U.S. System Summary: CALIFORNIA

HighSpeedRail
TEXASHSR.ORG

California High-Speed Rail System (Source: CHSRA)

The California high-speed rail system is a proposed system containing 798 miles of routes in nine segments wholly contained within the State of California. The proposed system consists of a core mainline between the San Francisco Bay Area and Los Angeles/Anaheim via San Jose and the San Joaquin Valley, with branches extending to San Diego and Sacramento. The California high-speed rail system is one of the most advanced high-speed rail proposals in the U.S., with significant planning activities having been completed in the last 15 years. ***Planning/Environmental*** activities have been initiated for all nine segments, with the two segments between Merced and Bakersfield having realized the most progress toward the completion of environmental activities. High-speed intercity passenger rail in the California high-speed rail system is based primarily on constructing new dedicated high-speed rail right-of-way blended with some incremental upgrades to existing railroad right-of-way in urban areas with maximum train speeds projected to be up to 220 mph. The entire proposed California high-speed rail system is part of the Federally-designated California High-Speed Rail Corridor.

SYSTEM DESCRIPTION AND HISTORY

System Description

The California high-speed rail system consists of nine segments, as summarized below.

California High-Speed Rail System Segment Characteristics

Segment Description	Distance	Segment Status	Designated Corridor?	Segment Population
San Francisco, CA, to San Jose, CA	50 Miles	Planning/Environmental	Yes	6,172,302
San Jose, CA, to Merced, CA	125 Miles	Planning/Environmental	Yes	2,092,704
Merced, CA, to Fresno, CA	60 Miles	Planning/Environmental	Yes	1,186,243
Fresno, CA, to Bakersfield, CA	114 Miles	Planning/Environmental	Yes	2,365,242
Bakersfield, CA, to Palmdale, CA	85 Miles	Planning/Environmental	Yes	992,381
Palmdale, CA, to Los Angeles, CA	58 Miles	Planning/Environmental	Yes	12,828,837
Los Angeles, CA, to Anaheim, CA	29 Miles	Planning/Environmental	Yes	12,828,837
Los Angeles, CA, to San Diego, CA	167 Miles	Planning/Environmental	Yes	20,149,001
Sacramento, CA, to Merced, CA	110 Miles	Planning/Environmental	Yes	3,604,679

The proposed California high-speed rail system consists of a core mainline connecting the state's two largest metropolitan areas, the San Francisco Bay Area and the Los Angeles Basin, by way of a route through San Jose and the San Joaquin Valley, and two extensions of this mainline to San Diego and Sacramento. The core mainline between San Francisco and Los Angeles/Anaheim is 521 miles in length and encompasses seven of the nine segments shown above. The core mainline serves major California cities, including San Jose, Merced, Fresno, and Bakersfield. The total population of communities that are being considered for high-speed rail stations along the 521-mile core mainline was 21,622,174 in 2010.

In November 2008, California voters approved a bond referendum authorizing $9.95 million to establish high-speed train service in the state.

Two extensions of the core mainline route are also planned: a 167-mile branch from Los Angeles to San Diego via the Inland Empire and a 110-mile branch from Merced to the state capital of Sacramento via Modesto and Stockton. The total population of communities being considered for proposed high-speed rail stations along the Los Angeles to San Diego segment was 20,149,001 in 2010. The total population of communities being considered for proposed high-speed rail stations along the Sacramento to Merced segment was 3,604,679 in 2010. The total population of communities being considered for high-speed rail stations across the full proposed California high-speed rail system was 32,291,224 in 2010, or approximately 86.7 percent of the total population of the State of California.

Development of high-speed intercity passenger rail in the California high-speed rail system is primarily based on the construction of new, dedicated high-speed rail right-of-way with incremental upgrades to existing commuter rail transit right-of-way in some locations within urban areas. The proposed system will operate using electric trains with maximum train speeds projected to be up to 220 mph.

System History

Planning for high-speed rail in the California high-speed rail system dates back to the early 1990s with a series of reports produced by the University of California Transportation Center for the "CalSpeed" initiative. These reports examined the feasibility of high-speed rail service in California, with particular focus on a mainline between the San Francisco Bay Area and Los Angeles, and included alternative routes, ridership, and financial considerations. Several reports were also developed assessing the suitability of Asian and European high-speed rail technology in California. In 1993, the California State Legislature created the California High-Speed Rail Commission to oversee development of high-speed rail in the state.

In 1996, the California State Legislature passed the *California High-Speed Rail Act*. The Act dissolved the California High-Speed Rail Commission and replaced it with the California High-Speed Rail Authority (CHSRA). The CHSRA continued the efforts to implement high-speed intercity passenger rail in the state that had been started by

Artist Rendering of California High-Speed Train (Source: CHSRA)

the Commission. The CHSRA issued its first business plan in 2000, which described the Authority's proposal: a 700-mile fully-electrified high-speed train system capable of speeds in excess of 200 mph, operating on dedicated right-of-way with full grade separation. The proposed system was expected to cost $25 billion and be operational by the year 2020.

Guided by the concept described in the 2000 business plan, the CHSRA submitted a program-level (Tier 1) environmental impact report/environmental impact statement (EIR/EIS) for the full proposed high-speed train system in California in August 2005. In November 2005, the Federal Railroad Administration (FRA) issued a Record of Decision (RoD) for the Program EIR/EIS, accepting the proposed high-speed train alternative. A second Tier 1 EIR/EIS was completed for the Bay Area to Central Valley portion of the California high-speed train system in May 2008 with a RoD affirming the "Pacheco Pass" as the Preferred Alternative issued in December 2008. With these Decisions in hand, the CHSRA divided the project into nine individual project sections for the purpose of advancing Tier 2 EIS activities. These nine segments form the basis for the nine segments considered here as part of the California high-speed rail system.

In November 2008, California voters approved a ballot measure, entitled the Safe, *Reliable High-Speed Passenger Train Bond Act*, also known as Proposition 1A. Proposition 1A authorized a bond issue of $9.95 billion to establish high-speed train service connecting the San Francisco Transbay Terminal to Los Angeles Union Station and Anaheim, linking the state's major population centers including Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The language of Proposition 1A stipulated some of the requirements for the California high-speed rail system, including electric trains with a minimum speed of 200 mph and travel time goals for major city pairs.

In recent years, however, the CHSRA's original vision for implementing high-speed intercity passenger rail in California has come under scrutiny for issues such as the high cost of the full project, the availability of Federal funding for the project, and ridership estimates. In response to these issues, the CHSRA issued a revised business plan in April 2012, entitled the *California High-Speed Rail Program Revised 2012 Business Plan: Building California's Future.* The *Revised 2012 Business Plan* outlined the CHSRA's new strategy for implementing high-speed rail in the state, focusing on delivering the benefits of high-speed rail investment in the state faster and to a broader population base. Specifically, the new strategy consists of a quasi-incremental approach as follows:

1. Construction of a 300-mile high-speed rail Initial Operating Segment (IOS) between Merced and the San Fernando Valley (just north of Los Angeles) as well as investments in upgrading commuter rail lines in the bookends of the system (i.e., Caltrain in San Francisco, Metrolink in Los Angeles) to prepare those sections for high-speed rail service.
2. Construction of dedicated high-speed rail infrastructure extending the IOS north and west to San Jose,

Artist Rendering of Interior of Typical Large High-Speed Rail Station in California (Source: CHSRA)

which will allow for a single-seat ride between the San Fernando Valley and San Francisco via a "blended" Caltrain corridor between San Jose and San Francisco. This system is referred to as the "Bay to Basin" system in the *Business Plan*.

3. Construction of the "Phase 1" System, extending the Bay to Basin system to San Francisco and Los Angeles, using one of two approaches. Under the Phase 1 Blended scenario, dedicated high-speed rail infrastructure would connect the San Fernando Valley with Los Angeles Union Station and with significantly-upgraded local rail infrastructure extending to Anaheim. Under the Phase 1 Full Build scenario, dedicated high-speed rail infrastructure would be extended all the way to Anaheim.
4. The Phase 2 System – extension of the Phase 1 system to Sacramento and San Diego, completing the full 800-mile statewide high-speed rail system.

The *Revised 2012 Business Plan* was approved by the CHSRA Board in April 2012. In July 2012, the California Legislature approved the use of bond proceeds approved in Proposition 1A combined with Federal grant funds to begin construction of a portion of the system. In September 2012, the FRA issued a Record of Decision for the Merced to Fresno segment EIS, allowing for construction on this segment to begin in 2013. The CHSRA anticipates that the FRA will issue an ROD for the Fresno to Bakersfield segment in early 2013.

Federally-Designated Corridors

The nine segments of the California high-speed rail system described in this summary are all part of the Federally-designated California High-Speed Rail Corridor. The initial California High-Speed Rail Corridor designation consisted of a corridor linking San Diego and Los Angeles with the Bay Area and Sacramento via the San Joaquin Valley. The California High-Speed Rail Corridor was one of five Federally-designated corridors authorized by the *Intermodal Surface Transportation Efficiency Act of 1991* (ISTEA) in December 1991. The initial designation was made official on October 19, 1992. In October 2000, the designation of the California High-Speed Rail Corridor was clarified to include "the entire region lying between and among the extensive metropolitan areas of the San Francisco Bay, Sacramento, Los Angeles, and San Diego." In July 2009, the U.S. DOT extended the California High-Speed Rail Corridor from Los Angeles to Las Vegas, Nevada. The Los Angeles to Las Vegas segment is described in the Arizona Southwest system summary.

Existing Intercity Passenger Rail Service

Existing Amtrak state-supported intercity passenger rail service covers portions of the proposed California high-speed rail system. The Amtrak *San Joaquins* service operates in the segments between San Jose/Sacramento as far south as Bakersfield while a portion of the *Pacific Surfliner* route is shared with the proposed high-speed rail segment between Burbank, Los Angeles, and Anaheim. In addition to this rail service, the State of California supports an extensive network of Amtrak Thruway Bus routes in other areas of the state that covers portions of the proposed California high-speed rail system, including the Bakersfield to Los Angeles segment.

Sources: 2010 U.S. Census, High-Speed Trains for California: Strategic Choice Comparison of Technologies and Choice of Route, California High-Speed Rail Authority 2000 Business Plan, FRA Environmental Reviews Website, California Secretary of State November 2008 Proposition 1A Voter Guide, California High-Speed Rail Program Revised 2012 Business Plan: Building California's Future, California High-Speed Rail Authority Website, Federal Railroad Administration High-Speed Rail Corridors Chronology, Amtrak System Timetable Fall 2011/Winter 2012

ESTIMATED SYSTEM COSTS AND FUNDING SOURCES

Estimated System Costs

The April 2012 *California High-Speed Rail Program Revised 2012 Business Plan: Building California's Future* contained up-to-date capital cost estimates for the California high-speed rail system. Capital cost estimates were developed for the implementation phases described previously. The Initial Operating Segment scenario is estimated to cost between $26.87 and $31.34 billion (in 2011 dollars). The Bay to Basin is estimated to cost between $41.31 and $49.01 billion and the Phase 1 (Blended) scenario is estimated to cost between $54.44 and $62.33 billion ($2011). Segment-specific capital cost estimates for the Phase 1 (Blended) scenario were presented in a supplemental report to the *Revised 2012 Business Plan* entitled *Cost Changes from 2009 Report to 2012 Business Plan Capital Cost Estimates*. The per-mile capital cost estimates for the three incremental scenarios and six of the nine project segments are shown below. The range of segment-specific per-mile costs reflects engineering and construction challenges related to the terrain between San Jose and Merced and Palmdale and Los Angeles.

Projected Funding Sources

The CHSRA business plans have evaluated several potential funding sources for developing the California high-speed rail system. One source that has been identified for funding the California high-speed rail system is proceeds from the sale of bonds as outlined in the voter-approved Proposition 1A. The maximum funding available for high-speed rail project under Proposition 1A is $9.95 billion. The CHSRA *Revised 2012 Business Plan* reported that $6 billion of funding has been identified to begin construction of the IOS. This funding consists of $3.3 billion of Federal grants and $2.7 billion of Proposition 1A bond proceeds. The CHSRA has also proposed the use of funds from California's market-based cap-and-trade program for greenhouse gas emissions as a potential funding source for high-speed rail projects. The CHSRA expects that successful construction of the full California high-speed rail system will ultimately require a combination of Federal grants, State bond funds, and private capital in addition to revenue generated by high-speed train operations.

California High-Speed Rail System Capital Cost Estimates

Study Name/Year/Segment Description	Maximum Speed/ Scenario	Estimated Capital Cost per Mile ($ Millions)
CHSRA 2012 Business Plan		
• Initial Operating Segment	Initial Operating Segment	$89.6 – $104.5
• Bay to Basin	Bay to Basin	$100.8 – $119.5
• Phase 1 (Blended)	Phase 1 (Blended)	$119.3 – $134.6
CHSRA 2012 Business Plan: 2009-2012 Cost Changes Supplemental Report		
• San Francisco to San Jose	Phase 1 (Blended)	$111.8
• San Jose to Merced	Phase 1 (Blended)	$107.9 – $133.6
• Merced to Fresno	Phase 1 (Blended)	$63.2 – $112.2
• Fresno to Bakersfield	Phase 1 (Blended)	$55.3 – $64.2
• Bakersfield to Palmdale	Phase 1 (Blended)	$89.3 – $91.9
• Palmdale to Los Angeles	Phase 1 (Blended)	$212.6 – $238.6

Artist Rendering of High-Speed Rail Station in Sacramento, California (Source: CHSRA)

Recent Funding Awards

The CHSRA as well as the State of California (via the California Department of Transportation) have received more than $4.24 billion in grants from the Federal Railroad Administration to implement high-speed intercity passenger rail service in the state and improve existing Amtrak services in California. Grants to the California High-Speed Rail Authority for planning and construction of the California high-speed rail system included:

- $2,866,176,231 from the *American Recovery and Reinvestment Act of 2009* (ARRA) high-speed rail funds for preliminary engineering, NEPA activities, right-of-way acquisition, and other improvements across four segments of the proposed California high-speed rail system.
- $300,000,000 from ARRA and FY 2010 high-speed rail appropriations to support a 20-mile extension of the initial Central Valley Construction Project between Bakersfield and Fresno.
- $715,000,000 from FY 2010 high-speed rail appropriations for construction of new high-speed rail lines, stations, and positive train control in the Central Valley section of the California high-speed rail system.
- $16,000,000 from FY 2010 high-speed rail appropriations for improvements to the 4th and King Street Station in San Francisco in preparation for high-speed rail service.

Grants to the California Department of Transportation for equipment, station, and track improvement projects on California's three existing Amtrak routes included:

- $168,993,000 from the *American Recovery and Reinvestment Act of 2009* high-speed intercity passenger rail program funds encompassing 10 separate awards.
- $44,800,000 from FY 2009 high-speed rail appropriations encompassing 4 separate awards.
- $132,174,000 from FY 2010 high-speed rail appropriations encompassing 13 separate awards.

Sources: California High-Speed Rail Program Revised 2012 Business Plan: Building California's Future, Cost Changes from 2009 Report to 2012 Business Plan Capital Cost Estimates, Federal Railroad Administration

RIDERSHIP AND TRANSPORTATION SYSTEM IMPACTS

Ridership Estimates

Ridership for the California high-speed rail system has been estimated in numerous reports and environmental studies during the past 15 years. The most recent official ridership estimates are contained in the April 2012 *California High-Speed Rail Program Revised 2012 Business Plan: Building California's Future*. Ridership was estimated for each project scenario evaluated in the Business Plan, as previously described: Initial Operating Segment, Bay to Basin, Phase 1 (Blended), and Phase 1 (Full Build). Ridership estimates for each scenario were developed for the year 2030 with low and high ranges as follows:

- Initial Operating Segment: 7.1 million to 12.8 million annual passengers.
- Bay to Basin: 13.4 million to 23.1 million annual passengers.
- Phase 1 (Blended): 19.1 million to 31.0 million annual passengers.
- Phase 1 (Full Build): 25.8 million to 39.1 million annual passengers.

Transportation System Impacts

Ridership estimates for the California high-speed rail system report that between 67.5 percent and 81 percent of high-speed rail passengers are expected to be diverted from auto travel. Between 14.2 percent and 25.4 percent of passengers are expected to be diverted from airplane while between 1.4 percent and 11.7 percent of passengers are expected to be diverted from existing intercity rail service. Between 1.6 percent and 2.4 percent of all high-speed rail trips were expected to be induced trips. The proposed California high-speed rail system is expected to capture up to 3.1 percent of all inter-regional travel within the state of California, including up to 38.0 percent of trips between Los Angeles and the Bay Area and up to 21.8 percent of trips between San Diego and the Bay Area.

Connectivity with Other High-Speed Rail Systems

The proposed California high-speed rail system connects to three segments of the Arizona Southwest high-speed rail system in two locations as follows: Los Angeles (Las Vegas to Los Angeles and Phoenix to Los Angeles) and San Diego (Phoenix to San Diego).

Sources: California High-Speed Rail 2012 Business Plan: Ridership and Revenue Forecasting

GOVERNANCE

The California High-Speed Rail Authority has the responsibility for planning, construction, and operation of high-speed intercity passenger rail service for the California high-speed rail system. The CHSRA was created in 1996 pursuant to the *California High-Speed Rail Act* and is an independent agency of the State of California. The CHSRA policy board is composed of nine members, five appointed by the Governor and two each appointed by the State Senate Rules Committee and the speaker of the State Assembly. The powers of the CHSRA include the ability to enter into contracts, issue debt, and acquire right-of-way through purchase or eminent domain.

Source: California High-Speed Rail Authority Website, California High-Speed Rail Act (1996)

BIBLIOGRAPHY

California High-Speed Rail Authority Website
URL: http://www.cahighspeedrail.ca.gov/

California High-Speed Rail Authority Business Plans Archive Website
URL: http://www.cahighspeedrail.ca.gov/Business_Plan_reports.aspx

California Secretary of State November 2008 Proposition 1A Voter Guide
URL: http://voterguide.sos.ca.gov/past/2008/general/pdf-guide/suppl-complete-guide.pdf#prop1a

California High-Speed Rail Act (1996)
URL: http://www.leginfo.ca.gov/pub/95-96/bill/sen/sb_1401-1450/sb_1420_bill_960924_chaptered.html

California High-Speed Rail Authority Revised 2012 Business Plan: Building California's Future
Prepared by California High-Speed Rail Authority, April 2012
URL: http://www.cahighspeedrail.ca.gov/Business_Plan_reports.aspx
Date Accessed: July 17, 2012

California High-Speed Rail Project: Cost Changes from 2009 Report to 2012 Business Plan Capital Cost Estimates
Prepared for the California High-Speed Rail Authority by Parsons Brinkerhoff, April 2012
URL: http://www.cahighspeedrail.ca.gov/assets/0/152/431/f69773ca-b451-44d7-87fb-a5c8f33bd302.pdf
Date Accessed: July 18, 2012

California High-Speed Rail 2012 Business Plan: Ridership and Revenue Forecasting
Prepared for Parsons Brinkerhoff and the California High-Speed Rail Authority by Cambridge Systematics, Inc., April 2012
URL: http://www.cahighspeedrail.ca.gov/assets/0/152/431/7b890372-19c0-4ba7-aa98-aa1d49dea11b.pdf
Date Accessed: July 17, 2012

California High-Speed Train Program EIR/EIS from FRA Environmental Reviews Website
URL: http://www.fra.dot.gov/rpd/freight/1187.shtml
Date Accessed: July 17, 2012

California High-Speed Train Bay Area to Central Valley EIR/EIS from FRA Environmental Reviews Website
URL: http://www.fra.dot.gov/rpd/freight/1613.shtml
Date Accessed: July 17, 2012

California High-Speed Rail Authority 2000 Business Plan: Building a High-Speed Train System for California
Prepared by California High-Speed Rail Authority, June 2000
URL: http://www.cahighspeedrail.ca.gov/2000_Business_Plan.aspx
Date Accessed: July 17, 2012

High-Speed Trains for California: Strategic Choice Comparison of Technologies and Choice of Route
Authors: Peter Hall, Daniel Leavitt, and Erin Vaca
UCTC CalSpeed Series, Working Paper No. 104, June 1992
URL: http://www.uctc.net/research/papers/104.pdf
Date Accessed: July 16, 2012