



JOBS, JOBS, JOBS?

IS THE CALIFORNIA HIGH SPEED RAIL PROJECT REALLY ON
TRACK?



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BY CINDY BLOOM, M.B.A.

Information is Deemed Reliable but Not Guaranteed

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INTRODUCTION

The High Speed Rail project in California is one of the most ambitious and largest infrastructure projects ever built in the United States, rivaled only by other iconic projects as the Hoover Dam, the interstate highway system, the transcontinental railroad, and the Golden Gate Bridge. California High Speed Rail Authority (CHSRA), the governmental agency overseeing the design and construction of the high speed rail train (HSR), publicly touts that the project will provide tens of thousands of jobs for Californians--20,000 jobs annually for the first 5 years, then increasing to 57,000 for the next 9 years, then 62,000 for the next 13 years, then finally 67,000 for 15 years.¹ The project's budget has ranged from \$16.5 billion to \$98.1 billion and many opponents claim that the cost estimates are closer to the \$98.1 billion. The popular \$68 billion cost estimate was published prior to the unveiling of extensive tunneling that is proposed for the Palmdale to Burbank corridors; both the Western and Eastern proposals include extensive tunneling which is estimated to cost approximately \$1 billion per mile. This tunneling portion of any of the alignments (E1, E2, E3) within the Eastern Corridor alone would therefore cost no less than \$15 billion of the budgeted \$68 billion. In other words, if the any of the Eastern Corridor routes are selected, 22% of the budget would be spent for 3% of the Phase 1 project consisting of 520 miles. For this report, the conservative \$68 billion amount will be used as the HSR's cost/budget/initial investment.

In addition to allegedly creating tens of thousands of jobs for California, proponents claim the train will save time, money, and pollution by providing speedy transportation (2 hours and 40 minutes) between the Bay Area and Southern California. Opponents counter that the project is underfunded, unsustainable fiscally, cannot physically achieve the promised travel time, and is unnecessary due to many other transportation methods that are accessible and affordable. Also, the decades of construction will actually harm the environment due to pollution-emitting heavy equipment, vibration, noise, and premature wear and tear on existing roadways.

Regarding claims that the HSR would reduce air pollution by providing clean transportation, the non-partisan Legislative Analyst's Office states:

"High-Speed Rail Would Initially Increase GHG² Emissions for Many Years. As mentioned above, in order to be a valid use of cap-and-trade revenues, programs will need to reduce GHG emissions. While the HSRA has not conducted an analysis to determine the impact that the high-speed rail system will have on GHG emissions in the state, an independent study found that—if the high-speed rail system met its ridership targets and renewable electricity commitments—construction and operation of the system would emit more GHG emissions than it would reduce for approximately the first 30 years. While high-speed rail could reduce GHG emissions in the very long run, given the previously mentioned legal constraints, the fact that it would initially be a net emitter of GHG emissions could raise legal risks."³ [emphasis added]

¹ http://www.hsr.ca.gov/docs/newsroom/fact%20sheets/Jobs_factsheet_FINAL_100814.pdf

² Green House Gas (GHG)

³ <http://www.lao.ca.gov/analysis/2012/transportation/high-speed-rail-041712.pdf>

PURPOSE

The purpose of this report is to identify other governmental, public works and/or infrastructure projects (hereinafter referred to as “projects”) that would create an amount equal to or exceeding the number of jobs, or more importantly, “job value”⁴ that CHSRA claims the HSR project would create. Also, this report’s purpose is to identify other more meaningful and pertinent public works/infrastructure projects that could be funded, sometimes multiple times over, by repurposing or redirecting the \$68 billion. In other words, what projects provide the most “bang for the buck” in terms of creating jobs and creating job value?

BACKGROUND

In 2008, the voters narrowly passed (52%) Proposition 1A to allow a bond issuance of \$9.5 billion for a high speed train to run from San Francisco to San Diego. On its face, the proposition’s language was very misleading as it inferred that the total project would cost \$9.5 billion, when in fact, the \$9.5 billion represented only the principal amount (interest will be an additional amount equal the principal amount, i.e., \$9.5 billion over the repayment term of 30 years) of a bond issue - not the \$68 billion total project cost as later disclosed by the CHSRA. Repayments of \$647 million per year will be paid from California’s General Fund. Operating costs, which will be partially offset by riders’ fees, will run approximately \$1 billion per year⁵. As the true budget was slowly unveiled and was continually revised upwards from the original \$16.5 billion in 1996, the project has come under intense fiscal public and private scrutiny and has been labeled a boondoggle on multiple levels by critics.

In 2013, polls showed voters would reject the train by 2-1 if given another chance.⁶ Voters who originally voted in favor of Proposition 1A are now feeling uncomfortable and expressing their dissatisfaction, with some opponents publicly speaking of collecting signatures for an additional ballot measure to either stop the project in its entirety or to enact strict fiscal constraints. Currently there are at least 30 active lawsuits against CHSRA, some of which are filed by other governmental agencies; ironically, taxpayers are paying both sides of the litigation. The lawsuits challenge environmental concerns, prices offered for property seizures, and legal issues related to what voters actually approved.

The main reasons for taxpayer and voter concern are⁷:

Overall Mismanagement by CHSRA: Rail officials haven't yet lined up funds needed to complete the initial system over the next 14 years. Construction is starting two years later than the state had promised. Acquisition of private property is going slower than expected; it has purchased

⁴ Number of jobs multiplied by annual assumed salary multiplied by number of years the job is active

⁵ http://ballotpedia.org/California_Proposition_1A,_High-Speed_Rail_Act_%282008%29

⁶ <http://www.ocregister.com/opinion/rail-495105-billion-bids.html>

⁷ <http://www.bakersfieldcalifornian.com/opinion/hot-topics/x1424422660/High-Speed-Rail-not-only-breaking-promises-but-busting-family-budgets>

only 122 of the 540 parcels needed for the 29-mile stretch from Madera to Fresno. CHSRA has yet to finalize legal agreements with two of the nation's most powerful private freight railroads that are concerned about how a bullet train network will affect their operations. As if all of this weren't offensive enough, the CHSRA announced in 2013 it (i.e., taxpayers) will pay contractors for bidding on designing and building the initial 30 miles of track, even if their bids are not accepted. Of five bidders, one will get the contract, but the four losers will walk away with a \$2 million "stipend" for having submitted bids.⁸

Cost: Besides Proposition 1A's misleading cost language, the supporters stated that the cost to complete the entire project would be \$33 billion; \$11 billion from the state funds, \$11 billion from the federal government and \$11 billion from private investment. Republicans in Congress voted to cut off all federal funding (although \$3.8 billion has already been appropriated and must be spent by September 30, 2017 or it will be forfeited)⁹ and no private funding is forthcoming. The former chairman of State Senate Transportation Committee, now-Democratic Congressman Mark DeSaulnier, said this massive transportation project could cost taxpayers as much as \$350 billion to complete. Effective January 1, 2015, a hidden gas tax was imposed on gasoline and diesel fuel which will be used to fund the HSR through the "cap and trade" program. Gov. Jerry Brown has designated 25% of proceeds from the cap and trade tax be set aside for HSR. Only 2 of the 99 current high speed lines in the world are fiscally self-sustaining, Tokyo-Osaka and Paris-Lyon, and they required considerable subsidies at the beginning.¹⁰

Speed: Voters were promised that the train would be able to achieve and sustain speeds of 220 mph throughout the entire trip. This is false and the HSR Authority is admitting that there will be numerous areas of the trip where the train will have to maintain lower speeds to reduce excessive noise, especially in densely populated areas. In San Francisco, the CHSRA is implementing a "blended approach."¹¹ This "blended approach" would run high-speed trains on existing rail as well as on new, dedicated tracks. The existing rail tracks are incapable of sustaining high speeds and can only travel 60 – 70 mph. In addition, the trains must slow down to navigate the substantial number of curves which are predominantly in Northern and Southern California (the Central Valley is fairly straight). The mixed use of these existing tracks also pose safety issues inherent with track-sharing and intersections with vehicular traffic.

Time: Voters were promised that they would be able to get from Los Angeles to San Francisco in two hours and 40 minutes. Current estimates now determine that the train will not be able to meet this time requirement, even for a non-stop trip, due in part to the reasons set forth in "Speed" above. Instead it is believed that a train ride from Los Angeles to San Francisco could take more than four hours as currently there are nine stops, with one optional, along the San

⁸ <http://www.oregister.com/opinion/rail-495105-billion-bids.html>

⁹ http://hanfordsentinel.com/news/in_focus/high_speed_rail/rushing-alleged-in-hsr-appraisal-process/article_7e1ab730-34c5-50cd-b4a6-b7032e224a6b.html

¹⁰ <http://www.latimes.com/opinion/op-ed/la-oe-zoellner-high-speed-rail-20140213-story.html>

¹¹ <http://www.spur.org/publications/article/2012-07-10/getting-high-speed-rail-track>

Francisco to Los Angeles route¹². It is not clear if there will be designated trains that board/unboard at all stops, some stops, or no stops in order to save time and meet the voter-approved ballot measure.

Route: Voters were told that to reduce impacts to the environment, and to mitigate the need to use eminent domain, the train route would follow existing transportation and utility corridors. From the route maps that have been released by the Authority, we know this to be false. The CHSRA has already seized private property through eminent domain and is plowing through family farms and tearing apart businesses that have been in operation for generations. The proposed “Eastern Corridor” alignments within the Palmdale to Burbank segment definitely fall outside of an “existing transportation” corridor definition. CHSRA’s sloppily shadowing Edison’s high tension lines is a very broad interpretation of a definition of a “utility corridor” and is likely to be legally challenged. The utility lines run above-ground and CHSRA is planning on tunneling *under* the Angeles National Forest and the San Gabriel National Monument where no utility lines currently exist. The issue is whether an underground tunnel follows an “existing utility corridor” when that path is actually above ground while the tunnel is underground, and not even necessarily directly below it.

Track: Voters were promised the train would run on a dedicated track. This dedicated system was required in order for the train to maintain the 200-mph speed as well as meet the time requirements. As noted above, in the Bay Area the train will not have a dedicated track (“blended approach”). This blended approach idea has also been suggested for other sections during the planning process.

ISSUES

1. How many jobs would other California infrastructure and/or public projects create?
 - a. What is the job value (workers’ salaries x number of years) of those jobs?
 - b. How many jobs could be created by building other projects if they had a \$68 billion budget?
2. How many other infrastructure projects could be funded using the HSR’s budget of \$68 million?
3. How much money has the CHSRA spent-to-date?
 - a. How many jobs have they actually created to-date?

SCOPE

The alternate projects identified for analysis are:

1. California highway and road repairs;

¹² http://www.hsr.ca.gov/docs/programs/statewide_rail/Proposed_Statewide_Alignment_Map.pdf

2. California bridge repairs;
3. Construction of a desalination plant;
4. Construction of an elementary school;
5. Construction of a city park with a recreation room center; and
6. Construction of a water purification treatment/reclamation plant.

METHODOLOGY AND ASSUMPTIONS

Overall Definitions and Assumptions

Overview. The jobs created by each of the projects will create jobs in both the public and private sectors, but for job value purposes, the jobs are considered of equal value since spending power from both sources of jobs provide economic benefits. Some examples of publicly funded operational jobs are public school teachers and school staff, city park employees, and employees of a water treatment plant (although this project will operate as a government enterprise fund paid for by customer usage fees). During the construction phase, the public agency employees are a small fraction compared to the jobs created for the private sector.

Project Phase Breakdown. Where feasible, projects were broken down into (1) *construction jobs* (“initial investment”) and (2) recurring (*operational*) jobs. The recurring “lifetime” portion of this report is assumed to be 50 years, inclusive of construction time.

Construction Costs. Where available, published construction costs were used. If not available, a construction cost estimator was utilized¹³. No cost overruns were assumed.

No. of Jobs Created. Where available, published number of jobs created were used. If no information was available regarding the number of jobs a construction project would create, a multiplier was applied to the construction costs based on the type of project.^{14 15}

Value of Jobs Project Lifespan. The “value of jobs” is the number of jobs multiplied by the number of years multiplied by the estimated annual salary(ies). For example, a \$50k annual salary for a particular job that lasts 3 years would calculate to have a \$150k “job value.” A job that lasts 50 years (“lifetime”) and pays \$50k per year would generate \$2.5 million in job value. The job value then translates into consumer purchasing power that supports the local economy through induced activities. The salary base used in this analysis is a blended average of the various job functions necessary to complete the project. No inflation factors are included as the salary-to-construction cost is assumed to be proportional so the same number of jobs would be created whether or not both variables were inflated over time. No operational revenues are included as part of the initial investment.

¹³ <http://www.strategieconomicresearch.org/AboutUs/StimCalcTool.pdf>

¹⁴ <http://www.strategieconomicresearch.org/AboutUs/StimCalcTool.pdf>

¹⁵ http://www.peri.umass.edu/fileadmin/pdf/other_publication_types/green_economics/PERI_Infrastructure_Investments

Labor Salaries. Labor costs (salaries) were based on California average salaries by industry and job type provided by the Bureau of Labor Statistics.¹⁶

Types of Jobs Depending on Job Phase. There are three types of jobs: (1) direct jobs for the initial phase construction or major repair work (for highways and bridge repair for which the infrastructure already exists); (2) indirect jobs (created as a result of new construction such as material suppliers, equipment rental companies, etc.); and (3) operating/maintenance jobs (once a project is complete and in operation, the jobs needed to operate and/or maintain the project). No operating jobs are included for the road repair or bridge repair scenarios since these projects are not considered new construction. Induced jobs are created when the overall spending level is increased as a result of spending power from direct and indirect jobs. Economists combine indirect and induced jobs and apply the multiplier.

Cost per Job. “Cost per job” is the total project cost divided by the number of jobs created, regardless of the number of years of work or the type of job created. This number will not necessarily translate into an annual salary as it is a ratio used to compare different projects on a level basis. It attempts to answer the question: “How much did each job cost to create?”

Benefit:Cost Ratio (Value of Jobs Created:Initial Investment): This indicator answers the question: What is the “return on job value” for my investment? The higher the number, the better.

Assumptions Particular to Project Type

California highways and roads repair. According to the American Road & Transportation Builders Association, California has 18,862 miles of highways and major roads that require resurfacing or reconstruction. Additionally, 18,837 of Federal-aid highways¹⁷ need resurfacing or reconstruction¹⁸. For purposes of this study, we are assuming only 6500 miles (roughly 1/3rd) of the California-owned roads/highways would be repaired immediately. The cost per mile for resurfacing or reconditioning for urban roads ranges from \$484k to \$1 million, depending on the number of arterials, lanes, and other variables¹⁹. For this analysis, a weighted average cost per mile of \$617k was used for major roads and highways. Using the cost per mile multiplied by the number of roads needing repair resulted in a total project cost. A multiplier was then used to determine the number of jobs created. Using an average annual full-time construction worker and related supervisors’ salary of \$49,780 (\$23.93 per hour) results in number of jobs funded²⁰. The second portion of costs is the lifetime maintenance and is not included in the initial cost/investment because (1) it would not exist if the initial investment did not occur; and (2) it does not commence until at least 7 years after the initial investment occurs. One component of

¹⁶ <http://www.bls.gov/oes/current/oes472061.htm#st>

¹⁷ <http://www.fhwa.dot.gov/federal-aidessentials/federalaid.cfm>

¹⁸ http://www.artba.org/Media/PDFs/6.03.2014_ARTBA_Conditions.pdf

¹⁹ <http://capitolfax.com/summary.pdf>

²⁰ City of Burbank MOU, <http://www.burbankca.gov/home/showdocument?id=28927>

routine maintenance is a slurry seal (every 7 years @ \$60k per mile), alternated with the second component of an asphalt overlay (every 22.5 years @ \$350k per mile)²¹. It is assumed that the same roads/highways that were fully reconstructed or repaired are then maintained at regular intervals instead of having to be completely remilled and resurfaced. Deferring maintenance on roadways is cheaper in the short-term but more costly in the long term due to the higher cost of completely removing old asphalt, regrading, regravelling and repaving the road. CalTrans, the governmental agency responsible for California freeways and roads, uses its own employees for maintenance but hires private contractors for new or major reconstruction projects.²²

California Bridge Repair: As of 2008, the official federal estimate to fix 100% of all bridges that are in need of repair in the United States was \$140 trillion²³. Using the appropriate inflation factor, this amount adjusts upwards to \$154 trillion in 2014. Of the bridges that are considered deficient or functionally obsolete, 4.7% are in California, resulting in an investment of \$7.3 trillion if all were repaired today. According to the report entitled "*Bridging the Gap*," nearly one in four bridges needs repairs, and the average age of America's bridges is 43 years -- seven years shy of the maximum age for which most are designed. Also, one in five U.S. bridges is more than 50 years old. Annual maintenance cost (painting, repairing wear and tear, etc.) is expected to be 4% of the initial construction cost per year.²⁴ Multipliers are used to estimate the number of jobs created.²⁵

Desalination Plants. There are two desalination plants currently under construction in California by Poseidon Water. One is in Carlsbad²⁶ and one is in Huntington Beach²⁷. The construction budgets are \$1 billion and \$892 million, respectively. For purposes of this study only the Carlsbad project was included. Construction salaries are assumed to be \$43.3k annually. The output is expected to be 50 million gallons of water per day and will go online within three years.

Elementary School. Using a construction estimating program²⁸, construction of an elementary school in Southern California would cost \$77 million. Construction salaries are assumed to be \$42.5k annually because it is carpentry-type building construction and does not require a high degree of civil engineering as would a water desalination plant. Operational costs would be for school staffing at an average annual salary of \$56.2k.

²¹ Sacramento Region MTP2035 Issue Papers: Road Maintenance,
<http://www.sacog.org/mtp/pdf/MTP2035/Issue%20Papers/Road%20Maintenance.pdf>

²² <http://www.dot.ca.gov/hq/paffairs/faq/faq60.htm>

²³ <http://www.cnn.com/2008/US/07/28/bridge.report/index.html?iref=nextin>

²⁴ <http://www.johndcook.com/blog/2010/03/31/maintenance-costs/>

²⁵

http://www.peri.umass.edu/fileadmin/pdf/other_publication_types/green_economics/PERI_Infrastructure_Investments

²⁶ <http://carlsbaddesal.com/>

²⁷ http://poseidonwater.com/our_projects/all_projects/huntington_beach_project

²⁸ <http://www.rsmeans.com/models/elementary-school/>

City Park with Recreational Center. The Robert “Bud” Ovrom Park in Burbank²⁹ was used as a model. The park provides one acre of park space and a 7,025 square foot building providing programmed recreation opportunities, two children’s play areas complete with play equipment, two picnic areas, a lighted basketball court, restrooms and open areas for passive use and play. The construction costs in 2007/08 were \$8.24 million. Using the CPI, costs in 2014 would be approximately \$9.2 million. A construction estimator program³⁰ was used to determine the number of construction workers needed to complete the project based on project type and total square feet. Construction salaries are assumed to be \$42.5k annually because it is a carpentry-type building construction and does not require a high degree of civil engineering as would a water desalination plant.

Water Purification Plant (wastewater cleanup). This project is a new advanced water purification facility at the Donald C. Tillman Water Reclamation Plant in Van Nuys. The new facility will treat approximately 27 millions of gallons per day and the water will be distributed through Los Angeles Department of Water and Power (DWP) pipelines to the Hansen and Pacoima spreading basins³¹. Operational salaries are based on an adjusted average of DWP water personnel salaries and no overtime.³² Currently, the plant has 67 employees and it is assumed that the new facility will employ 15 additional employees. The plant’s construction budget is \$370,000,000 and construction is scheduled to run from January 27, 2019 through January 27, 2022 for a total of 4 years. DWP is anticipating receiving partial or full funding from Proposition 1, the Water Bond measure that was approved by the voters in November, 2014. Construction salaries are assumed to be \$43.3k annually.

High Speed Rail. The HSR project’s assumptions were based on CHSRA’s documents gleaned from their website. Primarily, their 2012 and 2014 business plans were utilized. They delineated their direct construction jobs and indirect/induced jobs. However, their indirect (also includes induced) multiplier resulted in *more* jobs than the direct jobs. In all other scenarios and economic reports, indirect jobs are fewer in number than the direct jobs. For example, a common multiplier in the construction industry for infrastructure is every \$1 million in construction spending supports 12.4 total jobs (7.1 direct plus 5.3 indirect/induced). In HSR’s case, however, theirs is just the opposite—for every \$1 million in construction spending, 4.8 direct jobs were created, and 9.8 indirect/induced jobs were supported.

In order to estimate number of “jobs created” figures, the HSR has assumed certain job years (number of jobs multiplied by number of years) and multipliers for each section as follows³³:

²⁹ <http://www.burbankca.gov/departments/park-recreation-and-community-services/park-services-division/the-history-of-burbank-parks>

³⁰ <http://www.cyburbia.org/forums/showthread.php?t=24772>

³¹ <http://boe.lacity.org/uprs/report/ProjectInfoReport.cfm?k=5431&dmy=71301>

³² <http://salaries.latimes.com/dwp/?classification=Water%20Treatment%20Operator&year=2012&sort=classification#results>

³³ ³³ http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2012EIR.pdf, p. 29

	Direct Construction Job Years	Indirect Multiplier Job-Years	Total Employment Job Years
Initial Operating System (IOS) - First construction	33,000	65,000	98,000
IOS	135,000	271,000	406,000
Bay to Basin	92,000	184,000	276,000
Phase 1 Blended	72,000	145,000	217,000
Total Phase 1 Blended	332,000	665,000	997,000

Using CHSRA's chart and its own estimate that construction will take 20 years, the total project will generate 49,850 jobs annually.

NO. OF JOBS ANNUALLY	Direct Construction Jobs	Indirect Jobs	Induced Jobs (est)	TOTAL Indirect & Induced	Total Jobs Annually
Total Phase 1 Blended	16,600	22,517	10,733.23	33,250	49,850

Based on average salaries for direct jobs and indirect jobs, direct and indirect salaries represent \$33 billion, or 49% of the total \$68 billion project budget.

SUMMARY PHASE 1 BLENDED TOTAL-CONSTRUCTION PHASE					
	Direct Jobs	Indirect Jobs	Induced Jobs	TOTAL Indirect & Induced	TOTAL JOBS
Estimated annual salary	\$52,056	\$35,000	\$35,000	\$35,000	\$32,550
No. of jobs x Salary	\$864,134,580	\$788,086,776	\$375,663,224	\$1,163,750,000	\$2,027,884,580
Construction yrs	20	20	20	20	20
Total Spent on Salaries	\$17,282,691,600	\$15,761,735,511	\$7,513,264,489	\$23,275,000,000	\$40,557,691,600
BUDGET	\$68,000,000,000				
TOTAL SPENT ON SALARIES - DIRECT AND INDIRECT ONLY (EXCLUDES INDUCED)	\$33,044,427,111				
% of BUDGET SPENT ON DIRECT AND INDIRECT SALARIES	49%				

The HSR's segments and spending are broken down into three sections as follows³⁴:

Section	Length in Miles	From/To	Operational	Cumulative Cost (billions)
IOS	300	Merced to San Fernando Valley	2022	\$31
Bay to Basin	410	San Jose and Merced to San Fernando Valley	2026	\$51

³⁴ http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2012EIR.pdf, p. 16

Phase 1 Blended	520	San Francisco to Los Angeles/Anaheim	2028	\$68
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In addition to the jobs created during construction, operating and maintaining the system will create permanent jobs in both the public and private sector. This will include train operators and maintenance yard workers, station managers, operations planners, and others. The direct employment to run the system changes and grows over time as new segments are added and as high-speed rail operations expand. The biggest changes in employment will be with the start and growth in operations of the IOS, followed by significant jumps in employment as Bay to Basin and Phase 1 Blended come online.³⁵

EXHIBIT 7.4 PROJECTED DIRECT EMPLOYMENT FROM SYSTEM OPERATIONS	
DIRECT OPERATING JOBS	TOTAL
IOS IN 2022 (OPENING YEAR)	1,000
IOS IN 2026 (AFTER SERVICE RAMP-UP)	1,450
BAY TO BASIN IN 2027 (OPENING YEAR)	2,400
PHASE 1 IN 2034 (AFTER SERVICE RAMP-UP)	3,400

Train Sets. In addition to constructing the high speed rail tracks and infrastructure, train sets must also be contracted out for manufacturing.³⁶ The trainsets are anticipated to meet the following minimum characteristics: speeds up to 220 mph; width of 10.5 feet to 11.17 feet and a maximum train length 672.6 feet; static axle loads that do not exceed 17 tons; minimum of 450 passenger seats; first class seating shall be provided with spacing equivalent to 42 inches of pitch; business class seating shall be provided with spacing equivalent to 39 inches.

In its 2014 business plan, the CHSRA estimated that it will need to spend \$889 million (about \$44.5 million per train set for a 20-train order) to buy the vehicles it requires for its IOS from Merced to Burbank, now planned to start carrying passengers by 2022. By 2027/28, when the entire Phase 1 of the statewide system is expected to be built out from downtown San Francisco to downtown Los Angeles and Anaheim, capital spending for vehicles is anticipated to balloon to about \$3.3 billion (in 2013 dollars unadjusted for inflation). The trains are expected to have a service life of 30 years before they need to be replaced.

Federal law requires that the trains and all of their components be American-made. That means that the company that ultimately wins the contract must establish a manufacturing plant in the U.S., as well as an American parts-supply chain. California also has its own “Buy California”

³⁵ http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2014_Business_Plan_Final.pdf, p. 60

³⁶ http://www.hsr.ca.gov/docs/Programs/trainsets/REOI_for_Trainsets_Final.pdf

legislation on the books requiring the CHSRA to “make every effort to purchase high-speed train rolling stock and related equipment that are manufactured in California.”

However, the Federal Railroad Administration recently granted the CHSRA and foreign manufacturers who already have plants in the U.S. a waiver of the federal “Buy America” requirements, allowing up to two prototype trains to be foreign-built — a move that will allow time for the winning bidder to set up a U.S. production plant.

No U.S. company manufactures trains that attain a speed of 186 mph so the winning bid will be a foreign company. Although this foreign company will provide jobs to U.S. residents and will purchase parts locally, the profit generated from the HSR project will enrich the country where the manufacturer’s headquarters is located.

The following chart summarizes the assumptions used for this report for new construction projects (i.e., excludes roads and bridge repair projects) and assumes 50 years is the total project lifespan in order to calculate the total value of jobs.

ASSUMPTIONS	Desalination Plant-Carlsbad (new construction)	Elementary School (new construction)	City Park with Recreation Ctr (new construction)	Water Purification Plant (Tillman Center)	High Speed Rail (new construction)
Project Cost	\$1,000,000,000	\$77,000,000	\$9,208,150	\$370,000,000	\$68,000,000,000
Construction Time-Years	3	2.5	1	4	20
Lifespan Yrs (50) Less Construction Yrs	47	47.5	49	46	30
Construction Jobs	2500	523.6	65.4	2,627	16,600
Indirect/Induced Jobs	175	377	45	1,813	33,250
Operating Jobs (FTEs)	25	38	5	15	3,400
Avg. Annual Construction Salary	\$43,260	\$42,530	\$42,530	\$43,260	\$52,056
Avg. Annual Indirect Salary	\$35,000	\$35,000	\$35,000	\$35,000	\$35,000
Avg. Operating Salaries	\$75,000	\$56,227	\$47,000	\$85,000	\$57,220

ANALYSIS

Using the aforementioned assumptions and methodologies, the following chart (Figure 1) compares and contrasts each selected infrastructure/public works project by breaking down the numbers into key ratios:

- Cost per Job (initial investment divided by number of jobs created—lower is better)
- Benefit:Cost per Project (value of jobs divided by initial cost of investment-higher is better)
- Perceived Value Index (a subjective perceived value per project on a scale of 1-10 with 1 being less valuable and 10 being more valuable)

- Benefit:Cost Indexed Value (the benefit/cost per project multiplied by perceived index value)
- No. of jobs created if \$68 billion were spent
- More/(less) jobs than HSR Project
- Jobs created factor

Figure 1

	Roads Repair and Maintenance	Bridge Repair and Maintenance	Desalination Plant-Carlsbad (new construction)	Elementary School (new construction)	City Park with Recreation Ctr (new construction)	Water Purification Plant (Tillman Center)	High Speed Rail (new construction)
INITIAL TOTAL PROJECT/INVESTMENT COST	\$4,016,478,241	\$7,304,069,633	\$1,000,000,000	\$77,000,000	\$9,208,150	\$370,000,000	\$68,000,000,000
CONSTRUCTION PHASE							
Construction Yrs	1	1	3	2.5	1	4	20
Maintenance Yrs	5	49	n/a	n/a	n/a	n/a	n/a
No. of Jobs Created-Construction	49,370	73,839	2,500	524	65	2,627	16,600
Value of Jobs Created-Construction	\$2,457,631,062	\$3,675,692,717	\$324,450,000	\$55,671,770	\$2,780,521	\$454,576,080	\$17,282,592,000
CONSTRUCTION AND OPERATING JOBS							
Jobs - construction	49,370	73,839	2,500	524	65	2,627	16,600
Jobs - indirect/induced	26,973	38,423	175	377	45	1,813	33,250
Jobs - operating*	-	-	25	38	5	15	3,400
TOTAL JOBS	76,343	112,262	2,700	939	115	4,455	53,250
Cost per job	\$52,611	\$65,063	\$370,370	\$82,011	\$79,726	\$83,053	\$1,276,995
HSR JOBS COST MORE/(LESS) THAN ALT PRO	\$1,224,384	\$1,211,933	\$906,625	\$1,194,984	\$1,197,270	\$1,193,943	\$0
OUTPUT-VALUE OF JOBS PROJECT LIFESPAN (ASSUME 50 YEARS INCLUDE CONSTRUCTION YRS)							
CONSTRUCTION PHASE SALARIES	\$2,457,631,062	\$3,675,692,717	\$324,450,000	\$55,671,770	\$2,780,521	\$454,576,080	\$17,282,592,000
INDIRECT SALARIES	\$944,050,137	\$1,344,808,881	\$18,375,000	\$33,013,750	\$1,579,198	\$253,820,000	\$23,275,000,000
OPERATING SALARIES-50 YEARS			\$88,125,000	\$101,489,396	\$11,515,000	\$58,650,000	\$5,836,440,000
TOTAL VALUE OF JOBS CREATED	\$3,401,681,200	\$5,020,501,598	\$430,950,000	\$190,174,916	\$15,874,718	\$767,046,080	\$46,394,032,000
Benefit:Cost ratio**	0.85	0.69	0.43	2.47	1.72	2.07	0.68
Perceived Index Value 1-10	6	7	9	4	3	8	5
Benefit:Cost ratio Indexed	5.1	4.8	3.9	9.9	5.2	16.6	3.4
No. of jobs created using \$68 billion	1,292,502	1,045,144	183,600	829,158	852,924	818,757	53,250
More/(less) jobs than HSR Project	1,239,252	991,894	130,350	775,908	799,674	765,507	-
Cost per job	\$52,611	\$65,063	\$370,370	\$82,011	\$79,726	\$83,053	\$1,276,995
No. of jobs created using \$68 billion	1,292,502	1,045,144	183,600	829,158	852,924	818,757	53,250
Jobs created factor	24	20	3	16	16	15	1
*no incremental new operating jobs would be created							
**value of jobs divided by initial investment							

Cost Per Job. Repairing one-third of California’s failing roads and then keeping them maintained is the most efficient cost-per-job, at \$52.6k each, followed closely by repairing failing bridges, at \$65k cost per job. Not surprisingly, the most expensive cost-per-job is for the high speed rail, coming in at a whopping \$1.3 billion per job. To reiterate, definition of “job” for this purpose is a job that is created as a result of the project’s existence regardless of its duration.

HSR Jobs Cost More/(Less) than Alternative Projects. This line subtracts the HSR cost per job from each of the alternative project’s cost per job. For example, the HSR cost per job is \$906k more than the Carlsbad Desalination Plant cost per job.

Total Value of Jobs Created. This figure is a function of the total number of jobs multiplied by the number of years each job is active. Using the Elementary School as an example, construction jobs (524) multiplied by years of construction (2.5) multiplied by average salary of a worker related to construction yields \$55 million in job value in the construction category. The HSR project yields the highest value of jobs created, BUT at a tremendous cost. Its price tag of \$68 billion yielded a mediocre benefit:cost ratio of only .68. More about the benefit:cost ratio below.

Benefit:Cost ratio: This ratio is the function of Total Value of Jobs Created divided by the Initial Total Project/Investment cost. 1.0 would be the equilibrium where the value of jobs = initial projection/investment cost. A return more than 1.0 means the investment yielded a higher value of jobs than it cost; and a return less than 1.0 means the investment yielded a lower value of jobs than it cost. It is a raw number, i.e., not indexed to a perceived value of the project. The HSR project yielded a slightly better than half return of .68. Although not the worst-ranked project, its rank of 6 of the 7 projects on the scale cannot be deemed a sound use of investment capital. Only the desalination plant fared worse at 4.3 (Figure 2)

Perceived Value Index. This is a *subjective* number on a scale of 1 to 10, with 1 being the least important and 10 being the most important. This index's purpose is to weight the value of a project's necessity and the public's interest independent of its cost. For example, Californians' largest concern is water, therefore, any project to increase water supply is assigned a high value. Scientists predict a decades-long drought in the southwest for the last half of the century and it is no secret that California's current drought will not cease any time soon.³⁷ Unlike landlocked states, California is in a geographically advantageous position to utilize desalination plants to produce water. Highway and road repair has been identified as a concern for Californians, so a value of 6 was assigned. To avoid appearing biased against the HSR, it was assigned the neutral middle value of 5.

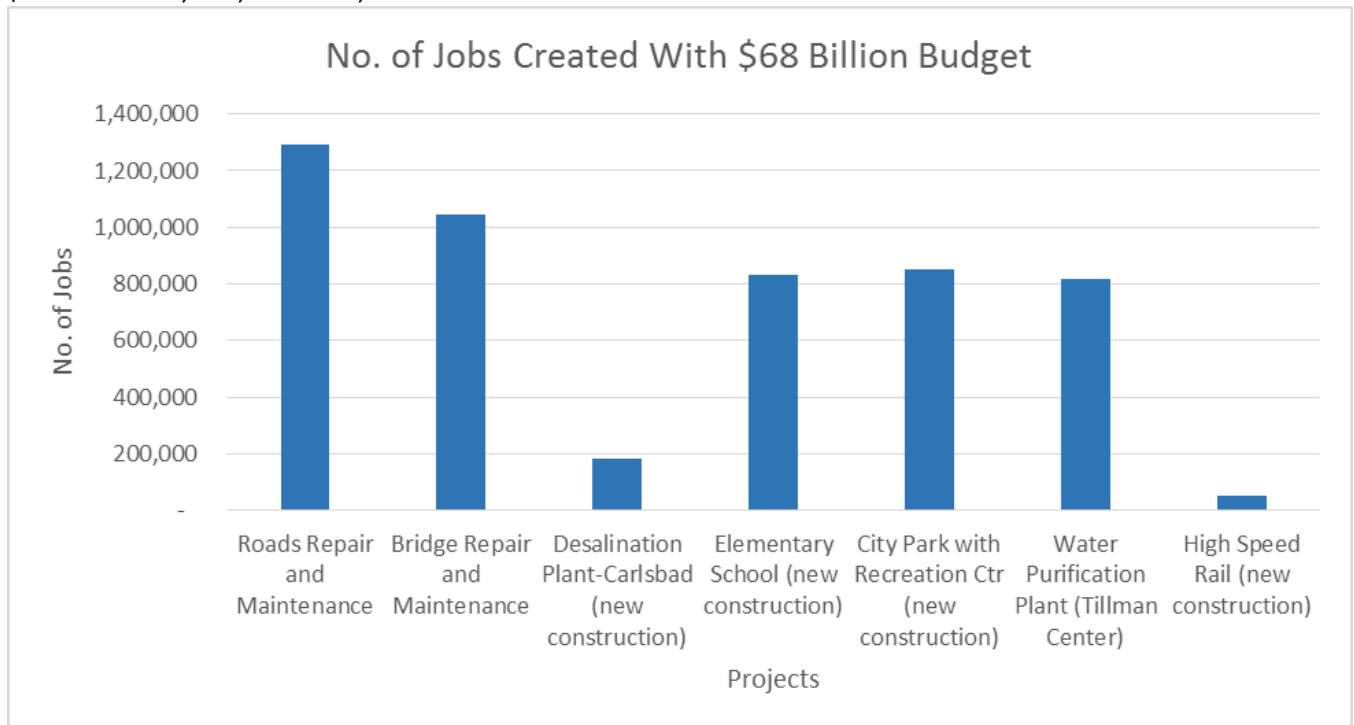
Benefit:Cost Ratio Indexed. This multiplies the above-referenced benefit:cost ratio by the perceived value index which adjusts the benefit:cost ratio to include the perceived value of each project. The HSR comes in last place at 3.4 (Figure 3).

No. of Jobs Created if \$68 Billion Were Spent: If the alternative projects were able to utilize the HSR budget of \$68 billion, this number calculates how many jobs could be created using the economics of that project. They range from 183.6k (desalination plant) to 1.3 million jobs (road repair and maintenance).

More/(Less) Jobs Created Than HSR Jobs: The HSR would create 53,250 jobs. This line calculates the difference between the HSR number of created jobs and each project's number of created jobs *if* \$68 billion were invested in the alternative project.

³⁷ <http://www.latimes.com/science/sciencenow/la-sci-sn-megadrought-risk-20150212-story.html>

Jobs Created Factor. The jobs created in each project category using \$68 billion divided by jobs created by HSR. For example 24x more jobs would be created in road repair if the project utilized \$68 billion. $1,292,502 \div 53,250 = 24$



\$68 Billion Could Fund the Comparative Projects Multiple Times

The following illustrates what \$68 billion would fund for each of the following projects:

	ROADS AND HWY REPAIRS and MAINTENANCE	BRIDGE REPAIRS and MAINTENANCE	Desalination Plant-Carlsbad (new construction)	Elementary School (new construction)	City Park with Recreation Ctr (new construction)	Water Purification Plant (Tillman Center)
INITIAL TOTAL PROJECT/ INVESTMENT COST	\$4,016,478,241	\$7,304,069,633	\$1,000,000,000	\$77,000,000	\$9,208,150	\$370,000,000
Unit of measurement	miles	Bridges	plant(s)	school(s)	park(s)	plant(s)
Amount Funded	6507	6953	1	1	1	1
Each Unit	\$617,218	\$1,050,492	\$1,000,000,000	\$77,000,000	\$9,208,150	\$370,000,000
How much will \$68 billion fund?	110172 miles	64732 Bridges	68 plant(s)	883 school(s)	7385 park(s)	184 plant(s)
Perspective	Could go around equator 4.5x; could pay for 100% of all roads needing repair (18,862) nearly 6x over	could repair 100% of bridges 2.5 times over	At 50 million gallons per day per plant, could produce 1.2 trillion gallons per year	Equivalent to 15% of Calif. Elementary schools	Could provide every California city (incorporated, charter and general law) with 7.5 new parks each.	At 27 million gallons per day, could treat/produce 1.8 trillion gallons per year

How Much Has CHSRA Spent and How Many Jobs Has It Delivered?

The CHSRA has spent approximately \$1 billion for the period 2006 through November 2014. 69% of the amount spent was for consultants, 8% on right-of-way acquisition, 8% on administration, and 15% on construction-related jobs. Actual construction did not begin until January 2015 yet

monies were expended in 2013-14 so it is unknown what these monies were for—perhaps demolition or paying the construction-related consultants. Because the bulk of the monies were paid to consulting firms which must cover overhead and profit, it is difficult to ascertain how much actually was paid for salaries and job creation. SWCAP is an indirect charge to CHSRA from the State of California to recoup overhead the State has incurred on the CHSRA’s behalf.

CHSRA has 174 budgeted positions (including 24 vacant positions) as of January 2015.³⁸ The amount budgeted is \$13.2 million for salaries (it is unclear if it also includes benefits and payroll taxes) and equates to an average salary (or salaries and benefits) of \$76k per position. It is unknown if HSR includes its own agency jobs in the “jobs created” figures that it publishes. The most recent Staffing Management Report from December 2013 memorializes the agency’s staffing history and its then-current projection. It has tripled its own staffing positions (153.6%) over 3 years, from 43 to 175:³⁹

Exhibit 2-2. Recent Changes in CHSRA Staffing Allocations

	FY2010/2011	FY2011/2012	FY2012/2013	FY2013/2014
Budgeted Positions	43	54	69	175*
% Change	-	25.6%	27.7%	153.6%

* FY2013/14 budgeted positions include 175 FTE, 88.5 are currently filled. Others are in the process of being filled over the course of the year.

The following chart shows the amounts expended from 2006 through December 2014. The categories appear to be a mix of internal and external expenses:

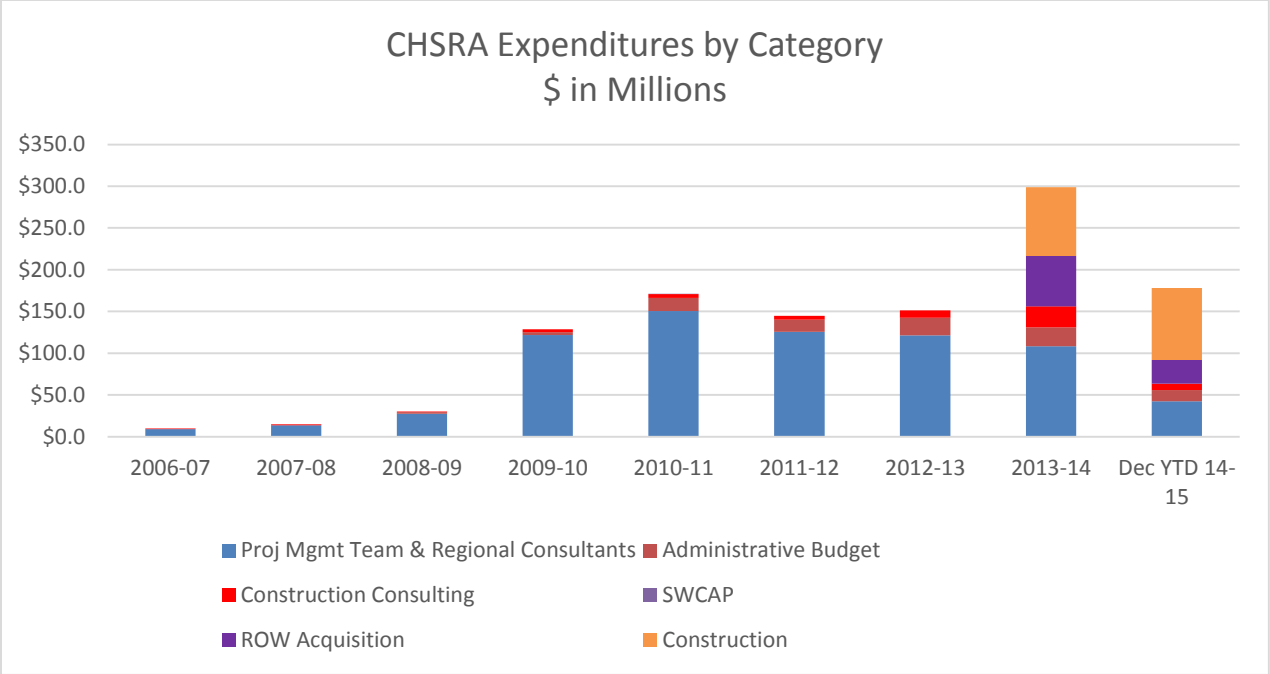
\$ in Millions											
	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	TD 14-15	TOTAL	% of Total
Proj Mgmt Team & Regional Consultants	\$9.3	\$13.8	\$27.6	\$122.0	\$150.5	\$125.7	\$121.3	\$108.5	\$42.5	\$721.2	64%
Administrative Budget	\$0.0	\$0.0	\$1.8	\$3.3	\$15.7	\$14.3	\$21.1	\$22.5	\$13.4	\$92.2	8%
Construction Consulting	\$0.5	\$1.0	\$0.8	\$3.5	\$4.5	\$4.8	\$8.8	\$25.3	\$7.7	\$56.8	5%
SWCAP	\$0.0	\$0.0	\$0.0	\$0.0	\$0.7	\$0.0	\$0.0	\$0.0	\$0.0	\$0.7	0%
ROW Acquisition	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$60.2	\$28.3	\$88.5	8%
Construction	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$82.3	\$86.1	\$168.3	15%
TOTAL	\$9.8	\$14.8	\$30.2	\$128.8	\$171.4	\$144.9	\$151.2	\$298.7	\$178.0	\$1,127.6	100%

The graph below visually represents the spending and it is important to note that December YTD 14-15 is a partial year (6 months) due to the fiscal year running from July 1 – June 30.

³⁸

http://www.hsr.ca.gov/docs/brdmeetings/2015/brdmtg_011315_Item3_Board_Report_Finance_and_Audit_2015_0109.pdf

³⁹ http://www.hsr.ca.gov/docs/about/legislative_affairs/Staff_Management_Report_2013.pdf



The CHSRA has only issued two Small Business Jobs Reports (one for June 2014 and one for the 1st Quarter July – September 2014). The following matrix represents these 5 months (really 2 separate fiscal years) to capture two separate fiscal years and how many FTEs⁴⁰ were generated from each consultant category:

TYPE OF WORK	HOURS	FTE	% of Total
Design-Build Total	183,801	592.50	39%
Financial Services Total	1,926	3.70	0%
Legal Services Total	2,728	5.20	1%
Program Management Total	110,380	331.10	24%
Project and Construction Total	13,025	38.30	3%
Regional Consultant Total	109,123	348.10	23%
Right of Way Total	47,244	144.50	10%
Grand Total	468,227	1463.40	100%

\$1 billion⁴¹ (averaging \$226 million annually) spent from 2006/07 through December 2014 (8 years) did not result in a stellar amount of “jobs created” and/or “job value.” Even though the above only represents the equivalent of 2 years, the years prior to FY 2013/14 would have had significantly lower FTEs created, so the above chart is probably the CHSRA’s “best years” of job creation. Using the CHSRA’s actual and budgeted amounts of \$1.1 billion for the two years of FY 2013/14 and FY 2014-15, the cost per job calculates to \$754.6.

⁴⁰ FTE is a full-time equivalent employee (40 hours per week x 52 weeks per year = 2080 hours per year).
⁴¹http://hsr.ca.gov/docs/brdmeetings/2015/brdmtg_021015_FA_Total_Project_Expenditures_with_Forecasts.pdf

CONCLUSION

The HSR project would create a significant number of jobs and job value but at a cost per job amount that is nearly 3.5 times more than its closest alternative, the Carlsbad Desalination Plant.

	Roads Repair and Maintenance	Bridge Repair and Maintenance	Desalination Plant-Carlsbad	Elementary School	City Park with Recreation Ctr	Water Purification Plant (Tillman Center)	High Speed Rail
CONSTRUCTION AND OPERATING JOBS							
Jobs - construction	49,370	73,839	2,500	524	65	2,627	16,600
Jobs - indirect/induced	26,973	38,423	175	377	45	1,813	33,250
Jobs - operating*	-	-	25	38	5	15	3,400
TOTAL JOBS	76,343	112,262	2,700	939	115	4,455	53,250
Cost per job	\$52,611	\$65,063	\$370,370	\$82,011	\$79,726	\$83,053	\$1,276,995

HSR does create largest amount of "job value," 9 times the amount of its closest alternative, Bridge Repair:

	Roads Repair and Maintenance	Bridge Repair and Maintenance	Desalination Plant-Carlsbad (new construction)	Elementary School (new construction)	City Park with Recreation Ctr (new construction)	Water Purification Plant (Tillman Center)	High Speed Rail (new construction)
CONSTRUCTION PHASE SALARIES	\$2,457,631,062	\$3,675,692,717	\$324,450,000	\$55,671,770	\$2,780,521	\$454,576,080	\$17,282,592,000
INDIRECT SALARIES	\$944,050,137	\$1,344,808,881	\$18,375,000	\$33,013,750	\$1,579,198	\$253,820,000	\$23,275,000,000
OPERATING SALARIES-50 YEARS			\$88,125,000	\$101,489,396	\$11,515,000	\$58,650,000	\$5,836,440,000
TOTAL VALUE OF JOBS CREATED	\$3,401,681,200	\$5,020,501,598	\$430,950,000	\$190,174,916	\$15,874,718	\$767,046,080	\$46,394,032,000

But, upon closer examination, the \$68 billion price tag returns a mediocre unadjusted Benefit:Cost ratio of .68. Of the 6 alternate infrastructure projects studied, 5 of the alternate projects would generate more job value:

Figure 2

Sorted by Unadjusted Benefit:Cost Ratio	Benefit:Cost ratio	Perceived Index Value 1-10	Benefit:Cost ratio Indexed
Elementary School	2.47	4	9.9
Water Purification Plant (Tillman Center)	2.07	8	16.6
City Park with Recreation Ctr	1.72	3	5.2
Roads Repair and Maintenance	0.85	6	5.1
Bridge Repair and Maintenance	0.69	7	4.8
High Speed Rail	0.68	5	3.4
Desalination Plant-Carlsbad	0.43	9	3.9

Comparing the projects using the Adjusted Benefit:Cost ratio, the HSR project comes in dead last in terms of job value:

Figure 3

Sorted by Adjusted Benefit:Cost Ratio	Benefit:Cost ratio	Perceived Index Value 1-10	Benefit:Cost ratio Indexed
Water Purification Plant (Tillman Center)	2.07	8	16.6
Elementary School	2.47	4	9.9
City Park with Recreation Ctr	1.72	3	5.2
Roads Repair and Maintenance	0.85	6	5.1
Bridge Repair and Maintenance	0.69	7	4.8
Desalination Plant-Carlsbad	0.43	9	3.9
High Speed Rail	0.68	5	3.4

In summation, the CHSRA has spent approximately \$1.0 billion for the period 2006 through December 2014 and has generated only 1463 private sector full-time positions during the most recent, and presumably the most job-populated years. At the end of FY 2014/15 (June 2015), it is estimated that the CHSRA will have expended \$1.7 billion, with 62% of that (\$1.1 billion) spent or budgeted during the last two years--FY 2013/14 and FY 2014/15.

The \$68 billion budgeted for the HSR project could fund critically needed repairs to 110,172 miles of roads or 64,732 bridges, construction of 68 desalination plants providing 1.2 trillion gallons of water annually, construct 883 new elementary schools, 7,395 parks, or 184 water purification plants recycling 1.8 trillion gallons of water per year. The \$68 billion budget, if used for other projects, could create 3 to 24 times the number of jobs that HSR creates.

Additionally, the uncertainty of future and total funding which would result in an aborted project, the escalating budget estimates, the doubtful speed and time estimates, the proposed routes, the plethora of lawsuits and delays, the environmental concerns, the type of tracks, all lead to the conclusion that this project is an extremely risky use of public monies and that the money would be better used for more cost and job efficient essential projects.

APPENDIX A – PROJECT COMPARISON AT A GLANCE

	Roads Repair and Maintenance	Bridge Repair and Maintenance	Desalination Plant-Carlsbad (new construction)	Elementary School (new construction)	City Park with Recreation Ctr (new construction)	Water Purification Plant (Tillman Center)	High Speed Rail (new construction)
INITIAL TOTAL PROJECT/INVESTMENT COST	\$4,016,478,241	\$7,304,069,633	\$1,000,000,000	\$77,000,000	\$9,208,150	\$370,000,000	\$68,000,000,000
CONSTRUCTION PHASE							
Construction Yrs	1	1	3	2.5	1	4	20
Maintenance Yrs	5	49	n/a	n/a	n/a	n/a	n/a
No. of Jobs Created-Construction	49,370	73,839	2,500	524	65	2,627	16,600
Value of Jobs Created-Construction	\$2,457,631,062	\$3,675,692,717	\$324,450,000	\$55,671,770	\$2,780,521	\$454,576,080	\$17,282,592,000
CONSTRUCTION AND OPERATING JOBS							
Jobs - construction	49,370	73,839	2,500	524	65	2,627	16,600
Jobs - indirect/induced	26,973	38,423	175	377	45	1,813	33,250
Jobs - operating*	-	-	25	38	5	15	3,400
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Cost per job	\$52,611	\$65,063	\$370,370	\$82,011	\$79,726	\$83,053	\$1,276,995
HSR JOBS COST MORE/(LESS) THAN ALT PRO	\$1,224,384	\$1,211,933	\$906,625	\$1,194,984	\$1,197,270	\$1,193,943	\$0
OUTPUT-VALUE OF JOBS PROJECT LIFESPAN (ASSUME 50 YEARS INCLUDE CONSTRUCTION YRS)							
CONSTRUCTION PHASE SALARIES	\$2,457,631,062	\$3,675,692,717	\$324,450,000	\$55,671,770	\$2,780,521	\$454,576,080	\$17,282,592,000
INDIRECT SALARIES	\$944,050,137	\$1,344,808,881	\$18,375,000	\$33,013,750	\$1,579,198	\$253,820,000	\$23,275,000,000
OPERATING SALARIES-50 YEARS			\$88,125,000	\$101,489,396	\$11,515,000	\$58,650,000	\$5,836,440,000
TOTAL VALUE OF JOBS CREATED	\$3,401,681,200	\$5,020,501,598	\$430,950,000	\$190,174,916	\$15,874,718	\$767,046,080	\$46,394,032,000
Benefit:Cost ratio**	0.85	0.69	0.43	2.47	1.72	2.07	0.68
Perceived Index Value 1-10	6	7	9	4	3	8	5
Benefit:Cost ratio Indexed	5.1	4.8	3.9	9.9	5.2	16.6	3.4
No. of jobs created using \$68 billion	1,292,502	1,045,144	183,600	829,158	852,924	818,757	53,250
More/(less) jobs than HSR Project	1,239,252	991,894	130,350	775,908	799,674	765,507	-
Cost per job	\$52,611	\$65,063	\$370,370	\$82,011	\$79,726	\$83,053	\$1,276,995
No. of jobs created using \$68 billion	1,292,502	1,045,144	183,600	829,158	852,924	818,757	53,250
Jobs created factor	24	20	3	16	16	15	1
*no incremental new operating jobs would be created							
**value of jobs divided by initial investment							

APPENDIX B – HOW MUCH \$68 BILLION CAN FUND FOR ALTERNATIVE PROJECTS

	ROADS AND HWY REPAIRS and MAINTENANCE	BRIDGE REPAIRS and MAINTENANCE	Desalination Plant-Carlsbad (new construction)	Elementary School (new construction)	City Park with Recreation Ctr (new construction)	Water Purification Plant (Tillman Center)
INITIAL TOTAL PROJECT/ INVESTMENT COST	\$4,016,478,241	\$7,304,069,633	\$1,000,000,000	\$77,000,000	\$9,208,150	\$370,000,000
Unit of measurement	miles	Bridges	plant(s)	school(s)	park(s)	plant(s)
Amount Funded	6507	6953	1	1	1	1
Each Unit	\$617,218	\$1,050,492	\$1,000,000,000	\$77,000,000	\$9,208,150	\$370,000,000
How much will \$68 billion fund?	110172 miles	64732 Bridges	68 plant(s)	883 school(s)	7385 park(s)	184 plant(s)
Perspective	Could go around equator 4.5x; could pay for 100% of all roads needing repair (18,862) nearly 6x over	could repair 100% of bridges 2.5 times over	At 50 million gallons per day per plant, could produce 1.2 trillion gallons per year	Equivalent to 15% of Calif. Elementary schools	Could provide every California city (incorporated, charter and general law) with 7.5 new parks each.	At 27 million gallons per day, could treat/produce 1.8 trillion gallons per year

APPENDIX C – HIGHWAY AND ROAD REPAIR ESTIMATED COSTS

Source: <http://capitolfax.com/summary.pdf>

<u>Models</u>	<u>Cost Per Mile</u>
URBAN	
New Construction 4 Lane Divided Urban Interstate Closed 22' Median with Barrier Wall 10' Shoulders Inside + Out	\$8,598,289.48
New Construction 5 Lane Undivided Urban Arterial with Center Turn Lane and 4' Bike Lanes	\$5,312,066.00
New Construction 6 Lane Urban Road with 22' Median and 4' Bike Lanes	\$6,386,655.68
New Construction Divided Urban 6 Lane Interstate with 22' Closed Median with Barrier Wall 10' Shoulders Inside + Out	\$9,543,509.41
New Construction Extra Cost for Additional Lane on Urban Arterial	\$515,867.67
New Construction Extra Cost for Additional Lane on Urban Interstate	\$555,802.41
Mill + Resurface 2 Lane Urban Road with 4' Bike Lanes	\$484,922.04
Mill + Resurface 3 Lane Urban Road with Center Turn Lane and 4' Bike Lanes	\$664,561.35
Mill + Resurface 4 Lane Undivided Urban Roadway with 4' Bike Lanes	\$954,929.65
Mill + Resurface 4 Lane Divided Urban Roadway with 4' Bike Lanes	\$965,050.62
Mill + Resurface 5 Lane Urban Roadway with Center Turn Lane and 4' Bike Lanes	\$1,143,408.13
Mill + Resurface 6 Lane Divided Urban Arterial with 4' Bike Lanes	\$1,514,689.09
Mill + Resurface 1 Additional Lane Urban Arterial	\$200,731.01
Add 2 Lanes to Existing 2 Lane Undivided Arterial 1 Lane Each Side with 4' Bike Lanes	\$3,646,379.66
Widen 2 Lane Urban Arterial to 4 Lane Divided with 22' Median + 4' Bike Lanes	\$4,230,437.93
Add 2 Lanes to Existing 3 Lane Undivided Arterial 1 Lane Each Side with Center Turn Lane and 4' Bike Lanes	\$3,830,330.97
Widen 4 Lane Urban Divided Arterial to 6 Lane Urban Divided with 22' Median and 4' Bike Lanes	\$3,938,157.45
Widen 4 Lane Urban Interstate with Closed Median to 6 Lanes Outside ` Mill + Resurface Existing` 10' Shoulders Outside	\$6,323,291.46
Widen 6 Lane Urban Divided Arterial to 8 Lane Urban Divided with 4' Bike Lanes	\$4,231,522.74
Widen 6 Lane Urban Interstate with Closed Median to 8 Lanes Outside ` Mill + Resurface Existing` 10' Shoulders Outside	\$6,809,415.57

APPENDIX D – SCHOOL STAFFING LEVEL ASSUMPTIONS

School staffing-operational	2007*	2014	No.	Extension
Principal	\$100,000	\$114,869	1	\$114,869
VP	\$90,000	\$103,382	1	\$103,382
Admin Staff	\$45,000	\$51,691	2	\$103,382
Teachers	\$55,000	\$63,178	21	\$1,326,732
Custodian	\$34,560	\$39,699	2	\$79,397
Cafeteria	\$19,000	\$21,825	2	\$43,650
Nurse	\$36,000	\$41,353	1	\$41,353
Librarian	\$37,000	\$42,501	1	\$42,501
Aides	\$16,380	\$18,815	3	\$56,446
		TOTAL	34	\$1,911,712
			Weighted Average	\$56,226.81

*source: LAUSD database 2007 (salary \$ only)

**based on Stonehurst Elementary webpage and phone interview for non-teacher staff

**APPENDIX E – HISTORY OF HIGH SPEED RAIL COST ESTIMATES ACCORDING TO
CHSRA**

History of Construction Cost Estimates		
\$16.5 billion	1996	<u>September 1996 Final Report of the California Intercity High Speed Rail Commission</u>
\$25 billion	2000	<u>2000 California High-Speed Train Business Plan</u>
\$37 billion	2005	<u>August 2005 California High-Speed Train Final Program Environmental Impact Report/Environmental Impact Statement</u>
\$45 billion	2008	<u>July 7, 2008 Senate Appropriations Committee Fiscal Study of Assembly Bill 3034</u>
\$45 billion	2008	<u>Analysis by the Legislative Analyst in the Official Voter Information Guide for the November 4, 2008 Election – Prop 1A – Safe, Reliable High-Speed Passenger Train Bond Act</u>
\$33.6 billion	2008	<u>November 2008 California High-Speed Train Business Plan</u>
\$43 billion	2011	<u>May 2011 Report of the California Legislative Analyst’s Office</u>
\$98.1 billion	2011	<u>November 1, 2011 California High-Speed Rail Program Draft 2012 Business Plan</u>
\$68.4 billion	2012	<u>April 12, 2012 California High-Speed Rail Authority Revised 2012 Business Plan</u>

APPENDIX F – STATEWIDE ALIGNMENT MAP FOR PHASE 1

Blue Line is Phase 1

