



RAILWAY VISION FOR NORTH AMERICA

➤ CHALLENGES FOR THE FUTURE



INTERNATIONAL UNION
OF RAILWAYS

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INTERNATIONAL UNION
OF RAILWAYS

INTRODUCTION

UIC is an international association, bringing together 230 railway companies across 95 countries on the five continents with over 30 external partners, enabling it to play a leading role in serving the world's railway community. UIC is platform for technical study, innovation, standardisation and training with the chief aim of promoting the fundamental values of rail and the role it has played on a social, economic and societal level in modern societies over the last 92 years.

In serving its members, UIC also defines the development strategy for its members within the five regions. It is in this context that recent consolidation work undertaken with all our members has led to the publication of seven strategic visions: Vision 2050 for Europe completed with the Rail Technical Strategy for Europe, a vision for Asia-Oceania, for the Middle-East, Africa, South America and last but not least for North America.

North America, as is well known, has a long railway history and is a developing economy with advanced infrastructure enabling it to meet the strong need for mobility of goods and people. North America is also facing strong urbanisation needing new intra-city and inter-city transport plans. North America also has needs, capacity and logistics competencies to structure logistics chains – whether passenger or freight – in an increasingly widespread logic of door-to-door customer service.

North America has long since illustrated its visions for a better future for society with the available investment capacity to achieve them. This North American Vision will obviously address, among others, the role of the American Association of Railroads (AAR) and the very important development in the area of freight. The edition will also address projects linked to Amtrak; will talk about the long-awaited high speed railway in North America, in the United States, with the Californian corridor, and will also mention of course the role of research to support a vision of the future with railways at the core of a global transport and mobility scheme of a 21st century America.



A handwritten signature in black ink, reading 'J. Loubinoux'.

Jean-Pierre Loubinoux,
UIC Director General

UIC MEMBERS IN NORTH AMERICA



FRA, FEDERAL RAILROAD ADMINISTRATION

The Federal Railroad Administration (FRA) was created by the Department of Transportation Act of 1966. It is one of ten agencies within the U.S. Department of Transportation concerned with intermodal transportation. The mission of the Federal Railroad Administration (FRA) is to enable the safe, reliable, and efficient movement of people and goods for a strong America, now and in the future. FRA accomplishes this mission primarily through issuance, implementation, and enforcement of safety regulations; selective investment to develop the rail network across the country; and research and technology development.

Recognizing the associated scale and complexity of improving the nation's rail network, FRA is also working with other agencies and rail stakeholders to develop comprehensive strategies for accomplishing this. The focus is on strategically maintaining current rail services and infrastructure, expanding and improving the rail network to accommodate growing travel and freight demand, and providing leadership in national and regional system planning and development.

► **FRA is a UIC Member (Affiliate) since 1973.**



AAR, ASSOCIATION OF AMERICAN RAILROADS

Operating over a 140,000 mile network stretching across the far reaches of North America, AAR members include the major freight railroads in the United States, Canada and Mexico, as well as Amtrak. Working with elected officials and leaders in Washington, D.C. on critical transportation and related issues, AAR ensures that the freight rail industry will continue to meet America's transportation needs today and tomorrow.

As the standard setting organization for North America's railroads, AAR is also focused on improving the safety and productivity of rail transportation. AAR helps advance these goals through its two subsidiaries, the Railinc Corp. and the Transportation Technology Center Inc. (TTCI), the world's leading research, development and testing facility, developing next-generation advancements in safety and operation efficiency.

► **AAR is a UIC member (Affiliate) since 1983.**



AMTRAK, THE NATIONAL RAIL OPERATOR FOR INTERCITY PASSENGER SERVICE

Amtrak, the national rail operator, connects America in safer, greener and healthier ways. With 21,000 route miles in 46 states, the District of Columbia and three Canadian provinces, Amtrak operates more than 300 trains each day — at speeds up to 150 mph — to more than 500 destinations. Amtrak also is the operator of choice for state-supported corridor services in 15 states and for four commuter rail agencies. Amtrak was created by Congress in the Rail Passenger Service Act of 1970 and incorporated in the District of Columbia in 1971, assuming the common carrier obligations of the private railroads (which found passenger service to be generally unprofitable) in exchange for the right to priority access of their tracks for incremental cost.

► **AMTRAK is a UIC Member (Associate) since 1978.**



CHSRA, CALIFORNIA HIGH-SPEED RAIL AUTHORITY

The California High-Speed Rail Authority is responsible for planning, designing, building and operation of the first high-speed rail system in the nation. California high-speed rail will connect the mega-regions of the state, contribute to economic development and a cleaner environment, create jobs and preserve agricultural and protected lands.

By 2029, the system will run from San Francisco to the Los Angeles basin in under three hours at speeds capable of over 200 miles per hour. The system will eventually extend to Sacramento and San Diego, totaling 800 miles with up to 24 stations.

In addition, the Authority is working with regional partners to implement a state-wide rail modernization plan that will invest billions of dollars in local and regional rail lines to meet the state's 21st century transportation needs.

► **CHSRA is a UIC Member (Affiliate) since 2012.**



VIA RAIL CANADA, THE CANADIAN NATIONAL PASSENGER RAIL SERVICE

VIA Rail Canada operates the national passenger rail service on behalf of the Government of Canada. Established as a Corporation in 1978, VIA Rail operates almost 500 trains weekly on 12,500 kilometers of track, and serves 450 communities across the country, from coast to coast and north to Hudson Bay.

VIA's fleet includes 396 passenger cars and 78 active locomotives. In addition to 159 railway stations, VIA operates four modern maintenance facilities, and employs some 3,000 people. While VIA owns 223 kilometers of track, most of the infrastructure used by the passenger service is owned and managed by the freight railways, including ten different national and short-line operators.

► **VIA Rail Canada is a UIC Member (Associate) since 1992.**

UIC ACTIONS IN NORTH AMERICA





TRANSPORTATION KEY FIGURES IN THE USA / CANADA

34 000 km of lines in the USA

12 500 km in Canada

300 trains / day (AMTRAK)

20 000 employees

500 trains / week in Canada

31,6 million passengers in 2013 in the USA

UIC ACTIONS IN NORTH AMERICA OVERVIEW OF THE REGION - KEY FIGURES

ECONOMIC GROWTH

- **2.6 %** in 2009 (start of the crisis)
- **3 %** in 2010
- **1.8 %** in 2011
- **2.8 %** end 2012
- **1.9 %** in 2013
- **2.8 %** in 2014 (FMI forecast)

WORLD ECONOMIC GROWTH

- **3.7 %** in 2013
- **3 %** in 2014 (FMI forecast)
- **3.9 %** in 2015

POPULATION

- **317** million in 2013, + 0,7 % (+1.1 % in the world)
- **339** million in 2020
- **409** millions in 2050
- **500** millions in 2100 (United Nations forecast)



WORLD TRADE

USA: world's largest importer and exporter of goods in 2012 (World Bank)

RATE OF URBANISATION

Over **82 %** of people live in cities in 2013

POLITICAL AND ECONOMIC CONTEXT



THE AMERICAN RECOVERY & REINVESTMENT ACT

The (Recovery Act) was signed into law by President Obama on February 17, 2009. It serves an unprecedented effort to jumpstart our economy, create or save millions of jobs, and put a down payment on addressing long-neglected challenges so our country can thrive in the 21st century. The Act is an extraordinary response to a crisis unlike any since the Great Depression, and includes measures to modernize the U.S infrastructure, enhance energy independence, expand educational opportunities, preserve and improve affordable health care, provide tax relief and protect those in greatest need.

Additionally, ARRA funding is being used to help achieve President Obama's vision for developing high-speed intercity passenger rail in America. Through ARRA, Congress made \$8 billion available to help transform America's transportation system through the creation of a national network of high-speed rail corridors.

▸ Strategic investment to:

- Provide rail access to new communities
- Improve the reliability, speed and frequency of existing lines

▸ **135 billion Americans (44% of the population):** near a rail corridor ready to receive significant investment

▸ Investment at 3 levels:

- Express Services of frequent trains (125-250 mph): most populated regions
- Regional Services (90-125 mph): between medium and large towns
- Emerging Services (up to 90 mph): linking communities to the rail transport network for the future development of corridors

▸ Strategic approach of President B. Obama's vision:

- Provide 80% of Americans with access to high speed within the next 25 years
- The Mission of the Federal Railroad Administration

U.S Congress established the Federal Railroad Administration (FRA) in the Department of Transportation *Act of 1966*. FRA's mission is to enable the safe, reliable, and efficient transportation of people and goods for a strong America, now and in the future. FRA advances this mission through development and enforcement of safety regulations, selective investment in passenger and freight rail services and infrastructure, and research and technology development.

FRA's activities, and those of its rail industry partners, have resulted in **one of the safest decades ever** — the number of train accidents drop-

POLITICAL AND ECONOMIC CONTEXT

ped by 47 percent since fiscal year (FY) 2004; casualties (deaths and injuries) dropped 9 percent; and highway-rail grade crossing incidents decreased by 35 percent. Although these statistics show significant success, we owe it to the public to drive continuous safety improvement now and in the future.

FRA also works to improve existing intercity passenger rail services, primarily by awarding and overseeing grants to Amtrak. With enactment of the Passenger Rail Investment and Improvement Act (PRIIA) in 2008, the American Recovery and Reinvestment Act (Recovery Act) in 2009, and subsequent appropriations, FRA's mission dramatically expanded to include managing market-driven investments in regional networks of **high-performance rail** corridors. Moreover, since the Recovery Act, communities across the United States have been planning new and expanded rail services. These communities are now poised to implement the capital projects that will turn plans into real world transportation improvements. Their success depends on continued strong Federal leadership and support.

FRA's two core authorizations – the Railroad Safety Improvement Act of 2008 (RSIA) and PRIIA – expired at the end of FY 2013. The FY 2015 Budget presents the Administration's ambitious rail reauthorization plan.

FRA'S REAUTHORIZATION PRIORITIES ARE

Enhancing world-class safety

Rail is already among the safest modes of transportation, and its record has improved in recent years. Nevertheless, continuous safety improvement is imperative, and with innovative practices and new technologies, the railroad industry can achieve this goal. FRA is leading several related initiatives, such as the system safety and risk reduction programs that influence safety outcomes proactively and preemptively; expanding the successful Close Call Confidential Reporting System program; and supporting implementation of positive train control (PTC) technology. The budget makes investments in advancing FRA's safety mission by supporting PTC implementation on Amtrak and commuter rail routes.

OVERVIEW OF FRA'S REAUTHORIZATION PRIORITIES

The rail industry has changed dramatically since 2008 when Congress enacted RSIA and PRIIA. After decades of decline due to underinvestment, rail transportation has become safer and more reliable, efficient, and responsive to the traveling public. Accidents and incidents are falling, while train ridership and reliability are at record highs. The public and private sectors have invested substantially in passenger rail equipment, corridor upgrades, freight capacity, and safety. However, significant work remains to improve the national rail network. For example, the number of trespassing deaths is rising, freight congestion remains a serious issue, and intercity passenger rail is not practical or available for travelers in many parts of the country.

The FY 2015 Budget lays out a comprehensive reauthorization blueprint for moving forward. It presents an integrated strategy for safety and service improvements. This approach reflects the reality of rail transportation in the United States – most track is privately-owned by freight railroads; rail passenger services operate over the same lines and must coordinate schedules with freight movements; safety is driven by regulation and inspection, as well as capital investment; and chokepoints hinder the reliable and efficient movement of intercity, commuter, and freight trains.

Meeting growing market demand

With the United States expected to gain 100 million people by 2050, the national transportation system must prepare for substantial increases in the movement of people and goods. Rail transportation will be critical to meeting this growing demand. FRA's budget makes strategic investments that reflect the needs of multiple stakeholders – passenger and freight rail operators, the traveling public and shippers, governments and private interests. The budget will fund projects based on specific market needs and rigorous analysis of costs and benefits. The budget makes investments in both new and improved passenger rail services with varying frequencies and speeds and provides financial assistance to eliminate rail chokepoints, add freight capacity, and conduct comprehensive planning.

Modernizing our rail infrastructure

Past generations of Americans invested heavily to build the infrastructure we rely on today. For example, most segments of the Northeast Corridor were initially built over a century ago. Maintaining and modernizing these assets will reduce long-term costs and result in safer, more reliable, and more efficient rail transportation. In support of the Secretary's Fix-it-First Initiative, the budget makes investments to reduce the backlog of rail maintenance needs, replace obsolete equipment, and modernize stations to comply with Americans with Disabilities Act requirements.

Promoting innovation

FRA's budget invests in research, development, and workforce to enable America's global leadership in rail safety, productivity, and technological innovation. FRA's vision is a domestic rail industry that leads the world again – we want U.S. companies to patent state-of-the-art rail technology, supply rail operators throughout the world, and employ the best engineers and railway workers. The United States should export intellectual capital and rail products, not import them. The budget makes investments in America's workforce, manufacturing, and critical research and development activities.

Ensuring transparency and accountability

Accomplishing the priorities described above can occur only if these programs are managed through a process that makes expected public benefits and service improvements transparent to the American people. The roles and responsibilities of the Federal government, States, Amtrak, freight railroads, and other stakeholders must be clear and based on sound public policy. The budget provides a transparent structure that will ensure delivery of public benefits and a high level of accountability for public resources.

WHY IS THIS PARTICULAR PROGRAM NECESSARY?

The importance of transportation infrastructure to global economic competitiveness is indisputable. The World Economic Forum (WEF) notes, "Extensive and efficient infrastructure is critical for ensuring the effective functioning of the economy... Well-developed infrastructure reduces the effect of distance between regions, integrating the na-



tional market and connecting it at low cost to markets in other countries and regions."

Even in challenging fiscal situations, it is imperative that the United States continue to invest in the infrastructure that will enable the country to maintain and strengthen its position as a global economic leader in the 21st century and beyond. The WEF currently ranks the U.S. 25th in quality of overall infrastructure, down from 7th in 1999 and below nearly all western European nations as well as several Asian and Middle Eastern countries.

Maintaining economic competitiveness over the long-term will require the U.S. to address a number of interconnected transportation challenges:

Population growth — By 2050, the U.S. Census Bureau projects that an additional 100 million people will reside in the United States. The vast majority of this growth will be concentrated in a small number of "megaregions." The U.S. DOT and Department of Commerce have found that 40 tons of freight is moved through the U.S. for each resident, and thus this population increase will mean an extra 4 billion tons of freight moved each year, an increase of 35 percent over 2010 levels.

POLITICAL AND ECONOMIC CONTEXT

Energy consumption — In 2010, the United States used more than 13 million barrels of oil every day for transportation. U.S. citizens consume nearly twice the oil per capita as citizens of OECD member nations.

Energy costs — The inflation-adjusted cost of oil increased 129 percent from 1990 to 2010. As a result, Americans spent \$630 million more per day on oil for transportation than they did 20 years earlier—an average annual increase of nearly \$750 for every American. The Energy Information Administration expects crude oil prices to rise an additional 50 percent between 2011 and 2035.

Environmental protection — The 2013 Inventory of U.S. Greenhouse Gas Emissions and Sinks found that the U.S. emitted 7.6 percent more greenhouse gases in 2010 than it did in 1990. In addition, 27.3 percent of all greenhouse gas emissions are now from the transportation sector.

Congestion and Mobility

► Highway and aviation congestion continues to rise, with an estimated economic impact growing from \$24 billion in 1982 to \$121 billion in 2011 in lost time, productivity, and fuel. In many places with the worst congestion, expanding airports and highways is difficult, as land is limited and environmental/community impacts are significant.

► In addition to increasing congestion, air travel is becoming less accessible and convenient for many communities. Changes in airline economics have led to small and mid-size cities losing 15 percent or more of their nonstop domestic flights, and fares

in some of these markets jumped 16 to 18 percent from 2010 to 2011, compared to the average nationwide increase of 6 percent.

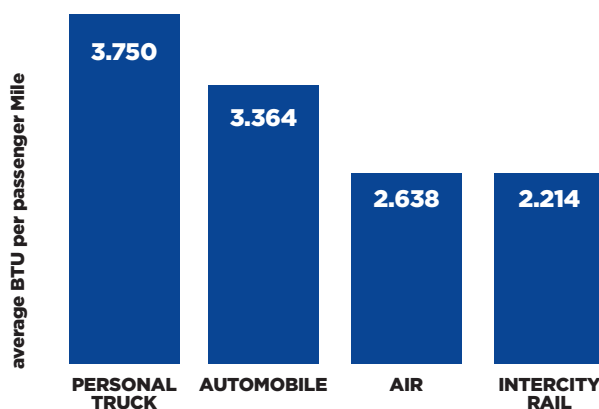
Changing Demographics — Younger generations of Americans are choosing to drive both less often and for fewer miles than previous generations. At the same time, a large number of Americans is entering their retirement years and are also choosing to drive less often, particularly over longer distances. Only 15% of Americans older than 65 drive regularly, and that rate declines to just 6% for those older than 75. The number of Americans in the 65-and-over age bracket is expected to double by 2040, to 81 million people, or more than 20% of the U.S. population in that year.

HOW DO YOU KNOW THE PROGRAM WORKS?

Americans are choosing rail in record numbers

Demand for passenger rail is surging across the United States. Ridership levels have set new records in ten of the past eleven years. In FY 2013, Amtrak carried a record 31.6 million passengers and saw growth across the country, with state-supported corridors reaching record ridership and long distance services having their highest ridership in 20 years. Twenty different routes set new ridership records, and overall ticket revenues set a new record at \$2.1 billion. These ridership levels are being achieved even before many of the substantial service improvements funded in recent years begin to come online. Once new trains are added and trip times and delays reduced, the system will see even higher levels of ridership.

ENERGY EFFICIENCY PER PASSENGER-MILE, BY MODE



Source : US Department of Energy, Transportation Energy Data Book, Edition 32, July 2013.

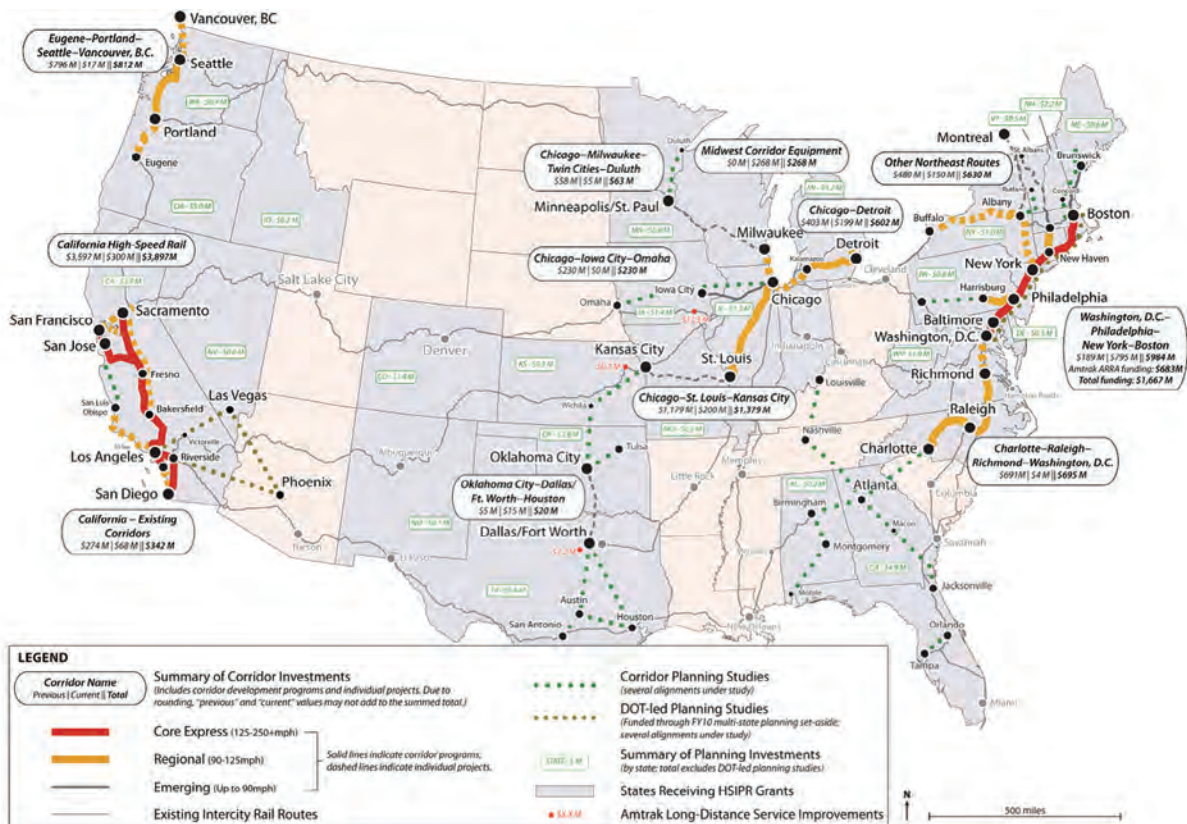
Rail is uniquely well-suited to meeting these challenges. To accommodate population growth, rail provides very high capacity within a relatively limited geographic “footprint.” Rail is among the most energy-efficient ways to travel, and also has lower pollution emission rates than other modes. As highway and airport congestion increases, rail can provide a more reliable and efficient travel options for many markets.

HIGH-SPEED INTERCITY PASSENGER RAIL PROGRAM FEDERAL INVESTMENT HIGHLIGHTS (FRA, MARCH 2013)



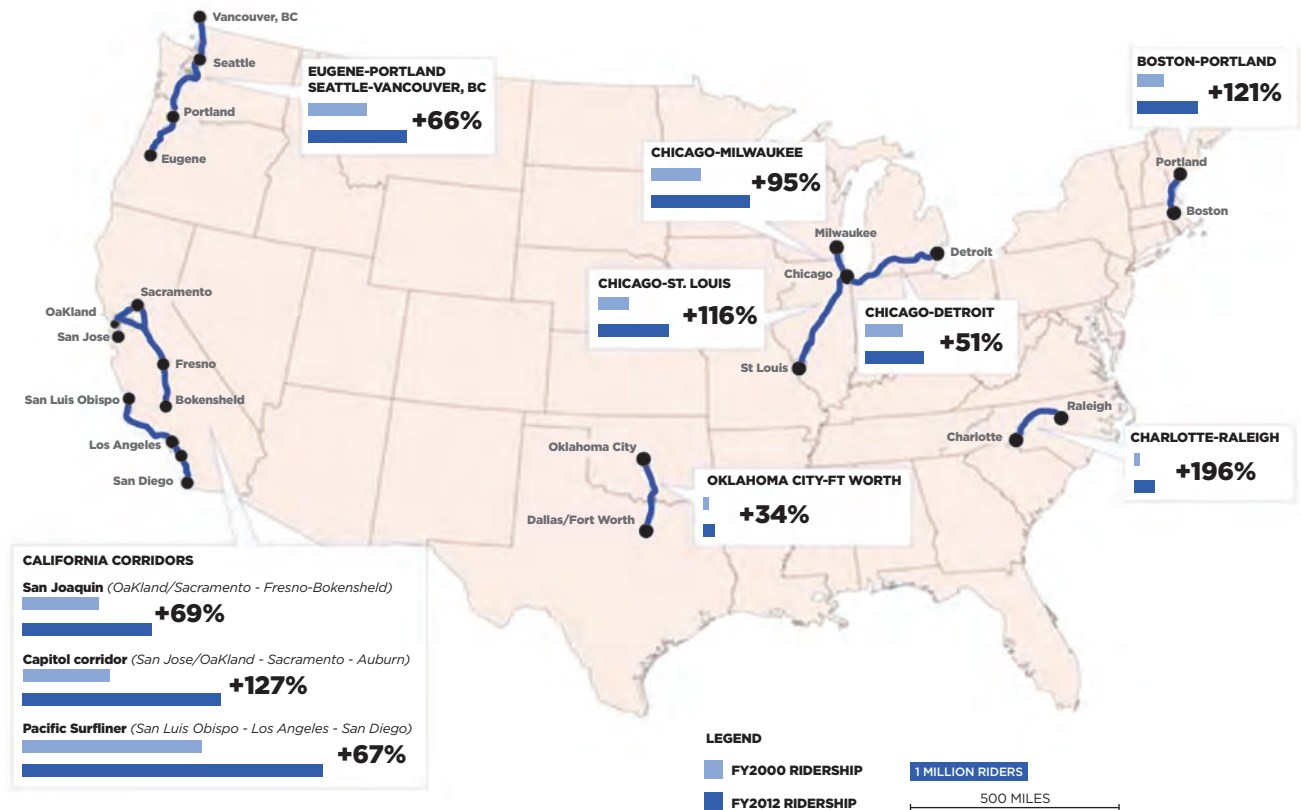
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HIGH-SPEED INTERCITY PASSENGER RAIL PROGRAM SUMMARY OF FEDERAL INVESTMENTS (FRA, MARCH 2013)



POLITICAL AND ECONOMIC CONTEXT

RIDERSHIP GROWTH ON SELECTED PASSENGER RAIL CORRIDORS, 2000 TO 2012 (SOURCE: AMTRAK)



MORE GOODS ARE TRAVELING BY RAIL

The intermodal market has been the fastest growing segment of the freight rail industry since 1980. As of December 2013, intermodal freight is on pace to exceed the record volumes achieved in 2013. Furthermore, goods are traveling shorter distances by rail on average, as new infrastructure to support intermodal freight comes online. This growth demonstrates the demand for intermodal rail transportation as more shippers decide to take advantage of the mode's inherent economic advantages.

COMMUNITIES ACROSS THE NATION ARE COMPETING FOR RAIL INVESTMENT DOLLARS

Every region in the U.S. has demonstrated demand for investments in passenger rail services. Between August 2009 and April 2011, FRA evaluated nearly 500 applications submitted by 39 states, the District of Columbia, and Amtrak, requesting more than \$75 billion. Over five rounds, the Transportation Investment Generating Economic Recovery

(TIGER) program has received more than 110 applications requesting over \$4 billion for intercity passenger rail projects, and more than \$5 billion in funding has been requested for freight rail-related projects.

PUBLIC SUPPORT FOR RAIL IS INCREASING

Public opinion polls consistently reveal strong support for intercity passenger rail. A 2011 Harris Poll survey revealed that nearly two-thirds of Americans (62 percent) support using Federal funds to develop high-speed rail.

Recent surveys of residents in Kansas, Colorado, Pennsylvania, Missouri and Illinois have consistently found substantial popular support for maintaining and expanding intercity services. For example, nearly 3 in 4 residents in a Pennsylvania poll supported expanding train service to places like Philadelphia, New York and Chicago. Similarly, 70 percent of residents from eight congressional districts in Colorado and Kansas supported federal funding for intercity rail.



RAIL HAS DEMONSTRATED PUBLIC BENEFITS, DOMESTICALLY AND INTERNATIONALLY

- Strengthening passenger rail services can help balance the Nation's transportation network, as demonstrated on the Northeast Corridor (NEC). Since the introduction of the Acela service 13 years ago, Amtrak has almost tripled its air/rail market share on the NEC, carrying 75 percent of travelers between New York and Washington. These changing travel patterns can free airport capacity for more cost-efficient long-distance flights.
- Rail is also proven to be highly fuel efficient. One intermodal train between Chicago and Los Angeles can save 75,000 gallons of fuel by replacing 300 trucks. Diverting just 10 percent of long-distance freight from truck to rail would save one billion gallons of fuel each year; the resulting decrease in greenhouse gas emissions would be the equivalent of taking nearly 2 million cars off the road for a year.
- Furthermore, freight rail systems consist primarily of privately-owned infrastructure and are maintained out of railroad revenues. In contrast, heavy intercity trucks pay only 80 percent of the costs they impose on Federal highways through wear-and-tear.

Finally, investing in rail produces tangible economic returns even beyond the improved transportation network. For example, German towns connected to high-speed rail achieved 2.5 percent greater economic growth than comparable, nearby towns not connected to the rail system.



Joseph C. Szabo,
Administrator
Federal Railroad
Administration (FRA)

Nominated March 20, 2009, and confirmed by the United States Senate on April 29, 2009, Joseph C. Szabo is the twelfth Administrator of the Federal Railroad Administration (FRA) and the first to come from the ranks of rail workers. He leads a staff of over 900 professionals located in Washington DC and at field offices across the United States who develop and enforce safety regulations; manage financial assistance programs; and oversee research and technology development programs. Their mission: To enable the safe, reliable, and efficient movement of people and goods for a strong America, now and in the future.

FOCUSSES ON MAIN ACHIEVEMENTS AND DEVELOPMENTS

- **HIGH SPEED** *by J. Morales, Chsra*
- **PASSENGERS** *by J. Boardman, Amtrak*
- **FREIGHT** *by R. Vanderclute, AAR*
- **RESEARCH** *by S. Kalay, TTCI*

➤ HIGH SPEED BY JEFF MORALES



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At the end of every year, we are presented with an opportunity both to reflect on the past and envision the future. In that spirit, we wanted to update you on the status of California's high-speed rail program and answer questions being raised about this transformative, but controversial, endeavor.

In 2008, Californians took a bold step toward a better future by passing an initiative approving bonds for construction of a high-speed rail system. Proposition 1A did not call for more studies. It called for action. In 2011, Gov. Jerry Brown took that action by declaring his support for high-speed rail, but only after bringing in a new team to turn it around. In 2012, we issued a revised business plan, which formed the basis for legislative appropriation later that year. Since then, we have moved forward aggressively and today are on the verge of breaking ground.

Unfortunately, many suffer from a "Christmas morning" fantasy, in which high-speed rail suddenly appears, tied up with a bow and ready to whisk passengers around the state. Reality is far different. Advancing once-in-a-generation infrastructure projects is always hard and contentious. Bay Area Rapid Transit (BART) was called a boon-



Jeff Morales,
Chief Executive Officer
California High-Speed
Rail Authority (CHSRA)

Jeff Morales is the Chief Executive Officer of the California High Speed Rail Authority and has a distinguished record of experience managing large and complex transportation issues and projects. As the former Director of the California Department of Transportation, Morales managed a \$10 billion program and more than 23,000 employees working to build, maintain and operate the largest state transportation system in the U.S. His experience at the federal level includes serving as a member of President Elect Obama's transition team focusing on transportation, Vice President Al Gore's National Performance Review, the White House Commission on Aviation Safety and Security, the United States Department of Transportation and as U.S. Senate staff.



San Jose.



FOCUSSES ON MAIN ACHIEVEMENTS AND DEVELOPMENTS

doggie. Over 2,300 lawsuits were filed to stop construction of the iconic Golden Gate Bridge. Decades later, does anyone regret those tough decisions? Where would California be if leaders at the time hadn't persevered?

Like these landmark efforts, there has been a great deal of misinformation about high-speed rail—much of it propagated by self-interested opponents determined to stop it. But the issues they raise today were well known when voters approved Proposition 1A. Today, we're in a better position to answer them:

Where will the funding come from?

Proposition 1A approved \$8 billion against a \$45 billion program with no specified source of federal or private funds. The fact is that major infrastructure projects are never fully funded on Day 1. At the time Proposition 1A passed, no federal funding had been allocated. Today, we have \$3.3 billion in federal funds committed and proposals are before Congress for long-term funding. We are building in phases, delivering usable segments only after we have the money in-hand to do so. Meanwhile, we've begun discussions with private investors and are confident that, based upon international experience and the strong response to date, a significant amount of private funding will emerge as construction advances.

Why start in the Central Valley?

The reason for our planned route is clear: it's the law. Proposition 1A mandated that high-speed rail connect Fresno, Bakersfield, and Palmdale. California needs the Central Valley, the fastest-growing yet poorest region in the state, to stimulate economic growth. Though some insist we should follow Interstate 5, this would clearly violate Proposition 1A while dooming the Central Valley to long-term stagnation. And despite overstated claims of agricultural ruin, high-speed rail's impact on farmland will be minimal—about 4,500 acres affected, compared to over 100,000 acres lost to sprawl over the last decade.

Aren't there cheaper alternatives?

No. To opponents of the project we ask: What is your plan to overcome the congestion, pollution, and economic hardship that will accompany the doubling of our population over the coming decades? California already has the nation's most crowded freeways and air corridors. Even if we substantially expand I-5 and the San Francisco Airport—neither of which is realistic—it would cost roughly three times more than high-speed rail.

Won't ridership and revenue fall short?

In 2008, our ridership and revenue forecasts were the subject of significant criticism. Today, those forecasts have undergone revision. Recently, the General Accountability Office – Congress' watchdog agency – concluded that our cost estimates are, "consistent with best practices," and found our "ridership and revenue forecasts to be reasonable."

We are living in a world of social media and instant gratification that discourages long-term solutions. Does that mean we shy away from building high-speed rail because it's hard? Will we simply kick these problems down the road to future generations, forcing our children to make the tough decisions we were too timid to face?

We believe the majority of Californians refuse that path. Despite the obstacles, the self-interested, and the declinists, we are moving forward with high-speed rail plan that will have an immeasurable positive impact on the Golden State.

CALIFORNIA HIGH-SPEED RAIL STAWIDE RAIL MODERNIZATION



➤ PASSENGERS BY JOSEPH H. BOARDMAN



AMTRAK AS PART OF UIC'S STRATEGIC VISION NORTH AMERICA

Amtrak Today

Amtrak plays an important role in the U.S.' national transportation network by providing travelers with a safe, efficient and reliable transportation alternative that mitigates the effect of high fuel prices and pervasive highway and airline congestion. It also provides connectivity to large portions of a nation that spans a continent, linking small communities and rural areas with the national transportation system. This role has grown in importance as commercial aviation and bus motor carriers retrench. If it were an airline, Amtrak would rank sixth in the number of domestic passengers carried.

The company operates a nationwide rail network, serving more than 500 destinations in 46 states, the District of Columbia and three Canadian provinces on more than 21,300 miles of routes, with more than 20,000 employees. It is the nation's only high-speed intercity passenger rail provider, operating at a top speed of 150 mph (241 kph). More than half of its trains attain top speeds of 100 mph (160 kph) or greater.

While Amtrak owns a majority of the route in the Washington-Boston Northeast Corridor, seventy-two percent of the miles traveled by Amtrak trains are on tracks owned by other railroads. Known as "host railroads," they range from large publicly traded companies based in the U.S. or Canada to state and local government agencies and small businesses. Amtrak pays these host railroads for use of their track and other resources required for Amtrak trains, with incentives for on-time performance.

In 2013, Amtrak covered 89 percent of its operating costs from internally generated funds, generating a 79 percent farebox recovery. Amtrak remains dependent upon the public sector, in particular the U.S. Federal Government, for the large majority of its capital investment requirements.

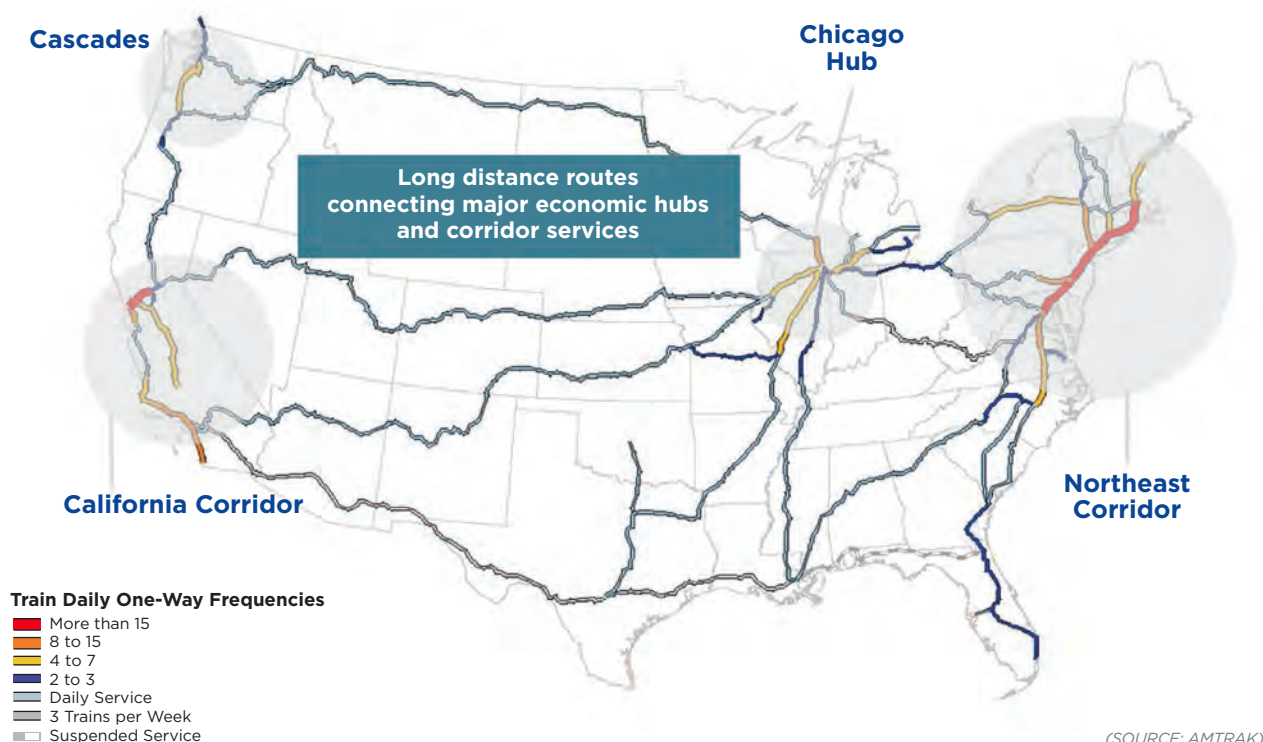


**Joseph H. Boardman,
President and Chief
Executive Officer Amtrak**

Joseph H. Boardman was appointed President and Chief Executive Officer by the Amtrak Board of Directors, effective November 26, 2008. A record 31.2 million passengers traveled on Amtrak in FY 2012 on more than 300 daily trains that connect 46 states, the District of Columbia and three Canadian Provinces. Prior to his appointment, Mr. Boardman was a member of the Amtrak Board of Directors and served as the U.S. Federal Railroad (FRA) Administrator, part of the U.S. Department of Transportation, since April 28, 2005. As administrator, Mr. Boardman was responsible for overseeing all aspects of operations for the organization. This includes managing comprehensive safety programs and regulatory initiatives; enforcement of FRA safety regulations; development and implementation of national freight and passenger rail policy; and oversight of diverse research and development activities in support of improved railroad safety.

Amtrak provides three relatively distinct services which we call "operating business lines". Amtrak's Northeast Corridor business line oversees the 457 mile (740 kilometer) rail route which links Washington, D.C., New York City and Boston, Massachusetts; the State-Supported business line operates short-distance corridor trains on routes of 750 miles (1200 kilometers) or less in length, while our Long Distance business line oversees 15 routes covering distances of up to 2,438 miles (3,930 kilometers).

FOCUSSES ON MAIN ACHIEVEMENTS AND DEVELOPMENTS



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Northeast Corridor

Amtrak's Northeast Corridor (NEC) is the busiest railroad in North America, with more than 2,200 trains operating over some portion of the Washington-Boston route each day. Approximately 260 million intercity and commuter rail passengers rely on the NEC each year. Amtrak has a strong competitive position in the NEC, carrying three times as many passengers between Washington and New York City as all airlines combined and the majority of trips in the market we share with the airlines for the New York City to Boston corridor.

The Northeast Corridor services already earn a financial surplus from operations, what is sometimes called "above the rail." Indeed, Amtrak's premium service on the NEC, Acela Express, is so popular that the service is now reaching the capacity of the current equipment. In the short term, Amtrak will address these capacity issues by acquiring new, high-speed trainsets that will initially supplement and eventually replace the 1990s-era equipment presently used for this service. This procurement will be the first major order for equipment under the Federal Railroad Administration's evolving passenger equipment standards that will permit equipment proven in commercial service in Eu-

rope or Asia to operate in the U.S. with little or no modification. In a first for Amtrak, this acquisition is being undertaken in partnership with the California High-Speed Rail Authority. The goal of this partnership is to see if there is a common platform that can meet Amtrak's short-term needs for operation on the existing NEC infrastructure, where maximum speeds for the near term will be capped at 160 miles-per-hour (mph), while also meeting the Authority's long-term needs for equipment to operate on purpose-built right-of-way at speeds up to 220 mph. Such equipment would also help meet Amtrak's long-term needs described below.

Amtrak published in 2010 a Vision for High-Speed Rail in the Northeast Corridor and updated it in 2012. This report envisions major capital improvements to the NEC, including substantial portions of new alignment and infrastructure that would permit trip times between Washington and New York City and New York City and Boston, of approximately 1:30. Today, trip times for these segments are 2:45 and 3:15, respectively.

Planning and environmental studies for this effort are presently in progress. They are most advanced in what is referred to as the New York City Gateway

Project, which would provide modern, expanded access into New York City from Newark, New Jersey. As part of the Gateway Project, Amtrak is presently investing in preserving right-of-way for new tunnels under the Hudson River that will eventually access New York City's Pennsylvania Station.

The State-Supported Services are adjusting to a new relationship between Amtrak and the States where the States have the primary responsibility for the design and funding of the services that benefit them. Amtrak sees its strategy related to these services addressing two different customers. For the customers that travel on the trains, the goal is to deliver superior customer service by providing friendly, efficient and on-time service that exceeds their expectations. For the States that help fund these trains, the goal is to provide cost-effective service that demonstrates they receive value for their investment.

The strategy for Long-Distance Trains, will in many ways parallel that for the State-Supported Service. For travelers on the trains we will provide superior

service that exceeds their expectations. For the Federal Government, which is also a customer for these services, Amtrak will seek to provide cost-effective service that demonstrates that the Federal taxpayers receive value for their investment.

The next year or two will see the periodic legislative redefinition by the U.S. Congress of the U.S. Federal Government's role in surface transportation. This will include the Federal investments in highways, public transit, and Amtrak. Amtrak will be an active participant in the debates that will lead to new transportation legislation. Amtrak's goal is to move away from the traditional approach of transportation investment that is defined by specific forms of transportation, such as highways. Our vision is for a new approach where the Federal Government's transportation investments will be based upon what investment yields the greatest benefit to national mobility needs in a specific situation. Amtrak believes that its future will be bright in such a transportation investment environment.



➤ **FREIGHT** BY ROBERT C. VANDERCLUTE



SUMMARY

From one end of the country to the other, the United States is connected by the safest, most affordable, and most reliable freight rail system in the world. The seven large “Class I” railroads, working in cooperation with hundreds of smaller railroads and tens of thousands of rail customers, deliver economic growth, support job creation, and provide huge environmental benefits such as reduced highway gridlock and cleaner air. Almost entirely privately owned and operated, America’s freight railroads in recent years have been reinvesting more than ever before — including a record \$25.5 billion in 2012, of their own funds, not government funds — on their nearly 140,000-mile network.

DELIVERING THE GOODS ACROSS THE COUNTRY AND TO THE WORLD

As an indispensable part of America’s transportation system, freight railroads serve nearly every industrial, wholesale, retail, and resource-based sector of our economy. More than 560 freight railroads operate in the United States. The seven “Class I” railroads account for 69 percent of freight rail mileage, 90 percent of employees, and 94 percent of revenue. Class I railroads typically operate in many different states over thousands of miles of track. Non-Class I railroads — also known as short line and regional railroads — range in size from tiny operations handling a few carloads a month to multi-state operators not far from Class I size. Together, America’s freight railroads form an inte-



Robert C. Vanderclute,
Senior Vice President
of Safety and Operations
Association of American
Railroads (AAR). Chairman
of UIC North America Region

Robert C. VanderClute has more than 40 years in railroading, and since 2003 has been the SVP of Operations at AAR. In this role, he oversees the railroad industry’s homeland security plan, equipment interchange standards, car service rules, quality assurance programs, safety initiatives and issues in environmental, hazardous materials, communication and signals as well as tank car safety and design standards. He also serves as the industry liaison with the federal government, including the U.S. Department of Transportation, the Federal Railroad Administration, the National Transportation Safety Board, The Environmental Protection Agency, the Department of Homeland Security, the Federal Communications Commission and other regulatory bodies. Prior to joining AAR, he was with Parsons Brinckerhoff (PB) where he led the company’s international passenger rail activities, including major high-speed projects in the U.K. and China. He is the Chairman of UIC North America.

THE U.S. FREIGHT RAILROAD INDUSTRY: 2011

Type of Railroad	Number	Miles Operated*	Employees	Freight Revenue (\$ billions)
Class I	7	95,387	158,623	\$65.0
Non-Class I	561	43,188	17,317	4.0
Total	568	138,575	17,940	\$68.9

* Excludes trackage rights. Source: AAR

grated, nearly 140,000-mile system that provides the world's safest, most productive, and lowest-cost freight service.

From the food on our tables to the cars we drive to the shoes on our children's feet, freight railroads carry the things America depends on:

- The rail share of ton-miles is about 40 percent, more than any other transportation mode.
- Coal historically has generated much more electricity than any other fuel source, and more than 70 percent of coal is delivered to power plants by rail.
- Railroads also carry enormous amounts of corn, wheat, soybeans, and other grains; fertilizers, plastic resins, and a vast array of other chemicals; cement, sand, and crushed stone to build our highways; lumber and drywall to build our homes; autos and auto parts; animal feed, canned goods, corn syrup, flour, frozen chickens, sugar, beer, and countless other food products; steel and other metal products; crude oil, asphalt, liquefied gases, and many other petroleum



products; newsprint, paperboard, and other paper products; iron ore for steelmaking; and much more.

- Intermodal (shipping containers and truck trailers moving on railroad flatcars) has been the fastest growing rail traffic segment over the past 25 years. Most intermodal traffic is consumer goods. In fact, just about everything you find on a retailer's shelves may have traveled on an intermodal train. More than 50 percent of rail intermodal consists of imports or exports, reflecting the vital role railroads play in international trade.

CARRYING THE THINGS AMERICA DEPENDS ON

intermodal: 12.3 million
trailers and containers



Food products:
1.6 million carloads



Lumber, paper & other forest
products: 1.0 million carloads



Farm products:
1.6 million containers



Plastics, fertilizers and other
chemicals: 2.2 million carloads



Sand, stone & gravel:
1.3 million carloads



Transp. equipment:
1.4 million carloads



Coal: 6.3 million
carloads

**And much
more!**

Figures are 2012.

FOCUSSES ON MAIN ACHIEVEMENTS AND DEVELOPMENTS

THE RIGHT TRACK FOR ECONOMIC RECOVERY

Throughout their 180-year history, freight railroads have played a vital role in America's economic development. As our economy continues to recover from the recent recession, America's freight railroads are working to help keep America moving on the right track.

➤ The approximately 180,000 freight railroad employees are among America's most highly paid workers. In 2011, the average freight rail employee earned wages of \$74,900 and fringe benefits of \$34,000, for total average compensation of \$108,900. By contrast, the average wage per full-time U.S. employee in 2011 was \$54,400 (just 73 percent of the comparable freight rail figure) and average total compensation was \$67,700 (just 62 percent of the rail figure).

➤ In addition to their own employees, America's freight railroads sustain more than one million additional jobs at firms that provide goods and services to railroads or that are recipients of spending by the employees of railroads and their suppliers.

AFFORDABLE AND EFFICIENT

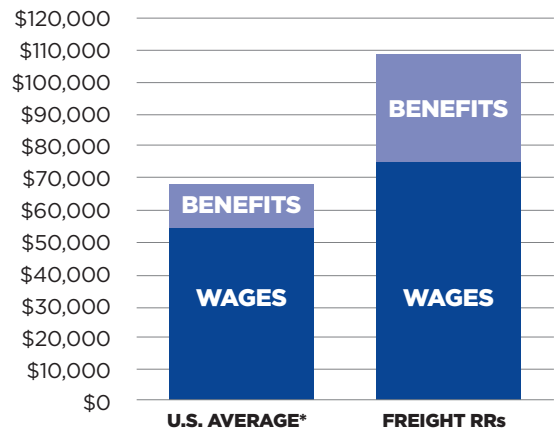
The affordability of freight railroads saves rail customers (and, ultimately, American consumers) billions of dollars each year and enhances the global competitiveness of U.S. goods.

➤ Average rail rates (measured by inflation-adjusted revenue per ton-mile) were 44 percent lower in 2012 than in 1981. This means that the average rail customer today can ship nearly twice as much freight for the same price it paid nearly 30 years ago.

➤ U.S. freight railroads are also the most affordable among the world's major countries. According to data from the World Bank and other sources, U.S. freight rail rates (measured by revenue per ton-mile) are less than half those in major European countries and well below China and Japan as well.

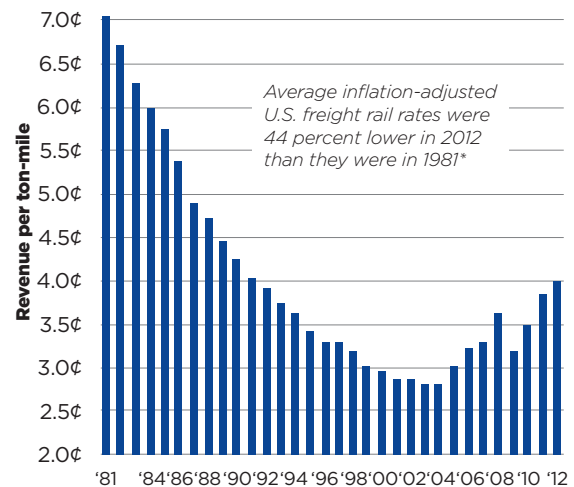
➤ A few years ago, the American Association of State Highway and Transportation Officials (AASHTO) estimated that if all freight rail traffic were

ANNUAL COMPENSATION: U.S. FREIGHT RAILROADS VS. U.S. AVERAGE*



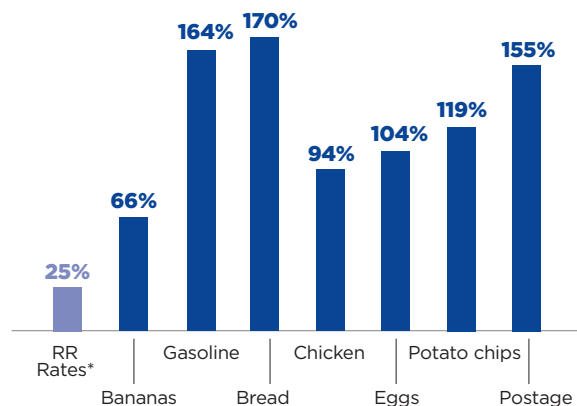
* Average per full-time employee equivalent. Data are 2011. Source: Bureau of Economic Analysis, AAR

SAVING AMERICANS MONEY



*Measured by revenue per ton-mile. 2012 is preliminary. Source: AAR

RAILROAD RATES* VS. AVERAGE PRICES OF COMMON CONSUMER GOODS (% CHANGE 1981-2012, NOT ADJUSTED FOR INFLATION)



*Avg. revenue per ton-mile, all commodities. Source: BLS, AAR

shifted to trucks, rail shippers would have to pay an additional \$69 billion per year. Adjusted for increased freight volume and inflation, that figure is probably close to \$100 billion today.

INVESTING FOR THE FUTURE

As America's economy grows, the need to move more people and goods will grow too. Recent forecasts reported by the Federal Highway Administration found that total U.S. freight shipments will rise from an estimated 17.6 billion tons in 2011 to 28.5 billion tons in 2040 — a 62 percent increase. Railroads are getting ready today to meet this challenge:

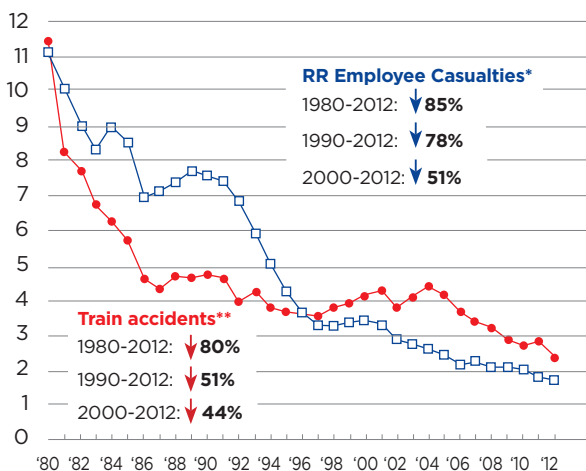
- America's freight railroads operate overwhelmingly on infrastructure that they own, build, maintain, and pay for themselves. By contrast, trucks, airlines, and barges operate on highways, airways, and waterways that are publicly financed.
- From 1980 to 2012, freight railroads reinvested \$525 billion on locomotives, freight cars, tracks, bridges, tunnels and other infrastructure and equipment. That's more than 40 cents out of every revenue dollar. Despite the recession, in recent years America's freight railroads have been reinvesting more than ever before — including \$25.5 billion in 2012 — back into a rail network that keeps our economy moving.
- The average U.S. manufacturer spends about 3 percent of its revenue on capital expenditures. The comparable figure for U.S. freight railroads is

nearly 17 percent, or more than five times more. The four largest U.S. freight railroads each spend much more on their tracks and infrastructure each year than most states spend on their highways.

SAFER THAN EVER

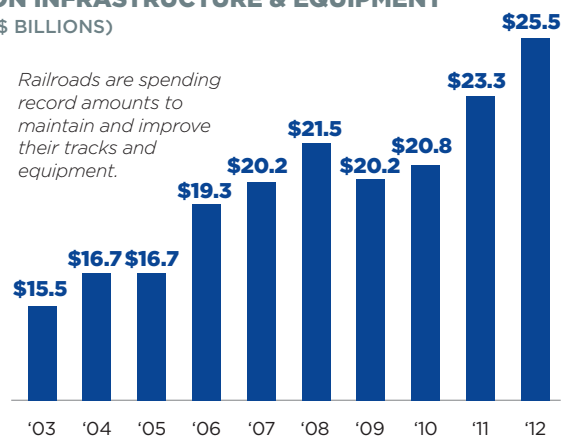
Nothing is more important to railroads than safety, and America's railroads are safer today than ever before. The safety challenge is never ending. That's why railroads, in cooperation with their employees, suppliers, customers and policymakers, are constantly developing and implementing new safety-enhancing technologies and operating practices to further improve their already excellent safety record.

ACCIDENT & CASUALTY RATES HAVE PLUNGED



FREIGHT RAILROAD SPENDING ON INFRASTRUCTURE & EQUIPMENT*

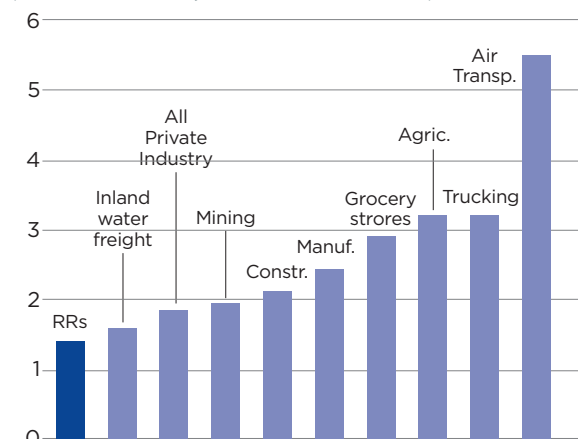
(\$ BILLIONS)



Railroads are spending record amounts to maintain and improve their tracks and equipment.

Capital spending + maintenance expenses. 2012 is preliminary. Data are for Class I railroads. Source: AAR

RRS ARE SAFER THAN MOST OTHER INDUSTRIES (INJURIES PER 200,000 EMPLOYEE-HOURS)



Data are 2011. Source: Bureau of Labor Statistics

FOCUSSES ON MAIN ACHIEVEMENTS AND DEVELOPMENTS

➤ The train accident rate in 2012 was down 80 percent from 1980 and down 44 percent from 2000; the employee injury rate was down 85 percent from 1980 and down 51 percent from 2000; and the grade crossing collision rate was down 82 percent from 1980 and down 45 percent from 2000. Each of these categories achieved record lows in 2012.

➤ Railroads today have lower employee injury rates than most other major industries, including trucking, inland water transportation, airlines, agriculture, mining, manufacturing, and construction — even lower than grocery stores.

➤ Railroads are constantly incorporating new technologies to improve rail safety. Just a few of the many examples include sophisticated detectors along tracks that identify defects on passing rail cars; ground-penetrating radar that identifies problems below ground, such as excessive moisture, that could destabilize track; and specialized rail cars that use sophisticated instruments to identify defects in tracks.

ESSENTIAL TO A GREENER, LESS-CONGESTED FUTURE

➤ Railroads are the most environmentally sound way to move freight and are committed to even greater environmental excellence in the years ahead.

➤ In 2012, U.S. railroads moved a ton of freight an average of 476 miles per gallon of fuel. On average, railroads are four times more fuel efficient than trucks.

➤ Because greenhouse gas emissions are directly related to fuel consumption, moving freight

by rail instead of truck reduces greenhouse gas emission by 75 percent.

➤ Since a single train can replace several hundred trucks, railroads help reduce highway gridlock and the need to spend scarce taxpayer dollars on highways.

A NEED FOR REASONABLE REGULATION

➤ Largely because of decades of excessive regulation, by the 1970s U.S. freight railroads were on the brink of ruin. Railroad bankruptcies were common, and tracks and equipment were falling apart because railroads could not afford the cost of upkeep. The economy suffered greatly because railroads could not provide the quality service their customers needed.

➤ Recognizing the need for reform, Congress passed the Staggers Rail Act of 1980. The Staggers Act put in place a more reasonable regulatory system under which railroads could largely decide for themselves — rather than have Washington decide for them — what routes to use, what services to offer, and what prices to charge. Staggers did not eliminate government oversight, though. Government regulators today still can take action, including setting maximum-allowable rail rates, if a railroad engages in anti-competitive behavior.

➤ Unfortunately, some shortsighted groups and individuals are calling for a return to the days of unbalanced and unreasonable regulation. Policymakers should reject these calls and retain a common-sense regulatory system that provides effective oversight while allowing railroads to provide the rail system our economy needs to grow.



➤ RESEARCH BY SEMIH KALAY

Since its inception in 1934, the Association of American Railroads (AAR) has undertaken jointly funded research projects on behalf of its members, Class I and short-line railroads. Through its Strategic Research Initiatives Program (SRI), the AAR is a major contributor of technology innovations in North America.

Transportation Technology Center, Inc. (TTCI) manages the SRI program and much of the program's research is conducted at the Transportation Technology Center (TTC) in Pueblo, Colorado.

Developments of innovative solutions are being pursued in the area of rolling stock design, inspection, and maintenance. New cost-effective and higher quality rolling stock component designs and materials, lubricants and friction control materials, together with electronics, sensors, and software development are part of the ongoing efforts. The current rolling stock research program focuses on improvements to wheel materials, brake system components, couplers, knuckles, and truck castings with the goal of significantly improving the service life of these components while reducing the scheduled maintenance and repair requirements. Extensive research and analyses are underway to determine the fatigue life of coupler and knuckles to improve the performance of these critical components. Research is also underway to test and evaluate the next generation bogie suspension systems developed by the US and international suppliers.

The North American railroad industry is increasingly moving towards detector and performance-based rolling stock maintenance to improve efficiency by reducing the cost of maintenance and inspection. Currently the various car health monitoring systems are being used to identify poorly performing cars. In the future, technology will allow for the detector systems to be integrated in order to assess the overall condition of the car and its components and to plan shorter and longer-term proactive maintenance actions as well as better car fleet management. Figure 1 shows a photo of a train undercarriage inspection system currently under testing and evaluation at TTC. The



Semih Kalay,
Senior Vice President
of the Communication
and train control business
unit TTCI

Semih Kalay has a Master's degree from Tennessee Tech University, will continue his successful management of the AAR's Strategic Research Initiatives Program and provide support for AAR's technical standard and inspection program. He has brought strong leadership on the industry's many rail technology committees.



detector system was developed by Beena Vision, a N.A detector technology supplier, to inspect the freight wagon and its components at speeds up to 60 kmph.

In cooperation with Federal Railroad Administration (FRA), TTCI is testing a new and alternative wheel flaw detection system. The ultrasonic wheel inspection system shown in Figure 2 was produced by China's Sheenline Corporation, shows promise for inspecting freight train wheels at speeds near 20 mph. If successful, this technology could substantially increase the inspection rate of train wheels for internal flaws.

FOCUSSES ON MAIN ACHIEVEMENTS AND DEVELOPMENTS



Figure 1.
A machine vision inspection system, one of many defect-detection technologies being tested at TTC.



Figure 2.
An automated Cracked Wheel Detection System under evaluation at TTC.

The Integrated Railway Remote Information Service® (InterRIS®), an advanced Internet database with wide potential applicability, was developed at TTCI. InterRIS® collects data from many detectors including wheel impact load detector systems (which identify wheel defects by measuring the force generated by wheels on tracks) and detectors that monitor the undercarriage of rail cars (which identify suspension systems that are not performing properly on curves). InterRIS® processes the information to produce vehicle condition reports. Many of these technological advances have been incorporated in the rail industry's Advanced Technology Safety Initiative (ATSI), a predictive and proactive maintenance system designed to detect and report potential safety problems and poorly performing equipment before they result in accidents or damage.

North American rail industry safety will also be enhanced by the Asset Health Strategic Initiative (AHSI), a multi-year rail industry program being developed by AAR's Railinc, that will apply information technology solutions and processes to improve the safety and performance of freight cars and locomotives across North America. AHSI aims to improve safety and reduce costs across the rail industry by addressing mechanical service interruptions, inspection quality, and yard and shop efficiency. It is based on the recognition that improving asset health means more than just focusing on railcar and locomotive repair. Rather, it

encompasses the entire rolling stock health cycle, incorporating prevention, detection, planning, movement, and repair.

The track and structures research program focuses on improvements to track materials, special trackwork designs, bridges and track substructure. Development of innovative solutions is underway by the N.A. rail industry in the area of track inspection and track maintenance, friction control, advanced track geometry inspection systems, ultrasonic-based rail inspection tools, and predictive algorithms that utilize measured data.

In 2013, TTCI continued its partnership with Edison Welding Institute (EWI), a leading developer of nondestructive inspection technology, to develop phased array rail inspection technology to improve rail inspection. Traditional rail inspection leaves some portions of the railhead uninspected because inspection angles are fixed in the hardware. With phased array ultrasonics, the inspection beam can be steered and focused without reorienting the probe. TTCI's goal is to use the greater capabilities of phased array to find any flaw in the railhead or web. In 2014, a demonstration of the prototype's capabilities will be performed in a rail inspection vehicle environment.

TTCI continues to manage another long-standing research program for the AAR at the Facility for Accelerated Service Testing (FAST) on the High



Figure 3.
FAST's 16,000-tonne train equipped with 110 wagons with 35.3-metric-tonne axle loads.



Figure 4.
FAST's 4.3 km. High Tonnage Loop with three 340-to 400-meter curves and three full-scale bridges.

Tonnage Loop (HTL) (Figure 4). Launched in 1976, FAST operates up to 140-million gross tons per year durability test bed for railroad track, rail vehicles, and their component parts. A 17,600-ton full-scale train comprised of 3 SD 70 locomotives and 110, 315,000-pound cars (Figure 3) are operated over a 2.7-mile-long HTL at 40 mph. The cars and the locomotives are loaned by the AAR member roads. The oval-shaped HTL, where the train is operated, is comprised of sharp curves and tangent track with new and untried track and bridge components and designs. The AAR, individual railroads, and railroad suppliers (through in-kind contributions) have cooperatively funded the operations at FAST and its test programs.

Given the high capital costs of bridge replacement, recent research at TTCI has been focusing on the oldest bridges in the railroad infrastructure. The addition of a 100-year old riveted girder span at FAST is serving as a proving ground for studying the effectiveness of various repair methods. In addition, it is providing valuable information about the effects of corrosion and the effects of impaired lateral bracing members. Effective inspection, maintenance, repairs and safety methods including ongoing stress and deflection measurements have successfully extended the service life of this bridge span at FAST. The research on bridges at TTCI also has the added benefit of being applicable not only to the rail industry, but also to highway applications, as well.

Research within the North American rail industry is a cooperative effort that takes advantage of not only the best minds within the industry, but also enlists the help of researchers at major universities through the Affiliated Laboratory Program. The AAR Affiliated Laboratory Program is one way in which the railroads maintain awareness, adopt, and assimilate new technologies. The program has grown to include four universities, providing a pool of engineers and scientists who are familiar with railroads and who are available to solve technological problems. They are University of Illinois, Texas A&M, Virginia Polytechnic Institute and State University (Virginia Tech), and University of Alberta. Projects of the program help train future engineers who will build and maintain the railroads, and can provide the basic research needed by the industry.

The long-term outlook for the N.A. railroad industry is that demand for railroad freight and passenger service will increase at rates beyond the growth of the gross domestic product. With the railway network already at capacity on some segments, it is imperative that research targeted at improving safety, network efficiency, and capacity is accelerated. The development of best practices and components, through continued use of the TTC's revenue-service type environment to test new materials and techniques for improving rolling stock, strengthening the track structure as well as reducing the stress state under HAL operations will benefit the industry in years to come.

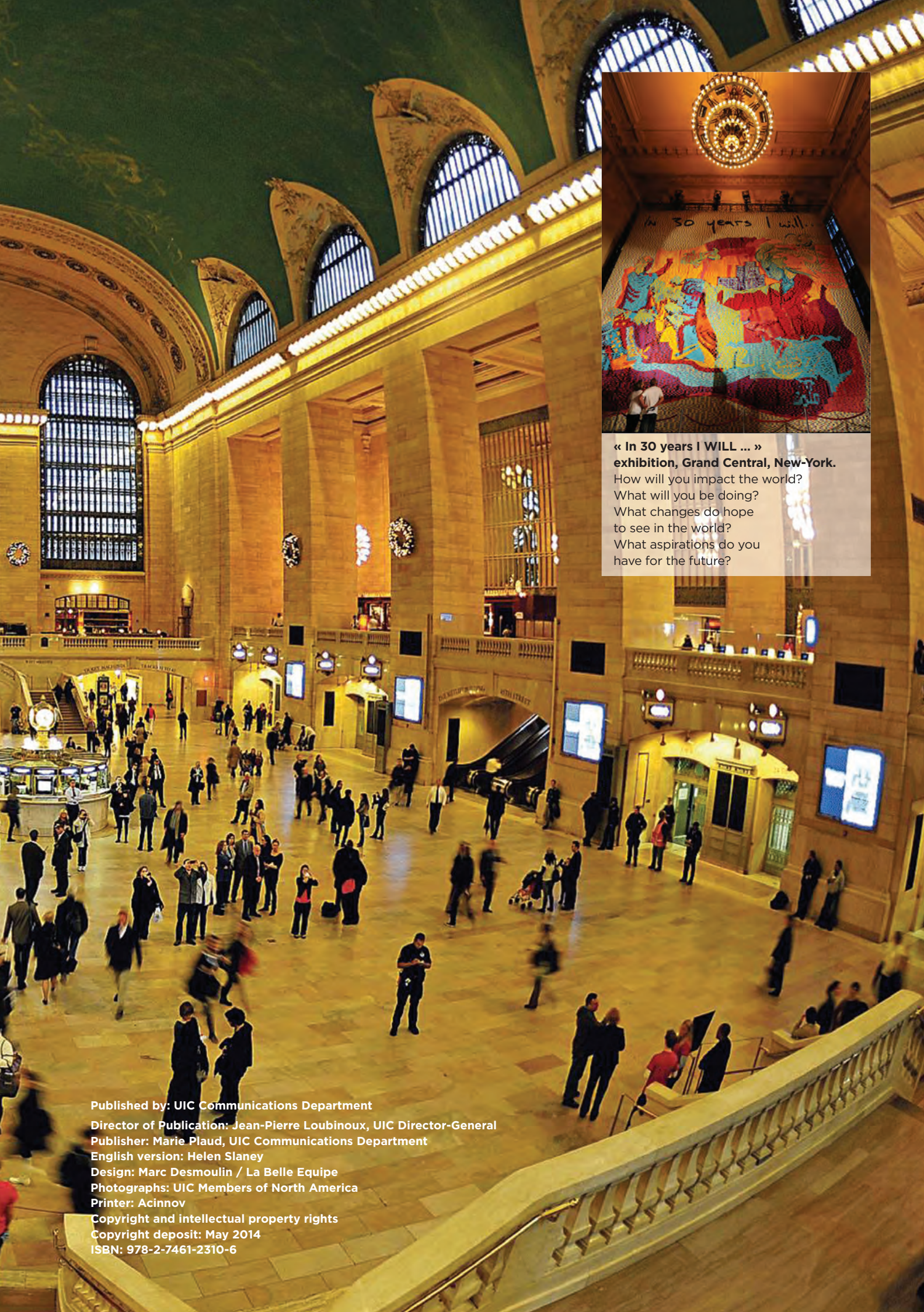
A FEW CONCLUDING WORDS

30

MAY THE REVIVAL OF THE RAILWAYS COME TO FRUITION...

It should be noted that the North American Region is a pioneer and has long understood to what extent infrastructure is a key concept to mobility and economic growth. May the United States, which has developed an efficient and exemplary rail freight system in many respects (in terms of market share, productivity, etc.), soon join the world's key players in developing intra- and inter-city passenger transport in the area of high speed. And may this dream be fulfilled this century...





**« In 30 years I WILL ... »
exhibition, Grand Central, New-York.**

How will you impact the world?
What will you be doing?
What changes do hope
to see in the world?
What aspirations do you
have for the future?



INTERNATIONAL UNION
OF RAILWAYS