

Case Study 8: California High Speed Rail Initiative:

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Source: <http://www.calhighspeedrail.org/contact>

List of Actors

- Fiona Ma, Assemblywoman and Chair of the Legislative High Speed Rail Caucus for last two years
- Shinkansen High-Speed Rail
- California High Speed Rail Authority
- Former California Governor Gray Davis
- Current California Governor Arnold Schwarzenegger
- San Francisco Bay Area's Metropolitan Transportation Commission
- Sen. Jim Costa, D-Fresno
- Sen. Tom McClintock, R-Simi Valley
- Assemblywoman Cathleen Galgiani

Timeline of Events

- 1964 – Shinkansen High-Speed Rail opens in Japan to coincide with Olympic Games
- 1980s – Promoters in California begin to push high-speed rail
- 1996 – Formation of California High Speed Rail Authority
- 2000 – CHSRA introduces plan for system providing connections between major cities and population centers
- September 2002 - Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century presented to the California legislature for 2004 General Election
- June 2004 – Gov. Schwarzenegger pushed back the Proposition to the 2006 Ballot due to budget concerns
- June 2006 – California legislature and Gov. Schwarzenegger move to delay vote on proposition to November 2008 General Election
- November 4, 2008 – Date bond issue goes before voters and passes

Shinkansen HSR

- Construction finished in 1964
- Opening coincides with 1964 Olympic Games in Tokyo
- Sanyo Shinkansen opens in 1967
- 1973 – construction for five lines planned, along with basic plans for 12 more lines.
- Construction costs delay lines until 1989

Shinkansen HSR

- Uses narrow- and wider-gauge tracks
 - Limits speed of trains
 - Allows for later upgrades of system
- All aspects of system have been continuously upgraded
 - Computerized crew training systems; expanded capacity through the use of double-decker cars; lower weight and increased strength of the rail cars
 - Conservation of energy through regenerative brakes; aerodynamic design of the trains; use of tilt trains; mechanized maintenance of the tracks
 - Application of electronics in mechanical systems management

Types of High-Speed Rail

- Two basic technologies exist:
 - Maglev (magnetic levitation)
 - Enhanced conventional
- Maglev currently used in Shanghai; able to reach 250 mph, or 400 km/h
- Enhanced conventional
 - Technological enhancements for the train
 - Better right-of-way conditions – dedicated lines
 - Path taken by Shinkansen, TGV, and the CHSRA

California High Speed Rail

- Transportation in California is a critical issue facing the state.
- Ever-expanding population
- Greater need for fast, reliable transportation between major cities and population centers

California High Speed Rail

- 1980s – promoters in California begin to push the concept of high-speed rail for the state as alternative to crowded airports and congested freeways.
- Rationale: high-speed rail systems had already seen success in Asia and Europe.
- 1996 – high-speed rail gained enough interest to inspire the creation of the California High-Speed Rail Authority (CHSRA)

California High Speed Rail

- Authority charged with designing the high-speed rail system for the state.
- 2000 – CHSRA introduces plans for a system providing connections between major population centers including Los Angeles; San Francisco Bay Area; Inland Empire (western, urbanized areas of Riverside and San Bernardino counties); Orange County; San Diego and Sacramento

California High Speed Rail

- September 2002 – Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century
- Intended to provide for the issuance of \$9.95 billion in general obligation bonds
 - \$9 billion used concurrently with available federal funds for planning & construction of HSR system
 - \$950 million spent improving other rail services connecting to HSR system

California High Speed Rail Map



Physical Characteristics

- California High-Speed Rail will...
 - ...encompass ~800 miles and
 - ...run from San Diego up to Sacramento w/deviations to Irvine in the So. portion and San Francisco in the No. portion of the state
- Cities and Locations included in the route (from south to north) are: San Diego, University City, Escondido, Murrieta, Riverside, Ontario Airport, Industry, Los Angeles, Norwalk, Anaheim, Irvine, Burbank, Sylmar, Palmdale Airport, Bakersfield, Visalia/Tulare/Hanford (potential), Fresno, Downtown Merced, Downtown Modesto, Stockton, Sacramento, Gilroy, San Jose Diridon, Redwood City/Palo Alto, Millbrae-SFO, San Francisco Bay Terminal

Pacheco Pass

- Route alternative serving San Francisco and San Jose termini. Selected for many reasons, including:
 1. The Pacheco Pass minimizes impacts on wetlands, waterbodies, and the environment.
 2. The Pacheco Pass best serves the connection between the Northern and Southern California.
 - Operational benefits result in greater frequency and capacity.
 - Provides a superior connection between the South Bay and Southern California.
 - Fewer stations between the major metropolitan areas.
 - Minimizes Logistical Constraints.

Pacheco Pass

3. The Pacheco Pass best utilizes the Caltrain corridor.
4. The Pacheco Pass alternative would enable the early, incremental implementation of the entire Caltrain Corridor section between San Francisco, San Jose, and Gilroy.
5. The Pacheco Pass is strongly supported by the Bay Area region, cities, agencies, and organizations.

Costs & Funding

- Current CHSRA estimated cost to build the 800-mile system is about \$45 billion.
- Once built, the system will not require operating subsidies and will generate over \$1 billion in annual profits.

Costs & Funding

- Capital costs developed by the Authority representative of:
 - All aspects of implementation of the proposed HST system, including construction, right-of-way, environmental mitigation, and design and management services.
 - Construction costs include procurement and installation of line infrastructure, facilities, systems and removal or relocation of existing infrastructure.
 - Right-of-way costs (estimated costs to acquire properties needed for construction)
 - Agency costs (administrative costs estimated in terms of add-on percentages to construction costs)
 - Contingency is added based on the total construction and right-of-way costs.

Costs & Funding

- Without state support for construction, the system will not be built.
- CHSRA claims that once the system is constructed, it will not continue to be a burden to taxpayers.
- Users of the system will cover the operations and maintenance of the system with their fares.
- Revenue surplus will attract the private sector to pay for part of the capital costs, and the direct benefits of the system will greatly outweigh the costs (by at least 2 times as much).

Costs & Funding

- CHSRA actively pursuing a multi-track financing strategy for the planning, design and construction phases of the project,
- Includes three tiers:
 - State and local funding
 - Federal funding
 - “P3”- public-private partnerships

Costs & Funding

- State and local funding comes in the form of a \$9.95 billion general obligation bond
 - Proposition 1A on California's November 2008 ballot.
 - Measure successfully passed
 - Bond measure would fund the state's portion of the construction cost of the project from Anaheim/Los Angeles through the Central Valley to San Francisco.
 - Bond will also infuse local transportation agencies with nearly \$1 billion for improvements to local and regional passenger rail projects that complement and connect with the high-speed train system.

Altamont Pass



Why use Bonds?

- California- High Taxed State
- Increase in taxes have a negative view
- Bonds are limited to a specific time frame
- Taxes often continue after project is finished
- Bonds also help limit usage to capital costs

Why use Bonds?

- Type of Bonds
 - Traditional Revenue Bonds
 - Budget Related Bonds
 - General-Fund Supported Bonds
 - General Obligation Bonds

Why use Bonds?

- Bonds will be repaid over 30 years
- Roughly \$2 paid for \$1 borrowed
- Estimation of \$650 million paid a year

Costs & Funding

- Federal matching funds are expected to account for a significant portion of the construction cost.
- Federal funding:
 - Would come in part from existing program funding sources
 - Would also require the creation of new grant allocation programs designed specifically for high-speed trains.

Costs & Funding

- CHSRA's finance team anticipates that commitment of state and federal dollars will attract private sector funding.
- Authority's finance team has targeted a broad array of public-private partnership opportunities, including
 - Project debt financing
 - Vendor financing
 - System operations and private ownership

Benefit: Job Creation

County	Employment			Population		
	2005 Conditions	2030		2005 Conditions	2030	
		No Project	High- Speed Train		No Project	High- Speed Train
Alameda	953,937	1,247,413	1,259,563	1,451,065	2,038,482	2,051,196
Contra Costa	508,854	763,445	769,521	1,017,644	1,543,053	1,549,526
San Francisco	779,357	975,823	983,634	741,025	796,208	809,680
San Mateo	522,830	717,526	723,835	701,175	814,065	821,063
Santa Clara	1,323,920	1,769,498	1,785,181	1,705,158	2,152,963	2,183,649
Bay Area Total	4,088,898	5,473,705	5,521,734	5,616,067	7,344,771	7,415,114

- Employment: 35.0% increase with rail vs. 33.9% increase without (a difference of about 50,000 jobs)
- Population: 32.0% increase with rail vs. 30.8% increase without (a difference of about 70,000)

Benefit: Tourism

- Travel from Los Angeles to San Francisco
 - 2½ hours by HSR for \$55 one-way
 - 6 hour car trip for \$87 one-way
 - 2-3 flight time for \$250 round trip
- Increased feasibility of a single California vacation encompassing both north and south which may also induce tourists to lengthen their visits
- Tourism supports other markets such as
 - Hospitality
 - Restaurant
 - Retail
 - Entertainment
 - Museums
 - Other cultural institutions



Disadvantage: Comparison of Costs

Cost Category	Air System	High Speed Rail	Highways
Infrastructure: Construction and Maintenance	\$0.0182	\$0.1290	\$0.0120
Carrier: Capital Cost	\$0.0606	\$0.0100	\$0.0000
Carrier: Operating Cost	\$0.0340	\$0.0500	\$0.0000
External: Accidents	\$0.0004	\$0.0000	\$0.0200
External: Congestion	\$0.0017	\$0.0000	\$0.0046
External: Noise	\$0.0043	\$0.0020	\$0.0045
External: Pollution	\$0.0009	\$0.0000	\$0.0031
User: Fixed + Variable	\$0.0000	\$0.0000	\$0.0860
User: Time	\$0.0114	\$0.0440	\$0.1000
TOTAL	\$0.1315	\$0.2350	\$0.2302

note: \$/pkt, highways assume 1.5 passengers per car; all transfers are subtracted out

- Overall air is the least expensive
- High speed rail and highways are about tied
- Most of the cost of high speed rail comes from infrastructure (capital costs)

Disadvantage: Projected Costs

CHSRA vs. Due Diligence Report

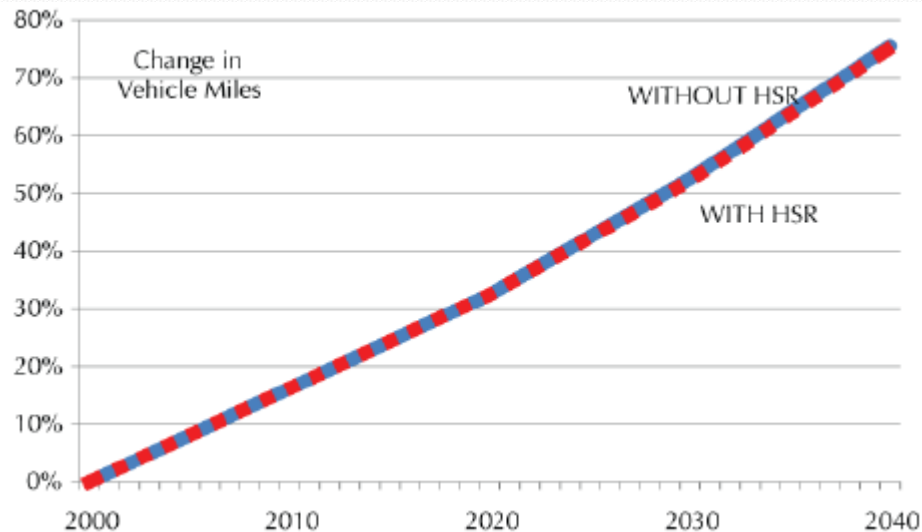
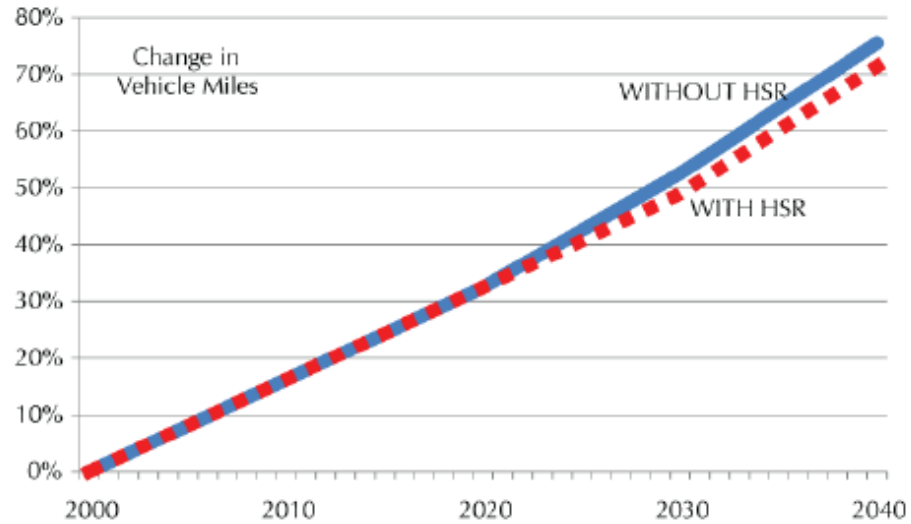
- CHSRA projections of costs, revenues, and pollution reduction are exaggerated in favor of high speed rail

	CHSRA	Due Diligence Report
Annual Ridership: 2030: Base, Intercity Only	65,500,000	23,400,000
Annual Ridership: 2030: Base, Intercity + Commuter	88,000,000	No Projection
Annual Ridership: 2030: High, Intercity Only	96,500,000	31,100,000
Annual Ridership: 2030: High, Intercity + Commuter	117,000,000	No Projection
Capital Cost: Entire System (2008\$): Low*	\$54,300,000,000	\$65,200,000,000
Capital Cost: Entire System (2008\$): High*		\$81,400,000,000
Capital Cost: Phase I (2008\$): Low	\$33,100,000,000	\$39,700,000,000
Capital Cost: Phase I (2008\$): High		\$49,600,000,000
Operating Cost: Phase I (2008\$): Low	\$1,100,000,000	\$1,430,000,000
Operating Cost: Phase I (2008\$): High		\$1,760,000,000
Fastest Non-Stop Express Travel Time: LA-SF	02:38	03:41
Greenhouse Gas Reduction (Tons of CO ₂): 2030**	1,770,000	630,000
Share of California 2020 Goal	1.0%	0.4%
Cost per CO ₂ Ton Reduced: Low	\$1,949	\$7,409
Cost per CO ₂ Ton Reduced: High	\$2,409	\$10,032
Times CO ₂ IPCC \$50-per-Ton Ceiling: Low	39	148
Times CO ₂ IPCC \$50-per-Ton Ceiling: High	48	201
Net Profit: 2030: Phase I: Optimistic Midpoint	No Projection	(\$350,000,000)
Net Profit: 2030: Phase I: Pessimistic Midpoint	No Projection	(\$3,590,000,000)
Unmet Capital Need: Phase I	No Projection	\$7,600,000,000 to \$33,100,000,000
Unmet Capital Need: Entire System	No Projection	\$28,800,000,000 to \$64,900,000,000
Note:		
*Entire system cost. Includes Missing Phase. Does not include Implied Phase		
**CHSRA greenhouse gas reduction adjusted to account for improved automobile and airline fuel efficiency.		

Disadvantage: Effects on Other Modes of Transportation

CHSRA Projection for the Change in Auto Travel for 2000-2030 – 2.5% reduction

Due Diligence Projection for the Change in Auto Travel for 2000-2030 – 0.8% reduction

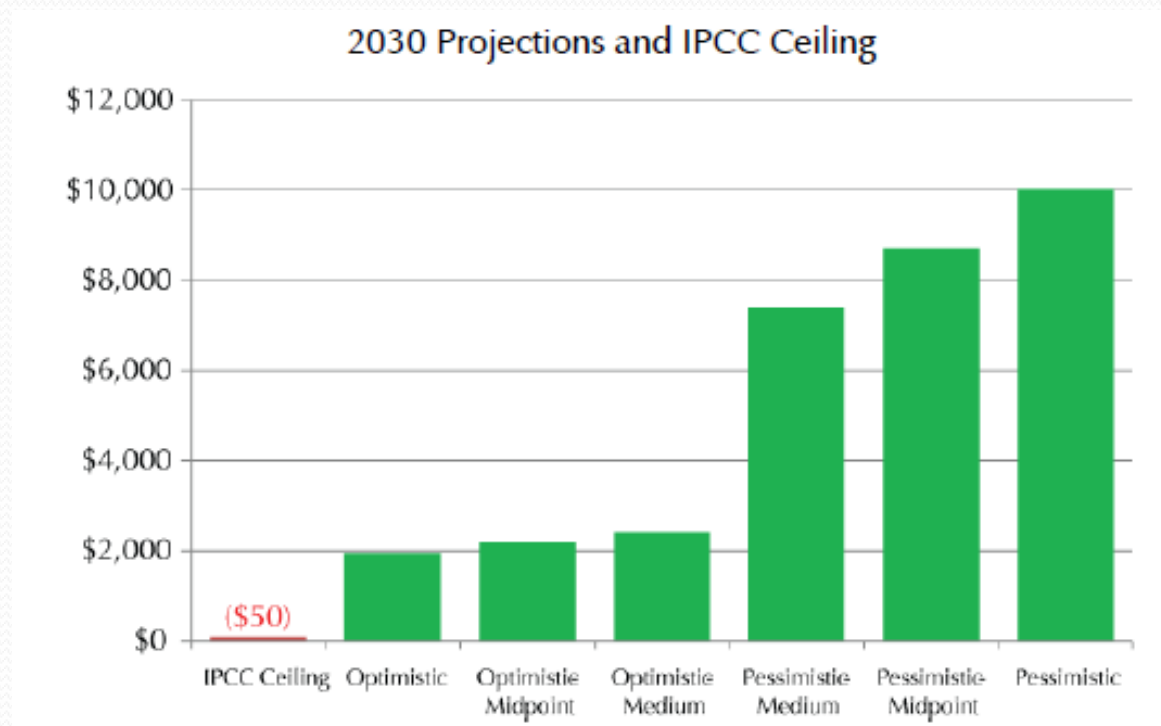


Disadvantage: Projected Pollution Reduction

City Pairs	Distance (miles)	Time	CO ₂ Saved per Trip (lbs.)	Ticket Price (est.)
San Francisco to Los Angeles	432	2:38	324	\$55
San Francisco to San Diego	616	3:56	462	\$70
San Francisco to Anaheim	456	2:57	349	\$58
San Francisco to Bakersfield	284	1:51	213	\$43
San Francisco to Fresno	188	1:20	141	\$32
San Francisco to Merced	131	1:14	98	\$30
San Francisco to Sacramento	284	1:53	213	\$40
San Francisco to San Jose	48	0:30	36	\$10
San Francisco to SFO	14	0:13	10	\$8
San Jose to Los Angeles	384	2:09	288	\$51
San Jose to San Diego	567	3:39	425	\$66
San Jose to Burbank	374	2:17	280	\$50
San Jose to Bakersfield	236	1:34	177	\$38
San Jose to Fresno	140	1:03	105	\$28
San Jose to Merced	83	0:45	62	\$26

- This accounts for operating costs but not capital costs

Disadvantage: Reducing Pollution



- Intergovernmental Panel on Climate Change believes reducing 1 metric ton of CO₂ emissions will cost between \$20 and \$50
- Using high speed rail to reduce 1 metric ton of CO₂ emissions will cost between \$2000 and \$10,000

Disadvantage: Effects on Parks



This area of Henry Coe State park could be in the path of the High Speed Train.

Photo courtesy of [Coe Advocates](#)

- Farmland severance - when the placement of rail through one farmland divides the land one or more pieces of land
- Increase in sporadic noise pollution in relatively quiet rural areas
- The rail might impact between 140 and 180 parks

Discussion Questions

- What can the planners of the high speed rail in California learn from the Los Angeles Metro and the Bus Riders Union case study?
- Are general obligation bonds or sales taxes more fair to the consumer? To the taxpayer? To the operators?
- As Governor of California, would you support this HSR initiative in light of its inherent costs and potential benefits?

Discussion Questions

- Should high speed rail be advertised as a means to reduce CO₂ emissions when it is so costly to build?
- How important is the effect of HSR on 140-180 parks, protected open spaces, and wildlife refuge areas relative to other potential environmental results?
- How reasonable is it to assume that the HSR in California will absorb much of the ridership from other modes of transportation?

Discussion Questions

- Does this project better serve political motives or public interest?
- In light of this, what areas (if any) in the U.S. might benefit from a HSR system?
- The CHSRA uses the Shinkansen as a model. How reasonable is this comparison?