High-Speed Rail: Issues in California

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TRB discussion

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System Planned as of June 2012

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Brief History OF HSR in CA

- 1996 – promotional HSRA (mostly consultants) established. Issued 2000 BP comparing HSR with Mag Lev. Funded by 0.25% sales tax.
- 2006/2008, Prop 1A ($9.95 B) with matching requirements
- 2008, collapse of the national economy **rescued** HSRA – total of $3.2 B in ARRA funding ($2.6 B CA)
- 2009 BP first comprehensive restated approach. Fed+state+private funding planned.
- 2009-2012, LAO, State Auditor, PRG all identified concerns – mostly ignored by HSRA (but >$300 million spent on consultants)

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Reality Happened

- Nov 2011, HSRA issued the draft 2012 BP and a proposed Funding Plan (the critical step). In broad terms, $100 Billion (YOE) program for 500+ miles.
- PRG, LAO and State Auditor called the Plans inadequate and recommended no funding, because:

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PRG Comments

- Need state planning context, not solely HSR
- Central Valley by itself posed high stranded investment risks. Needed balanced approach including “bookends.”
- No source of funding beyond the initial operating segment (IOS). ARRA is the $3billion tail wagging the $100 billion dog.
- Business model not consistent with funding amounts and sources and had no clear allocation of risk. State bears all risks until far in the future
- Management resources inadequate
- Capital costs uncertain (but going up) and subject to wide range of error. CV section is budget, not scope, driven
- Demand models need significant improvement, but are “greenfield” based on stated preference and always subject to wide range of outcomes
- O&M Model too simple and looks optimistic, Benefit-Cost Analysis distorted
- Overall, “optimist bias” is afoot, and risks are not clearly defined, understood or accepted by all parties

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Potential Business Models

- Purely public (BART). All cost and risk are public
- Management Contract (Caltrans, Metrolink). Some operating cost risk transferred to private contractor
- Gross Cost Franchise (most UK, Netherlands, Germany and Sweden). More cost risk transferred to franchise, but revenue risk remains public
- Net Cost Concession (some Argentina and UK). Cost and market risk transferred to concessionaire (maybe)
- Private (maybe the JRs). All risks transferred.
- Infrastructure separation – Can be used to transfer some infrastructure construction and operation risk, or at least costs. Most risk remains with public.

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Evolution of Demand Estimates

CA HSRA Demand Estimates in the Various Business Plans (millions of passengers)				
	Phase I (SF to LA/Anaheim)		Full System (SF and Sacto to LA/Anaheim and San Diego)	
	50% of air	83% of air	50% of air	83% of air
2000 Business Plan (Charles River Assoc)*			30.3	~24.0 (estimated from graph on pg E-14)
2008 Business Plan (Cambridge Systematics)**	54.6	39.9		
2009 Business Plan (CS)***	58.0	41.0		
2012 Draft Business Plan (CS)****	53.0	36.8	77.0	51.2
2012 Revised Business Plan (CS)*****	50.0	26.4	50.0	75.0

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Footnotes to demand estimates

* CRA, Independent Ridership and Passenger Revenue Projections, Jan 2000, pgs E-7 and E-14. Applies to VHS via Palmdale. CRA estimates are for intercity only. Commuters (included in CS estimates below) would add ~12 million.
** 2008 Business Plan, pg 18, figure 20. Note that 39.9 is for 77% of air: this would fall by 1 million or so at 83%.
*** 2009 Business Plan, pages 71 and 72
**** Draft 2012 Business Plan, pages 6-13 and 6-17
***** Revised 2012 Business Plan, pages 5-16 and 5-20. For Phase I demands, the 50% number is for full build out whereas the 83% estimate is for the blended system. The 50% number should probably be reduced by ~7 million for a comparable blended system estimate. About 4 million of the reduction in the 83% of air Phase I estimate is removal of external demand adjustments made by PB to the CS model, so the actual reduction is more like 32.8 to 26.4

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The Demand Model

- Extensive criticism of results: frequency sensitivity, gas prices and auto fuel economy, short/long trip disconnect, no induced demand, survey data insufficient
- Three reports by HSRA's Peer Review Panel (15 Feb 2012, 22 July 2011 and 1 August 2011)
  - Original model developed for a different purpose (MTC)
  - Interim model was a revised version of MTC model
    - Results sufficient for environmental and planning analysis
    - Interim model and near-term enhanced versions "...cannot meet anticipated future needs of the Authority." (15 Feb, page 6)
    - Second generation model needed: new and expanded market data, better model validation, eliminate SP bias
- This will be the focus of 2014 BP

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Evolution of Capital Costs

Report	Original Estimate*	Revised Estimate (2011 $)**	Miles	Cost/mile ($ millions)
2000 Business Plan****	25.0	31.9	703	45.4
2008 Business Plan	33.2	34.7	520	66.7
2009 Business Plan	35.7	36.9	520	70.9
2012 Business Plan	70.0	70.0	520	134.6
2012 Revised Business Plan***	59.7	57.9	520	111.3

* Uses average of hi/lo estimates for some years

** GDP Deflator from BEA

*** Blended system, not full build SF to SJ

**** 2000 uses 25% contingency, all others use 30%

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The Reaction: the 2012 Revised Business Plan

- Governor commits to project – new management
- Carbon trading income to fill the financial gap (if no more Federal money)
- $1.1 billion in “bookend” investments added (e.g. electrification of Caltrain and Metrolink improvements) combined with blended approach on the Peninsula
- Clearer Business Model (maybe)
- Lowered demand forecast, blended approach and faster completion theoretically save money

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The Revised 2012 BP: how it compares with the original 2012 BP and FP

2012 BP and FP	Response in Revised BP
FEASIBILITY	
No existing funding sources beyond the ARRA and related Federal Money and Prop 1A	Propose to use cap-and-trade if no other funding available
Business Model needs clarification because "illustrative," not consistent with funding available and does not involve operator soon enough	Revised Business Model is clearer and committed. Funding is consistent if cap-and-trade is approved. HSRA still making all decisions and taking liability
Management resources inadequate	Still unresolved
REASONABLENESS	
Confidence in demand forecasts	Demand reduced and variation increased.
Capital costs rising	Can cut ICS short if needed. Cost estimates for CV may be reasonable: unknown beyond then
Risk of stranded investment	Better integration for wider use of CV, Bookends adopted and blended approach
ASSUMPTIONS	
CV can be completed by 2017	Concern: sheer size of the program, lack of experience, lack of management and potential
Money for IOS will be found	Still a concern
IOS successfully completed within budget, demand proven, operator does not need subsidy	Remains to be seen: assertions rather than experience
Same apply to the B2B and Phase I	Conceivable but probably highly optimistic

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SB 1029 Passed and Signed: What's Next?

- 3 Planned DB contracts in the CV – results of first bidding in (?) will be informative
- Should be rapid movement on Caltrain and Metrolink improvements ($ transferred if Treasurer agrees)
- Environmental litigation appears certain
- Control points at various stages
- 2014 Business Plan to provide improved demand estimates, O&M cost models and benefit-cost measurement
- Overall: **A long PROCESS, not a construction PROJECT**

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If you want to look further

- Peer Review Group reports (http://www.cahsrprg.com/documents.html)
- Legislative Analyst's Office reports (http://www.lao.ca.gov/laoapp/main.aspx)
- CA HSRA Business Plans (http://www.cahighspeedrail.ca.gov/library.aspx)
- "Mega-Projects and Risk: An Anatomy of Ambition" by Bent Flyvbjerg, Nils Bruzelius and Werner Rothengatter, 2003/2006
- "Decision-Making on Mega-Projects" by Hugo Priemus, Bent Flyvbjerg and Bert van Wee, 2008
- "Mega-Projects: The Changing Politics of Urban Public Investment" by Alan Altshuler and David Luberoff, 2003
- Or, even, see, "The Northeast Corridor Project" by Louis S. Thompson, 1982 on TGA website at www.tgaassoc.com under Publications.

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National HSR Data

		2050 Rail Traffic (million pass-miles) By Source			POTENTIAL CO2 EMISSIONS SAVINGS (million tons)				
Corridor	2050 Rail Passengers (000,000)	Auto	Air	Induced	All Low	All Midrange	All High	Best for Rail (Rail low, others High)	Worst for Rail (Rail High, others Low)
California	101.0	16,667	10,606	3,030	3.0	2.3	2.2	3.9	1.3
Pacific NW	12.3	1,180	590	197	0.2	0.1	0.1	0.2	0.1
FLA	28.9	2,814	996	519	0.4	0.3	0.3	0.5	0.1
Chicago Hub	66.0	5,837	4,490	898	1.2	0.9	0.9	1.5	0.5
South Central	63.9	11,685	5,747	1,724	1.8	1.4	1.3	2.4	0.8
Southeast	84.4	12,446	6,329	2,320	2.0	1.5	1.4	2.6	0.8
Gulf Coast	21.6	3,348	1,620	432	0.5	0.4	0.4	0.7	0.2
NEC	35.0	4,322	1,995	332	0.7	0.5	0.5	0.9	0.3
Keystone	9.9	1,188	149	149	0.1	0.1	0.1	0.2	0.0
Empire	22.6	4,274	1,221	611	0.5	0.4	0.4	0.7	0.2
N New England	9.9	999	373	119	0.1	0.1	0.1	0.2	0.1
TOTAL	455.5	64,759	34,114	10,332	10.6	8.2	7.6	13.8	4.4

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Emissions Data

Emission factors in 2050 (grams CO2/passenger-km)	Low	Midrange	High
Rail	9.4	32.0	44.7
Auto	60.0	71.7	83.3
Air	109.0	116.0	123.0

Load factors used		
Rail	60	percent
Auto	1.5	pass./auto
Air	72	percent

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HSR Future in EU and Asia Positive Because:

- Favorable demographics (Population density, high fuel cost (taxes), social awareness, including GHGs)
- Positive gov't policy for rail, including HSR (EU and national levels)
- Established institutions to build and operate HSR
- Organizational experience and flexibility
- Understanding of public and (emerging) private roles
- Ability to define and pay for public benefits: economic versus financial analysis
- Ability to make and sustain public commitments

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How well does the US measure up to HSR requirements?

- NOT a technical issue (we have it or can buy it)
- NOT really a financial issue ($43 billion not that much)
- NOT private sector capability (far larger US private companies exist)
- INSTEAD: Policy, Institutions and Politics, Federal and State levels

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HSR Data

Miles of Higher Speed Line						
Country	> 150 mph "Express"	100 to 150 mph "Regional"	Total	2008 HSR Passengers	2008 HSR Passenger-Miles	Est Avg. Trip (mi)
Japan (3 JRs)	1,482		1,482	310,237	50,710	163
France (RFF/SNCF)	1,051	3,215	4,266	116,054	32,642	281
Germany (DB)	537	977	1,514	74,700	14,490	194
Korea (KTX)	149		149	38,016	6,308	166
Taiwan (THSRC)	214		214	30,581	4,077	133
Italy (FS)	330	1,718	2,049	23,882	5,513	231
Spain (ADIF/RENFE)	773	483	1,255	22,955	6,514	284
Belgium (SNCB)	108		108	9,697	670	69
UK (/Eurotunnel/Eurostar)		70	70	9,100	617	68
Sweden (Banverket/SJ)		1,600	1,600	8,764	1,858	212
U.S. (NEC Regional)		450	450	7,489	1,145	153
Netherlands		120	120	5,966	538	90
U.S. (Acela)		450	450	3,399	631	186
China	20	4,724	4,744			
World Total	**4,644**	**9,083**	**13,727**	**660,840**	**125,714**	190
CA HSR (2025)	*580*	*81*	*661*	*36,500*	*10,330*	*283*

Sources: UIC, International Railway Statistics 2008, Table 10 and Table 50
UIC, International Railway Statistics, Time Series 1970 to 2008
CA HSRA 2008 and 2009 Business Plans and PB data

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