

**EXAMINATION OF THE CAPITAL COST BASIS OF ESTIMATE REPORT**  
**Draft 2016 Business Plan: Technical Supporting Document**  
By Cindy Bloom

**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 (YOES), 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

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

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 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

<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)

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

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

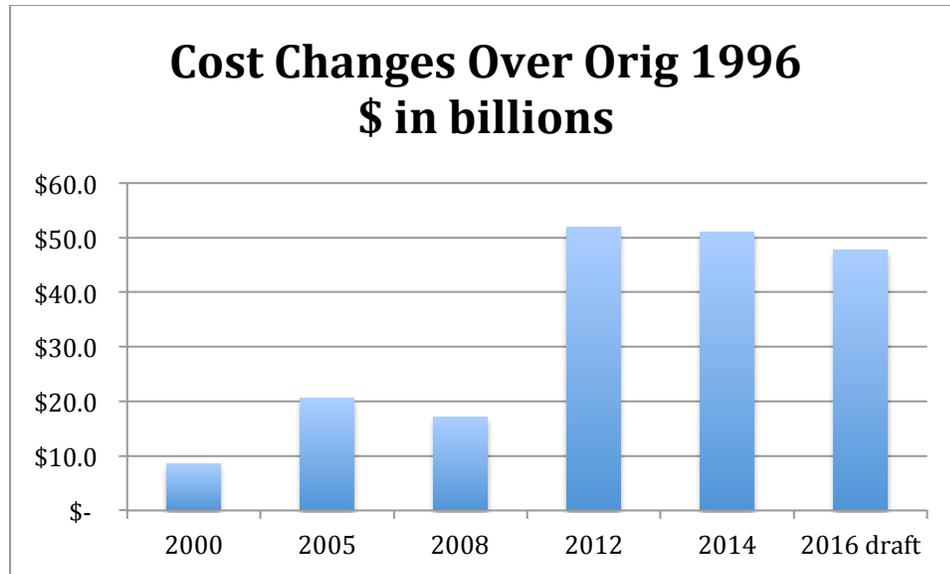
Amount	Year	Description
\$33.6 billion	2008	November 2008 California High Speed Train Business Plan
\$43 billion	May 2011	Report of the California Legislative Analyst's Office
\$98.1 billion	2011	November 1, 2011 California High Speed Rail Program Draft 2012 Business Plan
\$68.4 billion	2012	April 12, 2012 California High Speed Rail Authority Revised 2012 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 CHSRA 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>
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**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:

<b>\$ in</b>	
<b>Millions</b>	<b>Palmdale to Los Angeles</b>
\$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
<b>\$13.7</b>	<b>SAA East Corridor Tunnel*</b>
<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.

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<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.