in Canada and Mexico, steamship companies, and motor carriers in one seamless service. The growth of intermodal service of all categories during the past two and half decades has been remarkable. In 1984, one doublestack train per week originated on the West Coast and served one U.S. inland market. Today, over 241 doublestack trains per week originate on the West Coast and serve all the major long haul U.S. markets. Every day, over 17,000 containers laden with imported cargo enter the United States, and 60 percent of those containers that are discharged on the West Coast move inland by rail. A single 5,000 twenty-foot equivalent unit (TEU) vessel arriving at a U.S. port will typically generate seven doublestack intermodal trains.

Intermodal transports a huge range of consumer goods — everything from bicycles to automotive parts, from lawn mowers to glassware, from greeting cards to bottled water, from toys to electronic goods. The “big box” that supplied your local big-box store is probably an intermodal container that crossed the United States on a doublestack train. Major retailers are heavily dependent on the use of rail intermodal not only because it offers a cost advantage but

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22 On the basis that a 5,000 TEU vessel will typically discharge approximately 2,896 units with a 60 percent intermodal split. A doublestack train can handle approximately 280 intermodal units.
also because sufficient over the road capacity does not exist to handle the high volumes concentrated at port origins, especially during seasonal peaks.

**Domestic Intermodal Movements**

Today, railroads move domestic freight for a wide variety of customers utilizing both trailers and containers. In recent years, the creation of large-scale pools of domestic intermodal containers — competitive in size and capacity with those by over-the-road truckers — have facilitated intermodal growth and allowed the domestic shipper to capitalize on the gains in efficiency and ride quality of doublestack technology. Railroads and stack train operators have invested in thousands of new 48-foot and 53-foot containers used exclusively in domestic lanes. These containers provide the basis of a steady and important conversion of domestic freight from highway to rail and serve a diverse customer base: wine, food products, toys, electronic goods, and many others ride to market in these “high cube” domestic containers.

International containers also play an important role in the movement of non-international freight within the United States. In an effort to eliminate empty and inefficient movement of containers, the same containers that handle imported goods are often utilized to move domestic goods from the East Coast, Southeast, or Midwest to West Coast destinations. Likewise, goods produced domestically are transported by intermodal to international freight gateways located along the perimeter of the continental United States. Here, containers are transported by other modes to foreign markets mostly in North and South America, Asia, and Europe. This has the effect of improving the efficiency of both international and domestic supply chains.

Just as containerization facilitated the role intermodal plays in handling international freight, the development of new technologies focused on the penetration of middle-to-short distance intermodal markets in the United States hold significant promise.

One example of the way railroads have adapted innovative technology to meet short-to middle-distance shipping challenges is the RoadRailer. Essentially a trailer with interchangeable rail or road wheels, this “bi-modal” vehicle works as well on the highway as it does on the railroad. It provides railroads market reach and flexibility comparable to motor carriers. Another example, also focused on the middle-to-short distance truck market, involves the use of specially designed intermodal rail cars which enable conventional truck trailers, without modification, to be easily loaded and unloaded and transported quickly and efficiently by rail. By minimizing the need for specialized equipment, by minimizing terminal costs, and by reducing staging time, this approach makes rail intermodal a more realistic alternative at shorter length-of-haul. Both concepts are enjoying significant success in their current markets.

RoadRailers are being utilized to efficiently serve both long-haul and middle distance markets. Their truck-like service has attracted a variety of shippers including automotive parts manufacturers, appliance manufacturers, and food products companies, among many others. RoadRailer brings the ride quality of doublestack, but with its lower tare to net weight
ratio and minimal requirements for terminal infrastructure, it also brings a lower cost structure essential to compete in the under 1,000-mile markets. As with their other growing intermodal services, railroads have developed new business architectures to offer RoadRailer services, often establishing subsidiaries or joint ventures to market and manage this product offering.

III. The Future of Intermodal

Rail intermodal is underutilized today with a significant potential for growth. Between 1980 and 2000, the compound annual growth rate of rail intermodal was 5.9 percent, facilitated almost entirely through private capital investment by the freight railroads. However, intermodal’s potential is much greater than this incremental growth. In fact, intermodal has the potential to become the core of our long distance freight transportation networks and to make substantial inroads into new middle- and even short-distance markets.

This can be accomplished through the addition of new capacity in certain lanes and through the introduction of additional incentives to invest in intermodal capacity. Growing intermodal market share will require continuous investment in terminal, line haul, and equipment capacity as well as innovation and investment in technology that can reduce unit costs and provide higher levels of service essential to penetrating shorter haul markets and attracting an even broader range of shippers. This rate of development of intermodal capability can only come with capital formation and capital investment significantly beyond current levels.

Based on the current plans of major railroads for intermodal growth, and assuming that those plans are determined by the freight railroads’ ability to commit capital to this segment of their business, it appears that private capital can fund an intermodal growth rate in the range of 4.5 percent to 6 percent on an ongoing basis. Intermodal’s projected growth rate (as measured by tons) outpaces that of most other transportation modes, including truck (3.4 percent), inland water (3.5 percent), and even conventional carload rail (3.2 percent). Only air (5.9 percent), whose usage has been fueled largely by globalization, boasts a higher projected growth rate. The projected growth rates assume no modal conversion such as intermodal transportation, for example, gaining market share at the expense of truck. Intermodal’s projected annual growth rate greatly exceeds expected growth in the U.S. gross domestic product for the same period.

However, growth at even a 4.5 percent to 6 percent level will not meet the objective of aggressive modal conversion from truck to rail that, as discussed at the beginning of this paper, is needed to avoid the economic and social problems attendant to running out of freight transportation capacity. To accomplish this task, we need to as much as triple intermodal growth. Such a growth rate would be an enormous challenge to accomplish and would still leave an enormous amount of freight moving by truck, but the gains attendant to it for our economy and quality of life would be huge.

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23 This is the range of intermodal growth projected for the next five years by three Class I railroads.

24 The National Association of Manufacturers, for example, projects U.S. GDP growth of 3.3 percent per year.
Adding capacity in the future will require more significant investments than in the past, as “excess” capacity has been consumed and low cost capacity is no longer available. Land for terminals must be acquired rather than converted, additional mainlines along with terminal support track will have to be built, investment in new technologies will be required (e.g., signaling systems, state-of-the-art technology providing for in-transit-visibility, terminal management systems that integrate maritime and rail intermodal terminal planning and inventories, etc.), and so on. At its base, the future growth rate for intermodal will be driven by the total amount of capital available for investment in infrastructure, technology, and service improvements.

IV. Intermodal to become the Greatest Source of Revenue

Intermodal, which posted an eight percent growth over the past three months, is expected to surpass coal as the greatest source of railroad freight revenue by the fourth quarter of 2003, assuming projected annual growth of 5 percent for intermodal and 1.5 percent for coal, and assuming that the U.S. economy maintains no less than its current moderate growth rate.

In 2003, coal will still be the leading revenue producer for freight railroads, but by the fourth quarter of that year intermodal revenues should begin to surpass coal revenues. While 2000 rail revenue was $8.8 billion for coal and $8.3 billion for intermodal traffic, projected 2004 revenue levels are $9.4 billion from coal and $9.7 billion from intermodal.

V. Why Railroads Alone Cannot Solve This Problem

Unfortunately, future freight railroad investment in intermodal capacity is constrained by certain financial realities. Railroad capital spending in general is severely constrained by pressure railroads experience from the financial community to limit capital spending to maintain free cash flow. Railroads continue to invest heavily, but the focus of rail investment is on projects with the highest expected internal return to the railroad. While necessary and appropriate in a free market economy, a focus on financial returns to the railroad discourages railroad investments that would yield primarily public benefits — including reduced congestion, cleaner air, improved highway safety, and other effects that have a clear benefit to our nation at large but a less clear direct benefit for the railroads which would be committing the funds for the project.

The Staggers Rail Act of 1980 has had many positive impacts on the rail industry. The freight railroads have reduced costs, increased their productivity in virtually all categories, and improved their earnings. Despite these gains, the railroads still do not come close to earning their cost of capital. In 2001, for example, the rail industry’s overall cost of capital was 10.2 percent, compared with a return on investment of only 6.9 percent. Furthermore, railroad profitability is consistently in the bottom 25 percent of all U.S. industries. Given that the railroads can play a much larger role in meeting the pressing national need for additional freight capacity, it is clearly in the public interest that rail earnings be aligned with investment needs.

25 As determined by the Surface Transportation Board.
Capital is allocated in any business to those projects that will provide the highest rates of return. Intermodal rates of return on invested capital are typically among the lowest of the various rail commodity groups. This should not be surprising in that intermodal rates are capped by the necessity of competing with motor carriers utilizing publicly-funded rights-of-way for which they bear less than their full costs.

Consequently, while freight railroads can contribute significantly to the intermodal investment effort (as they have in the past), they cannot on their own generate all the capital required to create an intermodal system capable of reaching its potential. To reach this potential will require innovative forms of public and private partnerships, such as those that were used to fund the Alameda Corridor Project in Southern California and are being explored in the I-95/I-81 corridors on the East Coast.

The $2.4 billion Alameda Corridor is exemplary of such an approach. It is a 20-mile, multiple-track rail express line connecting the Ports of Long Beach and Los Angeles with the transcontinental rail network east of Los Angeles. Opened in April 2002, the Corridor eliminated highway traffic conflicts at approximately 200 highway-rail grade crossings, thereby vastly improving the speed and reliability of cargo moving out of and into the two busiest container ports in the country and easing traffic congestion in an area containing some of our nation’s busiest roads. This innovative facility was developed through the cooperation and financing from the port authorities; local, state, and federal governments; and two major railroads.

Building intermodal freight capacity will be very expensive and time consuming. For example, while concluding that rail can play a larger role in meeting the transportation needs of the Northeast, the Mid-Atlantic Rail Operations Study identified a program of 71 infrastructure and information system improvements that it argues must be undertaken over the next 20 years in order to relieve congestion. The estimated cost of these improvements is $6.2 billion. If these kinds of needs are to be met, as they must, new private-public partnerships for funding freight infrastructure must be developed and the political will to implement them must be found. And, while meeting this challenge will be expensive, addressing it with a greater dependence on rail intermodal will provide a less expensive, and more environmentally desirable, solution than addressing it solely with building highways.

Recently, a broad-based group, the Freight Stakeholders Coalition, representing a wide variety of the entities involved in providing freight transportation and services in the United States, has developed an innovative agenda in this regard. Among other things, the Coalition calls for dedicated funds for National Highway System connectors to intermodal freight facilities; the development of innovative financing options specifically aimed at freight capacity improvements and enhancements; increased funds for an expanded corridor/corridor and gateway program; and increased funding for the Congestion Mitigation and Air Quality Improvement Program (CMAQ) for freight projects. In addition to the Intermodal Association of North America and the American Association of Port Authorities, the Coalition includes the American Trucking Associations, the Association of American

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26 The ports of Los Angeles and Long Beach combined accounted for more than 7 million loaded container moves in 2001, equal to approximately one-third of the U.S. total.

27 Among other things, the Coalition calls for dedicated funds for National Highway System connectors to intermodal freight facilities; the development of innovative financing options specifically aimed at freight capacity improvements and enhancements; increased funds for an expanded corridor/corridor and gateway program; and increased funding for the Congestion Mitigation and Air Quality Improvement Program (CMAQ) for freight projects. In addition to the Intermodal Association of North America and the American Association of Port Authorities, the Coalition includes the American Trucking Associations, the Association of American
agenda as an element of national transport policy. These efforts will require significant public expenditures, but they will be a bargain compared to doing nothing and compared to continuing our existing over-dependence on highways and a doomed attempt at building new highway capacity to match future transportation needs.

Other changes are appropriate as well. For example, as documented by the U.S. Department of Transportation, motor carriers pay (in fuel and other taxes) far less than the costs of the damage they cause to our nation’s highways. This underpayment is a major reason why railroads find it difficult to recover the costs of capital on their private investment used in competition with motor carriers. A more complete recognition that an efficient freight market is one in which the users absorb the full marginal costs that they impose would both improve economic efficiency and enhance the ability of intermodal to serve our nation’s critical transportation needs.

Additionally, railroads must bear costs that truckers do not, further limiting their ability to utilize private capital to invest in intermodal-related projects. In the area of taxes, for example, railroads pay a “deficit reduction” fuel tax of 4.3 cents per gallon of fuel. Since 1990, railroads have paid approximately $2.0 billion in such taxes, which are directed to the general fund of the U.S. Treasury. These funds otherwise could have contributed to additional intermodal infrastructure. Railroads also pay some $450 million per year in property taxes on privately owned rights-of-way and sales taxes on infrastructure purchases that truckers do not pay. Additionally, railroads pay higher payroll taxes and are subject to discriminatory state taxes. Finally, railroads are subjected to a nine-percentage point penalty on their capitalized infrastructure investments which they must capitalize and depreciate over a period of years. In contrast, the fuel taxes paid by trucking companies, which are directed to highway infrastructure investment, can be deducted immediately. These tax issues must be redressed as we formulate a new national transport policy focused on shifting freight from truck to rail. Penalizing the freight railroads in this way limits private capital that can flow into meeting the future demand for freight capacity.

VI. Conclusion

The problems that our economy will face in the future, absent accelerated development of the rail intermodal alternative, are substantial and will increase dramatically if we do not define a new public policy to encourage increased reliance on rail intermodal. Intermodal can, and should, grow much more rapidly. We simply cannot build enough additional highway capacity to accommodate the forecasted growth in freight demand; nor should we want to, given that augmenting railroad intermodal capacity and capabilities is a more efficient and effective alternative.

Railroads, the National Industrial Transportation League, the U.S. Chamber of Commerce, the World Shipping Council, and the National Association of Manufacturers.

28 By contrast, fuel taxes paid by motor carriers are directed to the Highway Trust Fund, where they are used for highway infrastructure construction and maintenance. There are no trust funds for railroads, nor would the introduction of a trust fund be an efficient means to address railroad infrastructure needs.

29 “Railroad Tax Burdens,” AAR Background Paper.
Nor can we afford to do nothing and continue, by default, along our current path. Our economy relies on productivity increases to grow. Productivity gains will become much more difficult to achieve if transportation and logistics costs escalate rather than continue to decline. The inefficiency tax on our economy of a deteriorating transportation network will be enormous.

Unfortunately, the railroads cannot solve this problem alone. The reality is that government has played, and will continue to play, a decisive role in shaping the nature and use of investment in transportation infrastructure. The private capital to invest at the levels required to drive dramatic intermodal growth and to relieve our dependence on trucks and highways cannot be generated by the freight railroads because of the numerous structural and regulatory issues noted above that benefit trucks over intermodal and limit railroads’ ability to invest enough to fully reap the huge public benefits of rail intermodal to our nation.

Today, we have the most efficient logistics system in the world. Logistics costs in the United States, as a percentage of GDP, declined to 9.5 percent in 2001, significantly lower than in any other developed nation. Logistics costs are highly sensitive to transportation costs. Consider the impact on our economy — and on the ability to compete in a global marketplace — if our logistics costs, driven by steadily rising transportation costs in the future, became higher than those of the developed nations with which we compete.

We are at a critical moment in the development of the nation’s freight transportation infrastructure and in the formulation of public policy. We must realize that the past is a poor author to the future and that the price of choosing not to facilitate and invest in a rail intermodal alternative will be an enormous tax on the economy and a potential cap on GDP growth. Alternatively, a national transport policy reformulated to stimulate investment in the most efficient and appropriate use of each mode would have significant economic, social, and environmental benefits.

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