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on

NATIONAL RAIL FREIGHT INFRASTRUCTURE CAPACITY AND INVESTMENT

before

**THE SUBCOMMITTEE ON RAILROADS, PIPELINES,
AND HAZARDOUS MATERIALS
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
U.S. HOUSE OF REPRESENTATIVES**

Wednesday, April 23, 2008

Introduction

Mr. Chairman, distinguished committee members, my name is Lance Grenzeback. I am a Senior Vice President with Cambridge Systematics. We provide transportation policy, planning, and management consulting services to Federal, state, and local transportation agencies and to private-sector transportation and investment companies.

I am pleased to appear before you to discuss the findings of our *National Rail Freight Infrastructure Capacity and Investment Study*.[1] In my remarks I will describe for you—

- Current demand for rail freight transportation, and the capacity of the system to meet this demand;
- Future demand for rail freight in 2035, and the additional capacity needed to accommodate that demand; and
- Investment required to provide the additional capacity.

Current Demand and Capacity

Current demand for rail freight transportation is pressing the capacity of the rail system. Ton-miles of rail freight carried over the national rail system have doubled since 1980, and the density of train traffic—measured in ton-miles per mile of track—has tripled since 1980.[2] The

[1] *National Rail Freight Infrastructure Capacity and Investment Study*, prepared by Cambridge Systematics, Inc. for the Association of American Railroads, Washington, D.C., September 2007. The report is available at http://www.aar.org/Newsroom/Capacity_Investment_study.asp.

[2] One ton of freight moved one-mile counts as one ton-mile.

U.S. Department of Transportation (U.S. DOT) estimates that the demand for rail freight transportation—measured in tonnage—will increase 88 percent by 2035.

To keep up with the anticipated economic growth between now and 2035—and the accompanying demand for freight transportation services—the railroads must add capacity to handle almost two-thirds more tonnage and nearly three-quarters more ton-miles. The projected rate of growth over the next 30 years is not extraordinary, but it comes after two decades of growth in rail freight tonnage that has absorbed much of the excess capacity in the existing rail freight system.

The study was commissioned by the Association of American Railroads (AAR) at the request of the National Surface Transportation Policy and Revenue Study Commission. The objective of the study was to assess the long-term capacity expansion needs of the continental U.S. freight railroads. The study provides a first approximation of the rail freight infrastructure improvements and investments needed to meet the U.S. DOT projected demand for rail freight transportation in 2035.

The study focused on 52,340 miles of primary rail freight corridors, which carry the preponderance of rail freight traffic.[3] These corridors, which represent about half of all Class I-operated miles in the U.S. and about one-third of the 140,810 miles in the U.S. rail freight network, are expected to absorb the bulk of the forecast traffic and nearly all of the investment to expand capacity. For comparison, the Interstate Highway System comprises about 47,000 route miles, and the National Highway System, which adds other major U.S. and state freight highways, comprises about 162,000 route miles.

The study estimated the need for new tracks, signals, bridges, tunnels, terminals, and service facilities in these corridors. The study did not estimate the cost of acquiring additional land, locomotives, and freight cars, nor the cost of replacing and updating existing track, facilities, locomotives, and freight cars. The study assumed no shift in modal tonnage shares among rail, truck, and water beyond those projected by the U.S. DOT.

Finally, the study did not forecast passenger rail demand or estimate future passenger rail capacity needs; however, capacity was maintained for the long-distance Amtrak and local commuter passenger rail services that are currently operated over rail freight lines. The Commission convened a separate Passenger Rail Working Group to estimate the improvements and investments needed to support passenger rail demand through 2035.[4]

[3] Nearly all of these primary corridor miles are owned and operated by the seven Class I freight railroads: BNSF Railway, Canadian National (Grand Trunk Corporation), Canadian Pacific (Soo Line), CSX Transportation, Kansas City Southern, Norfolk Southern, and Union Pacific. There are more than 550 short line and regional freight railroads.

[4] See "*Vision for the Future: U.S. Intercity Passenger Rail Network Through 2050*." Report prepared by the Passenger Rail Working Group for the National Surface Transportation Policy and Revenue Study Commission, Washington, D.C., December 2007. The report is available at http://www.transportationfortomorrow.org/final_report/pdf/volume_3/commissioner_submissions/03_vision_for_the_future,_intercity_passenger_rail_network_through_2050.pdf.

The study estimated rail capacity and investment requirements by—

- Establishing **current** corridor volume in freight and passenger trains per day for each primary corridor, based on 2005 Surface Transportation Board Carload Waybill data;
- Estimating current corridor capacity in trains per day for each primary corridor; and
- Comparing current corridor volume to current corridor capacity.

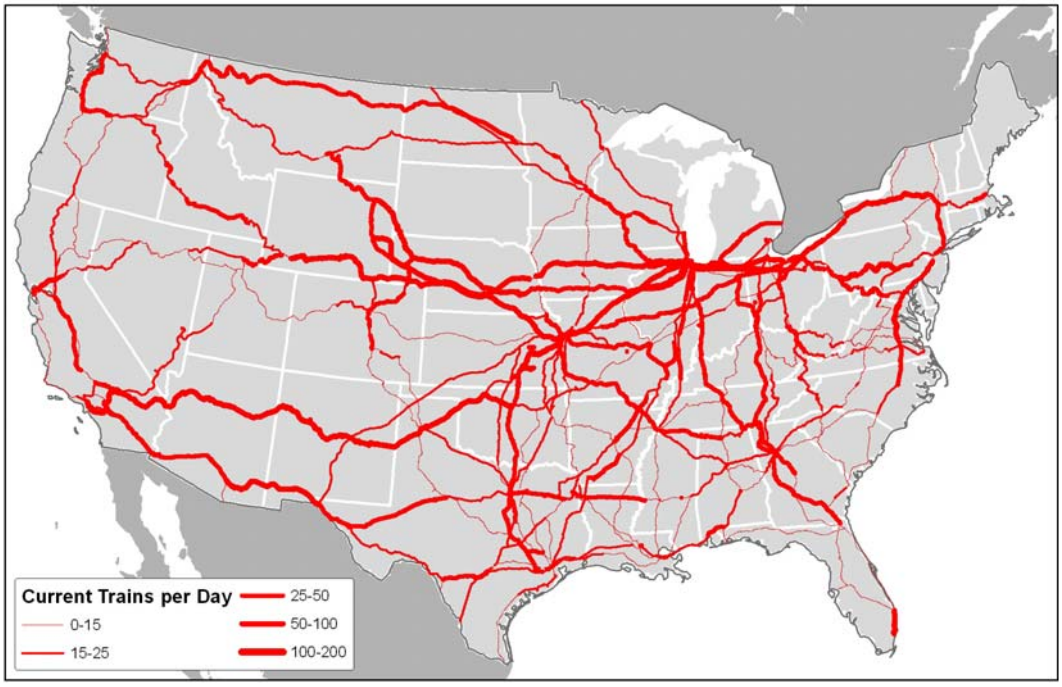
The process was then repeated—

- Estimating **future** corridor volume in trains per day using the U.S. DOT's Freight Analysis Framework Version 2.2 forecasts of rail freight demand in 2035 by type of commodity and by the origin and destination locations of shipments moving within the U.S. and through international land and port gateways; and
- Comparing the future corridor volume to current corridor capacity.

With this information, we calculated the additional capacity needed to accommodate future train volumes at an acceptable level of service reliability. The results are summarized in the series of maps that follow.

Figure 1 maps the current corridor volumes in trains per day for the primary rail freight corridors. The number of trains per day is indicated by the width of the corridor line. The thinnest line indicates that a corridor carries up to 15 trains per day; the thickest line, between 100 and 200 trains per day.

Figure 1. Current Corridor Volumes by Primary Rail Freight Corridor
2005 Freight Trains and 2007 Passenger Trains per Day



Source: Cambridge Systematics, Inc.

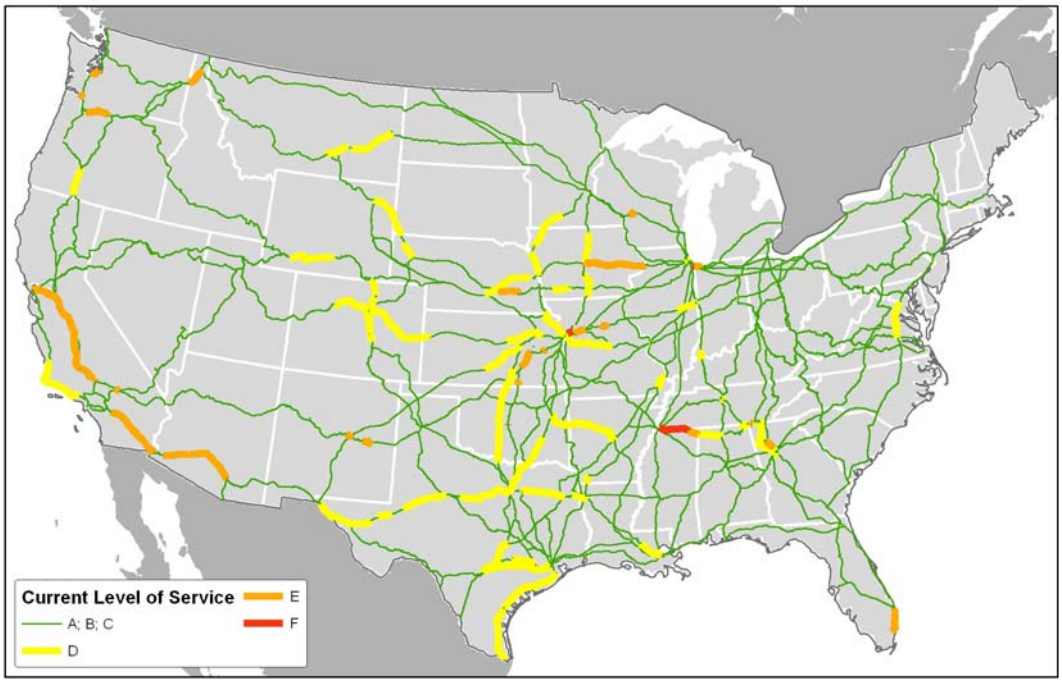
Note: Volumes are for the 85th percentile day.

Figure 2 maps current capacity on the primary rail corridors. The volume-to-capacity ratios are expressed as level of service (LOS) grades.

- Rail corridors operating at LOS A, B, or C (where current volume is below practical capacity) are mapped in green;
- Corridors operating at LOS D (where current volume is near practical capacity) are mapped in yellow;
- Corridors operating at LOS E (where current volume is at practical capacity) are mapped in orange; and
- Corridors operating at LOS F (where current volume is above capacity) are mapped in red.

Analysis of the current levels of service shows that 88 percent of today's primary corridor mileage is operating below practical capacity (LOS A/B/C), 12 percent is near or at practical capacity (LOS D/E), and less than 1 percent is operating above capacity (LOS F).

Figure 2. Current Corridor Volumes Compared to Current Corridor Capacity
2007



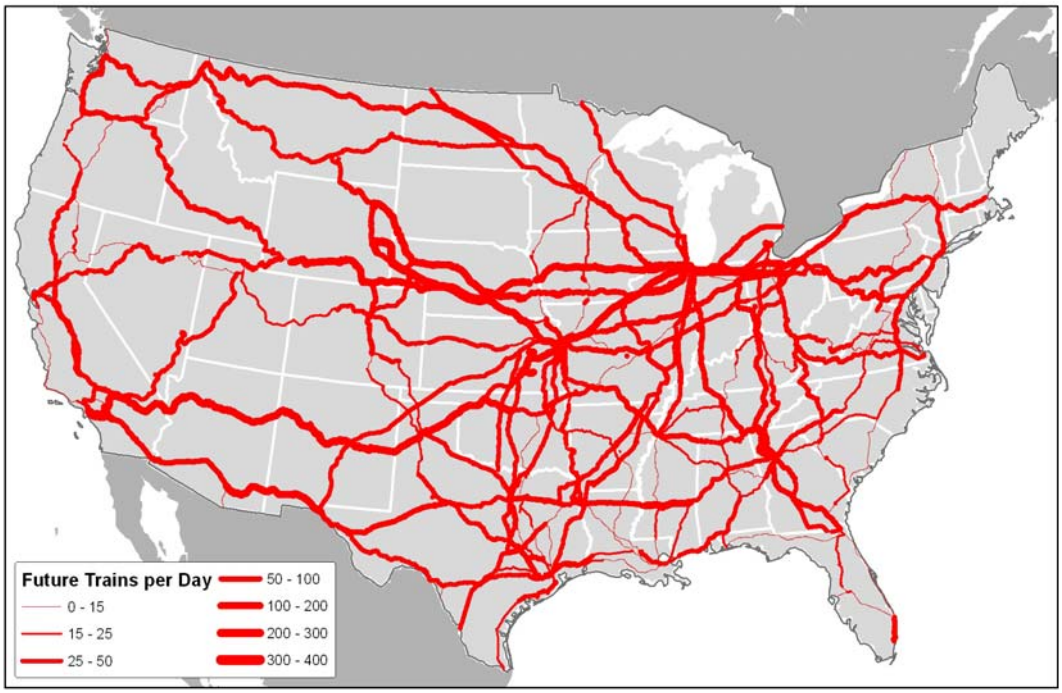
Source: Cambridge Systematics, Inc.

Note: Volumes are for the 85th percentile day.

Future Demand and Capacity

Figure 3 maps the projected train volumes in 2035.

Figure 3. Future Corridor Volumes by Primary Rail Freight Corridor
2035 Freight Trains and 2007 Passenger Trains per Day



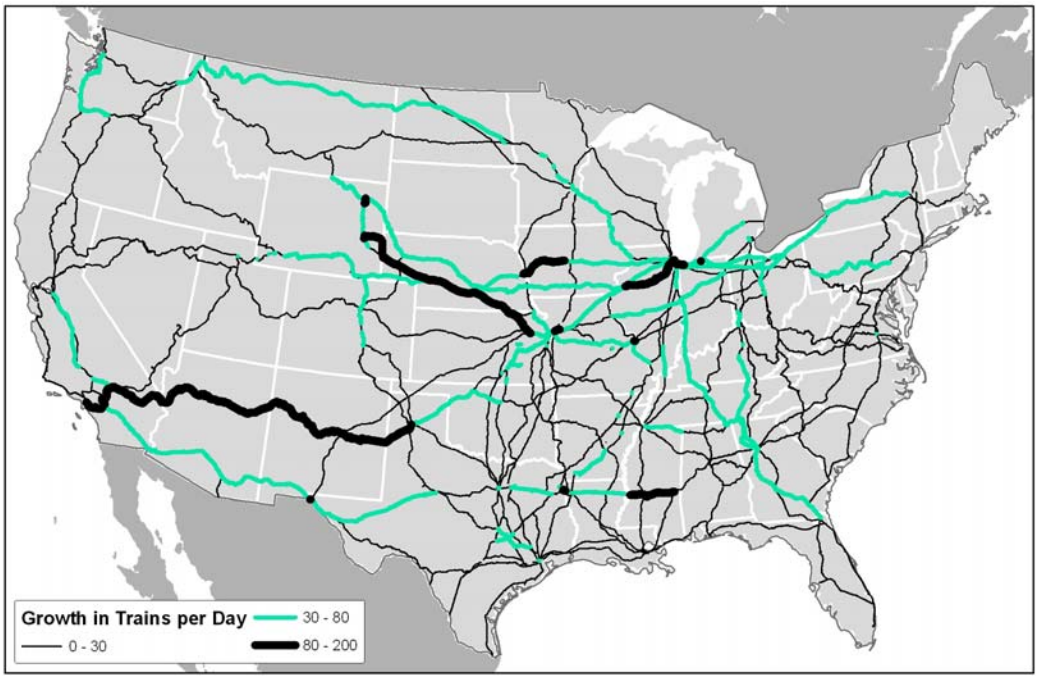
Source: Cambridge Systematics, Inc.

Note: Volumes are for the 85th percentile day.

The next figure, Figure 4, shows the growth in train volumes per day between 2005 and 2035. The growth is indicated by the width and color of the corridor line. A thin black line indicates that a corridor will carry up to 30 additional trains per day by 2035; a green line indicates that a corridor will carry between 30 and 80 additional trains per day; and a thick black line indicates that a corridor will carry between 80 and 200 additional trains per day.

Figure 5 compares the future train volumes to current corridor capacity. The analysis shows that many of the key national rail corridors supporting domestic and international trade could face severe capacity shortfalls in coming years if rail capacity does not keep pace with economic growth and demand.

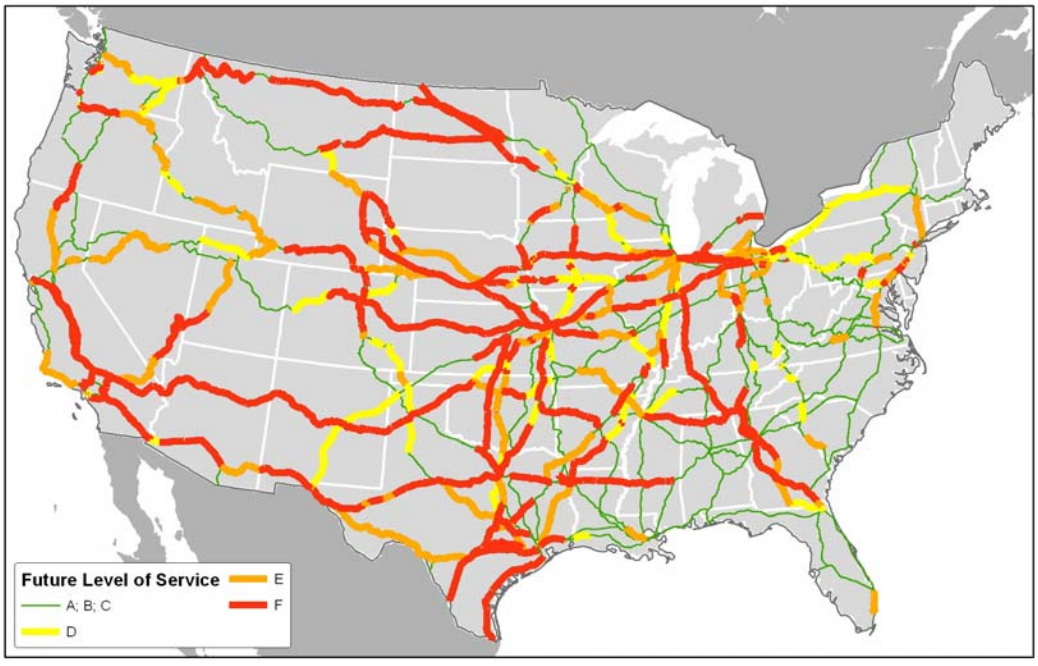
Figure 4. Growth in Trains per Day from 2005 to 2035 by Primary Rail Corridor



Source: Cambridge Systematics, Inc.

Note: Volumes are for the 85th percentile day.

Figure 5. Future Corridor Volumes Compared to Current Corridor Capacity
2035 without Improvements



Source: Cambridge Systematics, Inc.

Note: Volumes are for the 85th percentile day.

Analysis of the 2035 levels of service shows that—without improvements—45 percent of primary corridor mileage will be operating below capacity (LOS A/B/C), 25 percent will be operating at or near capacity (LOS D/E), and 30 percent will be operating above capacity (LOS F). The resulting congestion would affect nearly every region of the country and would likely shut down the national rail network.

Future Capacity and Investment Requirements

The study estimated that an investment of $148 billion (in 2007 dollars) for infrastructure expansion over the next 28 years will be required to keep pace with economic growth and meet the U.S. DOT's forecast demand. Table 1 shows the types of rail infrastructure improvements needed by 2035 and their allocation between the Class I railroads and the short line and regional freight railroads. The Class I railroads' share of improvements is projected to be $135 billion or about 91 percent of the total. The short line and regional freight railroads' share is projected to be $13 billion. Adding capacity to main lines (line haul expansion), upgrading major bridges and tunnels, and clearing lines for doublestack use are the major expense items, absorbing 81 percent of the $148 billion.

Table 1. Cost of Rail Freight Infrastructure Improvements
Millions of 2007 Dollars

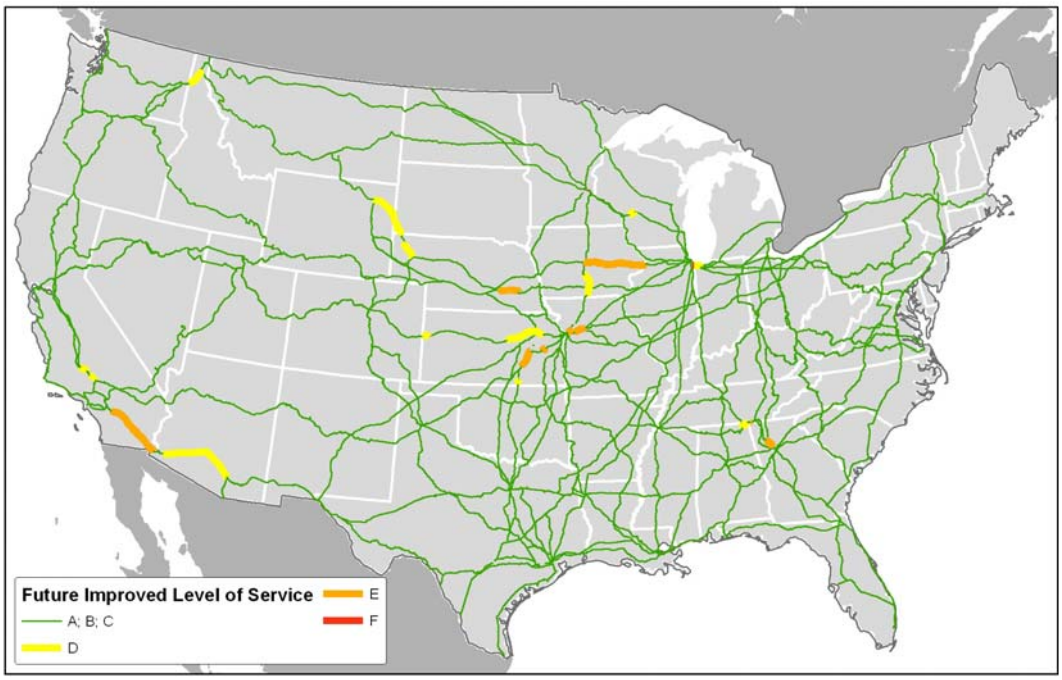
	Class I Freight Railroads	Short Line and Regional Freight Railroads	Totals
Line Haul Expansion	$94,750	$320	$95,070
Major Bridges, Tunnels, and Clearance	$19,400	$5,000	$24,400
Branch Line Upgrades	$2,390	$7,230	$9,620
Intermodal Terminal Expansion	$9,320		$9,320
Carload Terminal Expansion	$6,620		$6,620
Service Facilities	$2,550		$2,550
Totals	**$135,030**	**$12,550**	**$147,580**

Source: Cambridge Systematics, Inc.

Note: All estimates exclude real estate acquisition costs, consistent with national highway needs analysis study practices. Line expansion costs for short line and regional railroads are only for segments used to connect the primary corridors, not the entire system. The category Major Bridges, Tunnels, and Clearance covers very large projects such as expansion of major bridges and tunnels (or construction of new parallel bridges and tunnels) and corridor overhead clearance projects that are not adequately accounted for by per mile unit costs. The category Branch Line Upgrades covers upgrades to secondary main and branch lines to meet 286,000-pound weight-limit standards for the Class I railroads. A preliminary analysis shows limited need to upgrade the capacity of secondary mainlines and branch lines.

Figure 6 compares projected future corridor volumes in trains per day to projected future corridor capacity—assuming that the necessary improvements are made.

Figure 6. Future Train Volumes Compared to Future Train Capacity
2035 with Improvements



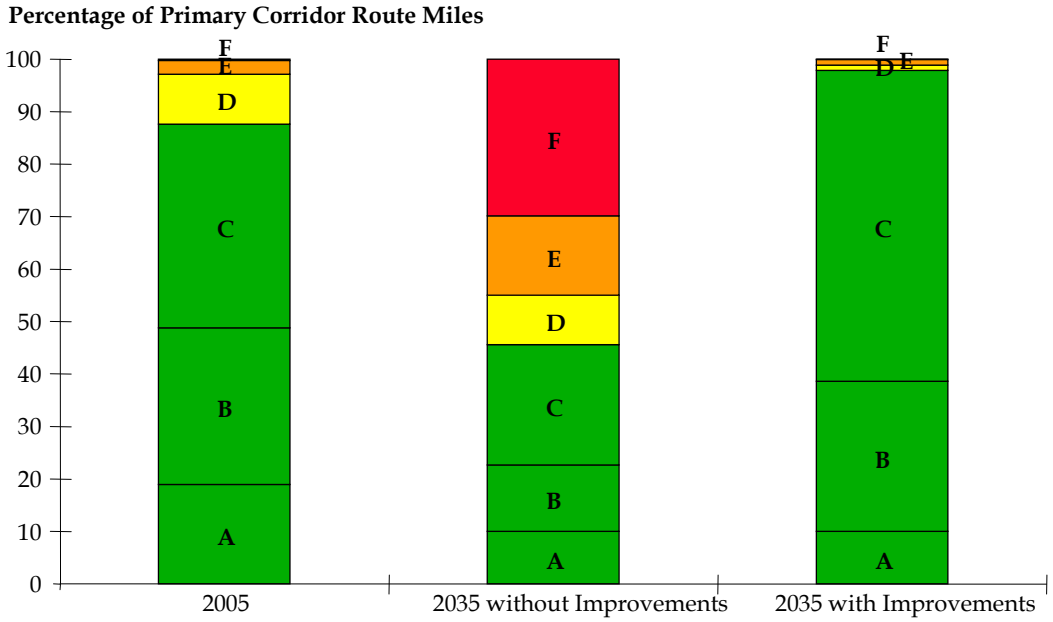
Source: Cambridge Systematics, Inc.

Note Volumes are for the 85th percentile day.

Analysis of the 2035 levels of service shows that—with improvements—97 percent of primary corridor mileage will be operating below capacity (LOS A/B/C), 2 percent will be near or at capacity (LOS D/E), and less than 1 percent will be operating above capacity (LOS F).

The impact of the investment is illustrated in Figure 7, which compares the percentage of primary rail freight corridor miles by LOS grade and year.

Figure 7. Percentage of Rail-Freight Primary Corridor Route Miles by Level of Service Grade in 2005, 2035 without Capacity Improvements, and 2035 with Capacity Improvements



Source: Cambridge Systematics, Inc.

The left column shows the percentage of miles by LOS grade for the current rail system. The center column shows the percentage of miles by LOS grade for the primary corridors in 2035 without improvements. Thirty percent of the rail miles in the primary corridors would be operating above capacity, causing severe congestion that would affect every region of the country and shift freight to an already heavily congested highway system. Finally, the right column shows the estimated LOS grades in 2035 with improvements. The improvements sharply reduce the number of primary corridor miles operating above capacity.

Meeting the U.S. DOT's forecast demand will require the Class I freight railroads to increase their investment in infrastructure expansion. The AAR estimates that between 2005 and 2007, Class I freight railroad capital expenditures for infrastructure expansion averaged $1.5 billion per year. To meet the U.S. DOT's forecast demand for 2035, the Class I freight railroads must invest about $4.8 billion per year.

The Class I freight railroads anticipate that they will be able to meet most of this increase in investment through growth and productivity gains. If revenue and capital expenditures for expansion follow the growth in rail tonnage, the Class I railroads could realize about $70 billion of the $135 billion from growth. And if the Class I railroads can continue to achieve train productivity gains of up to 0.5 percent per year, the railroads could realize savings of $26 billion in reduced capital expenditures for a total of $96 billion. This would leave a balance for the

Class I freight railroads of $39 billion or about $1.4 billion per year to be funded from railroad investment tax incentives, public-private partnerships, or other sources.

These investment projections assume that the market will support rail freight prices sufficient to sustain long-term capital investments. If regulatory changes or unfunded legislative mandates reduce railroad earnings and productivity, investment and capacity expansion will be slower and the freight railroads may not be able to meet the U.S. DOT's forecast demand.

The findings of this study provide a starting point for assessing future rail freight capacity and investment requirements. The findings outline the improvements and investments required for the railroads to carry the freight tonnage forecast by the U.S. DOT. Additional work is needed to determine how much more capacity and investment would be needed for the railroads to increase their share of freight tonnage and reduce the rate of growth in truck traffic on highways. Finally, the forecasts and improvement estimates in this study do not fully anticipate future changes in markets, technology, regulation, and the business plans of shippers and carriers. Each could significantly reshape freight transportation demand, freight flow patterns, and railroad productivity, and, thus, rail freight infrastructure investment needs.

This was a hallmark study, the first collective assessment by the major freight railroads of their long-term capacity expansion and investment needs. Its findings point clearly to the need for more investment in rail freight infrastructure and a national strategy that supports rail capacity expansion and investment.