The United States Conference of Mayors

The Economic Impacts of High-Speed Rail on Cities and their Metropolitan Areas

A research project summary prepared by Economic Development Research Group, Inc. and sponsored by Siemens

usmayors.org/highspeedrail

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This report summarizes a larger study prepared for The United States Conference of Mayors and sponsored by Siemens, based on interviews, research and modeling conducted by Economic Development Research Group, Inc. We would like to thank all those who participated in this study for their valuable insights and time. The full version of the study can be viewed at **www.usmayors.org/highspeedrail**

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Foreword

Tom Cochran
CEO and Executive Director
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Transportation is the backbone of America's economy. The United States cannot successfully compete in the global economy, however, if we fail to invest adequately in our domestic transportation infrastructure — particularly in cities and metropolitan areas, which underpin so much of the nation's economic output.

Existing modes of transportation currently consume more than two-thirds of our nation's oil supply and are responsible for nearly a third of our carbon dioxide emissions. As a result, we need to make tomorrow's transportation infrastructure more energy efficient, more environmentally sustainable and less reliant on foreign oil. Future federal transportation investments should address energy, economic, and climate concerns through reforms and programs that emphasize sustainable transportation investments.

That effort should start with dedicated federal funding for high-speed intercity passenger rail service in the pending authorization of the federal surface transportation law.

High-speed trains are not new to America. As far back as 1934, trains in the U.S. were already providing intercity passenger service at consistent speeds of more than 112 miles per hour. During the past 30 years in Europe and Asia, however, new generations of trains with speeds between 120 and 220 mph have been put into service. This new technology offers multiple advantages. First, it can run on tracks shared by passenger and freight trains, such as in Germany; or they can run on dedicated tracks where sharing is not an option, such as in France and Japan. Second, these trains provide high-quality service with similar — or better — travel times than automobile or air travel for trips of 500 miles or less.

With America about to take its most significant step toward transforming the nation's transportation network since the Interstate Highway System began more than half a century ago, this report examines the role high-speed intercity passenger rail plays in the U.S. It also answers critical questions not fully addressed in research elsewhere:

How will high-speed intercity passenger rail influence the market reach and competitiveness of cities and their metropolitan areas? And what are the implications for potential economic opportunities associated with its development?

The United States Conference of Mayors has had a long-standing interest in high-speed intercity passenger rail. We are pleased to be working with the Obama Administration and Congress in helping shape a national program that will improve America's transportation infrastructure while also laying the groundwork for a brighter economic and sustainable future for cities and their metropolitan areas across the United States.

Key Economic Impact Findings

In Los Angeles, as much as $7.6 billion a year in new business sales, producing up to 55,000 new jobs and $3 billion in new wages.

In Chicago, as much as $6.1 billion a year in new business sales, producing up to 42,000 jobs and $2.5 billion in new wages.

Four cities—Los Angeles, Chicago, Orlando and Albany (N.Y.)—were selected to represent metropolitan areas impacted by planned High-Speed Rail (HSR). In all four cities, the introduction of high-speed rail services will significantly increase jobs, wages, business sales, and value-added Gross Regional Product (GRP). Results particularly point to an increased economic payback when intercity travel time is under three hours.

In Orlando, as much as $2.9 billion a year in new business sales, producing up to 27,500 jobs and $1.2 billion in new wages.

In Albany, as much as $2.5 billion a year in new business sales, producing up to 21,000 jobs and $1.1 billion in new wages.

In all four cities, the potential long-term economic impact of proposed high-speed rail service will grow over time as service is fully implemented and savings in travel time, expenses, and congestion reduction are realized.

Note: While the U.S. Conference of Mayors generally uses Gross Metropolitan Product (GMP) as a measurement of the economic output of the 363 metropolitan areas in the country, this study uses Gross Regional Product (GRP) as the standard measurement.

Executive Summary

By 2035, HSR can annually add roughly $255 million in new spending in the Orlando area; $360 million in the Los Angeles area; $50 million in the Chicago area; and more than $100 million in the greater Albany area.

This report assesses High-Speed Intercity Passenger Rail's economic impact on city and regional economies. It examines job creation, the effects of improved market access, greater connectivity, work-related travel time savings, as well as increased income and business sales.

There are many proposals for future high-speed rail service. The U.S. Dept. of Transportation has endorsed the concept of developing both 110 mph and 220 mph services. To date, only preliminary funding for a few lines has been approved, and even for those lines, many questions remain about specific details of their design, finances, and operations. This study does not seek to take positions regarding specific alignments, stations, speeds or development time frames. Rather, it recognizes that the nature of high-speed rail service may evolve over a period of several decades as initial high-speed rail lines are upgraded and extended, and new services are introduced. Thus, the scenarios examined here are intended to span the full range of proposed and potential future rail service characteristics—including both 110 mph and 220 mph high-speed rail service.

Each of the four cities selected to represent metropolitan areas impacted by planned high-speed rail—Los Angeles, Chicago, Orlando and Albany (N.Y.)—represent different sized communities in different parts of the United States. Each also faces differing economic opportunities depending on the service speeds provided. All four cities, however, shared the following in common when it comes to the effects of high-speed rail on economic growth:

First, HSR service can help drive higher-density, mixed-use development at train stations. In Chicago, the Central Area Action Plan calls for development of new office development enabled by a coordinated strategy of local transit, HSR, and airport express connectors. Current plans for the expansion of Chicago's Union Station call for the addition of an 18-story tower over the station. At the Albany-Rensselaer station, plans have been announced for DeLaet's Landing, a mixed-use office, residential, and hotel development at an adjacent site. In Orlando, plans call for a new "Medical City" technology park next to the airport and its HSR station and for hotel construction surrounding the Convention Center station. In Los Angeles, the Alameda District Master Plan envisions large-scale mixed-use development adjacent to Union Station. The local development stakes are high in each city. If implemented, development at Albany-Rensselaer could support 2,000 jobs; Chicago, 5,000 jobs; Orlando, 10,000 jobs; and Los Angeles, 10,000 jobs.

Second, HSR service can increase business productivity through travel-efficiency gains. Travel efficiency can come from four sources: (1) The time and cost savings in travel time for those who could use HSR service; (2) Time and cost savings for car and truck travelers who benefit from reduced road congestion; (3) Time and cost savings for airport users who benefit from reduced air delays due to congestion at airports and their access routes; and (4) Additional benefits for travelers without car access who are now able to travel to places that were previously unavailable to them. All four are considered benefits to society.

Third, HSR service can help expand visitor markets and generate additional spending. In all four cities, ridership increases are projected by implementing HSR service. A portion of the riders will be local residents traveling to outside locations. Another includes outsiders who already come to these cities via car or airplane but will shift to use of new high-speed rail. An additional portion represents new tourism, conference, and business trips to the case study cities. These travelers will generate spending at local hotels, restaurants, and retail stores. That new spending will grow over time. Projections show that by 2035, HSR can annually add roughly $255 million in the Orlando area; $360 million in the Los Angeles area; $50 million in the Chicago area; and more than $100 million in the greater Albany area.

Fourth, HSR service can broaden regional labor markets. Expanding the distances that people can travel in a two- to three-hour trip provides businesses with access to more workers with specialized skills, while skilled workers can access employers with more specialized needs. These expanded markets offer important new opportunities, especially in an era of flexible work

schedules where daily commutes are not required. In Los Angeles, high-speed rail is anticipated to increase such commuting from outlying areas such as Palmdale and business trips from the Central Valley and San Diego. In Orlando, high-speed rail will enable commuting from the Lakeland area and day trips from Tampa. In Chicago, high-speed rail will enable commuting from the Milwaukee area and day trips from cities such as Madison. In Albany, faster trains can bring the local area to within the range of a commute or an easy one-day business day trip to New York City.

Fifth, HSR service can support the growth of technology clusters. In each case, high-speed rail service also provides particular opportunities to support the development of technology clusters by enhanced day-trip links between R&D and university research centers as well as sites where advanced products are produced. In Albany, a national center for nanotechnology has been developed and economic developers see a strong opportunity for high-speed rail to support regional connections to medical institutions, research institutions and universities in Rochester, Syracuse, New York City and Boston, as well as better access to venture capital sources in New York City. In Orlando, there is a concentration of aerospace, security and national defense technology firms that stand to benefit from high-speed rail connections to Cape Canaveral and the Space Coast. The region's concentration of medical research, pharmaceutical, and healthcare sectors is also expected to benefit from stronger travel connections to the Tampa and Miami areas. In Chicago, high-speed rail will enhance linkages between local research centers focusing on clean energy, physics and biotechnology as well as other technology R&D centers in Madison, Champaign/Urbana and Peoria. In the Los Angeles area, there is a cluster of national defense technology firms in Palmdale, near Edwards Air Force base, that will benefit from access to a more widely dispersed base of workers, consultants and specialists who can access the area via high-speed rail.

Conclusions

High-speed intercity rail service will create significant economic development opportunities for all types of cities. Jobs, wages, business sales and value-added will significantly increase with the introduction of high-speed rail services. For larger cities, HSR service will improve access to labor markets and consolidate higher-end business, financial, and cultural/tourism services. For mid-sized and smaller cities, high-speed rail service will expand access to specialized regional talent and help leverage local investments for accessing larger markets.

High-speed rail service needs to facilitate and optimize local and regional connections. In all four cities, the ultimate impact on regional economic growth depends on the effectiveness of connections between high-speed rail stations and the surrounding area. Where entirely new rail lines are planned—such as in Los Angeles and Orlando—there is an immediate opportunity to design new stations to enhance connectivity to airports, convention centers, and tourism sites. In cities where existing rail lines will be used—such as in Chicago and Albany—service upgrades will initially be in the form of speed and schedule improvements and are expected to occur in stages. These decisions will ultimately have important implications for the economic development associated with improving connections between cities, airports, and tourism venues.

Potential economic development impacts need to be placed in a broader, long-term economic perspective. The economic development impact of HSR service should be viewed in the broader context of a changing economy. While telecommuting and Internet conferencing are growing, long-term trends also show growth of long-distance tourism, professional convention business in major cities, as well as exponential growth in airplanes and urban delivery vehicles servicing overnight parcels.

Changes in trade regulation are also resulting in new domestic and global markets and supply chains. The development of high-tech clusters and the need for professional interaction is also creating new travel demand patterns. These and other trends will place additional burdens on the nation's transportation infrastructure. High-speed rail can help cities and metropolitan areas meet these challenges while also being a significant catalyst for economic growth and job creation.

Jobs, wages, business sales and value-added will significantly increase with the introduction of high-speed rail services.

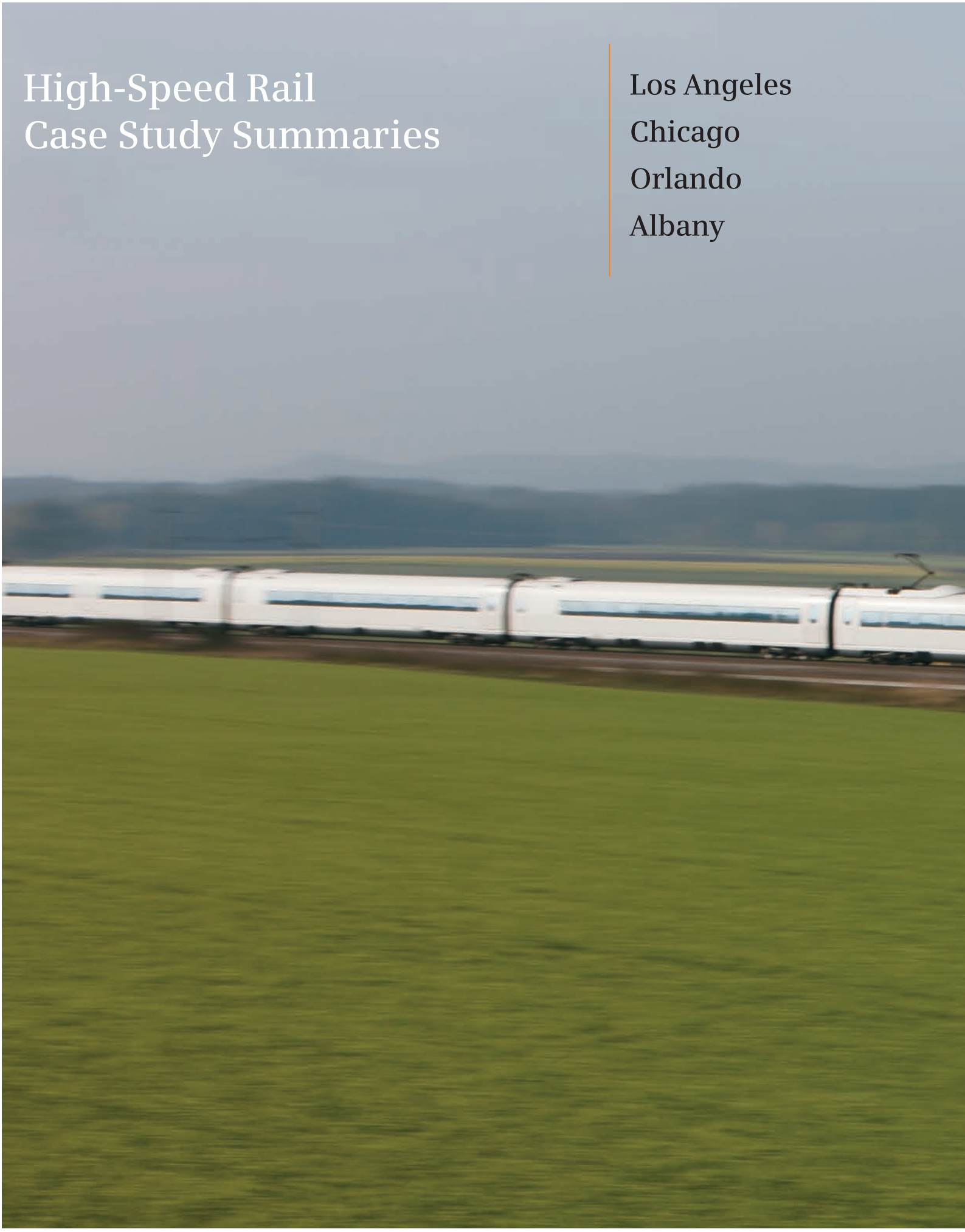
High-Speed Rail Case Study Summaries

Los Angeles

Chicago

Orlando

Albany



Los Angeles High-Speed Rail Case Study Summary

Los Angeles Mayor
Antonio R. Villaraigosa
Vice President
The United States
Conference of Mayors

"The California High-Speed Rail project and expansion of our transit system will have a huge impact on the economy of Los Angeles. They will make our region more sustainable and livable by providing viable alternatives to driving, reducing traffic congestion, and improving air quality and public health.

The effectiveness of high-speed rail will be increased by expansion of our transit system. On November 4, 2008, 68% of the voters in Los Angeles County approved *Measure R*, a half-cent transportation sales tax that will generate almost $40 billion in revenue over the next 30 years. The core program funded in *Measure R* is the expansion of our region's rail and busway network; including connections to the planned high-speed rail stations and extensions of lines already serving planned high-speed rail stations. The effectiveness of high-speed rail will be increased by expansion of our transit system. We are working to accelerate construction of 12 *Measure R* transit projects to 10 years instead of the 30-year plan (the '30/10 initiative').

High-speed rail and public transit will yield important economic benefits for Los Angeles and help transform our city and region into a more sustainable and livable metropolis."

City and Region Definition. Within the six counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura, the City of Los Angeles has a population of 4 million; the metropolitan area has 12.9 million. The broader, consolidated metropolitan area has nearly 18 million. Private employers generate 7.3 million jobs in the region.

Economy. While the Los Angeles area is most well known for its film, entertainment and tourism industries, it is also the site of the most active seaport in the Western Hemisphere in terms of both value of goods and tonnage, one of the most active airports in the nation for cargo and passengers, and the largest manufacturing center in the Western United States. Key industries include aerospace, computer and electronics technology, medical products, steel fabrication, fashion and apparel, international trade, as well as tourism. It is also a major national financial and banking center with strong ties to Asia. Much of the economic base depends on connectivity to other parts of California, the United States, and overseas.

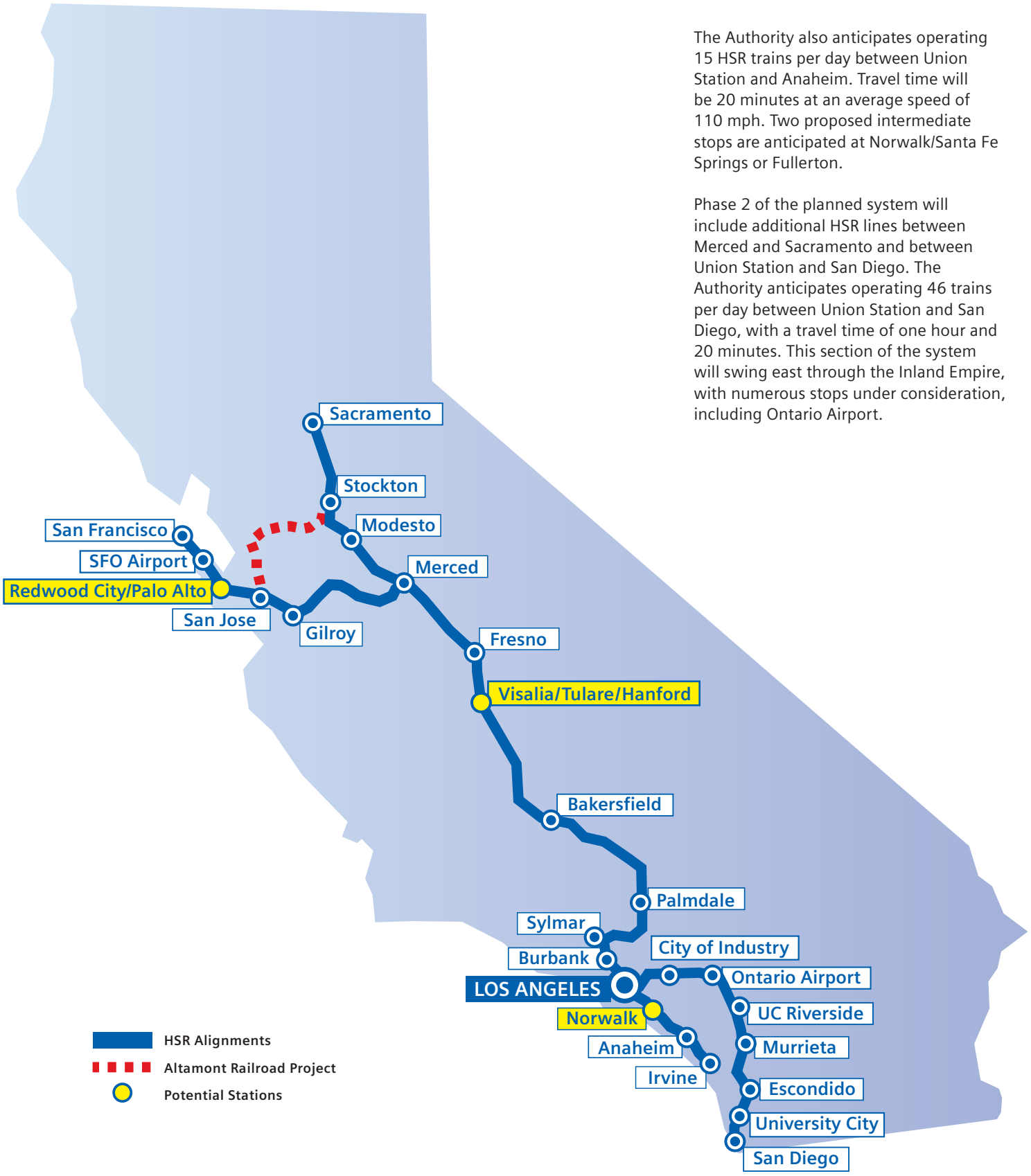
Proposed High-Speed Rail Routes

The planned California HSR service is designed for high-speed rail with widely spaced stops and speeds up to 220 mph for most of the distance from Sacramento to Fresno, Bakersfield, and Palmdale. From Palmdale southward through the entire Los Angeles region, the service operates at slower speeds resulting from physical constraints, such as track curvature typical for heavily urbanized areas.

Phase 1 of the planned system will include 500 miles of track that will transport passengers from Union Station in downtown Los Angeles to San Francisco in 2 hours and 40 minutes.[1] The California High-Speed Rail Authority (the Authority) anticipates operating 56 trains per day between Northern and Southern California, reaching speeds of up to 220 mph through the Central Valley. Ridership forecasts through 2025 estimate that the HSR line from Union Station to San Francisco will transport up to 120,000 passengers daily—including 80,000 long-distance passengers and 40,000 local passengers.

[1] California High-Speed Rail Authority, Dec. 2009 Report to the Legislature.

Figure 1. Proposed HSR Intercity Passenger Routes Serving Los Angeles



The Authority also anticipates operating 15 HSR trains per day between Union Station and Anaheim. Travel time will be 20 minutes at an average speed of 110 mph. Two proposed intermediate stops are anticipated at Norwalk/Santa Fe Springs or Fullerton.

Phase 2 of the planned system will include additional HSR lines between Merced and Sacramento and between Union Station and San Diego. The Authority anticipates operating 46 trains per day between Union Station and San Diego, with a travel time of one hour and 20 minutes. This section of the system will swing east through the Inland Empire, with numerous stops under consideration, including Ontario Airport.

Los Angeles to:	220 mph
San Francisco	7,171,500
Sacramento	2,878,000
San Diego	2,278,800
TOTAL	**12,328,300**

Ridership estimates are illustrative examples based on prior studies conducted for various HSR operating scenarios.

Table 1. Estimated Los Angeles-Based 2035 Annual Ridership for HSR Service (one-way trips)

The services provided to new visitors should result in at least $360 million per year of new spending in the downtown area, supporting roughly 4,000 hotel, restaurant and retail jobs in that area.

Based on current travel patterns by all transportation modes (auto, intercity air and bus) between city pairs, demand for 220 mph HSR service was estimated for both Phase 1 and Phase 2 service as proposed between Los Angeles and each of the major city pairs and intermediate stops: Sacramento, San Francisco and San Diego. Table 1 shows estimated annual demand for HSR used in this study.

Quantitative Assessment of Potential Economic Development Impacts

Travel Impact. High-speed rail service to and from the Los Angeles region is projected to capture roughly one-third share of the market for north-south travel by the year 2035. That represents around 34,000 trips daily (12.3 million trips per year). Of that number, more than half will be to or from Los Angeles Union Station; the rest will be to and from other key activity centers in the metropolitan area.

Types of Economic Impact. High-speed rail service will provide advantages to the City of Los Angeles and the entire metropolitan area as a result of reduced travel time and greater connectivity to outlying cities, improved accessibility to broader labor and customer markets, as well as associated productivity gains and economy-of-scale benefits. The ability of high-speed rail services to expand labor markets and business travel opportunities also enables it to support the growth of the finance, insurance, and technology industries in downtown business districts as well as other office centers.

High-speed rail service may also provide opportunities for developing air service connections at the Burbank, Ontario and Palmdale stops, as well as LAX via Union Station. In addition, it will provide major urban development opportunities in the Alameda District surrounding Union Station as well as in areas surrounding the Palmdale and Anaheim stops.

Local Impact (Visitor Spending and Station Area Development). The establishment of downtown Los Angeles as the hub of an HSR system is expected to help generate additional economic activity. The services provided to new visitors should result in at least $360 million per year of new spending in the downtown area, supporting roughly 4,000 hotel,

Table 2. New HSR Passengers Anticipated at Union Station, Daily, 2030

Category	Daily	Percent of Total
Total	**14,100**	
Local < 100 Miles	10,300	73%
Inter-Regional > 100 Miles	3,800	27%
Commuters	**6,600**	**47%**
Into Downtown	5,300	
From Downtown	1,300	
Business	**1,600**	**11%**
So. California Residents	1,100	
Long Distance Travelers	500	
Entertainment Shopping	**6,000**	**43%**
So. California Residents	4,500	
Long Distance Travelers	1,500	

Data Sources: California High-Speed Rail Authority, December 2009 Report to the Legislature; California High-Speed Rail Revenue and Ridership Forecasting Study, 2007. Assumes that 80 percent of commuters are traveling into the downtown area.

restaurant and retail jobs in that area. This impact is mainly due to HSR passengers embarking or disembarking at Union Station who would otherwise have traveled by air or car to and from other Southern California locations. A second segment of passengers will not create new positive economic impacts because they will simply be substituting a new mode of transportation for a trip they would otherwise have made by commuter rail or automobile. Based on visitor data from the Los Angeles Convention and Visitors Bureau, the impacts of each market segment include:

Workforce Commuters

- Approximately 5,300 workers per day will commute to the downtown area via HSR. These commuters will not generate any new positive economic impacts because they will simply be changing their transportation modes. Indirect positive impacts will be created by reducing automobile use, however. It is also possible that a segment of downtown workers will create new Transit Oriented Development (TOD) opportunities near the various stations on the system by choosing to live near HSR transit stops.

Local Business Travelers

- Approximately 1,100 Southern California residents will use HSR each day to travel downtown for business reasons. This market segment will not generate any new positive economic impacts because they will simply be changing the way that they travel to downtown. However, switching from automobile to high-speed rail will generate savings from reduced traffic, congestion, and air pollution.

Southern California Visitors

- HSR is expected to attract an additional 4,500 Southern California residents daily (1.64 million per year) to downtown Los Angeles for the arts, shopping, entertainment, food, and other activities. Essentially, the improved transit system will open the downtown area to a large segment of people who historically have avoided it due to congestion and perceived lack of parking.

- This translates into $234 million of new spending annually in the downtown area.

Long-Distance Travelers

- An additional 2,000 trips per day are expected to be made from San Francisco and other parts of Northern California to downtown Los Angeles via HSR. It is likely that most of these long-distance travelers would not have made these trips without the HSR system. At least 25% of the trips are expected to be for business travel; the rest will be for leisure.

- Together, these trips will translate into $126 million of new spending in downtown Los Angeles annually. This figure also includes likely gains by foreign and U.S. visitors to the Anaheim conference center and tourist attractions.

Table 3. Projected Annual Total Economic Impact of Los Angeles-based HSR Service in 2035 (2009 $)

Measure	Unit	220 mph
2035 Employment	Jobs	54,056
2035 Output (Sales)	$m per year	$7,519
2035 Value-Added (GRP)	$m per year	$4,340
2035 Wages	$m per year	$2,977

These estimates of the potential economic impact are meant to be interpreted as potential impacts dependent on: (a) Full implementation of the proposed HSR system, (b) A metropolitan economy that remains healthy and continues to grow over the next twenty years, and (c) Supportive public policies and infrastructure investments to allow the benefits of HSR to be realized, and the projected additional business development to occur.

Office Development

- High-speed rail service will also support additional growth of office development downtown and at other locations served by HSR, particularly growth sites such as Palmdale. Potential growth at these areas is large. Proposed development plans for downtown (Alameda District) and Palmdale envision development for up to 21,000 new jobs in the long-term.
- That value is actually modest for the Los Angeles region as it represents just one-half of 1% of the current 3.8 million workers in the metropolitan area employment base. However, it is also clear that local access enhancements enabled by high-speed rail represents only one of many factors making the region an attractive location for business activity.

Regional Economy. Besides the direct growth of business activity supported by visitor spending, and the direct attraction of development around new HSR stations, the proposed rail service will have broader regional impacts on travel time and cost savings for train riders, as well as congestion reduction impacts for those still riding or driving cars and trucks. The proposed service will also provide regional productivity benefits in terms of economies of scale from broader labor and customer markets that can benefit the banking and finance industries, and linkages to partner firms in the medical, computer, aerospace, motion picture and entertainment industries. These impacts, in addition to net expansion of visitor spending and office market attraction, will also lead to further "indirect" growth at suppliers to the growth businesses and "induced" growth supported by the additional consumer spending of worker wages. The total potential long-term economic impact of proposed high-speed rail service on the Los Angeles Metropolitan Area economy will grow over time as rail service is fully implemented and savings in travel time, expense and congestion reduction are realized.

- The estimated economic impact potential as of the year 2035 is $7.6 billion per year of additional business sales, which annually includes $4.3 billion of value-added (GRP). Of that value added, roughly $3 billion is worker wages, supporting an additional 55,000 jobs. The impact will grow over time, so it will be expected to be less than this amount in earlier years, and potentially more in later years. It is also important to note that these different impact measures cannot be added because they are all alternative ways of measuring the same economic growth.

Chicago High-Speed Rail Case Study Summary

Chicago Mayor Richard M. Daley

"Chicago enthusiastically supports the recent historic federal commitments to the future of passenger rail service in America and is dedicated to establishing Chicago Union Station as the preeminent hub of high-speed and intercity passenger rail service in the Midwest and throughout the United States.

For more than a decade, the City has been working in partnership with our Congressional delegation and colleagues in the State of Illinois government, Amtrak, the freight railroad industry, as well as the governments of surrounding states to develop a coordinated approach towards realizing a shared vision for improved and expanded intercity passenger rail service. In 2009, Illinois Governor Pat Quinn took these efforts to the next level by calling upon myself and the governors of seven Midwest states to form a Midwest High-Speed Rail Steering Group that is now successfully pursuing a coordinated approach to securing and stewarding the resources that recent and anticipated federal funding authorizations have made and will make possible.

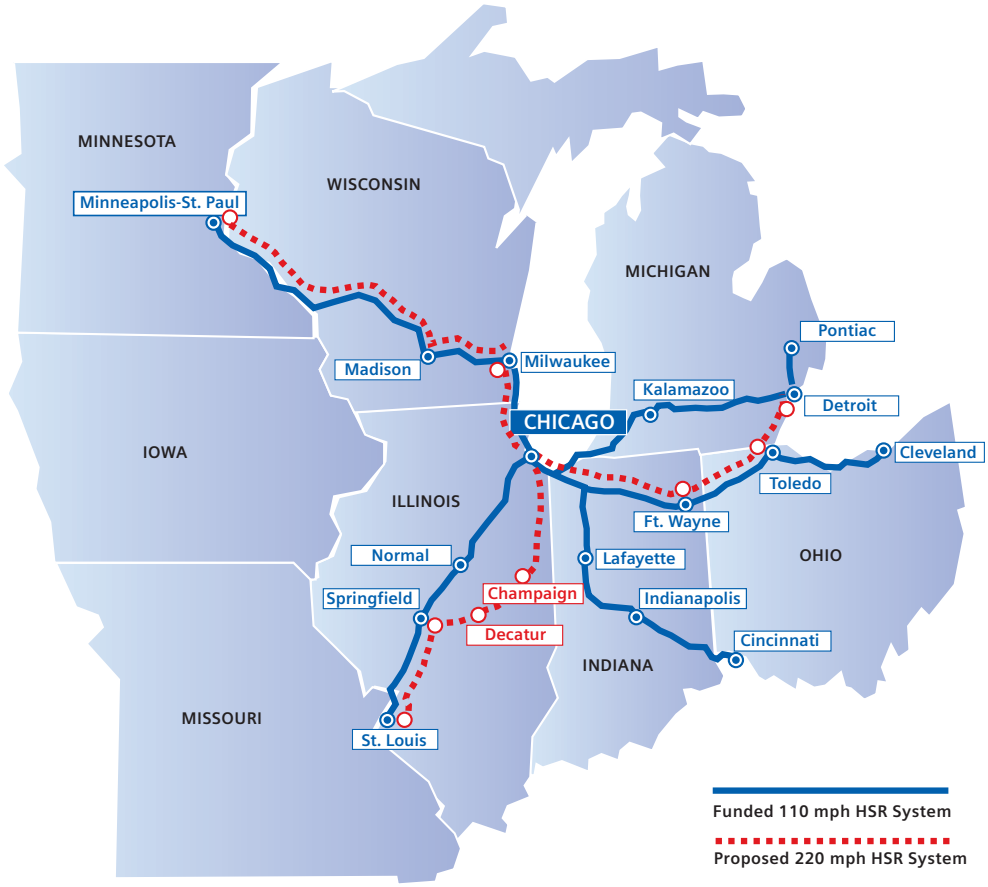
Chicago is a dedicated and active partner in the development of high-speed rail and improved intercity passenger rail service in the Midwest and throughout the country."

City and Region Definition. Among the case studies for high-speed rail, Chicago stands out for its position as the center of a vast economic region with the broadest set of proposed intercity connections. The city itself has a population of 2.8 million, the six-country metro area (which reaches into Wisconsin and Indiana) has a population of 8.5 million and the consolidated metropolitan area encompasses 9.6 million people. However, it has been widely noted that Chicago also serves as the economic center of a Great Lakes-Midwest economic region with nearly 100 million people living within a 500-mile distance that reaches into eight states. The governors of those eight states and the mayor of Chicago signed an agreement in 2009 to work together to bring high-speed rail to the region through a set of rail lines based on a common Chicago hub.

Economy. Chicago's economy competes in a global marketplace and is a major center for corporate headquarters. Manufacturing is still the region's largest major employment sector (accounting for 430,000 jobs within the metropolitan area), and it has continued to gain in labor productivity to bolster global competitiveness. Other major sectors include healthcare, education, research and development, retail, financial services, as well as professional and technical services. The Chicago area is currently a leading center for production of medical equipment and packaged food products. The financial center of the Midwest, Chicago also annually attracts 45 million visitors from elsewhere in the U.S. and abroad.

The city is a major transportation gateway to the Midwest, the U.S., and the world. O'Hare International Airport is one of the world's busiest airports, with flights to more than 60 foreign destinations. It is also a hub for both United and American Airlines. Midway Airport is a hub for Southwest Airlines. Together, the two airports provide nearly 3,000 daily flights serving more than 220 cities. Chicago is also a hub for six of the seven Class I North American freight railroads, as well as six major U.S. Interstate highways. Chicago's urban transit system, the Chicago Transit Authority, provides more than 1.6 million trips every weekday on 140 bus routes and eight rail lines. The region's commuter rail agencies, Metra and Northern Indiana Commuter Transportation District, serve more than 300,000 daily trips on 12 rail lines.

Figure 2. Proposed Initial HSR intercity passenger routes serving Chicago



High-speed rail service could help generate another 12,000 to 18,000 jobs in downtown Chicago.

Proposed High-Speed Rail Routes

A distinguishing aspect of proposed high-speed rail services to Chicago is the extent of proposed HSR lines serving other major metropolitan areas that are all designed to converge on the Chicago hub. The lines that have received some initial federal funding and are the focus of analysis here include: (1) South to St. Louis, (2) Northwest to Milwaukee, Madison, and Minneapolis/St. Paul, and (3) East to Detroit. Additional high-speed rail lines that are part of the long-term vision are: (4) Southeast to Indianapolis and Cincinnati, (5) Southwest to Des Moines and Omaha and (6) East to Cleveland.

Various studies have estimated either annual ridership or revenue for specific corridors in the entire proposed Midwest regional rail system. A recent concept plan for 220 mph service on the Chicago-St. Louis route estimated ridership between 1.5 million and 2.9 million passengers per year.[2] Independent estimates developed for this study indicate that annual demand for the Chicago-St. Louis route is approximately 1.1 to 2.1 million. Demand on each of the three routes for the 110 mph and 220 mph operating scenarios are shown in Table 4.

Quantitative Assessment of Potential Economic Development Impacts

Types of Economic Impact. High-speed rail service will provide advantages to the City of Chicago and the entire metropolitan area as a result of enlarged visitor and tourism markets, reduced travel time and greater connectivity to outlying cities, as well as associated business productivity gains. The ability of high-speed rail services to expand labor markets and business travel opportunities also enables it to support the local growth of the financial services, insurance, technical services and technology industry firms in downtown business districts and other office centers.

Local Impact (Visitor Spending and Station Area Development)

- The Midwest Regional Rail Initiative estimated that a 110 mph Midwestern rail service would result in a net gain of 5 million trips per year to and from Union Station by the Year 2040.[3]
- A separate study of service proposed for the Chicago-St. Louis corridor indicates that faster 220 mph HSR with a link to O'Hare Airport would likely generate an additional 3.7 million trips per year coming to Chicago Union Station over current station volumes.[4]
- These studies are in line with general expectations that Chicago Union Station may have an increase of roughly five million intercity trips (in addition to the current Amtrak trip volume of 3.1 million/year and Metra commuter rail volume of 28 million/year).

[2] Midwest High-Speed Rail Association, *Chicago to St. Louis 220 mph High-Speed Rail Alternative Corridor Study*, Volume 2—Ridership & Benefits, January 14, 2010.
[3] *Midwest Regional Rail Initiative, Benefit Cost & Economic Analysis*, TEMS in association with HNTB, 2006.
[4] *Chicago to St. Louis 220 mph High-Speed Rail Alternative Corridor Study*, Volume 2, TranSystems, January 2010.

Table 4. Estimated Chicago-Based 2035 Annual Ridership for HSR Service (one-way trips)

Chicago to:	110 mph	220 mph
St. Louis	1,106,600	2,093,700
Minneapolis	1,960,500	3,796,000
Detroit	1,877,700	3,710,500
TOTAL	**4,944,800**	**9,600,200**

Ridership estimates are illustrative examples based on prior studies conducted for various HSR operating scenarios.

- This includes around 3 million additional passenger trips coming into downtown Chicago that would otherwise not occur (since they would come into the metropolitan area via air or road travel and not necessarily visit downtown). These include trips by residents of outlying cities and smaller communities who travel to Chicago for business meetings or for sports and cultural attractions and events; visitors who fly into O'Hare and Midway airports from around the world and around the nation and then ride HSR to their regional destinations; and those who ride the high-speed rail into Chicago from out-of-state areas for business or leisure trips.
- The 3 million added visitors are estimated to generate roughly $700 million per year of spending in the region, though it is estimated that roughly $42 to $50 million per year of it is entirely new spending in the region (created by trips that would otherwise not have occurred),[5] and another $100 to 150 million per year is spending that is now channeled into downtown Chicago because of the high-speed rail terminus, which would otherwise occur elsewhere in the region if the travelers had driven or flown into the Chicago region.

Downtown Commercial Development. High-speed rail service will also support the expansion of labor markets and service industry markets, as well as inter-industry business travel—all enabling additional office development associated with growth of target industries.

- A study conducted for the Midwest Regional Rail Initiative estimated that high-speed rail service could help generate another 12,000 to 18,000 jobs in downtown Chicago.[6]
- For this study, it is estimated that visitor spending enabled by three specific HSR lines will directly support 2,000 additional jobs.
- Office business attraction enabled by HSR is estimated to attract between 4,500 and 8,500 net additional jobs in the downtown area.
- The total direct effect of HSR service on jobs is thus estimated at between 10% and 17% of the total (63,000) employment growth projected by the Central Area Plan "opportunity scenario" for downtown between 2010 and 2035.

[5]These figures are consistent with the most recent St. Louis to Chicago study that assumed up to 6.5% of all forecast ridership is induced new travel.

[6]Midwest Regional Rail Initiative, Benefit Cost & Economic Analysis, TEMS in association with HNTB, 2006.

Table 5. Estimated Annual Total Economic Impacts of Chicago-Based HSR Service in 2035 (2009 $)

Measure	Unit	110 mph	220 mph
2035 Employment	Jobs	18,374	42,200.0
2035 Output (Sales)	$m per year	$2,577.8	$6,087.3
2035 Value-Added (GRP)	$m per year	$1,489.7	$3,554.8
2035 Wages	$m per year	$1,033.0	$2,466.6

Estimates of the potential economic impact are based on: (a) Full implementation of the proposed Midwest HSR system, (b) A metropolitan economy that remains healthy and continues to grow over the next twenty years, and (c) Supportive public policies and infrastructure investments to allow the benefits of HSR to be realized, and the projected additional business development to occur.

Regional Impact. In addition to the direct growth of business activity supported by visitor spending and the direct attraction of development around Chicago Union station, the proposed rail service will have broader regional impacts on travel time savings and travel cost savings for train riders. It will also result in reduced congestion for those still flying, riding buses, or driving cars and trucks. The ability of HSR services to expand labor markets and business travel opportunities also enables it to support the growth of financial service and insurance industries in downtown Chicago and technology services in other office centers. It can additionally enable broader reach for business conventions. These impacts, in addition to net expansion of visitor spending and office market attraction, will also lead to further "indirect" growth of suppliers to growth businesses and "induced" growth supported by the additional consumer spending of worker wages.

The total potential long-term economic impact of proposed high-speed rail service will grow over time as rail service is fully implemented and the savings in travel time, expense and congestion reduction are realized. Outcomes will ultimately depend on travel speeds and schedules. The current plan is for medium speed (110 mph peak) service along three major intercity passenger rail lines converging on downtown Chicago (from St. Louis, Minneapolis/St. Paul and Detroit). However, this study also considered an alternative scenario in which dedicated tracks later enable even higher speed (220 mph peak) service, as has been proposed by Illinois DOT (for the St. Louis line) and by other states and stakeholder groups (for the other lines).

- Depending on the scenario, the estimated economic impact potential as of the year 2035 is $2.6 billion per year of additional business sales with the medium speed scenario, rising to $6.1 billion per year with the high-speed scenario.
- These values include $1.5 to $3.6 billion per year of value-added (GRP). Of that value-added, roughly $1 billion to $2.5 billion per year is worker wages, associated with 18,300 to 42,200 jobs.
- The impact will grow over time, so it will be expected to be less than this amount before 2035, and potentially more than this amount in later years. It is also important to note that these different impact measures cannot be added because they are all alternative ways of measuring the same economic growth.

Orlando High-Speed Rail Case Study Summary

Orlando Mayor Buddy Dyer

"On January 28, 2010, President Barack Obama announced Orlando would be the jumping-off point for America's High-Speed Rail network. Weeks earlier, the City secured its first commuter rail system.

The two projects mean Orlando will soon be a center of America's 'Rail Renaissance.'

That Orlando is on the cusp of reaping the social, economic and environmental benefits from this dramatic expansion of public transit is a testament to the power of partnership.

After decades of failure, Orlando came together to engage Central Florida's numerous governments, businesses and civic organizations in a new kind of collaborative, regional approach to securing rail transit unlike any Florida had ever seen. This historic coalition would ultimately help Florida send the defining signal to the federal government that the state was serious about rail."

City and Region Definition. While the City of Orlando has a population of around 230,500 people, it is the center of a four-county metropolitan area with a population of 2.1 million people (comprising Orange, Seminole, Lake and Osceola counties in Florida).

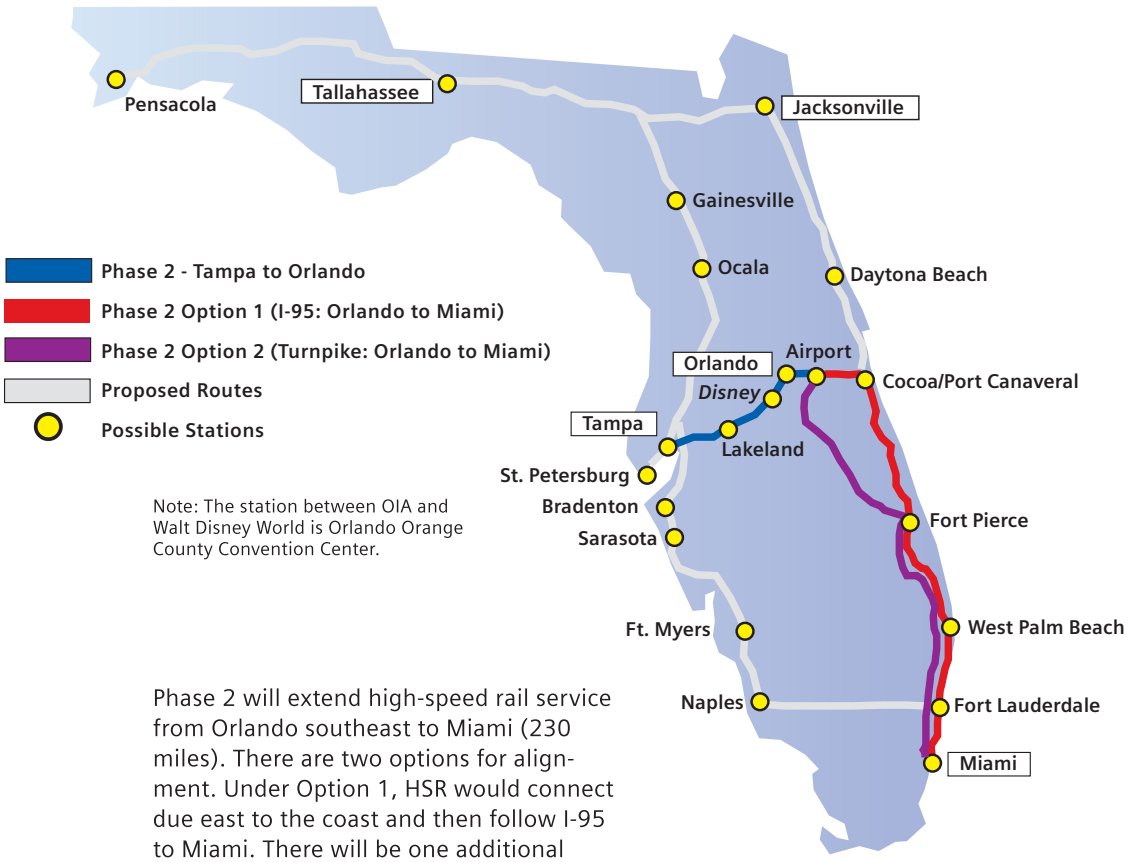
Economy. The Orlando area is a top tourist destination, most well known for its entertainment and theme park industries. The growth of entertainment, design, and creative professionals has also contributed to the rise of jobs in animation, motion simulation, and digital media. Diversification has also occurred with recent expansion of the medical-research, pharmaceutical, and healthcare sectors, supported by the growth of medical biosciences as a key core industry in Florida. Less familiar is the state's thriving $13.4 billion technology industry, which employs some 53,000 high-skilled workers. Florida's I-4 Technology Corridor, spurred by the growth of Lockheed Martin and similar firms that have clustered in Orlando, has nurtured the development of advanced military technology and space systems.

Metro Orlando provides more than 100,000 jobs in tourism. Due to the need to handle a large number of tourists, Orlando is also a center for passenger transportation logistics, a field that offers a multitude of good jobs for blue-collar workers, who often find limited opportunities in local economies with a high proportion of technical and professional services. The region would therefore benefit by providing the vital transit and feeder connections that will be essential to making HSR work.

Proposed High-Speed Rail Routes

Phase 1 of Florida's HSR system will link Orlando and Tampa. From Orlando, the line will extend southwestward along the I-4 median to downtown Tampa (85 miles), with one stop along the route at Lakeland (50 miles). Service from Tampa will include stops at three stations inside the Metro Orlando region—Orlando International Airport (OIA), Orlando Orange County Convention Center (OCCC), and Walt Disney World. The design speed for Phase 1 would be 168 mph, with operating speeds somewhat slower to accommodate station stops, acceleration, deceleration and operations in urban areas.

Figure 3. Proposed Initial HSR intercity passenger routes serving Orlando



Phase 2 will extend high-speed rail service from Orlando southeast to Miami (230 miles). There are two options for alignment. Under Option 1, HSR would connect due east to the coast and then follow I-95 to Miami. There will be one additional stop at Port Canaveral in addition to three stops at Fort Pierce, West Palm Beach and Fort Lauderdale. Option 2 will follow the coastal bypass route of the Florida Turnpike before connecting with I-95 at Port St. Lucie. This option calls for three stops on the way to Miami-Fort Pierce, West Palm Beach and Fort Lauderdale. In this study, we assumed routing under Option 1 to capture the "Space Coast" markets and strengthen the technology and defense connections between industries in Orlando and Port Canaveral. The design speed for Phase 1 would be 186 mph, with speeds constrained as in Phase 1 due to operational requirements. However, average operating speeds on the Orlando-Miami route would be somewhat higher because routes would be able to operate at higher speeds for longer distances between stops.

A second scenario was also developed for this study that examined the effects of operating HSR service at a design speed of 220 mph for both the Orlando-Tampa and Orlando-Miami routes. Economic impacts based on increased ridership associated with these slightly higher operating speeds are presented in this report, and provide comparable design speeds to alternative scenarios considered for each of the other three cities in this series of reports.

Ridership estimates vary, but are generally consistent at between 1.2 million and 1.9 million for the Orlando-Tampa market. Estimates for the Orlando-Miami route (Phase 2) range between 5.2 and 5.9 million. Independent estimates developed for this study indicate that demand for the Orlando-Tampa route range between 1.6 and 2.1 million, depending on the operating scenario. As shown in Table 6, estimates for Orlando-Miami service is expected to range between 4.2 and 4.9 million (for the 168/186 mph and 220 mph scenarios, respectively.)

Quantitative Assessment of Potential Economic Development Impacts

Types of Economic Impact. High-speed rail service will provide advantages to the City of Orlando and the entire metropolitan area as a result of enlarged visitor and tourism markets, reduced travel time and greater connectivity to outlying cities, and associated business productivity gains. The ability of high-speed rail services to expand labor markets and business travel opportunities also enables it to support the growth of the medical, pharmaceutical and motion picture support industries in downtown business districts and other office centers.

Table 6. Estimated Orlando-Based 2035 Annual Ridership for HSR Service (one-way trips)

Orlando to:	168 / 186 mph	220 mph
St. Petersburg	1,597,500	2,055,200
Miami	4,208,500	4,873,900
TOTAL	**5,806,000**	**6,929,100**

Ridership estimates are illustrative examples based on prior studies conducted for various HSR operating scenarios.

Local Impact (Visitor Spending and Station Area Development). A detailed study conducted for the Phase 1 Tampa-Orlando service estimates riders going to and from Orlando will have a profile of 60% Florida residents and 40% other visitors.[7] The study also estimated that roughly 35% of all riders will be using the service for access to or from the airport. It is reasonable to assume that train riders going to and from Orlando on the Phase 2 north-south line (connecting to Miami) will not be dramatically different from those profiles. Estimates of the total impact on visitor spending also require a combination of data from the ridership forecasts and data on average visitor spending profiles.[8] Based on this data, we calculate that HSR may bring an additional $255 million annually in visitor spending into the area, supporting hotel, restaurant, retail, and entertainment industry growth. It is based on the following travel market impacts:

Airport Connections

Out-of-state visitors who fly into Orlando International Airport (OIA) from the U.S. (outside of the Southeastern states) and from around the world and then ride HSR to their destinations. Leisure, out-of-state visitors spend an average of $940 per person during a multiple-day visit.

- An analysis conducted for this study indicates that they may generate around $600 million annually spending. Altogether, it is estimated that about one-fifth of that amount ($118 million per year) is new spending within the Orlando metropolitan area.

Out-of-Town Leisure Travelers

Out-of-state visitors who ride HSR into the Orlando area from within the Southeastern U.S. These may also include convention and group meeting visitors. These visitors spend an average of $737 per day during a multiple-day visit.

- An analysis conducted for this study indicates that they may generate around $140 million annually in spending. It is estimated that about some 40% of that amount ($56 million annually) is new spending within the area.

New Business Trips

Additional business trips into the Orlando area can be induced as a result of HSR service and the high tech linkages it will enable. Many of these are day trips, though some will be overnight. These visitors spend an average of $162 per trip.

- An analysis conducted for this study indicates that they may generate around $81 million annually in new spending in the area.

Commercial Development. High-speed rail service will also support the expansion of labor markets and service industry markets, as well as inter-industry business travel—all enabling additional office development associated with growth of target industries that are not visitor related.

- Announced development in the area of the OIA HSR station and Orlando Orange County Convention Center/ International Drive Activity Center HSR station alone may eventually total more than 50,000 jobs.
- More conservatively, short-term plans indicate that around 10,000 jobs are likely to be supported by the addition of the HSR service at those locations.

[7]Florida High-Speed Rail Ridership and Revenue Study,— Supplemental Details, 2002.
[8]Orlando/Orange County Convention and Visitors Bureau, data for 2007.

Table 7. Estimated Annual Economic Impacts of Orlando-Based HSR Service in 2035 (2009 $)

Measure	Unit	168 / 186 mph	220 mph
2035 Employment	Jobs	19,935	27,453.0
2035 Output (Sales)	$m per year	$2,128.1	$2,942.4
2035 Value-Added (GRP)	$m per year	$1,230.7	$1,706.1
2035 Wages	$m per year	$ 833.5	$1,155.8

These estimates of the potential economic impact are meant to be interpreted as potential impacts dependent on: (a) Full implementation of the proposed HSR system, (b) A metropolitan economy that remains healthy and continues to grow over the next twenty years, and (c) Supportive public policies and infrastructure investments to allow the benefits of HSR to be realized, and the projected additional business development to occur.

Regional Impact. In addition to the direct growth of business activity supported by visitor spending, and the direct attraction of development around new HSR stations, the proposed rail service will have broader regional impacts on travel time and cost savings for train riders, as well as some time savings resulting from reduced vehicle congestion. The proposed service will also provide regional productivity benefits in terms of economies of scale from broader tourism markets and linkages to partner firms in the medical equipment, pharmaceutical, aerospace and motion picture industries. These impacts, in addition to net expansion of visitor spending and office market attraction, will also lead to further "indirect" growth among suppliers to the growth businesses and "induced" growth supported by the additional consumer spending of worker wages.

The total potential long-term economic impact of proposed high-speed rail service will grow over time as rail service is fully implemented and the savings in travel time, expense and congestion reduction are realized. It will ultimately also depend on travel speeds and schedules. The current plan is for high-speed (220 mph peak) service between Orlando and Miami, but medium-speed (168 mph peak) service between Orlando and Tampa. This study additionally considered an alternative scenario in which the Orlando to Tampa section is also upgraded to the higher speed service.

- Depending on the scenario, the estimated economic impact potential by 2035 is $2.1 to $2.9 billion annually in additional business sales, which includes $1.2 to $1.7 billion per year in value-added (GRP).
- Of that value added, roughly $850 million to $1.2 billion per year is worker wages, supporting an additional 20,000 to 27,500 jobs.
- The impact will grow over time, so it will be expected to be less than this amount in earlier years, and potentially more in later years. It is also important to note that these different impact measures cannot be added because they are all alternative ways of measuring the same economic growth.

Albany High-Speed Rail Case Study Summary

Albany Mayor
Gerald D. Jennings

"High-speed rail between New York City and the City of Albany will have a transformative effect upon the City and Capital Region.

While we currently have rail service, the prospect of significantly reducing travel times and increasing the frequency and efficiency of service between downstate and upstate will benefit our region's economy and overall quality of life. New businesses will be able to locate in our region because of the convenient and reliable connection to the New York City metropolitan region, bringing with them jobs for all segments of our population. The connection will bring a diversity of new residents to live and work in our cities, making our neighborhoods thriving mixed-use and mixed-income communities of choice, as well as thousands of visitors who will take advantage of our cities and region's wealth of cultural and recreational opportunities.

Albany will become an attractive alternative for businesses; individuals and families who are looking for an affordable urban lifestyle, while remaining within a short and regular commute to the New York City Region."

City and Region Definition. Albany, New York State's capital, is located 142 miles north of New York City along the Hudson River. It's part of the Capital District Region, comprising Albany, Rensselaer, Schenectady, and Saratoga Counties. The region sits at a crossroads, with Boston to the east, New York City to the south, Buffalo to the west, and Montreal to the north. The City of Albany has a population of more than 94,000; the four-county Capital District region, more than 850,000; and the larger Albany-Schenectady-Amsterdam Combined Statistical Area, 1.1 million. The region's population has been increasing at a rate almost twice as fast as New York State's average.

Economy

Institutional Sector

State government employment constitutes more than 21% of the jobs in the Capital District. The service industry is also a significant employer, with a concentration of restaurants and professional services that support the government sector. The region is also home to several colleges and universities, including the State University of New York at Albany, Rensselaer Polytechnic Institute, Skidmore College, the College of Saint Rose, and two community colleges. There are large hospital complexes in both Albany and Schenectady.

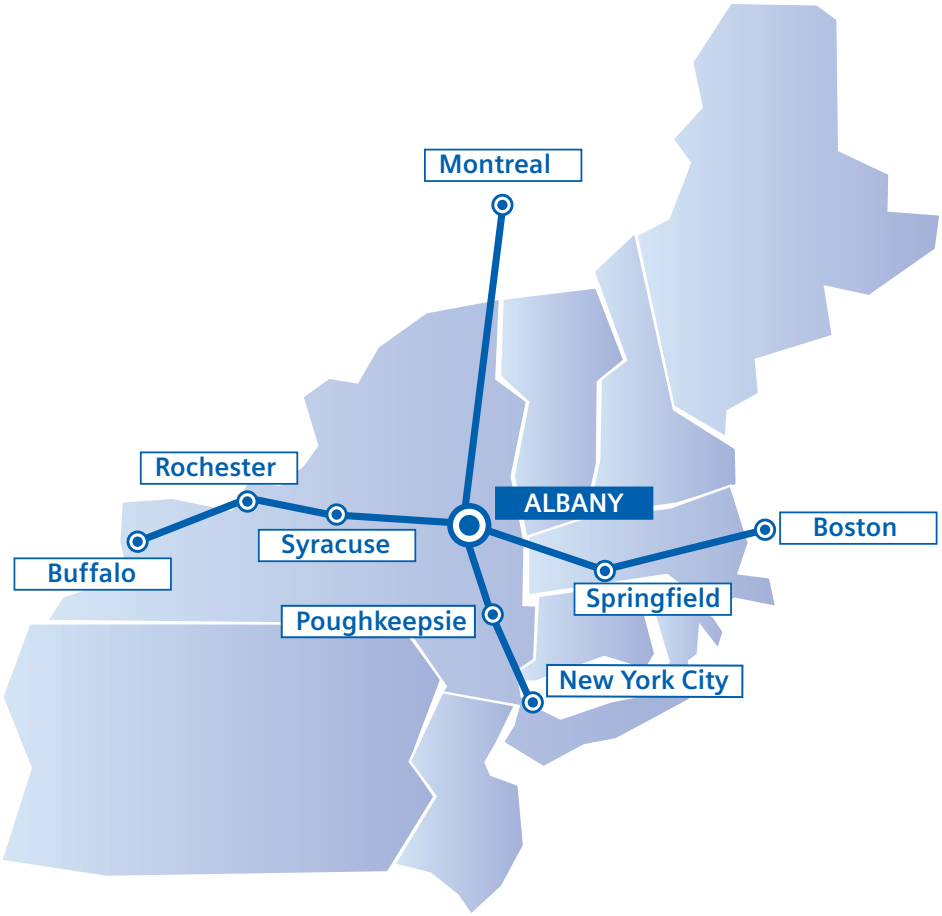
Technology Sector

The Capital District is part of the 19-county Tech Valley, a region of New York that runs from just north of New York City north through the eastern Adirondack Mountains. Tech Valley is being marketed as an emerging high-tech manufacturing and research center. Research institutions in the Capital District have successfully attracted new investments, leading to growth in the technology sector. Albany Nanotech, a university-based research center opened in 2003, is recognized as the preeminent nanotechnology center in the United States.

Tourism Sector

The Capital District's regional economy benefits from a strong and growing tourism sector. The Albany capital area attracts nearly $900 million per year in tourism, while the adjacent Saratoga area attracts almost $400 million. A new $185 million convention center/hotel complex, planned for downtown Albany, is expected to further increase business-related visits. Currently, the region hosts approximately 120,000 convention delegates each year. This number is projected to rise to around 250,000 when the new convention center opens. The new facility will include two full-service hotels.

Figure 4. Proposed Initial HSR Intercity Passenger Routes Serving Albany



Current and Proposed High-Speed Rail Routes

Current plans call for increasing the current 26 trains per day (13 round trips) between Albany and New York City to 32 per day in the initial phase and ultimately to 44 trains per day with 110 mph service. Syracuse and Utica/Rome will increase from the current eight trains per day to 26 trains per day, and service to Rochester and Buffalo is expected to increase from eight trains per day currently to 22 trains per day under the 110 mph scenario. Independent estimates developed for this study indicate that annual demand for the Albany-New York City route range from approximately 1.1 million under the slower 79/90 mph design scenario to 2.3 million for 220 mph service. Demand on each of the four routes for the 79/90, 110 and 220 mph operating scenarios are shown in Table 8.

Current Passenger Rail Service. Currently, Amtrak provides rail service to three Capital District stations. The Albany-Rensselaer station is located in the City of Rensselaer, directly across the Hudson River from downtown Albany. The station is also served by local buses and taxis. The Schenectady station, served by the Empire Amtrak service, is located in downtown Schenectady and includes local bus connections. The Saratoga Springs station is approximately one and one-half miles from downtown Saratoga and features express bus service to Albany.

Quantitative Assessment of Potential Economic Development Impacts

Types of Economic Impact. High-speed rail service will provide economic advantages to the City of Albany and other cities in the Albany metropolitan areas including Schenectady and Saratoga Springs. These advantages come as a result of enlarged visitor and tourism markets, reduced travel time and greater connectivity to New York City, other cities around the state, and associated business productivity gains. The ability of high-speed rail services to expand labor markets and business travel opportunities also enables it to support the growth of office activities and services that support state government, emerging nanotechnology, clean energy and computer chip-related industries.

Table 8. Estimated Albany-Based 2035 Annual Ridership for HSR Service (one-way trips)

Albany to:	79/90 mph	110 mph	220 mph
Buffalo	280,800	329,500	623,400
Montreal	156,000	167,900	324,000
NYC	1,152,300	1,291,800	2,252,200
Boston	270,000	315,300	589,300
TOTAL	**1,859,100**	**2,104,500**	**3,788,900**

Ridership estimates are illustrative examples based on prior studies conducted for various HSR operating scenarios.

Local Impact (Visitor Spending and Station Area Development). Local interviews with convention, tourism and planning officials indicate that the HSR impacts on business attraction and local investment will vary, depending on train speeds and frequencies, and on the capacity and timing of available convention center facilities.

- With the modest, currently planned speed improvements, impacts will be relatively small—in the range of 1,000 tourism-related jobs (in the hotel, restaurant, museum, performing arts, and scenic travel service industries) and 2,000 technology-related jobs (in professional and technical services, engineering, computer data processing, and chemical and electrical product manufacturing) are projected by the 2035 target study date.
- However, with travel times to New York City cut to less than two hours, the number of potential additional jobs attracted to the region could grow to 2,500 visitors (tourism and convention business-related jobs) and 6,000 technology-based office and industry jobs by the year 2035.

Regional Economy. In addition to the direct growth of business activities supported by visitor spending, and the direct attraction of development around new HSR stations, the proposed rail service will have broader regional impacts on travel time and cost savings for train riders. It will also reduce congestion for those still riding or driving cars and trucks to and from New York City. The proposed service will additionally provide regional productivity benefits in terms of economies of scale from broader tourism markets and linkages to partner firms in state government, as well as emerging nano-technology, clean energy and computer chip-related industries.

The total potential long-term economic impact of proposed high-speed rail service will grow over time as rail service is fully implemented and as savings in travel time, expense, and congestion reduction are realized. It will ultimately also depend on travel speeds and schedules.

The current plan is for incremental speed improvement (79-90 mph peak), although two alternative scenarios are also considered—in which service is upgraded to medium-speed (110 mph peak) as well as full high-speed service (220 mph peak).

- The business sales impact is projected to be in the range of $358 to $534 million per year for incremental and medium-speed service, rising dramatically to nearly $2.5 billion per year with full high-speed rail service.
- The employment impact similarly varies, from some 3,200 to 4,700 permanent jobs added by the year 2035, rising dramatically to more than 21,000 jobs with full high-speed rail service.

Table 9. Estimated Annual Economic Impacts of Albany-Based HSR Service in 2035 (2009 $)

Measure	Unit	79 / 90 mph	110 mph	220 mph
2035 Employment	Jobs	3,184	4,703	21,361
2035 Output (Sales)	$m per year	$357.9	$534.4	$2,485.6
2035 Value-Added (GRP)	$m per year	$205.9	$308.4	$1,444.6
2035 Wages	$m per year	$158.7	$238.5	$1,118.2

These estimates of the potential economic impact are meant to be interpreted as potential impacts dependent on: (a) Full implementation of the proposed HSR system, (b) A metropolitan economy that remains healthy and continues to grow during the next twenty years, and (c) Supportive public policies and infrastructure investments to allow the benefits of HSR to be realized, and the projected additional business development to occur.

A Note on Sustainability

Oliver Hauck
President
Siemens Industry, Inc.
Mobility Division

As this report notes, transportation is the backbone of the U.S. economy—the world's largest. As our economy has grown, moving people and goods from place to place has had an inevitable impact on our environment.

Over the past 16 years, transportation sector emissions increased by more than 25%, representing almost half of the total greenhouse gas emissions during this period. A major portion of that pollution—85%—came from surface transportation such as the cars, trucks and buses that deliver our active population to an increasing number of locations across the U.S.

Without major changes in our transportation systems and technology, we will fall even further behind in our efforts to create a more sustainable environment.

At Siemens, we are dedicated to providing innovative transportation solutions that reduce or even eliminate the need to use fossil fuels to power our ever-increasing need for mobility. Our goal is to provide complete, integrated mobility products and services to cities across the nation while also reducing the carbon footprint not only of our facilities but also for our customers.

That is why Siemens engineers regularly measure the energy consumption of each light-rail vehicle we produce—how much was consumed and how much was regenerated. This feature is available to our customers, providing them with ongoing awareness of energy consumption in their vehicles.

Utilizing the results from this study, Siemens calculated the following conclusions, based on a fully-realized operational high-speed rail system with design speeds of 220 mph:

Carbon Emissions: In just the four cities studied in this report, a high-speed rail system will reduce annual carbon emissions for intercity travel by 2.8 million tons a year. These reductions amount to more than one-third of the total carbon dioxide (CO_2) currently created by intercity travel in the four cities—with the more significant reductions in larger cities.

In the following cities, HSR eliminates intercity travel emissions:

- In Los Angeles—more than one-third of its current emissions (1.4 million tons of CO_2 and—38% of current emissions)
- In Chicago—more than one-third of its current emissions (800,000 tons of CO_2 and—38% of current emissions)
- In Orlando—one-quarter of its current emissions (400,000 tons of CO_2 and—25% of current emissions)
- In Albany—more than one-quarter of its current emissions (200,000 tons of CO_2 and—27% of current emissions)

Intercity Car Trips: In the four cities, high-speed rail can take as many as 28 million car trips off the road, reducing intercity car travel by more than 27%.

This reduces highway congestion and frees up existing highway capacity so that new roads and more lanes of interstate highway are available in the future, and remaining highway users travel more safely and reliably.

The most congested, car-dependent cities receive the most benefit, with intercity car trips being reduced by:

- In Los Angeles—reduced as much as 37%
- In Chicago—reduced as much as 33%
- In Orlando—reduced as much as 18%
- In Albany—reduced as much as 22%

Short-Hop Intercity Air Travel: In the four cities, which represent some of our nation's busiest airports, high-speed rail eliminates nearly 900,000 "short-hop" intercity air trips per year, reducing highly polluting aviation emissions and freeing up our congested airports.

Cities that are most congested with regional air travel could potentially gain the most benefits, with short-hop air travel to and from each city being reduced by:

- In Los Angeles—reduced as much as 25%
- In Chicago—reduced as much as 31%
- In Orlando—reduced as much as 30%
- In Albany—reduced as much as 36%

Economic Development Impacts of Existing High-Speed Rail Services:

A Synopsis of Experience Around the World

Distance and Ridership. High-speed rail tend to attract the most ridership when serving city pairs in the 100 to 400 mile range.

- In the United States, the highest ridership for the Acela high-speed rail is along the Washington, D.C.-New York City route (230 miles) and the Boston-New York City route (218 miles).
- In Europe, high-ridership routes include Paris-Brussels (183 miles), Paris-Marseille (411 miles), Paris-Lyon (290 miles), Madrid-Seville (330 miles), and Rome-Florence (143 miles).
- In Asia, the highest ridership route is Tokyo-Osaka (341 miles).

Market Share. High-speed rail can command a significant market share along the most heavily traveled and congested corridors.

- In the United States, Amtrak Acela service took air-travel shares of approximately 65% from the Baltimore-New York City route, 50% from the Washington, D.C.–New York City route, and 40% from the Boston-New York City route.
- In Spain, Madrid-Seville high-speed rail account for 52% of the travel market, having taken approximately 64% of passengers from air travel, 65% from bus travel, and 43% from automobile travel.
- In France, the commercial travel rail share between Paris and Marseille went from 22% to 69% after high-speed rail was initiated.
- The Eurostar train from London to Paris has taken 70% of the market between those cities.

Local Transit Connections. High-speed rail ridership is greatest for cities that have extensive commuter rail systems that provide local connectivity.

- In the United States, the five cities with the highest Acela ridership—New York; Boston; Philadelphia; Washington, D.C. and Baltimore—all have extensive transit and commuter rail systems.

Regional Economic Patterns. High-speed rail has widened the effective reach of economic regions surrounding large cities by linking their economies with suburban cities. Research in Europe has made a distinction between the catalyst role that high-speed rail can have on small- and medium-size cities, by providing wider network connections that draw new activity, and the facilitating role that they can have on large cities, by providing market accessibility enabling them to keep pace with their continuing growth. (Source: *The Economic Impact of High-Speed Trains on Urban Regions*, Peter M.J. Pol, Erasmus University Rotterdam)

- In the United States, Providence, Rhode Island grew economically with the addition of Amtrak Acela links placing it between Boston and New York City (59 and 180 miles away, respectively).
- In Europe, high-speed rail is widely viewed as a factor supporting economic growth of more distant cities, including Ciudad Real in Spain (120 miles from Madrid), Lyon in France (290 miles from Paris), and Cologne in Germany (94 miles from Frankfurt).

Station-Area Development. High-density office, retail, and residential development is sometimes spurred in areas adjacent to high-speed rail stations, though the impact varies widely depending on the local setting.

- In Europe, recent research found that office and retail rents and development investment increased following the start of high-speed rail service at the Amsterdam-South, Frankfurt, and London-St. Pancras stations, though no such impact occurred in several other cities. The variation is attributed to differences in location, access, and regional economic factors. (Source: *European High-Speed Train Station Areas*, Mig de Jong, Delft University, European Transport Association, 2009)
- French studies have shown that new office development occurred adjacent to high-speed rail stations in Aix-en-Provence (Domaine de la Gare and L'Arbois technology parks), LeMans (Novaxis office park), and Lille (Euralille mixed-use development).

Economic Competition. Countries with the greatest mileage of high-speed rail lines (110+ mph) tend to be globally competitive economic regions with high-density urban environments, including Japan, China, France, and Germany, along with the Netherlands, South Korea and Taiwan.

THE UNITED STATES CONFERENCE OF MAYORS

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