

**2016 Business Plan RECORD DETAIL**

**Submission Date :** 3/30/2016

**Submission Method :** Project Email

**First Name :** Cindy

**Last Name :** Bloom

**Stakeholder Comments/Issues :** >

>

> Dear California High Speed Rail Authority:

>

> Please see the attached reports (one of which is revised); consider them my comments.

> 1. Analysis of 2016 Draft Business Plan Capital Cost Basis of Estimate

> 2. 2016 Draft Business Plan Ridership/Revenue and Projected Cashflow  
REVISED

>

> In summary, the capital cost projection is incomplete as it leaves out many presumably expensive components and compares the 2016 figure to the 2014 figure, when instead, it should be comparing the 2016 figure to, at minimum, the 2008 figure which was the basis for voters' marginal approval of Prop 1A. Additionally, the revenue projections are just pure bunk.

>

> One issue which I have never seen addressed is: If private investor(s) do provide equity to the project, in what proportion or priority do they recoup their investment? Do they keep 100% of operating revenue or it is based on the amount of their equity stake? Do the taxpayers recoup any sunk costs?

>

> Your agency frequently boasts of its transparency and this 2016 draft business plan is just that: Transparent. It is easy to recognize when a fiscal target is set and then input variables are manipulated. Your 2016 draft business plan is a textbook case of fudging numbers. Congratulations!

>

> Thank you.

>

> Cindy Bloom, M.B.A.

>

>

**Notes :**

**Attachments :**

2016 Draft Business Plan Ridership & Cashflow.Rev.Final.pdf (1 mb)  
Analysis of 2016 Draft Bus Plan Capital Cost.Final.pdf (1 mb)

**ANALYSIS OF CALIFORNIA HIGH SPEED RAIL AUTHORITY'S  
RIDERSHIP/REVENUE AND PROJECTED CASH FLOW**

**Draft 2016 Business Plan  
and  
Technical Supporting Document**



**March 9, 2016 Revised March 28, 2016  
By Cindy Bloom**

## TABLE OF CONTENTS

<b>ABSTRACT .....</b>	<b>3</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>3</b>
<b>INTRODUCTION.....</b>	<b>4</b>
<b>PURPOSE.....</b>	<b>5</b>
<b>SCOPE AND METHODOLOGY .....</b>	<b>5</b>
<b>DRAFT 2016 BUSINESS PLAN CORRIDOR SUMMARY .....</b>	<b>5</b>
<b>2014 ADOPTED BUSINESS PLAN CORRIDOR SUMMARY .....</b>	<b>6</b>
<b>VALLEY TO VALLEY MAP .....</b>	<b>8</b>
<b>PROJECTED HIGH SPEED TRAIN FARES AND REVENUE .....</b>	<b>8</b>
<b>RIDERSHIP VOLUME .....</b>	<b>10</b>
<b>WHO ARE THESE PASSENGERS?.....</b>	<b>14</b>
<b>COST OF COMMUTING USING HIGH SPEED TRAIN - IOS .....</b>	<b>15</b>
<b>COST OF COMMUTING USING HIGH SPEED TRAIN – IOS – ASSUMING HIGH PAID JOB IN     SILICON VALLEY.....</b>	<b>15</b>
<b>TRAVEL SAVINGS IN MINUTES BY USING HIGH SPEED TRAIN .....</b>	<b>16</b>
<b>CASH FLOW ANALYSIS.....</b>	<b>17</b>
<b>CONCLUSION.....</b>	<b>19</b>
<b>HIGH-SPEED RAIL SYSTEM MAP .....</b>	<b>21</b>

## ABSTRACT

On February 18, 2016, the California High Speed Rail Authority (CHSRA) released its draft 2016 Business Plan (2016 Draft BP), which is comprised of several documents, including *Ridership and Revenue Forecasting* and *High, Medium and Low Cash Flows*. These documents are vital in convincing private investors to provide equity capital for the venture as soon as possible so that the California State Legislature can approve the sale of the \$9 billion in bonds to help fund the \$64.2 billion project. CHSRA is in a catch-22: They need the Prop 1A bond money to build the system to attract private investors but in order to be in compliance with Prop 1A, they need private investors to issue the bonds to build the system. The ridership revenue projections and cash flow models must provide enough of a return on investment to assuage potential private investors' fears and persuade them to invest. This analysis suggests the CHSRA has exercised liberties in inflating the 2016 Draft BP revenue numbers in order to achieve this goal.

## EXECUTIVE SUMMARY

CHSRA has essentially turned their statewide high-speed train into a high-cost commuter train for the revised IOS although few people could afford it (a commuter from Fresno to San Jose would spend \$27,000 annually on train fare).

When dissected, the 2016 Draft BP's first year of operation breaks down to 11,233 (high), 7,794 (medium), and 6,027 (low) passengers riding *daily* within the IOS which runs from one metropolitan area (San Jose) to the Central Valley, California's agricultural area.

Average ridership increases from the 2014 BP to the 2016 Draft BP range from 22% to 29%--double-digit increases--with no legitimate explanation. CHSRA merely states, "Forecasts reflect an enhanced travel demand model."

The ridership farce flows through to its cash flow projections. There is no explanation why the 2016 Draft BP net cash flow increased 66% to 132% over the 2014 BP. It is even loftier based on a 5% discounted cash flow, ranging from 83% to 150%. While the 2014 BP includes the capital cost as part of its cash flow, it is suspiciously absent from the 2016 Draft BP's cash flow projection.

If CHSRA actually meets their incredibly aggressive ridership targets, they will be forced to purchase and operate more train sets at a cost of \$49 million each beyond the budgeted 70 at full build-out.

It is clear that in CHSRA's desperation, they inflated their ridership/revenue figures in order to present a picture of fiscal viability to (1) prospective investors and (2) taxpayers.

## INTRODUCTION

The *Ridership and Revenue Forecasting* is a very statistical, and difficult to follow document. It was prepared by Cambridge Systematics, Inc., a transportation modeling and analytics firm for Parsons Brinckerhoff. Rather than using straight-forward and verifiable traditional financial forecasting models, it instead relied exclusively on multiple input variables through multiple regression analyses; the last step was running the data through a simulation program 50,000 times. These tools, while helpful, only add to the convoluted ridership and resultant revenue figures that became the basis for the cash flow document. While probabilities can be useful, it is similar to forecasting the weather. If there is a 30% chance of rain, the end result ultimately is that it either rained or it didn't. The same can be said for the revenue and ridership projections. Even if there is a 95% chance that the project will achieve break-even or surplus in any given year: either it will – or it won't.

Operating revenue is the backbone of every company. Every company at minimum is measured by its revenue, profit and cash flow. It uses these key ratios to compare its own earnings year over year, and to other companies within the same industry. If any of these items are deficient or trending downwards, a company cannot sustain its operations and will eventually be faced with the daunting and difficult decision of how to proceed. The most immediate strategy is to reduce expenses but if this solution is insufficient, a company may seek a buyer, merge with another company, declare bankruptcy, or in the worst case, go out of business.

CHSRA is not a privately held company, but instead is a governmental agency that is managing the construction of the largest infrastructure project in the history of the United States and is not held to the rigorous universally accepted accounting standards imposed in private industry. There are other governmental public works projects, such as freeways, road and bridges, that are also not subject to profit and loss or cash flow measurements as they provide the infrastructure for others to utilize. There are, however, other projects' whose operations are sustained by user fees, for example water reclamation plants, power plants, etc. These projects intend to be self-sustaining and have the ability to raise rates in order to cover their costs. Most public works projects during the construction phase are funded in large part by debt (bonds) and are subject to reporting requirements in order to maintain their bond rating and other compliance issues. For CHSRA to successfully complete the high-speed train project, it must present positive cash flow, otherwise: (1) it cannot attract private investment dollars to assist the funding of construction; (2) without these private investment dollars, it also cannot unlock the balance of the \$9 billion in Prop 1A bonds in order to fund construction; and (3) it will be unable to sell the concession once the infrastructure is built. It is also required to provide matching funds for several federally funded grants and could potentially lose several billion dollars if it fails to meet its deadlines. If any of these criteria are not met, the project is doomed.

## PURPOSE

The purpose of this report is to scrutinize the 2016 Draft BP’s ridership revenue and resultant cash flow projections while also attempting to answer the following questions:

1. Are the ridership (number of passengers) projections attainable and/or reasonable?
2. Are the ridership revenue projections attainable and/or reasonable?
3. Is the projected cash flow attainable and/or reasonable?

## SCOPE AND METHODOLOGY

The 2016 Draft BP is comprised of several documents:

- Connecting and Transforming California (100 pages, main document)
- Capital Cost Basis of Estimate Report (49 pages)
- High, Medium, Low Cash Flows (12 pages)
- 50-Year Lifecycle Capital Cost Model Documentation (74 pages)
- Service Planning Methodology (18 pages)
- Ridership and Revenue Forecasting (62 pages)

This analysis examines the revenue portion of the *Connecting and Transforming California, Ridership and Revenue Forecasting*; and *High, Medium, Low Cash Flows*. This report will not address the Initial Operation Section Extended because it is contingent upon CHSRA securing additional federal funding to complete.

### DRAFT 2016 BUSINESS PLAN CORRIDOR SUMMARY

Section	Length in Miles	From/To	Operational	Cumulative Cost (billions) 2015\$ / YOE <sup>1</sup>
IOS <sup>2</sup>	250	San Jose and North of Bakersfield (aka Valley to Valley/ Silicon Valley to Central Valley)	2025	\$18.7 / \$20.7
Initial Operation Section Extended	321	San Francisco to Bakersfield (aka Valley to Valley Extension/ Silicon Valley to Central	2025	Unk / \$22.7

<sup>1</sup> Year of Expenditure, adjusted for future inflation

<sup>2</sup> Formerly was Merced to San Fernando Valley

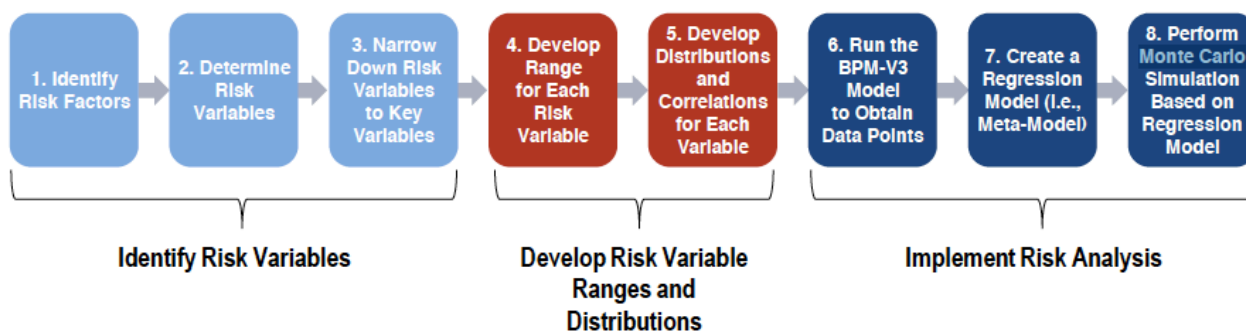
		Valley Extension)		
<b>Phase 1</b>	<b>520</b>	<b>San Francisco/Merced to Anaheim</b>	<b>2029</b>	<b>\$55.3 / \$64.2</b>
Phase 2	280	Merced to Sacramento; Los Angeles to San Diego		

**2014 ADOPTED BUSINESS PLAN CORRIDOR SUMMARY**

<b>Section</b>	<b>Length in Miles</b>	<b>From/To</b>	<b>Operational</b>	<b>Cumulative Cost (billions) YOE</b>
IOS	300	Merced to San Fernando Valley	2022	\$31
Bay to Basin	410	San Jose and Merced to San Fernando Valley	2026	\$51
<b>Phase 1 Blended</b>	<b>520</b>	<b>San Francisco to Los Angeles/Anaheim</b>	<b>2028</b>	<b>\$68</b>

CHSRA utilized a very complex methodology to arrive at their ridership, revenue, and cash flow estimates as illustrated in Figure 7.1. Although it appears to be a very comprehensive approach, the problem is that it is over-complicating the process and over calculating by averaging averages. The final process, the Monte Carlo Simulation, was run 50,000 times. It is unclear whether or not CHSRA or its contractor, Cambridge Systematics, Inc., kept running the simulation until they came up with projections that met their goals or whether 50,000 is considered a standard number of times to run the simulation model.

**Figure 7.1 Risk Analysis Approach**



The 2016 Draft BP contains projections in 2015 dollars (2015\$) and Year of Expenditure dollars (YOES)<sup>3</sup>. For easy comparison and familiarity to today’s travel fares, unless otherwise stated,

<sup>3</sup> The familiar \$64.2 or \$68 billion figure for capital costs is in YOES

this report uses 2015\$ instead of YOE\$. CHSRA uses two sets of forecasts and cost estimates below:

- Silicon Valley to Central Valley line – (Valley to Valley) - One scenario assumes that operations begin on the Silicon Valley to Central Valley line from San Jose to a station north of Bakersfield in 2025 (construction completed in 2024) and on the entire Phase 1 system from San Francisco and Merced to Los Angeles and Anaheim in 2029.
- Silicon Valley to Central Valley Extension (not included in the scope of this study) - A second scenario runs from Silicon Valley to Central Valley to San Francisco and Bakersfield. This scenario also assumes operations starting in 2025 and the Phase 1 system opening in 2029. Together these extensions would provide a one-seat ride from Bakersfield to San Francisco. Because this scenario is dependent upon securing additional funding, it is not examined in this report.

Ridership and revenue forecasts in the 2016 Draft BP reflect an “enhanced” travel demand model and changes to some key assumptions. There are several key differences between the forecasts presented in the 2014 BP and the forecasts presented in the 2016 Draft BP including:

- The 2016 Draft BP assumes that service will start on the line from San Jose to north of Bakersfield (to an interim facility that functions as a temporary station) and evaluates an additional scenario extending service to San Francisco and Bakersfield that had not been analyzed in the 2014 BP (not within the scope of this report). It also assumes a Phase 1 system that offers a one-seat ride to Anaheim; ridership and revenue forecasts in the 2014 BP assumed a Phase 1 southern terminal in Los Angeles.
- Forecasts reflect an “enhanced” travel demand model that incorporates the latest available input data, new variables that better reflect travel behavior and adjustments to the transit access network and station locations.



VALLEY TO VALLEY MAP

Figure 3.1 Silicon Valley to Central Valley Line



PROJECTED HIGH SPEED TRAIN FARES AND REVENUE

While other comparisons were utilized in order to estimate projected fares, airfare prices were the governing basis and CHSRA used 77% to 80% of these current prevailing airfare prices within or close to the same travel corridors. The following chart contains the presumed fares in 2015 dollars. Although the IOS is actually “North of Bakersfield,” the following chart has no fare for this as a terminus station<sup>4</sup>. According to Table 3.1, for the IOS, a one-way fare from San Jose ranges from a low of \$19 (Gilroy) to a high of \$83 (Bakersfield).

<sup>4</sup> This will be a temporary station

**Table 3.1 Assumed High-Speed Rail Fares**  
2015 Dollars

High-Speed Rail Stations	San Francisco (Transbay)	Millbrae	San Jose	Gilroy	Merced	Fresno	Kings/Tulare	Bakersfield	Palmdale	Burbank Airport	Los Angeles Union Station	Gateway Cities/ Orange County	Anaheim
San Francisco (Transbay)		\$18	\$23	\$25	\$59	\$70	\$78	\$89	\$89	\$89	\$89	\$89	\$89
Millbrae			\$20	\$24	\$59	\$70	\$77	\$89	\$89	\$89	\$89	\$89	\$89
San Jose				\$19	\$56	\$63	\$68	\$83	\$89	\$89	\$89	\$89	\$89
Gilroy					\$52	\$59	\$65	\$78	\$89	\$89	\$89	\$89	\$89
Merced						\$45	\$52	\$67	\$85	\$86	\$89	\$89	\$89
Fresno							\$40	\$56	\$74	\$75	\$78	\$81	\$84
Kings/Tulare								\$51	\$67	\$68	\$74	\$76	\$78
Bakersfield <sup>9</sup>									\$51	\$52	\$56	\$58	\$60
Palmdale										\$32	\$33	\$34	\$36
Burbank Airport											\$27	\$30	\$32
Los Angeles Union Station												\$27	\$30
Gateway Cities/ Orange County													\$27
Anaheim													

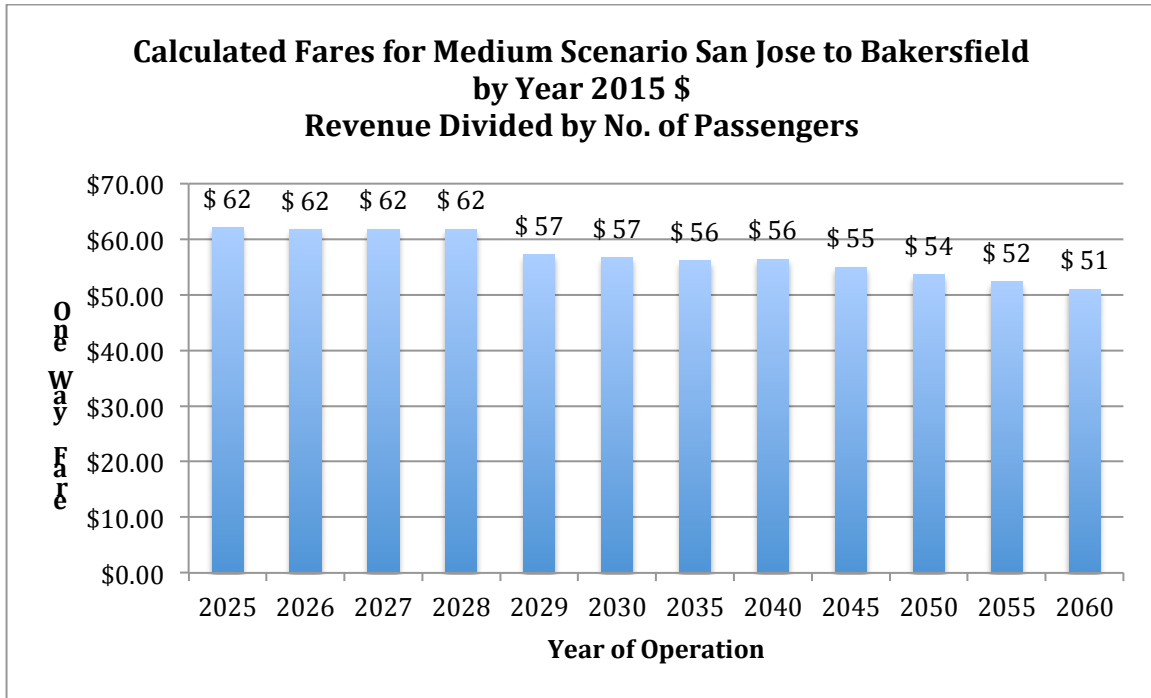
Source: Cambridge Systematics, Inc.

The following is the projected revenue that was used to calculate average fares. For example, year 2025: \$255,000,000 (revenue) divided by 4,100,000 (ridership) = \$62.20.

	FAREBOX REVENUE: SAN JOSE - NORTH OF BAKERSFIELD (2015 dollars)											
	(SILICON VALLEY TO CENTRAL VALLEY LINE) THROUGH PHASE 1 (IN MILLION OF 2015 \$)											
	2025	2026	2027	2028	2029	2030	2035	2040	2045	2050	2055	2060
	VALLEY TO VALLEY	VALLEY TO VALLEY	VALLEY TO VALLEY	VALLEY TO VALLEY	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1
High	\$255	\$351	\$447	\$543	\$1,460	\$1,793	\$2,927	\$3,139	\$3,218	\$3,299	\$3,383	\$3,468
Medium	\$180	\$247	\$315	\$383	\$1,098	\$1,360	\$2,250	\$2,413	\$2,474	\$2,537	\$2,601	\$2,666
Low	\$140	\$193	\$246	\$299	\$859	\$1,064	\$1,761	\$1,889	\$1,936	\$1,985	\$2,035	\$2,087

When backing into an average fare based on total revenue and ridership, the average fare comes to around \$62 for the IOS (2025 through 2028). This implies that Fresno would be the most common origin or destination. As the years progress, the fare prices trend downwards, meaning that more passengers are opting for shorter routes. There are several station-to-station permutations that fall within \$50 - \$57 fare range.

	AVERAGE TICKET PRICE (CALCULATED: RIDERSHIP DIVIDED BY REVENUE)											
	2025	2026	2027	2028	2029	2030	2035	2040	2045	2050	2055	2060
	VALLEY TO VALLEY	VALLEY TO VALLEY	VALLEY TO VALLEY	VALLEY TO VALLEY	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1	PHASE 1
High	\$62.20	\$61.58	\$61.23	\$61.01	\$56.37	\$55.86	\$55.02	\$55.26	\$53.90	\$52.62	\$51.34	\$50.04
Medium	\$62.07	\$61.75	\$61.76	\$61.77	\$57.19	\$56.67	\$56.11	\$56.38	\$54.98	\$53.64	\$52.33	\$50.98
Low	\$63.64	\$62.26	\$63.08	\$62.29	\$57.65	\$57.20	\$56.62	\$56.90	\$55.47	\$54.09	\$52.86	\$51.53



Since there is limited air service between many of the cities, the train would fill that gap, however, at a relatively high cost when compared to taking a bus or driving. While conventional trains are also an alternate mode of transportation, they are not addressed.

### RIDERSHIP VOLUME

The 2016 Draft BP uses three scenarios for ridership: high, medium and low, starting in 2025. Phase 1 (San Francisco to Anaheim) becomes operational in 2029. In each scenario, the annual increase in ridership is aggressive through 2035. From 2025 to 2028, the average annual increase over the prior year ranges from 22% to 41%. Then, in 2029 when Phase 1 becomes operational, the increase over 2028 ranges from 191% to 210%.

**RIDERSHIP: SAN JOSE - NORTH OF BAKERSFIELD**

**(SILICON VALLEY TO CENTRAL VALLEY LINE) THROUGH PHASE 1 (IN MILLIONS OF RIDERS)**

	2025	2026	2027	2028	2029	2030	2035	2040	2045	2050	2055	2060
	VALLEY TO VALLEY	VALLEY TO VALLEY	VALLEY TO VALLEY	VALLEY TO VALLEY	PHASE 1	PHASE 1	PHASE 1*	PHASE 1*	PHASE 1*	PHASE 1*	PHASE 1*	PHASE 1*
High Ridership	4.1	5.7	7.3	8.9	25.9	32.1	53.2	56.8	59.7	62.7	65.9	69.3
Yrly Increase in volume		1.6	1.6	1.6	17.0	6.2	4.2	0.7	0.6	0.6	0.6	0.7
Increase in %		39%	28%	22%	191%	24%	13%	1%	1%	1%	1%	1%
Medium Ridership	2.9	4.0	5.1	6.2	19.2	24.0	40.1	42.8	45.0	47.3	49.7	52.3
Yrly Increase in volume		1.1	1.1	1.1	13.0	4.8	3.2	0.5	0.4	0.5	0.5	0.5
Increase in %		38%	28%	22%	210%	25%	13%	1%	1%	1%	1%	1%
Low Ridership	2.2	3.1	3.9	4.8	14.9	18.6	31.1	33.2	34.9	36.7	38.5	40.5
Yrly Increase in volume		0.9	0.8	0.9	10.1	3.7	2.5	0.4	0.3	0.4	0.4	0.4
Increase in %		41%	26%	23%	210%	25%	13%	1%	1%	1%	1%	1%

\*divided by 5 due to projection changing from annual to every 5 years

The daily ridership seems unattainable, especially in the “High” scenario. CHSRA asserts that over 11,000 passengers will ride the IOS the first year of operation, increasing to nearly over 24,000 by year 2028. When Phase 1 becomes operational, their estimate soars to almost 71,000 daily passengers.

In comparison, Bob Hope Airport served nearly 2 million outbound passengers (5,479 per day) and nearly 2 million inbound (5,400 per day) for 2015. CHSRA is claiming that it will serve more passengers in its first year of operation for a segment that is only 250 miles long and only serves one metro area (San Jose). The other terminus station isn’t even in Bakersfield—it is 20 miles north of Bakersfield in the town of Shafter, population of 17,000. In contrast, Bob Hope Airport is a regional airport with service to the entire country, including Hawaii and Alaska.

**RIDERSHIP IN MILLIONS**

	VALLEY TO VALLEY	VALLEY TO VALLEY	VALLEY TO VALLEY	VALLEY TO VALLEY	PHASE 1	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 6	PHASE 7
Scenario	2025	2026	2027	2028	2029	2030	2035	2040	2045	2050	2055	2060
High	4.1	5.7	7.3	8.9	25.9	32.1	53.2	56.8	59.7	62.7	65.9	69.3
Medium	2.9	4.0	5.1	6.2	19.2	24.0	40.1	42.8	45.0	47.3	49.7	52.3
Low	2.2	3.1	3.9	4.8	14.9	18.6	31.1	33.2	34.9	36.7	38.5	40.5

**RIDERSHIP PER DAY (WEEKDAYS AND WEEKENDS)**

Scenario	2025	2026	2027	2028	2029	2030	2035	2040	2045	2050	2055	2060
High	11,233	15,616	20,000	24,384	70,959	87,945	145,753	155,616	163,562	171,781	180,548	189,863
Medium	7,945	10,959	13,973	16,986	52,603	65,753	109,863	117,260	123,288	129,589	136,164	143,288
Low	6,027	8,493	10,685	13,151	40,822	50,959	85,205	90,959	95,616	100,548	105,479	110,959

How do these ridership estimates compare to the ridership estimates in the 2014 BP? In order to compare apples to apples, this analysis will examine Phase 1 because both business plans have Phase 1 running from San Francisco to Anaheim and covering 520 miles. In order to be further comparable, the “matching” is based on year of operation, not calendar year.

2016 Draft Business Plan Ridership Estimates (Millions) - PHASE 1									
Operation Year No.	Year 1	Year 2	Year 7	Year 12	Year 17	Year 22	Year 27	Year 32	Average
Year of Operation	2029	2030	2035	2040	2045	2050	2055	2060	
High Ridership	25.9	32.1	53.2	56.8	59.7	62.7	65.9	69.3	<b>53.2</b>
Medium Ridership	19.2	24.0	40.1	42.8	45.0	47.3	49.7	52.3	<b>40.1</b>
Low Ridership	14.9	18.6	31.1	33.2	34.9	36.7	38.5	40.5	<b>31.1</b>

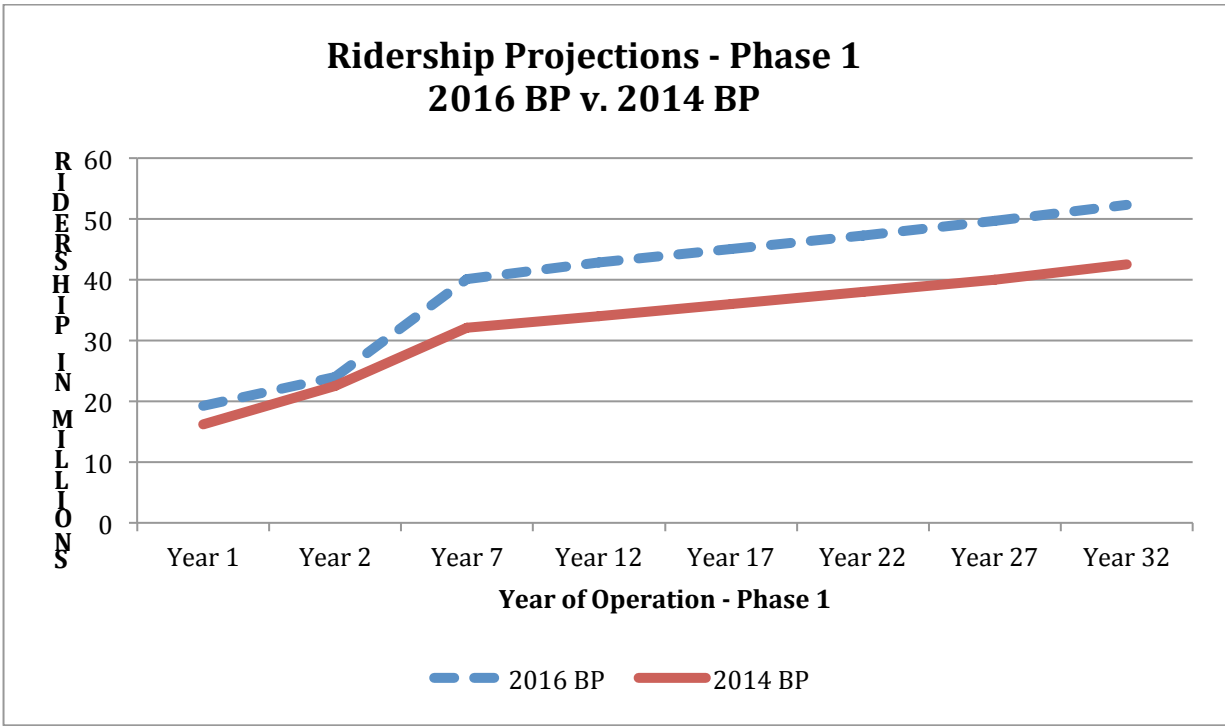
2014 Adopted Business Plan Ridership Estimates (Millions) - PHASE 1									
Operation Year No.	Year 1	Year 2	Year 7	Year 12	Year 17	Year 22	Year 27	Year 32	Average
Year of Operation	2028	2029	2034	2039	2044	2049	2054	2059	
High Ridership	23.0	28.0	41.4	44.9	47.0	49.5	52.0	54.9	<b>42.6</b>
Medium Ridership	16.2	22.5	32.1	34.0	36.0	38.0	40.0	42.5	<b>32.7</b>
Low Ridership	13.0	12.5	24.1	26.0	27.0	28.0	30.0	31.9	<b>24.1</b>

Change in Ridership Figures (Millions) 2016 versus 2014 - PHASE 1									
	Year 1	Year 2	Year 7	Year 12	Year 17	Year 22	Year 27	Year 32	Average
Year of Operation 2016	2029	2030	2035	2040	2045	2050	2055	2060	
Year of Operation 2014	2028	2029	2034	2039	2044	2049	2054	2059	
High Ridership	2.9	4.1	11.8	11.9	12.7	13.2	13.9	14.4	<b>10.6</b>
2016 +/- 2014 %	13%	15%	29%	27%	27%	27%	27%	26%	<b>24%</b>
Medium Ridership	3.0	1.5	8.0	8.8	9.0	9.3	9.7	9.8	<b>7.4</b>
2016 +/- 2014 %	19%	7%	25%	26%	25%	24%	24%	23%	<b>22%</b>
Low Ridership	1.9	6.1	7.0	7.2	7.9	8.7	8.5	8.6	<b>7.0</b>
2016 +/- 2014 %	15%	49%	29%	28%	29%	31%	28%	27%	<b>29%</b>

With no plausible explanation except for the word “enhanced,” the 2016 Draft BP increased its ridership figures over the 2014 BP for Year 1 of operation by 2.9 million, 3 million, and 1.9 million for the high, medium, and low scenarios respectively. The average increase ranges from 22% (medium scenario) to 29% (low scenario) (note that these are done in 5 year increments with the exception of years 1 and 2).

The increase in daily ridership for 2016 Draft BP over 2014 BP is aggressive. Even the “low scenario” of an increase of 5,205 is nearly the same number of Bob Hope Airport’s daily outbound passenger figure of 5,479.

Change in Ridership Figures 2016 versus 2014 - PHASE 1 DAILY									
Operation Year No.	Year 1	Year 2	Year 7	Year 12	Year 17	Year 22	Year 27	Year 32	Average
Year of Operation	2028	2029	2034	2039	2044	2049	2054	2059	
High Ridership	7,945	11,233	32,329	32,603	34,795	36,164	38,082	39,452	<b>29,075</b>
Medium Ridership	8,219	4,110	21,918	24,110	24,658	25,479	26,575	26,849	<b>20,240</b>
Low Ridership	5,205	16,712	19,178	19,726	21,644	23,836	23,288	23,562	<b>19,144</b>



According to CHSRA’s incredible ridership projections, it would not have enough trains to satisfy demand. The 2016 Draft BP states it will have 70 trains at full build-out, which is consistent with the number of trains per hour during peak (3 hours in the morning and 3 hours in the evening) and non-peak (10 hours). According to the Request For Expressions of Interest (RFEI) for train sets, each train must have a minimum of 450 passenger seats.

Scenario	RIDERSHIP PER DAY (WEEKDAYS AND WEEKENDS)											
	2025	2026	2027	2028	2029	2030	2035	2040	2045	2050	2055	2060
High	11,233	15,616	20,000	24,384	70,959	87,945	145,753	155,616	163,562	171,781	180,548	189,863
Medium	7,945	10,959	13,973	16,986	52,603	65,753	109,863	117,260	123,288	129,589	136,164	143,288
Low	6,027	8,493	10,685	13,151	40,822	50,959	85,205	90,959	95,616	100,548	105,479	110,959
No. of Runs	44	44	44	44	196	196	196	196	196	196	196	196

Passengers per train												
High	255	355	455	554	362	449	744	794	834	876	921	969
Medium	181	249	318	386	268	335	561	598	629	661	695	731
Low	137	193	243	299	208	260	435	464	488	513	538	566

% Train Capacity Based on 450 Seats per Train												
High	57%	79%	101%	123%	80%	100%	165%	176%	185%	195%	205%	215%
Medium	40%	55%	71%	86%	60%	75%	125%	133%	140%	147%	154%	162%
Low	30%	43%	54%	66%	46%	58%	97%	103%	108%	114%	120%	126%

To meet this astonishing demand, and assuming that each train has exactly 450 seats, additional train sets would need to be purchased at a cost of \$49 million each. Not only will additional train sets have to be purchased, but also they will require additional recurring O&M including operating personnel expense. At an average fare of \$57, it would require 860,000 tickets to pay for 1 train set, excluding recurring O&M.

Additional Number of Trains Needed to Satisfy Demand												
High	-	-	1	1	-	-	1	1	1	1	2	2
Medium	-	-	-	-	-	-	1	1	1	1	1	1
Low	-	-	-	-	-	-	-	1	1	1	1	1
Additional Capital Cost to Purchase Train Sets @ \$49 million each (2015 \$)												
High	\$0	\$0	\$49	\$49	\$0	\$0	\$49	\$49	\$49	\$49	\$98	\$98
Medium	\$0	\$0	\$0	\$0	\$0	\$0	\$49	\$49	\$49	\$49	\$49	\$49
Low	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$49	\$49	\$49	\$49	\$49

Comparison to Eurostar service from London to Paris. In 1996, London and Continental Railways (which have true expertise in forecasting ridership figures) predicted that passenger numbers would reach 21.4 million annually by 2004, 10 years after its opening in 1994, but only 7.3 million (34%) was achieved. This is particularly important to realize because, unlike the CHSRA high-speed train, the only transportation competition that the Eurostar has is air service. As airlines reduced their fares, the Eurostar had to reduce theirs in order to maintain competitive.

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.

**WHO ARE THESE PASSENGERS?**

CHSRA assumes that their passengers will include business travelers, commuters, and recreational travelers. The noted variables that affect ridership include auto operating costs, high-speed rail fares, frequency of service, bus connections, high-speed train station proximity to passengers’ points of origin and destination, and airfares. CHSRA contends that the initial operating section from San Jose to North of Bakersfield<sup>5</sup> (Valley to Valley) will allow residents in the now affordable Central Valley to commute to jobs in Silicon Valley, providing them with a relatively short commute when compared to driving. It is true that travel time is greatly reduced, but it is an expensive mode of transportation for commuting. Additionally, once one arrives at his/her destination, additional transportation may be needed in order to get to one’s place of employment. The time “savings” could be greatly reduced if the passenger has to endure additional time getting to/from the HSR station on either or both ends of their journey.

The following chart illustrates how much it would cost for a commuter to travel from/to San Jose to/from various stations along the Valley to Valley segment.

---

<sup>5</sup> 20 miles north of Bakersfield which means a passenger must somehow get there to catch a high-speed train

### COST OF COMMUTING USING HIGH SPEED TRAIN - IOS

No. of weeks (assumes 2 vacation weeks/yr and 10 holidays/yr): 48

Round trip; assumes 10% discount for a pre-paid pass for monthly and annual<sup>6</sup>

San Jose to/from:	Gilroy	Fresno	Kings/Tulare	Bakersfield
Daily	\$38	\$126	\$136	\$166
Weekly	\$190	\$630	\$680	\$830
Monthly	\$735	\$2,438	\$2,632	\$3,212
Annually	\$8,208	\$27,216	\$29,376	\$35,856
Annual Median Income	\$81,056	\$45,201	\$42,863	\$48,574
After-tax	\$71,329	\$37,517	\$35,576	\$40,316
HSR Cost as % after tax	12%	73%	83%	89%

It becomes clear that using the high-speed train is *not* an affordable commute. It is possible that an employer would provide a commuting subsidy but that is outside the scope of this report. Let us further assume that the commuter who lives in the Central Valley is traveling to San Jose because he/she secured a higher paying job in Silicon Valley:

### COST OF COMMUTING USING HIGH SPEED TRAIN – IOS – ASSUMING HIGH PAID JOB IN SILICON VALLEY

No. of weeks (assumes 2 vacation weeks/yr and 10 holidays/yr): 48

Round trip; assumes 10% discount for a pre-paid pass for monthly and annual

San Jose to/from:	Gilroy	Fresno	Kings/Tulare	Bakersfield
Daily	\$38	\$126	\$136	\$166
Weekly	\$190	\$630	\$680	\$830
Monthly	\$735	\$2,438	\$2,632	\$3,212
Annually	\$8,208	\$27,216	\$29,376	\$35,856
Annual Median Income*	\$81,056	\$93,854	\$93,854	\$93,854
After-tax	\$71,329	\$82,592	\$82,592	\$82,592
HSR Cost as % after tax	12%	33%	36%	43%

\*Santa Clara County (Silicon Valley) median income for Central Valley commuters only; no adjustment for Gilroy

Even if commuters now earned a Silicon Valley salary, the high-speed train commute is still unaffordable for most commuters.

With the exception of to/from San Jose to/from Gilroy, a high-speed train will be faster than a bus or car<sup>7</sup> and it is doubtful that one would spend \$19 one-way for a 33-mile trip:

<sup>6</sup> Not included in CHSRA documents but it is common to offer discounted passes for public transportation

<sup>7</sup> “Car” includes SUVs, trucks and other motorized vehicles



**TRAVEL SAVINGS IN MINUTES BY USING HIGH SPEED TRAIN**

<b>San Jose to/from:</b>	<b>Gilroy</b>	<b>Fresno</b>	<b>Kings/Tulare</b>	<b>Bakersfield</b>
Bus	9	173	344	435
Car	2	127	171	208

The main factor for choosing a high-speed train for transportation is how it compares in terms of cost, convenience, and time saved to other modes of transportation. CHSRA is attempting to schedule its service times to coincide with bus and conventional rail schedules so that passengers can link to these if they need to continue their travels beyond high-speed rail stations and/or to get to their final destination within a short distance of the high-speed train station.

It is uncertain if passengers would be willing to pay \$83 each way (\$53<sup>8</sup> more than driving) to/from Bakersfield to/from San Jose, and then deal with the inconvenience and additional cost of finding short-distance transportation from point of origin and again at the destination, to save less than 2 hours (and less than that if additional transportation is needed to travel to/from the high speed rail station).

<b>San Jose to/from:</b>	<b>Gilroy</b>	<b>Fresno</b>	<b>Kings/Tulare</b>	<b>Bakersfield</b>
<b>HSR No. Minutes</b>	32	72	93	128
<b>Cost</b>	\$19.00	\$63.00	\$68.00	\$83.00
<b>Cost per Minute</b>	\$0.59	\$0.88	\$0.73	\$0.65
<b>Bus</b>				
<b>Bus No. Minutes</b>	41	205	376	467
<b>Cost</b>	\$10.50	\$33.00	\$45.00	\$55.00
<b>Cost per Minute</b>	\$0.26	\$0.16	\$0.12	\$0.12
<b>Car</b>				
<b>Car</b>	34	159	203	240
<b>Cost</b>	\$4.00	\$19.50	\$24.50	\$30.00
<b>Cost per Minute</b>	\$0.12	\$0.12	\$0.12	\$0.13
<b>HSR Cost above in \$</b>				
<b>Bus</b>	\$9	\$30	\$23	\$28
<b>Car</b>	\$15	\$44	\$44	\$53
<b>HSR Cost above %</b>				
<b>Bus</b>	81%	91%	51%	51%
<b>Car</b>	375%	223%	178%	177%
<b>HSR Cost Per Minute above in \$</b>				
<b>Bus</b>	\$0.34	\$0.71	\$0.61	\$0.53
<b>Car</b>	\$0.48	\$0.75	\$0.61	\$0.52
<b>HSR Cost above %</b>				

<sup>8</sup> This is on the high end, assuming peak prices for gasoline

<b>San Jose to/from:</b>	<b>Gilroy</b>	<b>Fresno</b>	<b>Kings/Tulare</b>	<b>Bakersfield</b>
Bus	132%	444%	511%	451%
Car	405%	613%	506%	419%

## CASH FLOW ANALYSIS

The 2016 Draft BP’s cash flow unashamedly excludes the capital investment/cost while the 2014 BP included it. Why? Simple: It scared off potential investors. At several community outreach meetings, CHSRA representatives stated that it does not include any investment cost as part of their return on investment (ROI) calculation; it is no wonder that CHSRA refuses to perform an ROI measured as an internal rate of return (IRR), as this is the result:

	<b>IRR</b>
High Revenue	0.64%
Medium Revenue	-1.18%
Low Revenue	-3.09%

Since the core reason for CHSRA to provide an attractive cash flow projection is to entice private investors to (1) become an equity partner during the construction phase and (2) to take over operations once the infrastructure has been completed, it is a certain project failure if that the cash flow projections fail to deliver satisfactory rates of return on investment.

According to CHSRA, even the “low” forecast will show positive cash flow from 2025 to 2060. The 2016 Draft BP cash flow projections also include ancillary revenue (1% of the total), which includes on-board sales, advertising, asset and right-of-way utilization and transit-oriented development opportunities<sup>9</sup>. Note that operation and maintenance (O&M) and capital replacement costs vary between the scenarios. It is presumed that the variance is due to the number of trains increasing or decreasing based on passenger demand.

**2016 Draft Business Plan**

<b>Scenario</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>
Revenue in Millions	\$100,572	\$77,151	\$60,376
Less: O&M	-\$31,411	-\$28,704	-\$27,505
Net Cash Flow from Operations	\$69,161	\$48,447	\$32,871
Capital Replacement	-\$6,043	-\$5,549	-\$5,033
<b>Net operating cash flow after Capital Replacement</b>	<b>\$63,118</b>	<b>\$42,898</b>	<b>\$27,838</b>
<i>Breakeven or Profit Occurs</i>	<i>2025</i>	<i>2027</i>	<i>2029</i>
<i>Ancillary Revenue only</i>	<i>\$1,006</i>	<i>\$772</i>	<i>\$604</i>

<sup>9</sup> A type of community development that includes a mixture of housing, office, retail and/or other amenities integrated into a walkable neighborhood and located within a half-mile of quality public transportation.

In order to make a meaningful analysis, the 2016 Draft BP must be compared to the 2014 BP. Note that the 2014 BP *includes* the capital cost investment wherein the 2016 Draft BP *excludes* it.

**2014 Business Plan-Adjusted to 2015\$**

<b>Scenario</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>
Revenue in Millions	\$82,359	\$63,922	\$47,650
Less: O&M	-\$36,385	-\$32,318	-\$29,019
Net Cash Flow from Operations	\$45,974	\$31,604	\$18,631
Capital Replacement	-\$7,965	-\$7,313	-\$6,634
<b>Net operating cash flow after Capital Replacement</b>	<b>\$38,009</b>	<b>\$24,291</b>	<b>\$11,998</b>
<i>Breakeven or Profit Occurs w/o Capital Cost</i>	2022	2022	2024
Capital Cost	-\$57,239	-\$57,239	-\$57,239
<b>Net Cash Flow After Capital Cost</b>	<b>-\$17,208</b>	<b>-\$30,925</b>	<b>-\$43,217</b>
<i>Breakeven or Profit Occurs</i>	<i>Never</i>	<i>Never</i>	<i>Never</i>

It is shocking to see that the 2016 Draft BP’s revenue estimates range from \$12.7 to \$18.2 billion *higher* (22% to 27%) than the 2014 BP which was prepared *only two years previously*. The net operating cash flow ranges from nearly \$16 to \$25 billion higher (66% to 132%).

**2016 Draft Business Plan +/- 2014 Business Plan**

<b>Scenario</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>
Revenue in Millions	\$18,213	\$13,229	\$12,726
Less: O&M	\$4,974	\$3,614	\$1,514
Net Cash Flow from Operations	\$23,187	\$16,843	\$14,240
Capital Replacement	\$1,922	\$1,764	\$1,601
<b>Net operating cash flow after Capital Replacement</b>	<b>\$25,109</b>	<b>\$18,607</b>	<b>\$15,840</b>
2016 +/-2014 Business Plan	<b>66%</b>	<b>77%</b>	<b>132%</b>
<i>Breakeven or Profit Occurs</i>	3 yrs later	5 yrs later	5 yrs later

Another useful measurement is to compare 2016 Draft BP to the 2014 BP in discounted cash flow or Net Present Value (NPV). This measurement takes into account the time value of money, based on the assumption that a dollar today is worth less than a dollar next year, the year after, and so on. For example, if two competing projects ultimately bring in \$50,000, but one provides positive cash flow earlier, that is the better investment. Typically, assessing discounted cash flow is one of the items that potential investors examine in making a decision whether or not to invest in a project.

The following chart illustrates that CHSRA has inflated discounted its cash flow (assuming a 5% discount rate) for the 2016 Draft BP to the extent that is nearly double of that in the 2014 BP

(ranging from 83% to 150% [versus non-discounted 66% to 132%]). Assuming the “low scenario,” it is no surprise that potential investors ran away from this project based on the 2014 BP. Their return would be a pitiful \$4.3 billion (*excluding* their initial investment). If they had been foolish enough to invest \$9 billion (matching the Prop 1A bond issue), they would have lost \$4.6 billion (\$9 billion minus \$4.4 billion). Although the 2016 Draft BP is more palatable, the “low scenario” only returns a net \$10.9 billion (again, excluding an initial investment).

<b>Cash Flow NPV at 5% (\$ in Millions)</b>			
<b>Scenario</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>
<b>2016 Draft Business Plan NPV</b>	<b>\$24,745</b>	<b>\$16,777</b>	<b>\$10,869</b>
<i>Non-Discounted 2016 Draft BP</i>	<i>\$63,118</i>	<i>\$42,898</i>	<i>\$27,838</i>
<i>Cost of Time</i>	<i>\$38,373</i>	<i>\$26,121</i>	<i>\$16,969</i>
<b>2014 Draft Business Plan NPV</b>	<b>\$13,533</b>	<b>\$8,687</b>	<b>\$4,355</b>
<i>Non-Discounted 2016 Draft BP</i>	<i>\$38,009</i>	<i>\$24,291</i>	<i>\$11,998</i>
<i>Cost of Time</i>	<i>\$24,476</i>	<i>\$15,604</i>	<i>\$7,643</i>
<b>2016 Draft BP +/- 2014 BP</b>	<b>\$11,212</b>	<b>\$8,089</b>	<b>\$6,514</b>
<b>2016 +/-2014 Business Plan</b>	<b>83%</b>	<b>93%</b>	<b>150%</b>

**CONCLUSION**

In order for the high-speed train project to survive, it is imperative that CHSRA demonstrate positive cash flow within a few short years of the start of operation to secure private investment—both as equity capital partners for construction and for operation of the train concession once construction is completed. CHSRA was shrewd to exclude the capital investment as part of their presentation, especially to potential investors, because the IRR ranges from .64% (high) to -3% (low). In order to achieve its goal, CHSRA has turned their high-speed train into a high-cost commuter train for the revised IOS. While on its face this appears to be a good strategy, the reality is that very few, if any, people could afford it (a commuter from Fresno to San Jose would spend \$27,000 annually on train fare). The average one-way fare of \$62 skews close to the San Jose and Fresno route fare of \$63 and supports the “commuter train” designation. Then as Phase 1 comes online, the calculated fares trend downwards, meaning that the bulk of ridership will be for shorter trips as time progresses.

CHSRA has omitted some key inputs, for example, excluding passenger fares in Table 3.1 for San Jose to North of Bakersfield that is part of the IOS. Also, some of their assumptions are inconsistent between the figures published in the *Ridership and Revenue Forecasting* document and their main 2016 Draft BP document.

CHSRA utilized a convoluted methodology to arrive at its ridership and revenue projections. Incorporating key input variables, using multiple regression analysis, and then running a Monte Carlo simulation 50,000 times in order to arrive at its ridership, revenue, and resultant cash flow, the financial models’ components become nearly impossible to scrutinize. It is hubris to believe that in year 1 of operation that 11,233 (high), 7,794 (medium), and 6,027 (low)

passengers will ride *daily* within the IOS which runs from one metropolitan area (San Jose) to the Central Valley, California's agricultural area.

Average ridership increases from the 2014 BP to the 2016 Draft BP range from 22% to 29%--double-digit increases--with no legitimate explanation. CHSRA merely states, "Forecasts reflect an enhanced travel demand model."

The farce continues to its cash flow projections. There is no reasonable explanation as to why the 2016 Draft BP net cash flow (after capital replacement but excluding capital investment) increased from 66% to 132% over the 2014 BP. On a discounted cash flow basis, the increase is even larger: 83% to 150%.

If CHSRA meets their projected ridership targets, they will have to purchase and operate more train sets<sup>10</sup> beyond the budgeted 70 at full build-out to meet their incredible passenger demand. These additional train sets require increased operating costs for O&M, including employees' salaries, benefits, etc.

In conclusion, in CHSRA's desperation, they inflated their ridership/revenue figures in order to present a picture of fiscal viability of the high-speed train project to potential private investors and taxpayers.

---

<sup>10</sup> The RFEI for train sets specifies a minimum of 450 passenger seats per train

# HIGH-SPEED RAIL SYSTEM MAP

## EXHIBIT 4.1 HIGH-SPEED RAIL SYSTEM



**ANALYSIS OF CALIFORNIA HIGH SPEED RAIL AUTHORITY'S  
CAPITAL COST BASIS OF ESTIMATE REPORT  
Draft 2016 Business Plan: Technical Supporting Document**



By Cindy Bloom  
March 9, 2016

## TABLE OF CONTENTS

<b>ABSTRACT .....</b>	<b>3</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>3</b>
<b>SCOPE .....</b>	<b>4</b>
<b>COMPARISON OF DRAFT 2016 BUSINESS PLAN TO 2014 BUSINESS PLAN .....</b>	<b>6</b>
<b>EXCLUDED ITEMS FROM THE 2016 BUSINESS PLAN .....</b>	<b>7</b>
<b>ANALYSIS OF COST ESTIMATES BY PROJECT SECTIONS.....</b>	<b>7</b>
<b>PALMDALE TO BURBANK SECTION .....</b>	<b>8</b>
<b>MISCELLANEOUS .....</b>	<b>11</b>
<b>CONCLUSION.....</b>	<b>11</b>
<b>APPENDIX A .....</b>	<b>12</b>



## ABSTRACT

From 1996 through 2016, there have been eleven publicly available budgets<sup>1</sup> prepared by the California High Speed Rail Authority (“CHSRA”) (formerly known as the California Intercity High Speed Rail Commission) and/or the California Legislative Analyst’s Office. These cost estimates range from a low of \$16.5 billion (1996) to a high of \$98.1 billion (2011). The aforementioned \$98.1 billion cost estimate was published in November 2011 as a precursor to the 2012 Draft Business Plan and plummeted by \$29.7 billion to \$68.4 billion by the time the 2012 Revised Business Plan was revealed—only a few short months later. While CHSRA attempted to explain this significant drop, it served to aim a spotlight on CHSRA’s planning process. Also, the \$81.6 billion variance from this 2012 Draft Business Plan over the 1996 Business Plan, and CHSRA’s “moving target” cost estimates is a symptom of an underlying problem and strongly suggests the CHSRA’s management team and Board of Directors are tasked with a project for which they do not possess the core competency to successfully plan, build, and implement this project--the largest infrastructure project in U.S. history.

## EXECUTIVE SUMMARY

On February 18, 2016, CHSRA released its draft 2016 Business plan (“2016 BP”). The 2016 BP plan’s cost now stands at \$64.2 billion versus \$67.6 billion, a reduction of \$3.4 billion (5%) compared to the 2014 Adopted Business Plan (“2014 BP”). However, while on its face this reduction appears to be legitimate, when analyzing the details, this “cost reduction” seems to be a distraction in order to switch attention away from the fact that a \$64.2 budget is *billions* more than what was presented as recently as May 2011. For example, rather than compare its 2016 BP to historical figures, it uses the 2014 BP as its only basis for comparison. Further, it continues to mix 2015 dollars with Year of Expenditure dollars (YOE\$), which are adjusted for future inflation, in order to confuse and convince its readers that it is transparent and honest in its assessment of the project’s true cost. It is worth mentioning that the savings could have been \$5.5 billion instead of \$3.4 billion had the agency had decided not to use some of its “savings” to add \$2.1 billion worth of elements to the Los Angeles to Anaheim project section.

Although the CHSRA has properly included several contingency margins, at the same time it has also failed to include many necessary line items which could consume their \$3.4 billion “savings” and possibly push the project’s cost back up and possibly beyond the 2014 BP’s estimate of \$67.6 billion. Additionally, the 2016 BP states that CHSRA will seek to secure loans and financing, yet it has *excluded any interest or finance charges in its 2016 BP estimate*. For example, interest expense on a \$5.3 billion loan<sup>2</sup> will incur approximately \$5 – \$5.2 billion in interest expense. The Prop 1A bond of \$9.95 billion will incur \$9.4 billion in interest charges that will be repaid from the General Fund. It is unclear where the interest charges on any debt

---

<sup>1</sup> The terms “budget,” “cost,” and “cost estimates” are used interchangeably in this document

<sup>2</sup> The loan amount mentioned in its main business plan which is expected to be repaid by cap and trade proceeds; Director Rossi acknowledges that cap and trade sunsets in 2020:

[https://www.youtube.com/watch?v=MxeSHZ9DoxQ&feature=em-subsub\\_digest](https://www.youtube.com/watch?v=MxeSHZ9DoxQ&feature=em-subsub_digest)

beyond the Prop 1A bond issue will be budgeted; the only true known is that there will be billions of dollars in interest and the taxpayers will be held accountable for repayment.

Another item of concern is that these costs are the *capital costs only*—they exclude overhead, administrative costs, and a portion of planning costs. For total expenditures, CHSRA is on track to spent \$2.5 billion from inception through June 30, 2016. Of this, \$138 million for administrative costs<sup>3</sup> is not part of the capital costs/budget.

### SCOPE

The 2016 BP is comprised of several documents:

- Connecting and Transforming California (100 pages)
- Capital Cost Basis of Estimate Report (49 pages)
- 50-Year Lifecycle Capital Cost Model Documentation (74 pages)
- Service Planning Methodology (18 pages)
- Ridership and Revenue Forecasting (62 pages)
- High, Medium, Low Cash Flows (12 pages)

This analysis examines the Capital Cost Basis of Estimate document that is the basis for the project’s capital costs as of 2016.

### ANALYSIS OF OVERALL PROJECT COST ESTIMATES<sup>4</sup>

Amount	Year	Description
\$16.5 billion	1996	September 1996 Final Report of the California Intercity High Speed Rail Commission
\$25 billion	2000	2000 California High Speed Train Business Plan
\$37 billion	2005	August 2005 California High Speed Train Final Program Environmental Impact Report/Environmental Impact Statement
\$45 billion	2008	July 7, 2008 Senate Appropriations Committee Fiscal Study of Assembly Bill 3034
\$45 billion	2008	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
\$33.6 billion	2008	November 2008 California High Speed Train Business Plan
\$43 billion	May 2011	Report of the California Legislative Analyst’s Office
\$98.1 billion	2011	November 1, 2011 California High Speed Rail Program Draft 2012 Business Plan
\$68.4 billion	2012	April 12, 2012 California High Speed Rail Authority Revised 2012

<sup>3</sup> It is unclear whether the administrative budget includes CHSRA staff salaries

<sup>4</sup> Source: California High Speed Rail Authority

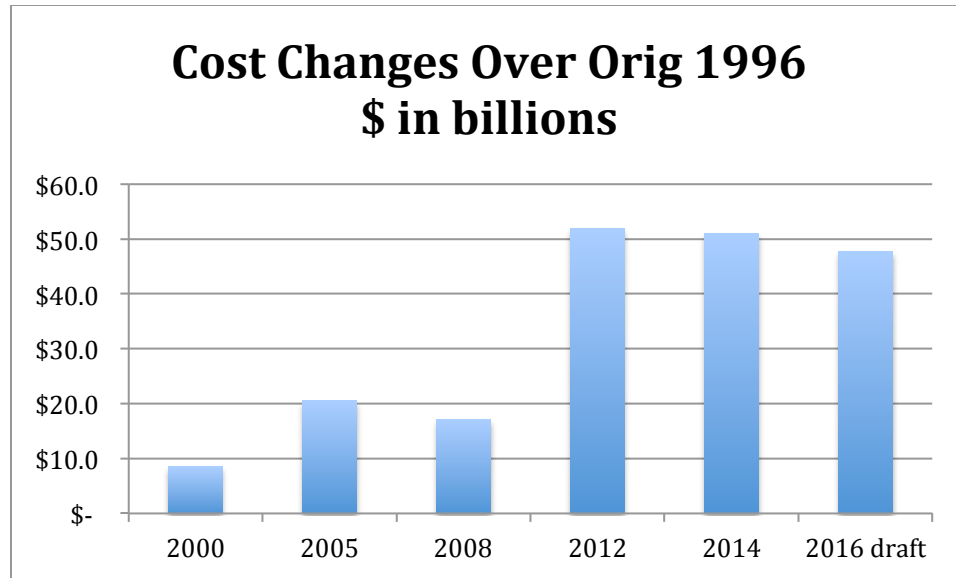
Amount	Year	Description
		Business Plan
\$67.6 billion	2014	California High Speed Rail Authority's Adopted 2014 Business Plan
\$64.2 billion	2016	California High Speed Rail Authority's Draft 2016 Business Plan

Although the costs have declined slightly from the most recent business plan, when compared to the original estimate put forth in 1996, the 2016 BP is over by 289%. These increases are not due to inflation, and the CHSRA frequently states that the majority of their business plan numbers is already inflation-adjusted and uses the "Year Of Expenditure" ("YOES") figures. According to the U.S. Bureau of Labor Statistics, the original 1996 budget of \$16.5 billion, when adjusted for inflation in 2016, would be \$24.9 billion—certainly *not* \$64.2 billion.

When 2016 is compared to 2008 estimates published in the text of the Prop 1A ballot initiative, it is 43% over that estimate; when compared to the subsequent 2008 Business Plan, it is 91% above--or nearly double--in less than a 10 year period. What is important to remember is that the electorates who voted in favor of Prop 1A approved a project estimated to cost \$45 billion.

The following chart lays out each business plan budget and calculates the change in cost compared to the previous business plan, and then to the original \$16.5 billion. For example, 2012's budget increased \$34.8 billion over the prior business plan in 2008, and \$51.9 billion over 1996.

Business Plan Capital Costs Comparison							
Business Plan Year	1996	2000	2005	2008	2012	2014	2016 draft
Cost (billions)	\$ 16.5	\$ 25.0	\$ 37.0	\$ 33.6	\$ 68.4	\$ 67.6	\$ 64.2
\$ Change over Prior BP (billions)		\$ 8.5	\$ 12.0	\$ -3.4	\$ 34.8	\$ -0.8	\$ -3.4
% Change over Prior BP		52%	48%	-9%	104%	-1%	-5%
\$ Change over Original BP (billions)		\$ 8.5	\$ 20.5	\$ 17.1	\$ 51.9	\$ 51.1	\$ 47.7
% Change over Original BP		52%	124%	104%	315%	310%	289%



When further broken down into “cost per mile,” the story is similar and just as troublesome. The cost per mile increased 558% 2016 BP versus 1996:

Cost per Mile (millions)							
Business Plan Year	1996	2000	2005	2008	2012	2014	2016 draft
Miles	880	700	520	520	520	520	520
Cost per mile (millions)	\$ 18.8	\$ 35.7	\$ 71.2	\$ 64.6	\$ 131.5	\$ 130.0	\$ 123.5
\$ Change over Prior BP (billions)		\$ 17.0	\$ 35.4	\$ -6.5	\$ 66.9	\$ -1.5	\$ -6.5
% Change over Prior BP		90%	99%	-9%	104%	-1%	-5%
\$ Change over Original BP (billions)		\$ 17.0	\$ 52.4	\$ 45.9	\$ 112.8	\$ 111.3	\$ 104.7
% Change over Original BP		90%	279%	245%	602%	593%	558%

#### COMPARISON OF DRAFT 2016 BUSINESS PLAN TO 2014 BUSINESS PLAN

The capital costs overall decreased by a nominal 5%, a rate commonly used for allowances and returns in other industries, yet CHSRA claims this to be a major victory:

	\$ in Billions	
<i>2014 Business Plan</i>	\$67.6	
Design Refinements	\$-3.5	
Lessons learned from bids	\$-1.3	
Allocated contingencies	\$-0.7	
LA to Anaheim	\$2.1	
	\$64.2	<---2016 Biz Plan YOE \$
	\$-3.4	<---Net change 2016 v. 2014
	-5%	<---Net change 2016 v. 2014 %
	\$55.3	<---2016 Biz Plan 2015 \$
	\$8.9	Cost of Time

Further, their estimates could be grossly inaccurate. The CSHRA is using an Association for the Advancement of Cost Engineering Class 3 estimate process which currently which has a swing of -10% to 20% and +10% to 30%. In YOES terms, this could conceivably inflate their 2016 BP figure from \$64.2 to \$83.5 billion:

\$ in billions 2016 Est.	COST RANGE BASED ON CLASS 3 ESTIMATE			
	-10%	-20%	10%	30%
\$ 64.20	\$ 57.78	\$ 51.36	\$ 70.62	\$ 83.46

### EXCLUDED ITEMS FROM THE 2016 BUSINESS PLAN

It is essential to note that there are many items excluded from the cost estimates that could conceivably push the project way beyond its current projection of \$64.2, even with all the built-in contingencies:

- Finance charges (entire project)
- CHSRA administration costs (entire project)
- Five mile track from Santa Clara to San Jose for UPRR (SF to SJ)
- Structural modifications to 4 existing tunnels (SF to SJ)
- Conversion of Caltrain platforms to level boarding except for stations shared with HSR (SF to SJ)
- Platform extension to 1400 feet (SF to SJ)
- Blast protection zone (Bakersfield to Palmdale)
- Metro/UPSS agreements for shared used (Burbank to Union Station)
- Burlington North Santa Fe Railroad’s Hobart yard expansion (Burbank to Union Station)


### ANALYSIS OF COST ESTIMATES BY PROJECT SECTIONS

There is a wide cost variation between project sections and it becomes apparent why CHSRA decided to change direction and select the Central California to Northern California as the initial operating section.

The following chart illustrates the cost per mile by project section. Not surprisingly, the Palmdale to Burbank segment is the most expensive, nearly 2.5x more than its nearest “competitor,” San Jose to Gilroy.

**COST PER MILE BY PROJECT SECTION SORTED DESCENDING**

<b>Project Section</b>	<b>\$ Millions</b>	<b>Miles</b>	<b>Cost Per Mile</b>	<b>+/- Avg Cost</b>
Palmdale to Burbank	\$ 11,877.0	33.0	\$ 359.9	\$ 244.2
San Jose to Gilroy	\$ 4,376.0	30.0	\$ 145.9	\$ 30.2
Burbank to LA	\$ 1,593.0	13.0	\$ 122.5	\$ 6.8
Bakersfield to Palmdale	\$ 9,746.0	80.0	\$ 121.8	\$ 6.1
Merced to Wye Legs 1	\$ 1,032.0	9.0	\$ 114.7	-\$ 1.0
Wye Legs 1	\$ 1,183.0	11.0	\$ 107.5	-\$ 8.2
Gilroy to Carlucci Road	\$ 5,483.0	54.0	\$ 101.5	-\$ 14.2
Poplar Avenue to Bakersfield**	\$ 2,030.0	23.0	\$ 88.3	-\$ 27.4
LA to Anaheim	\$ 2,319.0	30.5	\$ 76.0	-\$ 39.7
San Francisco to San Jose	\$ 3,136.0	48.0	\$ 65.3	-\$ 50.4
Madera Acres to Poplar Ave**	\$ 6,908.0	118.0	\$ 58.5	-\$ 57.2
Carlucci Road to Madera Acres (Wye Leg 2)	\$ 960.0	37.0	\$ 25.9	-\$ 89.8
<b>TOTAL - CORRIDORS*</b>	<b>\$ 50,643.0</b>	<b>486.5</b>	<b>\$ 115.7</b>	
Maintenance Facilities	\$ 1,242.0			
Trainsets	\$ 3,399.0			
<b>TOTAL (unadjusted for inflation)</b>	<b>\$ 55,284.0</b>			

Average Cost 

\*does not tie to CHSRA's 520 mile figure

\*\*new segment based on adding in an interim stop in Shafter

Although the Southern California operating segments represent only 16% of the total miles, they consume 31% of the budget:

**SOUTHERN CALIFORNIA ROUTES ONLY**

<b>Project Section</b>	<b>\$ Millions</b>	<b>Miles</b>
Palmdale to Burbank	\$ 11,877.0	\$ 33.0
Burbank to LA	\$ 1,593.0	\$ 13.0
LA to Anaheim	\$ 2,319.0	\$ 30.5
<b>TOTAL SOUTHERN CALIFORNIA ONLY</b>	<b>\$ 15,789.0</b>	<b>\$ 76.5</b>
% of Total	31%	16%

**PALMDALE TO BURBANK SECTION**

The project section S.A.F.E. is most interested in is the Palmdale to Burbank operating segment. The 2016 BP is quite vague as it specifically refers to E1a, and “a new alternative defined in ... adopted in June 2015.” Note that they have eliminated smoke control shafts and instead are using a “compartmentation strategy” for smoke control, which sounds neither safe nor desirable. Also note that it is eliminating any third bore service tunnel for tunnels over six miles long so one can assume it applies to tunnels along the SR14 route. It certainly can be implied from this statement that in the event any of the East Corridor routes are selected, CHSRA is

planning on building three tunnels through the Angeles National Forest: Two for trains and one for service. The following is copied directly from their document:

***Palmdale to Burbank***

Table 16. Palmdale to Burbank Cost by SCC

STANDARD COST CATEGORY	2014 BP COST (2015 \$, millions)	2016 BP COST (2015 \$, millions)
10 TRACK STRUCTURES & TRACK	\$5,994	\$7,580
20 STATIONS, TERMINALS, INTERMODAL	\$246	\$313
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	\$149	\$19
40 SITEWORK, RIGHT-OF-WAY, LAND, EXISTING IMPROVEMENTS	\$2,367	\$1,609
50 COMMUNICATIONS & SIGNALING	\$88	\$214
60 ELECTRIC TRACTION	\$278	\$450
80 PROFESSIONAL SERVICES	\$1,106	\$1,247
90 UNALLOCATED CONTINGENCY	\$372	\$446
<b>SUBTOTAL</b>	<b>\$10,599</b>	<b>\$11,877</b>

Estimate assumes a new segment based on the east corridor tunnel alignment option E1a terminating just south of Burbank Airport station, and also reflects a new alternative defined in the Palmdale to Burbank Supplemental Alternative Analysis adopted in June 2015. The 2014 Business Plan estimate for this section was based on a SR-14 West alignment alternative resulting in comprehensive revision to earthwork, viaducts, and tunneling and grade separation quantities. The right-of-way requirements were also reevaluated to reflect the new east corridor tunnel alignment.

***Assumptions***

- Based on an alignment section length of 33 route miles
- An allowance is being carried for mechanical ventilation in tunnels due to the length of the tunnel segments
- Based on compartmentation strategy for smoke control in tunnels that would eliminate shafts to the surface within Angeles National Forest
- Third bore service tunnel was assumed not to be required in tunnels over six miles in length

Figure 1 Report on The Capital Cost Basis of Estimate Report, p. 40

The most notable change from 2014 to the 2016 BP is the addition of the Angeles National Forest corridor; overall, the incremental increase is only \$14 million:

Palmdale to Los Angeles	\$13,456	\$13,470	\$14	<ul style="list-style-type: none"> <li>• Reflected Supplemental Alternative Analysis East Corridor alignment under the Angeles National Forest</li> <li>• Increase in tunneling costs due to increase in tunnel length (+\$0.8B)</li> <li>• Increase in retaining walls due to constrained right-of-way (+\$1.4B)</li> <li>• Increase in Los Angeles Union Station costs with shared tracks into station and dedicated platform faces for high-speed rail (+\$0.6B)</li> <li>• Decrease in aerial guideway due to increase in tunneling (-\$0.7B)</li> <li>• Decrease in grade separations costs by implementing shared use of existing corridor south of Burbank (-\$0.7B)</li> <li>• Decrease in right-of-way costs (-\$0.7B)</li> <li>• Reduced utility relocation costs due to increase in tunneling (-\$0.2B)</li> <li>• Moved cost of LMF to HMF (-\$0.2B)</li> </ul>
-------------------------	----------	----------	------	---

**Figure 2 Report on the Capital Cost Basis of Estimate Report, p.16**

CHSRA appears to have intentionally excluded the incremental cost increase for solely the tunneling portion in its 2016 BP. However, due to the magic of math, it was easy to figure out, as follows:

\$ in Millions	Palmdale to Los Angeles
\$1.4	retaining walls
\$0.6	LA-US
-\$0.7	Less aerial, more tunnel
-\$0.7	shared corridor
-\$0.7	ROW
\$0.2	utility reloc due to tunnel
\$0.2	LMF to HMF
\$13.7	<i>SAA East Corridor Tunnel*</i>
<b>\$14.0</b>	<b>Total Net Change</b>

\*calculated number; includes \$.8 billion for increased tunnel length

Using the numbers above, the incremental increase in costs due to tunneling through the Angeles National Forest is \$13.7 million. This amount seems faulty since there is approximately 33 miles of tunneling and this would equate to roughly \$415 million per mile. This figure seems low, particularly since it is inferred that there will be 3 tunnels bored through 33 miles of mountains. It also appears to be low compared to other projects' cost per tunnel mile with some estimates being as high as \$1 billion per mile. However, the shorter the tunnel, the lower



the cost per mile due to amortizing the fixed costs (i.e., boring machine) over more miles. Even so, the \$415 million per mile seems suspiciously under-budgeted.

## MISCELLANEOUS

The CHSRA did include some reasonable assumptions such as their contractor mark-ups and overhead; and future CPI inflation rates.

### **Fun facts:**

- Each train set is about 72 feet long and will cost \$49 million each
- Phase 1 assumes 54 train sets; full build out will have 70
- Full build out construction is expected to be completed by 2028 and start of revenue operations is 2029
- Palmdale to Burbank<sup>5</sup> is at “conceptual” design stage, meaning it’s only about 5% complete
- To date, the California Legislature has appropriated \$3.71 billion in restricted Prop 1A bond funds although they have not been issued. If the bond funds are lost for any reason, the funds will be unencumbered (unappropriated).

## CONCLUSION

The 2016 BP plan’s cost now stands \$64.2 billion versus \$67.6 billion, a reduction of \$3.4 billion (5%) over the 2014 BP. Although the CHSRA has properly included several contingency margins, it has also failed to include many necessary line items that could consume their \$3.4 billion “savings” and possibly push the project’s cost back up and perhaps beyond the 2014 BP’s estimate of \$67.6 billion. Additionally, the 2016 BP states that it will seek loans and financing, yet it has *excluded any interest or finance charges in its estimate*. Other risks include: (1) relying solely on cap and trade for capital investment and loan payments, and which revenue stream is scheduled to sunset in 2020; (2) depending heavily on securing dubious federal and other agency grants; (3) appropriating Prop 1A bond funds which are being legally challenged and are burdened with stringent requirements for issuance; and (4) 2016 ballot initiatives and pending legislation proposing to repurpose the Prop 1A bond funds for other state projects. Based on a plethora of recent negative press and intense public scrutiny, it appears that the 2016 BP’s goal was to come in less than the 2014 BP by excluding several key items and under budgeting others, while simultaneously ignoring very genuine risks.

---

<sup>5</sup> The document does not identify when the Palmdale to Burbank operating segment will be operational

**APPENDIX A**  
**SOURCE OF FUNDING**  
**From Draft 2012 Business Plan (page 60)**

***Federal Grants***

\$3.48 billion in Federal grants, including funds available through the American Recovery and Reinvestment Act and Fiscal Year 2010 funds are available for the program:

- \$315 million is dedicated for Phase 1 planning activities
- \$3.165 billion is dedicated for construction in the Central Valley

***Proposition 1A Bond Proceeds***

- 9.95 billion in bond funds are available to pay for the planning and construction of the system, including regional services which will connect to the system:
  - \$2.609 billion has been appropriated for and committed to matching the Federal grant funds in the Central Valley
  - \$1.1 billion has been appropriated for and committed to "bookend" improvements in Caltrain electrification and improvements in Southern California
  - \$950 million was appropriated for regional connectivity projects, as laid out in Proposition 1A
  - Up to \$1.125 billion can be set aside for preconstruction activities and administration costs, as spelled out in Proposition 1A
- This leaves approximately \$4.166 billion of bond funds available to help fund capital costs for the first high-speed rail line

***Cap & Trade Proceeds***

- In 2014, the Legislature approved appropriation of funding including 25% of the annual Cap and Trade proceeds on a continuous basis beginning in FY15/16 along with two one-time appropriations:
  - \$250 million, one-time appropriation in FY14/15
  - \$600 million in the Governor's budget for FY15/16 based on the continuous appropriation
  - \$500 million in the Governor's budget for FY16/17 based on the continuous appropriation plus \$100 million of a \$400 million one-time appropriation, for a total of \$600 million in FY16/17
- In making the continuous appropriation, the Legislature determined that we could use these funds to pay for planning and construction costs for the system and/or to repay loans made to the Authority.