

# Commission Briefing Paper 4M-06

## Review of Proposals and Alternative Concepts for Systematic Expansion of the U.S. Freight Rail and Passenger Rail Infrastructure

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### Introduction

This paper is one of a series of briefing papers prepared for the National Surface Transportation Policy and Revenue Study Commission authorized in Section 1909 of SAFETEA-LU. The papers are intended to synthesize the state-of-the-practice consensus on the issues that are relevant to the Commission's charge outlined in Section 1909, and will serve as background material in developing the analyses to be presented in the final report of the Commission.

The nation's freight railroads operated 140,810 miles of rail lines, employed 182,000 people, and reported \$47.88 billion in revenue in 2005. The intercity passenger rail system, operated primarily by Amtrak, ran 260 trains per day over 23,000 miles of track in 2002, carrying 23 million passengers and collecting \$1.1 billion of revenue. Demand for rail service is growing, but investment in new rail capacity has been lagging demand. This paper reviews concepts and proposals that have been put forth to make significant expansions to the nation's freight and passenger rail infrastructure. This paper does not examine the potential impacts of significant technological improvements, which are addressed by other papers.

### Background

The demand for freight rail service is forecast to increase 71 percent by tonnage and 85 percent by ton-miles between 2005 and 2035. However, the freight railroads are not keeping pace with this demand. Railroads continue to shed traffic to trucks and an already congested highway system. This is happening despite the improving financial health of the railroad industry because the industry is generally operating at capacity and is not investing fast enough to keep pace with demand and the economy. The demand for intercity, regional, and commuter passenger rail services is also growing, driven by growth in urban area populations, roadway congestion, and fuel prices. Most passenger rail services are operated over rail lines owned by private sector freight railroads, so the added passenger demand puts more pressure on the already overcrowded freight rail infrastructure. Calls for high-speed rail service will require yet more rail infrastructure capacity, including separate passenger rail lines in some corridors.

### Key Findings

- There are no comprehensive rail system expansion strategies at the national level to keep pace with the growing demand. Expansion is done by each railroad based on business decisions.
- The nation's freight rail infrastructure and services are expected to continue to transform from "retail" railroading to "wholesale" railroading, with less direct customer service and more trains between large hubs.

- In a market-based future, capacity expansion would occur on existing rights-of-way along major corridors.
- Passenger rail service, which operates predominately over lines owned by the freight railroads, would have to follow the corridors maintained by the freight railroads unless public and or private funding is available to develop separate corridors.
- A partnership-based future, in which the public sector actively invests, would encourage capacity expansion in cases where rail expansion costs less than expansion on other modes.

## **Alternative Futures for the Nation's Rail Infrastructure**

Recent analyses of the nation's rail system<sup>1</sup> have pointed to several potential futures, which are the direct result of present-day policy choices:

- Market-based futures, in which freight and passenger railroads make infrastructure investments based solely on business performance, with minimum public investment. In these scenarios, the railroads are viable business entities, but aim to maximize profitability as opposed to maximizing system volumes and services. Lower-profit traffic is shed from the system over time, and must be handled by other modes.
- Partnership-based futures, in which the public sector actively invests to encourage lower-profit (or even money-losing) traffic to be handled on the nation's rail system in cases where solving the capacity problem on rail costs less than solving it on other modes.

Today's system is a blend of both approaches, although market-based futures and private investments largely shape the freight rail network. As a result, there are no comprehensive system expansion strategies at the national level. Concepts and proposals have been more circumscribed, designed to address either business concerns across a particular railroad's own network, or public benefit objectives associated with specific services or geographies. This paper does not offer policy recommendations, but observes that the future improvement and development of the nation's rail infrastructure will depend on the interplay of these two forces: market-based investments, driven by the railroads and aimed at sustaining a baseline profit; and public benefit-based investments, driven by federal and state and regional governments and aimed at meeting system-wide multimodal transportation, economic, and environmental objectives.

## **Key Factors Driving Infrastructure Development**

### **Freight and Passenger Demand**

The U.S. economy is forecast to grow at a compound annual rate of 2.8 percent over the next 30 years. At this rate, the demand for freight transportation will nearly double between 2005 and 2035. Measured in tons, freight demand will grow from 15 billion tons today to 29 billion tons in 2035 (see Figure 1), an increase of 89 percent. There are four major drivers of this growth:

- The U.S. population reached 300 million people in 2006 and is forecast to reach 380 million by 2035; a larger population will consume more food, clothing, housing, and transportation;

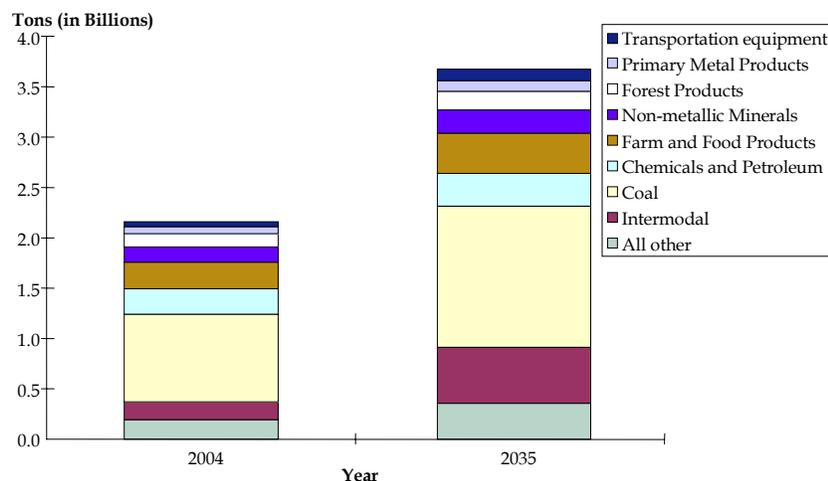
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<sup>1</sup> AASHTO Freight Rail Bottom Line and Passenger Rail Bottom Line reports, various GAO passenger rail reports, et al.

- Although the number of people employed in manufacturing will drop, industrial production will rise because of automation, generating more manufactured products; this means more freight transportation. Coal production—moving predominately by rail—will also increase as the demand for energy rises;
- Trade is expected to grow faster than the economy as a whole, intensifying the flow of imports and exports moving through U.S. international trade gateways; and

Businesses have been aggressively adopting on-demand supply chains, cutting costs by reducing inventory and replenishing whatever the customer consumes as soon as it is sold. This shift is producing smaller shipment sizes (since units are consumed one by one), more individual products per shipment (to make lot sizes economical to ship), more time-sensitive shipments, and more shipments in total.

**Figure 1. Major Rail Commodities by Tonnage, 2004 and 2035**



Source: Cambridge Systematics, Inc., AASHTO Freight Transportation Bottom Line Reports, forthcoming, 2007, based on Global Insight, Inc. 2004 TRANSEARCH data.

Together, these changes in consumption, production, trade, and supply chain practices will generate 14 billion new tons of freight to be moved in 2035. Railroads will carry 1.5 billion of these tons, 71 percent more than they do today. Roughly two-thirds of all new rail tonnage is attributable to coal and intermodal. The intermodal business is projected to maintain a 3.8 percent compound annual growth rate over the next three decades, causing it to more than triple in size. This freight will be carried over longer distances than in the past, resulting in an 85 percent increase in rail ton-miles. By 2035, every second railcar on the rail lines today will have an additional railcar behind it.

Intercity passenger rail mileage peaked in the period 1941 to 1945, reaching more than 65 billion annual passenger miles. With the emergence of the interstate highway system and efficient passenger air travel, the role of intercity rail declined significantly. In 2005, rail handled less than six billion passenger miles, representing around one percent of all intercity passenger miles. Intercity rail remains important in certain corridors, where it is highly competitive with highway or air travel, and where it provides an important modal choice and travel opportunity. Over the past two decades, Amtrak’s annual ridership has increased slightly, from 21.5 million passengers

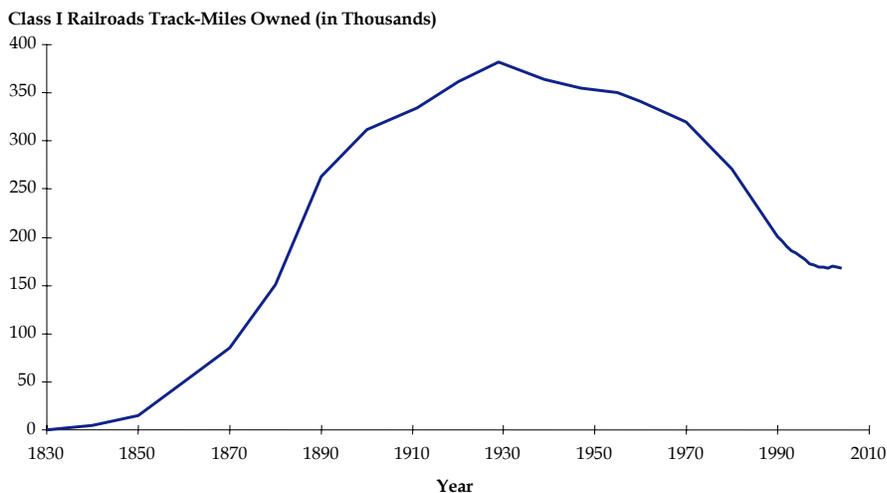
in 1988 to 24.3 million in 2006. Future growth of intercity rail depend will depend largely on the provision of needed investments in the Northeast Corridor, state-supported corridors, and selected high-speed corridors currently under consideration.

Data has not been assembled during this study for the nation’s various commuter rail systems, but experience suggests that ridership on many of these systems—which in many cases share track with freight railroads and/or Amtrak—is growing faster than intercity rail passenger travel. Future growth in these systems should be robust, as highway travel and parking in urbanized regions becomes increasingly difficult.

### Rail Infrastructure Extent and Capacity

Today’s railroad system is about half the size of system that existed in the early 1900s. The Class I freight railroads have cut back the number of track-miles they operate—mostly through abandonment and spin-offs of low-volume and less profitable lines to short line railroads—to create a core system that can be maintained and operated cost-effectively and profitably. The two watershed events that accelerated the contraction of the system were the completion of the U.S. Interstate Highway System after World War II (which diverted freight from rail to more flexible truck service) and the economic deregulation of the rail industry by the Staggers Act of 1980 (which precipitated a massive restructuring of the rail industry and simplified the divestiture of unprofitable rail lines). Since the Great Depression, the only substantial new rail system mileage added has been to improve access to the Powder River Basin region, which generates a huge portion of the nation’s coal supply. Figure 2 charts the expansion and contraction of the track miles owned by the Class I railroads.

Figure 2. Rail Network Today



Sources: L. Thompson/World Bank, historic data; American Association of Railroads, recent data.

However, increasing demand has caught up with the downsized rail system, resulting in rail congestion and deteriorating service levels in many rail corridors and at interchange locations. In response, the Class I railroads are adding track, lengthening sidings, improving signaling, and upgrading track to support more traffic and heavier loads.

But despite recent increases in rail prices and railroad revenues, the industry is not attracting capital fast enough to replenish its infrastructure quickly nor keep pace with demand and public expectations. This is because the railroad industry is unique among the nation's major industries in its extraordinary need for capital reinvestment. Much of the system was built originally in the 1800s, and today the rail industry spends three to five times as much on infrastructure as other major industries, much of this going to maintenance of existing track and facilities. The rail industry invested more than \$8 billion in rail infrastructure in 2005, representing over 17 percent of freight revenues. As a consequence, both lenders and railroads tend to be very cautious about over-investing in infrastructure, and the proportion of total capital that represents real increases in system capacity remains at fairly modest levels.

Limited freight rail capacity also impacts passenger service, because most of the nation's intercity passenger service mileage is operated over freight railroad trackage. Although Amtrak operates over a 22,000-mile network, it actually owns only around 650 route miles; most of which is along the Northeast Corridor (NEC) between Washington D.C. and Boston. The freight rail system also hosts, in some areas, extensive commuter rail operations. The co-mingling of freight and passenger traffic contributes to decreased freight rail performance in urbanized regions (where passenger services typically have priority), and decreased intercity passenger service outside of urbanized areas (where Amtrak is supposed to have priority, but is often delayed due to freight train activity). Additionally, Amtrak's NEC route, parts of which date to the mid-1800s, has a deferred capital maintenance cost estimated at between \$3.8 billion and \$5.5 billion.<sup>2</sup>

## **Concepts and Proposals for Significant Expansion of the Nation's Freight Rail Infrastructure**

There are no comprehensive rail system expansion strategies at the national level. Each railroad makes its own infrastructure investment decisions based on minimizing costs (rationalizing low margin track and services) and maximizing revenues (running longer, more frequent trains between high density hubs). The current concepts and proposals for significant expansion of the nation's freight rail infrastructure are built around the premise that railroading is completing a transformation from "retail" railroading to "wholesale" railroading.

Starting in the mid-1800s, the railroads built a ubiquitous rail network offering retail-level services that provided nearly door-to-door delivery of people and goods, with freight handled in lot sizes ranging from parcels to carloads. The federal and state governments participated in early development of this system through land grants and credit support. Retail railroading was hugely successful, freeing business and industry from the need to live near ports and river terminals, and opening up the Midwest and West to settlement and development. However, retail railroading began contracting in the 1930s, the result of improving roads and the introduction of competitive truck services. Trucking freed business and industry from the need to live near rail lines and rail terminals and provided services that could be closely tailored to the needs of shippers and receivers. Trucking rapidly became the preferred mode of freight transportation in urban areas, and with the development of the Interstate System trucking, became the preferred mode for a large portion of intercity freight as well. The decline of retail

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<sup>2</sup> Intercity Passenger Rail: National Policy and Strategies Needed to Maximize Public Benefits from Federal Expenditures, GAO, November 2006; and Office of the Inspector General, letter of May 3, 2002.

railroading accelerated rapidly after World War II as the economy shifted toward production of lighter, higher-value manufactured goods that were moved more effectively by truck and air.

The economic deregulation of the railroad industry in the 1980 Staggers Act marked the beginning of a new cycle of railroading—the reinvention of railroading as “wholesale” railroading. The U.S. railroad system is being rebuilt as a lean network of high-volume, long-haul, intercity rail lines serving large terminals on the outskirts of the nation’s major cities and trade ports. The objective is to achieve economies of scale that make railroading more cost-effective and profitable. The railroads cannot compete today with trucking for retail transportation, but the railroads can compete on volume. A mile-long train hauling double-stacked intermodal containers from Los Angeles to Chicago or a unit train hauling coal from the Powder River Basin to Midwest electric utilities is much more efficient and profitable than a truck. The railroads are redesigning their service patterns and refocusing their infrastructure investments to realize the economies of scale that can be achieved from high-volume, long-haul freight lanes and providing hook-and-haul service between new, high-capacity terminals. The new terminals are increasingly being located outside of cities as “integrated logistics centers.” Because the freight railroads no longer depend on passenger service, they no longer provide service into city centers. Instead they are relying on trucks and short line railroads to pick up and deliver freight to customers.

The major proposals for systemic expansion for freight rail infrastructure to support wholesale railroading center around three areas: infrastructure, operations, and services. The next sections briefly outline these proposals.

### **Infrastructure Concepts and Proposals**

**Expand Mainline Capacity and Develop New Rail Corridors.** The railroads are investing heavily—using their own revenues and monies borrowed in the capital market—to expand mainline capacity. In most cases, this involves replacing or adding track within existing rights-of-way. The focus of current investment is on the primary freight corridors such as the BNSF intermodal corridor from Los Angeles to Chicago, and the CSXT corridor from Chicago to Nashville. But the industry is beginning to entertain proposals to open up new rail corridors. The most aggressive of these is the proposal to create new TranTexas corridors, which would carve out entirely new rights-of-way capable of accommodating highways, rail lines, pipelines, and telecommunication links. The industry is also discussing the possibility of new routes, perhaps south of Chicago that would allow some transcontinental traffic to bypass the congested Chicago rail hub. The general expectation is that the industry will expand mainline routes, but continue to contract or sell off branch lines. There may also be some pull back from vulnerable coastal areas and along the Gulf Coast. Representative projects underway or under discussion include:

- *Alameda Corridor & Alameda Corridor East* - The Alameda Corridor is a 20-mile-long freight-rail expressway between the neighboring ports of Los Angeles and Long Beach and the transcontinental rail yards and railroad mainlines near downtown Los Angeles. The centerpiece is the Mid-Corridor Trench, a below-ground railway that is 10 miles long, 30 feet deep, and 50 feet wide. This public-private partnership project has helped remove thousands of trucks from the roads between the ports and the rail yards. The Alameda Corridor East is a proposed extension of the service to additional rail facilities.

- *Amtrak High Speed Corridors* – Amtrak is studying a series of high speed rail corridors around the nation. One such corridor, the Southeast High Speed Rail Corridor, would provide service from Washington, DC through Richmond, Raleigh, Columbia, Savannah, and Jacksonville. Another branch would run west of Raleigh through Charlotte, Atlanta, and Birmingham. This service will run in existing freight corridors, but will require elimination of at-grade crossings and capacity expansion to safely accommodate freight and passenger service.
- *BNSF LA to Chicago* – BNSF is double tracking the former ATSF rail line in New Mexico, which will complete an effort to double track the entire route connecting the ports in Southern California and Chicago. This is a heavily traveled route for international containers.
- *CSXT “S” Line Capacity Expansion* – CSXT has announced a 1250 acre intermodal logistics center in Winter Haven, FL to serve the growing Orlando and Tampa markets. The plan also calls for CSXT and the Florida DOT to invest in additional sidings and road-rail grade crossing separations to expand capacity on the “S” Line between Jacksonville and Winter Haven.
- *DC Rail Realignment* – Prompted by concerns over hazardous materials running through downtown Washington DC and past the U.S. Capitol building, proposed realignments of the CSXT rail line are being evaluated. Realignment would this help alleviate security concerns, and also eliminate some of the clearance and capacity problems that prevent double stack containers from moving on the rail lines along the I-95 corridor.
- *Dakota, Minnesota & Eastern (DM&E) Powder River Basin Access* – In the most ambitious rail construction project in decades, the DM&E is attempting to extend their track 262 miles from South Dakota into the rich coal fields of Wyoming’s Powder River Basin. DM&E would be the third railroad, along with BNSF and UP, to access the coal fields. Although their request for a \$2.33 billion loan was denied in March of 2007 by the FRA, the DM&E is still moving ahead with their plans.
- *Florida East Coast Double Tracking* – The FEC has begun double tracking their entire rail line along the populous Atlantic seaboard of Florida. This series of projects is driven by increased demand for goods and construction material to support a rapidly expanding population. The Florida DOT is participating in this effort with the FEC.
- *Interstate 81 Corridor* – The Commonwealth of Virginia is evaluating the trade-offs between investment in I-81 to support current and growing truck traffic, and investments in the parallel NS rail line. At issue is whether a sufficient number of trucks will divert from I-81 to offset the rail investment.
- *Meridian Speedway* – A joint venture between KCS and NS to upgrade the KCS line between Meridian, MS and Shreveport, LA, this project will enhance the connection of traffic moving between the southeast and southwest U.S. KCS will contribute their 320-mile line between Meridian Shreveport to the joint venture company and a NS will invest

\$300 million in cash for capital improvements to increase capacity and improve transit times over the line.

- *Northeast Corridor* – Through the Mid-Atlantic Rail Operations Study, the I-95 Corridor Coalition identified \$6.2 billion in rail projects between Virginia and New Jersey that are needed to expand capacity and help mitigate growing truck traffic on I 95 by diverting it to rail.
- *The North Jersey Development Plan (NJDP)* – The NJDP is series of rail projects to expand capacity in the Conrail Shared Assets Area in northern New Jersey, including double tracking to eliminate chokepoints, adding new switches, and upgrading signals along some sections. Out of the total program, a series of Phase I projects were selected based on importance and ability to advance towards construction, up to a \$50 million cap. Another consideration was that projects should not upset the competitive balance between CSX and NS. Phase I is proceeding, with the PANYNJ contributing \$25 million, and CSX and NS each contributing \$12.5 million.

**Consolidate Freight Pick Up and Delivery Through Large Freight Hubs or Integrated Logistics Centers (ILCs) Located Outside Urban Areas.** The leading examples of the new generation of freight hubs or ILCs are BNSF’s Centerpoint in Joliet, Illinois near Chicago, and the recently announced CSXT ILC in Winter Haven, Florida. These ILCs are designed to handle intermodal containers and truck trailers on railcars as well as bulk transload commodities (e.g., commodities such as plastic pellets, lumber, etc., that can be shipped in railcars, then offloaded to trucks for final delivery to local and regional customers). The ILCs are also laid out to accommodate shipper/receiver warehouses and distribution centers within or closely adjacent to the rail yards. The ILCs are located well outside of the urban areas, but near Interstate Highways with the expectation that most freight will be picked up or delivered to the customer by truck, not rail. While the railroads generally expect to finance mainline improvements themselves, they are looking to public sector to help with land assembly, permitting, and financing of the ILCs and supporting highway infrastructure.

**Serve Ports From Inland Transload/Consolidation Terminals Using Rail Shuttles.** The cost and complexity of expanding existing port terminals is making proposals for inland “ports” more attractive. Leading examples are the Front Royal facility in Virginia, and the BNSF and UP rail yards connected to the Ports of Los Angeles and Long Beach by the Alameda Corridor. The Ports of LA/LB are actively exploring next-generation rail shuttle technology such as maglev transport to link the seaports and inland rail terminals.

**Upgrade Signal and Control Systems to Increase Throughput on Mainline Tracks.** The railroads are moving steadily toward elimination of mechanical signals in favor of GPS-based control systems on the main freight corridors. The next generation of investment in telecommunications and control infrastructure will be targeted at automatic train control systems, at least in the most heavily trafficked and profitable corridors. These systems will allow trains to operate safely at reduced headways, thus creating additional network capacity. The railroads would like to move towards one-person crews on trains, with a futurist vision of automated trains controlled and operated from a central location. The transfer of military technology and experience with pilotless drones is expected to accelerate proposals for automated operations,

pushing at least portions of the rail system in the direction of large-scale conveyor system that provides relatively high-speed and reliable freight transfer between major ILCs at lower transportation costs. Remote control devices are commonly used in rail yards today to reposition trains without the need for an engineer on board.

### **Operations Concepts and Proposals**

#### **Operate Longer and Heavier Trains, Focusing on Scheduled Unit Train Operations.**

Consistent with the shift toward wholesale rail operations, the railroads are introducing longer trains and operating them as unit trains. For example, BSNF is considering operation of 8,000-foot long doublestack intermodal trains between the Pacific Northwest ports and Chicago. As with coal and grain unit train operations, the container flatbed and articulated well cars are assembled and loaded in the origin terminal, then hauled directly to the destination terminal for unloading. Few if any stops are made en route to add or put out cars; this reduces costs and travel time, and greatly enhances service reliability. To increase the appeal of these services to shippers concerned about frequency and reliability of service, the railroads are moving toward scheduled operations, with a high density of scheduled trains operating between ILCs. Unpinning these operations concepts is the assumption that the more and more railroad freight will be handled as containerized freight (e.g., as intermodal containers on railcars or as truck trailers on flat cars).

**Encourage Third-Party Consolidation of Rail Traffic and Development of Short-Haul Intermodal Services.** The corollary to the railroads' shift toward intermodal freight and hook-and-haul services is a shift away from traditional carload services, where the railroads pick up small lots of cars from widely distributed shippers and deliver them to many equally widely distributed receivers. Where they have mainline capacity, the railroads have encouraged third parties to consolidate shipments and deliver a ready-to-go blocks of railcars that can be delivered non-stop to a single destination such as an ILC. An example of a successful operation of this type is Railex, which assembles a full train of railcars carrying fresh produce from Eastern Washington State for delivery to distributors in Albany, New York. The success of these operations and similar operations such as Norfolk Southern's Iron Highway service, which provides roll-on-roll-off short-haul intermodal service for trucks, depends on the availability of Class I mainline capacity and the development of smaller (than ILCs) consolidation terminals. Here again, shippers and the railroads are proposing that the public sector help with land assembly, permitting, financing, and facility roadway access.

**Merge Railroads to Form Two North American Class I Railroads.** There is a good probability that railroads will renew their exploration of merger options. The need to achieve continuing economies of scale in wholesale railroad operations will likely lead to further consolidation of Class I railroads. The current guesstimates are that discussions will lead eventually to two major transcontinental operators with the Canadian and Mexican railroads (of which there are two each) partnering with the two U.S. railroads to form two North American Class I railroads.

### **Service Concepts and Proposals**

**Provide Less Direct-To-Customer Services.** Behind the infrastructure and operations concepts and proposals is an explicit shift toward provision of wholesale services, described as "less

direct-to-customer services.” There will be less door-to-door carload service to customers, and less rail service into urban areas. Trucks and rail will work together more closely than they do today, with trucks providing most of the collector/distributor services. Rail will focus on long-haul services for shippers and truckers, with the expectation that this market will grow because of shortages in recruiting and retaining long-haul truck drivers and higher fuel costs. Regional and short line railroads will provide niche roles in select markets.

**Use Pricing and Yield Management to Match Demand to Supply.** One option for managing capacity being employed by the railroads is demand management. By using pricing to discourage low margin traffic, the railroads can free capacity for the most profitable markets. Industry analysts expect the railroads to follow the model of the steamship lines and telecommunications industries by selling wholesale capacity on trains by traffic lane, time, and reliability of delivery. This allows for yield management pricing, similar to that used for airline seats and hotel rooms. Some anticipate the emergence of a commodity futures markets for train and cargo slots.

## **Implications of Infrastructure Expansion**

### **For Freight Service**

The freight railroads most impacted by the shift from retail to wholesale operations are the short line operators. These railroads are largely dependent upon the Class I railroads to provide long-haul operations for their customers. In many locations, short line operators can no longer obtain competitive rates from the Class I railroads for shipments that offer lower profits to the larger railroad. This is especially true for low volume, short distance moves. Short lines connecting with only one Class I are losing customers to the trucking industry for reasons outside their control. The short line operators either need to build large blocks of cars so the Class I railroads can efficiently “hook-n-haul,” or gain access to Class I facilities such as an ILC.

### **For Passenger Service**

The restructuring of the freight rail industry from retail to wholesale operations has a number of direct implications for passenger rail service and the capacity of the passenger rail infrastructure. One possible future would have the freight railroads withdrawing from track and yards in urban areas, freeing up urban rail corridors for expanded commuter rail service. An example of this can be found in Florida, where CSXT is planning to close Taft Yard in Orlando and shift services to the Winter Haven ILC once it is operational. The State of Florida is purchasing 62 miles of track in Orlando to maintain the urban corridor for a new commuter rail service. There will also be opportunities for passenger rail created by the continuing abandonment or sale of branch lines, though these corridors are also valued for their potential recreational uses.

Conversely, the freight railroads focus on maximizing the throughput of their intercity lines means that there will be fewer opportunities for shared use of corridors for freight and regional intercity rail service and for shared use for freight and long-distance intercity rail services. This will renew proposals for development of separate rail corridors or dedicated lines within a shared rail corridor for high-speed passenger rail service.

## **For Public Sector Rail Policies and Programs**

With the transformation of the freight rail system from “retail” railroading to “wholesale” railroading will come the need to revamp the regulation of the railroads. Initial development of government regulation for the railroad industry lagged the construction and expansion of the national system by about a generation. The Interstate Commerce Commission was not effective until 1887, and the regulatory regime that was constructed was not rescinded until the Staggers Act of 1980. Industry observers expect a new regulatory regime to similarly lag the emergence of wholesale railroading by about a generation, but expect that by 2025 a new regulatory framework will be put in place.

The new regulatory framework will likely take shape around negotiations over the merger of railroads to form two North American Class I railroads. Focus areas likely to be: regulations governing the marketing of wholesale train space to protect against commodity manipulation and monopolization; regulation to ensure equitable access by truckers, short lines, and Class I railroads to publicly owned ILCs; and protection of competitive access to key, large or captive shippers and terminals. The latter, which involves preservation of price and service competition is complex. Three general concepts have been ricocheting through the industry and academic forums: the “American” model, where railroads own their track, prohibit access to other railroads as a competitive tools, and only grant rate concessions to shippers and operating rights to other railroads as mergers agreements or bilateral business negotiations; the “Canadian” model, where the railroads own their own tracks, but must provide access and service, for a reasonable fee, to other railroads who have a customer on the line; and the “British” open-access model, where the government owns the rail infrastructure and the railroads bid for and purchase time and space use. The Canadian and British models force railroads to compete on the quality, reliability, and price of their services, not just simple physical access. However, both models create complex incentives and disincentives to coordination of investment in infrastructure, maintenance, and scheduling, etc. Most observers are skeptical of applicability of these models to the U.S. rail system, but some hybrid regulatory framework is likely to emerge to control wholesale railroading.

The need to keep the freight rail system expanding apace with demand and economy—and mitigate the costs of shifting freight to the congested public highway system—is drawing forth proposals for public financing of railroad expansion, something that has not been done at a major scale since the mid-1800s. Expectations are that public financing will again focus on land grants and credit support, this time focused on ILCs. For example, Florida has entered into a public-private partnership with CSX to develop a 1250 acre ILC at Winter Haven. Other examples are in Alliance, Texas and in Joliet, IL. A large public role in the development of terminal and perhaps public ownership of ILCs, similar to public ownership of marine ports and airports (as landlords, not operators) is a possibility. A major issue for the public will be trade off between investing in ILC on the fringes of metropolitan areas and investing in the rehabilitation of existing inner-city rail yards. Investing in new ILCs will create more efficient wholesale rail operations, benefiting area businesses and consumers, but at the cost of increasing truck traffic on metropolitan highways. The Los Angeles region is beginning this debate, and air quality issues and congestion will drive public decisions and investments.

## Summary

The demand for freight rail service is forecast to increase 71 percent by tonnage and 85 percent by ton-miles between 2005 and 2035. The demand for intercity, regional, and commuter passenger rail services is also growing, driven by growth in urban area populations, roadway congestion, and fuel prices. However, there currently are no comprehensive rail system expansion strategies at the national level to keep pace with this demand.

Left to a market-based futures, in which railroads make infrastructure investments based solely on business performance, the nation's freight rail infrastructure and services will continue to transformation from "retail" railroading to "wholesale" railroading. This involves less direct customer service, which means more rationalization of Class I branch lines. Capacity expansion will occur on existing rights-of-way in the form of additional tracks, longer passing sidings, and improved train control devices.

Passenger rail service, which predominately operates over lines owned by the freight railroads, will have to follow the corridors maintained by the freight railroads unless public and/or private funding is available to develop separate corridors. The most likely scenario is that states and local agencies will need to purchase corridors critical to passenger service, especially those involving urban tracks and yards sold as freight operations move outside the urban area to ILCs.

In a partnership-based futures, the public sector actively invests to encourage lower-profit (or even money-losing) traffic to be handled on the nation's rail system in cases where solving the capacity problem on rail costs less than solving it on other modes. This future will require a comprehensive national freight and passenger rail capacity expansion plan to determine the wisest investments of public funds.