Another California High Speed Rail Authority Glossy Marketing Document Portrayed As The 2016 Business Plan

A Critique of the California High-Speed Rail Authority's 2016 Draft Business Plan,
With Reference to the 2008, 2009, 2010, 2012, and 2014 Business Plans

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To Whom It May Concern:

This transmittal letter accompanies a document called: "Another California High Speed Rail Authority Glossy Marketing Document Portrayed As The 2016 Business Plan – A Critique of the California High-Speed Rail Authority's 2016 Draft Business Plan, With Reference to the 2008, 2009, 2010, 2012, and 2014 Business Plans"

It is submitted as commentary on the California High-Speed Rail Authority's Draft 2016 Business Plan.

Thank You

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PREFACE

This critique came about because, like prior ones, the Authority's latest business plan continues to ignore empirically based facts about the ridership, fares and the costs of operating existing HSR systems. If it took empirical information about those variables of the financial viability equation into account, its per mile fares would double or triple, its ridership would shrink by at least half and its operating costs would far more than double; but the California high-speed rail (HSR) train would be profitable.

At least twice the Authority has been told there will be no private, at-risk investment without proven financial viability, and in 2015 that message was repeated. It continues asking future contractors' interest not only to design and build, but also to finance and maintain the rails, electrical power and signaling systems atop the Authority's substrate, with the *proviso* that State would owning that privately financed infrastructure!

The Authority also 'moves the goal posts' on legally binding issues in hope that the Legislature will 'run cover' for them, and lives in fantasyland about private investment. Its financial viability formula is based on a European Union railroad accounting system, prohibited in the United States.

The Authority presents glossy headlines. That's good marketing. But the project's reality is very different. If the present Authority strategy of "dig the hole deep enough that the public has no choice except to keep digging" prevails, California will woe the day it approved Proposition 1A. This paper highlights some of the Authority's reckless behavior that will lead to its financial collapse and abrogation of its foundation law – AB3034. It is a clear and present danger.

EXECUTIVE SUMMARY

The Authority headlines it has *"sufficient to deliver a high- speed rail line connecting the Silicon Valley to the Central Valley"* [1] i.e. VtoV Extension but only Federal funds are actually available. The claims and realities are:[2]

SUPPOSEDLY APPROPRIATED – $2.6Billion of Prop1A funds – all of which was blocked by court rulings from 2013. Until a second funding plan clears the state's courts, there is no access.

Federal ARRA/FY 10 Grants and Planning Funds – The Authority has access to these monies, with the proviso that the State match whatever the federal government provides.

SUPPOSEDLY COMMITTED – $4.2Biilion of State Prop1A Bond funds – all of which was blocked by court rulings from 2013

Cap & Trade Funds (through 2024) – $5.3Billion – but SB826 only commits a percentage of Cap & Trade funds (25%) not a fixed amount and then only through 2020

Long Term Cap & Trade Funds (through 2025-2050) – $5.2Billion – but SB826 only commits only 25% of Cap & Trade funds, not a fixed amount and then only through 2020.

The Authority's assumes it has nearly $21billion. In reality it lacks about $17Billion to build VtoV Extension, and SB1029 constrains those available federal funds to the Madera-Bakersfield section. [3] In short, the Authority can only claim to have about 15% of the $21Billion needed to build VtoV Ext.

The high-speed rail (HSR) project is first and foremost a commercial enterprise required to operate without a subsidy. [4] The Authority needs private investment, but in 2008 and 2009 investors were in a 'wait and see'

[1] Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan p. 9 [PDF 9]

[2] See Exhibit 6.2, p. 61 [PDF 61] of Draft 2016 Business Plan: Connecting and Transforming California, Section 6: Funding and Financing.

[3] Even the appropriated portion available is encumbered by SB1029 language restricting it to only the Initial Operating System as defined in the 2012 Business Plan, not the IOS of the 2016 Business Plan. SB1029 speaks specifically of the 2012 Business Plan as its reference document. SB1029, Appropriations for Initial Construction Segment (Items 2665-306-0890 and 2665-304-6043) says; "*This bill appropriates to the Authority $3.24 billion from the Federal Trust Fund and $2.61 billion from the High Speed Passenger Train Bond Fund for the construction and acquisition of a portion of the initial operating segment.* ***This initial construction segment constitutes the segment running for 130 miles between Madera and Bakersfield."*** [Emphasis added]

[4] AB3034 2704.08 (2) (J) says, *"The planned passenger service by the Authority in the corridor or usable segment thereof will not require a local, state, or federal operating subsidy."*

stance on whether an Initial Operating Segment (IOS) proved profitable.

The 2012 Plan said, *"On its own, the IOS is a viable, profitable high-speed rail system."* The 2014 Plan mentioned profitability only twice, and only as a key objective, not a legal requirement [5] and admitted it split its costs into several accounts as in the European Union,[6] illegal in the US. The 2016 Plan never mentions the 'profit' requirement, and 'commercially viable' only twice.

The ". . *IOS is a viable, profitable high-speed rail system."* mantra gets modified for two reasons in the 2016 Plan to *"Early involvement of the eventual operator is key to establishing a commercially viable system over the long-term."* [7] The first reason the mantra was modified is, unlike AB3034's demand that the IOS be profitable its first years, it isn't.

> *". . . opening year of the Silicon Valley to Central Valley line in 2025 (38% chance of breaking even), the ramp-up period between 2025 and 2029 (75% chance of breaking even)."* [8]

Being one-third or three-fourths profitable, particularly if how ridership, revenues are forecasted and Operating and Maintenance (O&M) expenses are hidden, is neither good a business proposition, nor conforms to AB3034. The second reason is that private investment is needed to install rails, electrification and signaling systems atop its substrate (aka dirt mound) before the IOS opens, not after IOS was proven profitable. The latter reason came with the *proviso* the government will own the privately financed investments. In 2015 the Authority again asked for private investors' interest, but again with the non-starter *proviso*.

> *The specific high-speed rail components that will be delivered under a potential* **[Design, Build, Finance and Maintain]** ***DBFM*** *or other*

[5] See: Connecting California, 2014 Business Plan, April 30, 2014 page 53 [PDF 53].
[6] For a detailed discussion of the differences in European railways accounting under EU Directive 91/440 and the DOT requirements of GAAP, see To Repeat, The Authority's Train Will Need A Subsidy Forever, August 22, 2012, particularly pages 32-36. Found at: www.sites.google.com/site/hsrcaliffr
[7] See: pp. 36 and 38 [PDF 36 and 38] of Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan
[8] See p. 99 [PDF 99] of Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan

contract are described in detail below. [9] [Emphasis added]

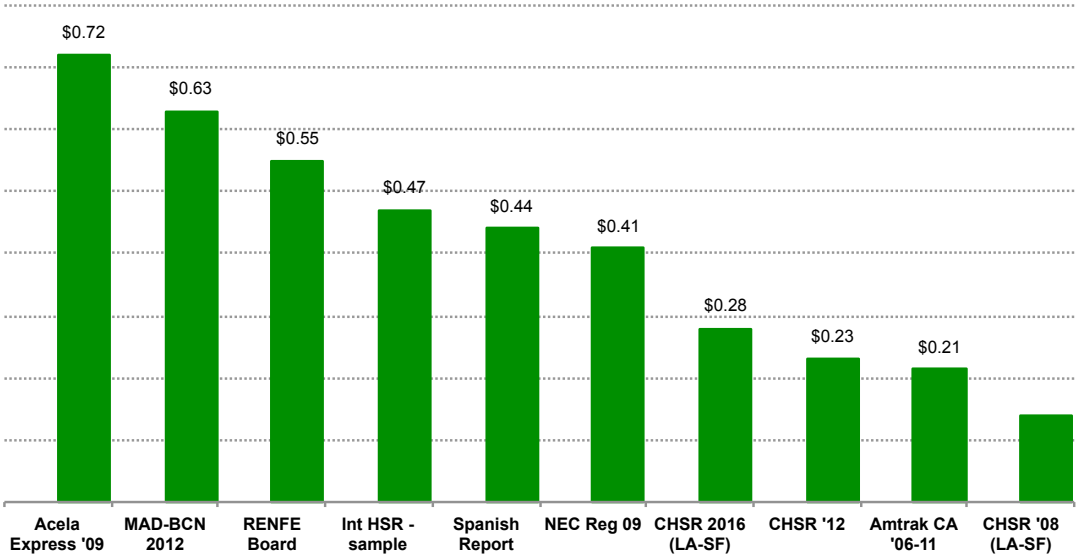
Private investors will not put funds at risk when the Authority's 2016 Plan admitted that the project is only "*. . commercially viable . . over the long-term.*" [10] and they will have no control over their investments.

Fares are at the heart of why the IOS North (VtoV Ext.) and future phases will not profitable. The Authority's maximum fare, '83% of airfares' for SF-LA travel was set to be "*. . somewhat below current airfares . .*" [11] This makes the SF-LA fare, about 23¢-28¢/passenger mile shown in Figure 1, an 'outlier' to existing 45¢-72¢/mile HSR fares, including the USA's Acela Express.

Figure 1

Fares/mile Of Existing HSR Operations

And the Authority's Proposed Fares



But the Authority's formula has a dark side: about a third of today's average the Authority's fares are limited to $89.[12] No private HSR operator would

[9] See pp. 8-12 [PDFs 16-18] of the Request for Expressions of Interest for the Delivery of an Initial Operating Segment, RFEI HSR#15-02; Release date June 22, 2015. Found at: http://www.hsr.ca.gov/docs/about/doing_business/HSR15_02_RFEI.pdf

[10] See: pp. 36 and 38 [PDF 36 and 38] of Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan

[11] See: California High-Speed Rail Program Revised 2012 Business Plan, April 2012, page 5-11 [PDF 119]

[12] See Table 3.1, p. 3-3 [PDF 25] of Ridership and Revenue Forecasting; Draft 2016 Business Plan, Technical Supporting Document.

survive financially by charging travelers going the 407miles[13] between San Francisco and Anaheim[14] the same $89 fare as the 283mile fare from San Francisco to Bakersfield.[15]

While IOS North isn't dependent on capturing airline passengers, its own consultants report[16] showed the air passenger market between southern California and SF Bay Area airports stagnant at about 10Million passengers. The Authority admits its fares are ". . *well above the out-of- pocket cost of driving . .*" [17] i.e. driving is always cheaper, not to mention ride sharing. For example, the out-of-pocket cost of one person driving between LA and SF's downtowns is less than half ($42.25)[18] the HSR $89 fare.

Where do passengers come from if the Authority's has almost no access to the personal vehicle driving market (+95% of trips >50miles) and must wrest passengers from airlines' slow or non-growth LA-SF market? The Authority has never done a dedicated survey of potential IOS South or IOS North travelers. Their own consultants told them that HSR's potential market share dropped from 58% to 41%between the 2005 and 2013/2014 RP/SP surveys, [19] and the Authority cited the doyen of demand forecasting,[20] who said "*. . for two-thirds of the rail projects, forecasts are overestimated by two-thirds; . . on the average by 65 percent . . a massive and highly*

[13] See: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Anaheim,+CA Unless otherwise stated, miles are driving miles as are used by the Authority, see p. 65 [PDF 67] of California High-Speed Rail Authority, Report to the Legislature, December 2009.
[14] See: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Anaheim,+CA
[15] See: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Bakersfield,+CA
[16] See: Table 1, p. 10 [PDF 116] Appendix B, Potential Airline Response to High-Speed Rail Service in California, prepared by Aviation System Consulting LLC, for Cambridge Systematics, Inc. Found in California High-Speed 2012 Business Plan, Ridership and Revenue Forecasting, final technical memorandum, April 12, 2012.
[17] See: California High-Speed Rail Program Revised 2012 Business Plan, April 2012, page 5-11 [PDF 119]
[18] On April 11, 2016 the cost of driving between the two metropolitan centers was $42.25. Found at http://www.travelmath.com/cost-of-driving/from/San+Francisco,+CA/to/Los+Angeles,+CA
[19] See p.12 [PDF 10]; Cambridge Systematics, California High Speed Rail Ridership and Revenue Forecasting, Survey Data and Inputs to Version 2/Version 3 Preliminary Choice Patterns and Traders/Non-traders; Prepared for California High Speed Rail Authority and Ridership Technical Advisory Panel, March 20, 2014.
[20] See California High-Speed Rail Authority, Revised 2012 Business Plan, p. ES-15 [PDF 23]

significant problem." [21] But those devastating findings were ignored, and early years' ridership increased from 2014's 11.4Million to 12.8Million in the 2016 Plan, although the primary market (7Million in the SF Bay Area) is one-third that of 2014's Los Angeles metropolitan area. The above empirically based facts undercut the Authority's ridership, and therefore revenue [22] forecasts, even after the misuse of *avant-garde* mathematics modeling forecasting and risk analysis.

Operations and Maintenance (O&M) Cost is the final variable of the profitability equation. As in the case of ridership and revenues the public, including the LAO, the GAO and strangely DOT's Office of Inspector General, is prohibited from scrutinizing the data, assumptions and algorithms that support the O&M component of Authority's profitability equation.[23]

But we do know three facts that destroy any misplaced credibility in the Authority's O&M costs. First, the Union International des Chemins des Fer (UIC/IUR) study of the Authority's operating costs concluded the California train's increased average speed will increase costs exponentially (i.e. operating costs increase at a faster pace than the increases in speed) both for powering above the industry standard 186mph[24] and maintenance costs

[21] See: Megaprojects and Risks: An Anatomy of Ambition, Bent Flyvbjerg, Cambridge University Press, 2003 page 26

[22] The Authority treats revenue as a fixed multiple of ridership for each phase: i.e. over or under estimated demand means revenue is over or under estimated .999%. See: page B-9 [PDF 80] of California High-Speed Rail Draft 2014 Business Plan: Ridership and Revenue Forecasting, draft technical memorandum: *"Revenue and ridership were closely correlated with a R^2 of more than 0.999 for each year."*

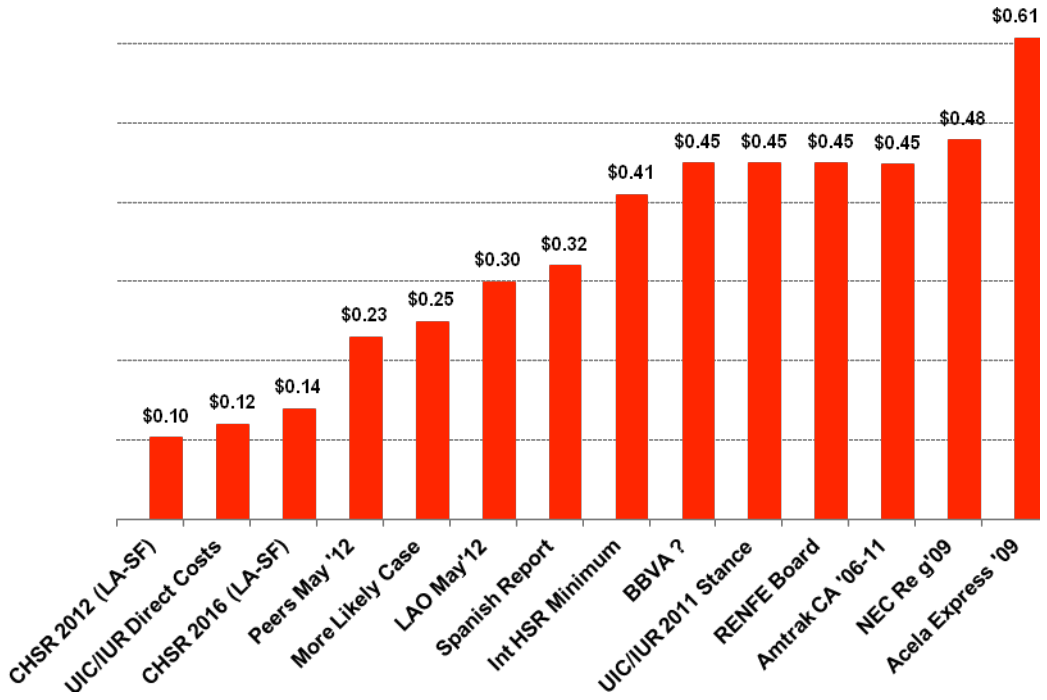
[23] Public Records requests concerning access to the actually used data and assumptions on ridership, revenues, O&M costs and profits, and the algorithms used for THE AUTHORITY's computations, have been met with responses that, for example, say: *"This is trade secret information pursuant to Evidence Code section 1060, incorporated into the California Public Records Act through Government Code section 6254(k) and, therefore, will not be provided."* See email to Mr. Robert Prantis from Ms. Anne Parker of the Public Records Act Staff of the CA High-Speed Rail Authority, December 27, 2013.

[24] See International Union of Railways; UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013. Page 7 [PDF 12] Finding #13 "*The electricity consumption for trains running at 220 mph (350 km/h) has to be increased by 10 to 30 percent (depending on the topography of the HSR line) in comparison with trains running at 186 mph (300 km/h)."* Operating & Maintenance Costs - UIC Peer Review, January 31, 2013, UIC (International Union of Railways) Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf

due to increased wear and tear on the fixed infrastructure and rolling stock.[25] UIC also told the Authority it should increase its maintenance estimate on the electricity-carrying overhead catenary system by 20%[26] and its track maintenance by at least 40%.[27]

Figure 2

Actual O&M Expenses PPM Vs. The Authority's O&M Forecasts



[25] See p.8 of International Union of Railways; UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013 Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf *"The experts also recommend making a significant cost provision for speeds up to 220 mph (350 km/h)) as preliminary findings show that the increase in equipment maintenance costs is above linearity when speed increases.*

[26] International Union of Railways; UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013, Appendix 2-14 [PDF 30] *"The impact assessment of speed on catenary and overhead line is a simple forecast of friction consumption which is in direct proportion with speed level; the —theoricall [sic] increase of maintenance corrective actions should be at least 20% (based on extrapolation from available information)."* Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf

[27] International Union of Railways; UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013, Appendix 2-14 says *"theoricall [sic] increase of the maintenance activity on the geometry of the track should be at least 40% (based on extrapolation from available information)."* Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf

Second, like fares/mile, the Authority's O&M costs/mile is an 'outlier.' As Figure 2 shows, even European HSR systems with generally lower labor costs than the US,[28] operate at 45¢-48¢ per mile, while the profitable California HSR's surrogate, Acela Express, operates at over 60¢ per passenger mile.

Third, large swaths of O&M costs are omitted because the Authority split its accounting system into several parts, [29] like that required by European Union Directive 91/440.[30] UIC/IUR said in a 2011 policy statement that not all O&M costs in Europe arrive on the HSR train's operators' accounts.

> *"The **public authorities/society generally bear the costs** of investing in new infrastructure, constructing **and maintaining the infrastructure and related equipment such as safety, control-command and signalling**,* [sic] *etc."* [31] [Emphasis added]

Under Generally Agreed Accounting Practices (GAAP) rules, adopted by DOT for private rail operators in the United States, all revenues and O&M must be

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[28] See the 2009 Amtrak report, Amtrak, Office of Inspector General; EVALUATION REPORT E-09-01; Comparison of Amtrak Infrastructure Labor Costs to European Railroad Averages; March 24, 2009 pages 2-3 [PDF 5-6]. While the Authority's 2014 Plan shows numerous wage and benefit costs, in 2009 Amtrak Inspector General's report said, *"1) The average annual labor cost of an Amtrak infrastructure worker is more than twice (2.3) that of the average European railroad infrastructure worker. 2) Amtrak's Base Wages per Worker are 1.3 times that of the Average European Worker. 3) Amtrak's Extraordinary Wages per Worker are 3.5 times that of the Average European Worker. 4) Amtrak's Annual Benefit Costs per Worker are 4.25 times that of the Average European Worker."* Attached as Pet No 213, Amtrak Labor Cost and Efficiency Report E-09-01 March 2009.PDF. Also found at: https://www.amtrakoig.gov/report-records/audit-reports/comparison-amtrak-infrastructure-labor-costs-european-railroad-averages or http://www.amtrakoig.gov/sites/default/files/reports/LaborCostandEfficiencyReportE-09-01.pdf

[29] Page 37 [PDF 37] of the Authority's 2014 Plan says, *"The 2014 lifecycle cost model methodology is based on research and best practice established by a part of the European Union-funded research program called MAINLINE. The 2014 lifecycle model also draws from lifecycle guidance by the UIC and the European Investment Bank (EIB), based on their experience with developing and funding existing high-speed rail systems around the world."*

[30] For a detailed discussion of the differences in European railways accounting and the DOT requirements of GAAP, see To Repeat, The Authority's Train Will Need A Subsidy Forever, August 22, 2012, particularly pages 32-36. Found at: www.sites.google.com/site/hsrcaliffr

[31] See the official policy statement by the Union International des Chemins des Fer (UIC/IUR) on profitability included "social profitability" a concept unknown to US accounting practices: *". . , the profitability of high speed is not assessed by adding infrastructure costs to operational costs, line section by line section, but from the perspective of a high speed rail system serving both the passenger transportation market and society – the citizens – as a whole."* See pages 3-5 of UIC policy accompanying a letter to Mr. Roelof van Ark from Jean-Pierre Loubinoux, Director General of the UIC, Paris, dated 8 February 2011. Found at http://www.calhsr.com/wp- content/uploads/2010/02/IUR- Officials-Letter-to-THE AUTHORITY-CEO.pdf

in a single account.

As with Authority's uncompetitive fares to gain riders (and therefore revenue), its O&M costs should also be dismissed. No other conclusion is possible. The whole edifice of HSR in California depends on a document as reputable as the Donation of Constantine.

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ATTACHMENTS & FOOTNOTES

Attachments – There are 12 PDF files attached to this document. These files are included in a "Thumb Drive" that is appended to this Critique.

Footnotes – References to documents in the Administrative Record of Tos vs The Authority will show the Leading Bates Number of the document, or the specific Bates Number of the page being referenced. These appear as AG######.

SECTION 1

INTRODUCTION TO THIS CRITIQUE

The body of publically available information on the financial performance and competitive nature of the world's high-speed rail (HSR) systems has grown immensely since the California High-Speed Rail Authority's (Authority) predecessor's inception twenty years ago. But whether that comes from 'outsiders' or its own consultants, the Authority 'cherry picks' and promotes only that which supports its arguments to continue spending. It assumes that travelers will find reasons to take its HSR train when there are none, and uses modelers' outputs that depend on indefensible inputs.

1.1 The Authority Ignores Its 'External' Critics And 'Internal' Consultants' Findings – To its detriment in maintaining the public trust for the nation's largest public works program, the Authority has ignored years of 'outsiders' evidence-based critiques of its ridership, fares revenues and financial viability. The courts blocked use of Prop1A bond funds, yet the Authority ignores that fact.[32] California's Legislative Analyst's Office (LAO) questioned the capital shortcomings needed to build the project,[33] and questioned whether the project can meet the Legislature's demand to not require an operating subsidy.[34]

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[32] The 2016 Draft Business Plan still assumes the Authority has full access to $9.956Billion of Prop1A funds for construction. See p.59 [PDF 59] *"$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"*

[33] Review of High-Speed Rail Draft Business Plan, Legislative Analyst's Office, March 28, 2016, p. 7 [PDF 8] says, *"Current law does not appear to authorize the program's continuation beyond 2020. Thus, without legislative action, the cap-and-trade funds HSRA plans to use to build the IOS would likely not be available . . . Moreover, the plan estimates that the amount of funding that could be generated would fall significantly short of the level needed to complete Phase I and does not identify how this shortfall would be met."* Found at: http://www.lao.ca.gov/Publications/Detail/3394

[34] *" . . it is unclear whether the system will actually generate an operating surplus."* See p. 7 [PDF 8] of Review of High-Speed Rail Draft Business Plan, Legislative Analyst's Office, March 28, 2016, found at http://www.lao.ca.gov/Publications/Detail/3394

Perhaps even more egregious, the Authority ignored and attempted to squelch its own consultants evidence-based findings on: A) the private sector's reluctance to put funds at risk for the project; B) that Operations and Maintenance costs were underestimated; C) construction costs in the Central Valley and the Tehachapi/San Gabriel mountains need to be seriously increased; and D) that the percent of Californians interested in being HSR riders' had declined. Chronologically, these are:

A) In a June 2008 presentation the Authority's consultants, the Infrastructure Management Group (IMG), reported that private firms were reluctant to take risks based on the Authority's then-ridership forecasts;

> *". . respondents argued that interest in equity investment would increase if the risk to the concessionaire were decreased, perhaps through some form of revenue guarantee . ."* [35]

In September 2009 IMG and Goldman Sachs, a company that has raised over $100Billion[36] for an at-risk investment, told the Authority,

> *"Private appetite for ridership risk is limited without revenue guarantee or until ridership proven."* [37]

The Authority has known for nearly eight years that its assumption of private, at-risk investment in its HSR project was a fantasy.

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[35] See: Report of Responses to the Request for Expressions of Interest For Private Participation in the Development of A High-Speed Train System in California by the Infrastructure Management Group (IMG) to the California High-Speed Rail Authority Board Financing Workshop, dated October 2008; page 2 of 17. The presentation was given in June but the printed report issued in October. *"A presentation summarizing the results of the RFEI was made before the Authority Board of Directors on June 11, 2008 "*

[36] In 2000, Goldman Sachs – an advisor to the Authority in 2009 – led Vodafone's $183 billion purchase of Mannesmann. Vodafone AirTouch took control of Mannesman in February 2000. The £112bn ($183bn) all-share deal is still the largest corporate merger in history. See: http://news.bbc.co.uk/2/hi/business/630293.stm

[37] See p. 9 [PDF 9] of California High-Speed Rail Authority, Board Financing Workshop, September 2, 2009.

B) In May 2012, the Authority commissioned the Union International des Chemins des Fer (UIC/IUR) to comment on their O&M costs.[38] Among UIC's 19 findings:

> "*The electricity consumption for trains running at 220 mph (350 km/h) has to be increased by 10 to 30 percent (depending on the topography of the HSR line) in comparison with trains running at 186 mph (300 km/h).*" [39]
>
> *"The impact assessment of speed on catenary and overhead line is a simple forecast of friction . . . increase of maintenance corrective actions should be at least 20% . . ."* [40]
>
> *The "theorical"* [sic] *increase of the maintenance activity on the geometry of the track should be at least 40%*" [41]

The impact on either the 2014 or 2016 O&M costs forecasts is unknown, as the public is not allowed access to trade secret-protected information. The commissioned O&M cost review by UIC should have told the Authority their O&M estimates were far "off-base" and should be revised upwards. Instead O&M (Medium) for 2025 the Initial Operating Segment (IOS) decreased 40% from the 2014 Plan – $358 to $220Million.[42]

C) In October 2013, the Authority's lead consultants gave its Board a presentation updating the cost estimates for the then-forthcoming 2014

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[38] See p. 1, [PDF 4] of the UIC, International Union of Railways, UIC Peer Review of Operating & Maintenance Costs Of The California High-Speed Rail Project, Final Report, January 2013.
[39] Finding #14, p. 8 [PDF 14] See: UIC, International Union of Railways, UIC Peer Review of Operating & Maintenance Costs Of The California High-Speed Rail Project, Final Report, January 2013.
[40] See Appendix 2-14 [PDF 30] of UIC, International Union of Railways, UIC Peer Review of Operating & Maintenance Costs Of The California High-Speed Rail Project, Final Report, January 2013.
[41] See Appendix 2-14 [PDF 30] of UIC, International Union of Railways, UIC Peer Review of Operating & Maintenance Costs Of The California High-Speed Rail Project, Final Report, January 2013.
[42] The 2014 Plan said year 2040's O&M was $872Million, an increase of less than 1% in the 2016 Plan when comparing the 2014 Medium Forecast with the VtoV forecast, which is correct because in 2014 there was no stated intention to improve the SF Peninsula Corridor, a project now contemplated by Caltrain and the Authority. For the 2014 O&M costs, see: California High-Speed Rail Authority, Draft 2014 Business Plan, Exhibit 5.1, p. 49 [PDF 49] and Exhibit 7.1, p. 75 [PDF 75] of the California High-Speed Rail Authority, Draft 2016 Business Plan.

Business Plan.[43] Among other construction cost increases the consultants raised were:

> Cost escalation *"Accounts for $370-$410 million increase to Phase 1 costs in 2012 dollars."* [44]
>
> A *"$2,050 million increase"* between Fresno and Bakersfield, a *"$2,290 - $2,950 million increase"* between Bakersfield and Palmdale and between Palmdale and Los Angeles, a *"$90 - $845 million increase."* [45]

These quotations equate to at least $2.75Billion, and up to $9Billiondf of uncounted costs, a 4% to 13% increase in Phase 1 (SFTBT-LA Union/Anaheim) construction costs. Only by the efforts of a Los Angeles Times' reporter were the cost escalations brought to light in October 2015. Until then, the Authority's consultant's report had been hidden from public scrutiny for two years. Despite these professionals' calculations, the 2016 Plan claims the Year of Expenditure capital costs – including rolling stock, terminals, signaling and electrification – had decreased by $4Billion.[46] How can that be?

D) In 2014 the Authority's commissioned the 2013/2014 Revealed Preference/Stated Preference (RP/SP) surveys that brought them bad tidings about ridership, which *inter alia* were:

1. HSR's potential market share dropped from 58% to 41%between the 2005 and 2013/2014 RP/SP surveys.[47]

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[43] 2014 Business Plan Capital Cost Estimate Update, October 3rd 2013. Found by scrolling down the PDF file's letter from Chair Dan Richard on the URL http://www.hsr.ca.gov/docs/newsroom/Speaker_Atkins_Response_to_Request_for_Subpoena_110315.pdf This is also found in the Tos, Fukuda court record as AG031773

[44] See [PDF 18] of 2014 Business Plan Capital Cost Estimate Update, October 3rd 2013. Found by scrolling down the PDF file's letter from Chair Dan Richard on the URL http://www.hsr.ca.gov/docs/newsroom/Speaker_Atkins_Response_to_Request_for_Subpoena_110315.pdf. This is also found in the Tos, Fukuda court record as AG031773

[45] See [PDF 23-25] of See [PDF 18] of 2014 Business Plan Capital Cost Estimate Update, October 3rd 2013. Found by scrolling down the PDF file's letter from Chair Dan Richard on the URL http://www.hsr.ca.gov/docs/newsroom/Speaker_Atkins_Response_to_Request_for_Subpoena_110315.pdf This is also found in the Tos, Fukuda court record as AG031773

[46] See Draft 2016 Business Plan, Exhibit 5.3, p. 56 [PDF 56]

[47] Document# AG015260, see AG015269 – pg.12 [PDF 10]; Cambridge Systematics, California High Speed Rail Ridership and Revenue Forecasting, Survey Data and Inputs to Version 2/Version 3 Preliminary Choice Patterns and Traders/Non-traders; Prepared for California High Speed Rail Authority and Ridership Technical Advisory Panel, March 20, 2014.

2. The future use of autos was fourteen points (46%-60%) higher than 2005's equivalent survey.[48]

3. Drivers inclined to stay with their cars increased between the RP/SP surveys from 52% to 77%.[49]

4. Depending on the reasons for travel, 91%-99% of Californians[50] will continue to travel by auto.[51]

These client-friendly surveys were telling the HSR project's leadership that ridership should dwindle in their Draft 2016 Business Plan. Instead, ridership increased by 12-23% since the 2014 Plan.[52] IOS ridership estimates went from 11.4 to 12.8Million and Phase 1 (2040) ridership went from 34.7 to 42.8Million.[53]

Long ago, but certainly by 2013, the Authority should have listened to both 'outside' and 'inside' fact-based critiques and adjusted to the realities they presented. They have ignored criticism and that strategy has 'come home to roost' as reflected by public opinion polls. For example, the Public Policy Institute of California (PPIC) reflected in March 2016 that while its three prior annual surveys documenting public support for HSR found that 52% of California's voters favored building the project,

[48] Document# AG015260, see AG015270 – Table 1.1 of Cambridge Systematics, California High Speed Rail Ridership and Revenue Forecasting, Survey Data and Inputs to Version 2/Version 3 Preliminary Choice Patterns and Traders/Non-traders; Prepared for California High Speed Rail Authority and Ridership Technical Advisory Panel, March 20, 2014. This document contrasts findings of the 2013/2014 RP/SP versus the 2005 survey.
[49] Document# AG015260, see 015272 – Table 1.3, Ridership and Revenue Forecasting - Survey Data and Inputs to Version 2 / Version 3, Preliminary Choice Patterns and Traders/Non-traders", Cambridge Systematics, March 20, 2014
[50] Document# AG015004, see AG015019, AG015020, AG015021 – See pages 16, 17 18 [PDF 16-18] of the California High Speed Rail Version 2 Ridership and Revenue Model; Calibration and Validation Briefing Book, Cambridge Systematics, January 1th, 2014.
[51] Document# AG015004, see AG015019, AG015020, AG015021 – See pages 16, 17 18 [PDF 16-18] of the California High Speed Rail Version 2 Ridership and Revenue Model; Calibration and Validation Briefing Book, Cambridge Systematics, January 1th, 2014.
[52] For the 2014 O&M costs, see: California High-Speed Rail Authority, Draft 2014 Business Plan, Exhibit 5.1, p. 49 [PDF 49] and Exhibit 7.1, p. 75 [PDF 75] of the California High-Speed Rail Authority, Draft 2016 Business Plan
[53] For the 2014 O&M costs, see: California High-Speed Rail Authority, Draft 2014 Business Plan, Exhibit 5.1, p. 49 [PDF 49] and Exhibit 7.1, p. 75 [PDF 75] of the California High-Speed Rail Authority, Draft 2016 Business Plan

"Today, 44 percent of likely voters favor the project." [54]

The Authority has no one to blame but itself for diminishing the public trust in the HSR project. If the general public knew more about the Authority's consistent efforts to mislead, support would further decline.

1.2 The Authority's Assertions Don't Reflect Either Real World Travelers' Thinking Or The Real World Costs Of Operating A High-Speed Rail System – While each of the last three Plans have increased the use of sophisticated ridership/revenue and O&M modeling and forecasting techniques, and calibrated the results to seem defendable, the Authority seems to not have asked itself two fundamental questions based on comparing the results of their assertions with empirical evidence.

1) Are travelers rational when they compare the costs and convenience of auto, HSR and air travel and choose a mode or modes?

> **Assumption Used In This Paper –** Travelers will trade-off the costs of travel in one mode versus the convenience of significantly faster door-to-door travel time and/or the convenience of not having to change to another travel mode as AB3034 demands.[55] Data on the stagnation of airline passenger growth is testimony to the high priority travelers give to costs versus the time saving convenience of air travel between the two major metropolitan centers.

2) Do the results of the California system's O&M costs reflect all the elements of operating and maintaining the entire system under the accounting system rules required of US private transportation operators?

> **Assumption Used In This Paper –** This has been the hidden element of the profitability equation. No "outsider" has access to the line items the Authority uses to assert profitability. But there is some publically

[54] See Public Policy Institute of California (PPIC) March 2016, p. 20 [PDF 20] http://ppic.org/content/pubs/survey/S_316MBS.pdf

[55] 2704.09 (f) of AB3034 says, *"For each corridor described in subdivision (b), passengers shall have the capability of traveling from any station on that corridor to any other station on that corridor without being required to change trains."* For practical purposes this means an HSR traveler would not have to change to auto, bus, air or conventional rail (CVR) in a door-to-door trip within a given corridor.

available data that says not only are many Operations & Maintenance (O&M) items missing from the Authority's equations, but the formulae they use is not acceptable for commercial operations in the US.

The foundation of this document's analyses is that travelers are rational, particularly when using their pocketbooks in a society with multiple ways and costs of traveling between the state's two metropolitan centers, and that Acela Express is the California HSR system's most proximate surrogate. Because the Authority's ridership/revenue forecasts IOS have no grounding in rational 'travel consumer' behavior, the results are divorced from that thinking as the following analyses on fares, then ridership will show.

1.3 Getting To Profitable – Though there are many noble goals for the California high-speed rail (HSR) project, first and foremost AB3034 requires the HSR system to not require an operating subsidy. [56] In short, the project is first and foremost a commercial project and must adhere to the same US accounting rules as any commercial operation.

Revenues (= Fares x Ridership), when greater than (>) Total[57] Operations and Maintenance (O&M) Costs equates to Positive Operational Cash Flow (Profitability).[58] The result of the three variable equation governs whether the to-be privately operated[59] and maintained[60] California high-speed rail (HSR) system meets AB3034's demand that the Initial Operating Segment (IOS) and beyond be financially viable. The Authority's statement that each of the

[56] See: AB3034, 2704.08 (J*) "The planned passenger service by the Authority in the corridor or usable segment thereof will not require a local, state, or federal operating subsidy."*
[57] The word 'Total' is used here because the US DOT, uses Generally Agreed Accounting Principles (GAAP) guidance, and requires all revenues and costs be in a single account.
[58] See: To Repeat – The Authority's Train Will Need A Subsidy Forever, August 22nd 2012. Found at: www.sites.google.com/site/hsrcaliffr Page. 35 [PDF 35] refers to France's and EU's rail accounting under Directive 91/440 that separates fixed infrastructure O&M accounts from rolling stock O&M accounts, as well as attributing at least part of health, pension and other benefits' costs to non-rail accounts. See: Réseau Ferré de France (RFF) History at http://www.fundinguniverse.com/company- histories/Reacute;seau-Ferreacute;-de-France-company-History.html
[59] Table ES-3 [PDF 21] in the 2012 Plan and see Exhibit 1.1 [PDF 16] in the 2014 Plan show that, starting with the IOS, the system is privately operated.
[60] The 2014 Plan, page 30, [PDF 30] says, *"The Authority will also rely on the private sector for the delivery and maintenance of the remaining elements of the infrastructure (i.e., track, systems, and power)."* See: UN Business Plan page 30 [PDF 30].

three IOS forecasts is profitable is supposed to be taken *prima facie*.[61]

"Outsiders" have been denied access to the data, assumptions and calculations[62] to verify or refute the Authority's claims on ridership/revenue claims. They've also cannot inspect the Authority's O&M costs to asses whether they are done on the basis of the US Department of Transport's (DOT) required per passenger mile metric[63] (PPM), and conform to US Generally Accepted Accounting Principals (GAAP) that would support or disprove financial viability during IOS.

Based on publically available documents, this paper shows the arbitrariness and/or lack of reasonableness of each of the profitability formula's variables, as well as other data and analyses that refute financial viability claims during IOS. It concludes that the Authority's IOS is not financially viable and will require government(s) to subsidize the IOS' operations.

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[61] *"On its own, the IOS is a viable, profitable high-speed rail system."* See: California High-Speed Rail Program, Revised 2012 Business Plan; April 2012; pg. 2-15 [PDF 59].

[62] Public Records requests concerning access to the actually used data and assumptions on ridership, revenues, O&M costs and profits, and the algorithms used for its computation, have been met with responses that say: *"This is trade secret information pursuant to Evidence Code section 1060, incorporated into the California Public Records Act through Government Code section 6254(k) and, therefore, will not be provided."* See: email to Mr. Robert Prantis from Ms. Anne Parker of the Public Records Act Staff of the CA High-Speed Rail Authority, December 27,2013

[63] Appendix 16 [PDF 145-146] of the To Repeat report presents two documents showing the requirement and utility of the PPM metric versus per seat mile [PSM] to calculate financial performance. See: http://www.bts.gov/publications/federal_subsidies_to_passenger_transportation/ and the Congressional Research Service's 2009 report that says, *"Comparing costs on a per-mile basis is not as useful as comparing costs on a per passenger- mile basis, which is the cost of moving one passenger one mile."* Found at: www.fas.org/sgp/crs/misc/R40973.pdf

SECTION 2

THE STATUS OF AVAILABLE CAPITAL FUNDS, THE LACK OF PROGRESS AND AUTHORITY'S VACILATING COMMITMENT TO AB3034

While the Authority claims it has all the funds needed to build the IOS North (VtoV Est.) it doesn't and its terms and conditions for desperately needed private investment guarantee there will be none.

2.1 Getting Past The Headlines Is The Key To Understanding What The Authority Can Actually Build – A viable project is first a constructed project. But its plans fall short of what the law[64] and private investors require. First, the Authority's assumptions on certified sources of funding are misleading, exhibited by headline on the shift northward.

> *"The funding authorized by the Governor and Legislature, by the federal government and the people of California is sufficient to deliver a high-speed rail line connecting the Silicon Valley to the Central Valley"* [65]

> *"First, initiate high-speed rail passenger service as soon as possible."* [66]

But the 2012 and 2014 Plans promised to initiate IOS South high-speed rail service starting in 2022; not 2025 as the Draft 2016 Plan now promises. The next cloak over the truth is the headline:

> *"In July 2014, the California 3rd District Court of Appeal ruled in the Authority's favor in two lawsuits relating to our ability to access*

[64] For example, since 2008, the Authority hasn't addressed the legal requirement to report on the costs of building each corridor, as SEC. 2. Section 185035 was added to the Public Utilities Code, to read: *"(a) The Authority shall* ***establish an independent peer review group for the purpose of reviewing*** *the planning, engineering, financing, and other elements of the Authority's plans and issuing an analysis of appropriateness and accuracy of the authority's assumptions and an analysis* ***of the viability of the Authority's financing plan, including the funding plan for each corridor*** *required pursuant to subdivision (b) of Section 2704.08 of the Streets and Highways Code."* [Emphasis added]

[65] Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan p. 9 [PDF 9]

[66] Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan p. 9 [PDF 9]

Proposition 1A bond funds.[67]*"*

That statement should end in "*. . . but ruled in favor of the Plaintiffs on both the Authority's lack of certified funds and incomplete certified environmental clearance to complete an initial operating segment and therefore the Authority has no access to Prop1A bond funds for construction."* The next headline hiding the truth is:

> *"As previously noted, with the passage of Senate Bill 862, the Legislature and Governor approved an annual appropriation of 25% of the annual Cap and Trade proceeds on a continuous basis to fund high-speed rail."*[68]

That should continue with, "*at best continuing until five years before IOS North is to be operational (2020)."* The Authority knows there is no certainty Cap & Trade funds will be available, rulings on two lawsuits are pending and there is no certainty the Legislature will extend SB862 past 2020.

Then to get from Bakersfield to San Francisco with HSR, but continuing slowly northward from San Jose to SFTBT – and somehow get a 50% jump in ridership and revenue – the Authority says,

> *"An additional $2.1 billion investment in that corridor will provide not just blended service, but allow for one additional track and, in some segments, two additional tracks in the existing corridor."* [69]

But that contradicts the prior page's general statement on sufficient funds.

2.1.1 Show Me Real Money, Not Phantom Funds – In its 2016 Draft Plan, the Authority says,

> *"Given the opportunity to leverage more ridership, revenue and private sector participation, we will seek federal funds to help complete the full San Francisco to Bakersfield line. If those additional funds are not forthcoming, we can and will still construct the Silicon Valley to Central*

[67] Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan p. 28 [PDF 28]
[68] Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan [PDF 10]
[69] Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan [PDF 11]

Valley line described above." [70]

That convoluted statement and the *"An additional $2.1 billion investment . ."* declaration mask that the Authority has no source of committed funds to build the VtoV Extension in 2016 or in 2025, but rather has lowered the future and yet invisible Phase 1 costs 8% to get a 'phantom' $2.1Billion. Later in the 2016 Plan, the Authority claims for itself the full complement of funds, but only one part of which is actually available. *Inter alia* these are:[71]

- **SUPPOSEDLY APPROPRIATED –** $2.6Billion of Prop1A funds – all of which was blocked by court rulings from 2013. Until a second funding plan clears the state's courts, there is no access.
    - **Federal ARRA/FY 10 Grants and Planning Funds –** The Authority has access to these monies, with the proviso that the State match whatever the federal government provides.
    -
- **SUPPOSEDLY COMMITTED** – $4.2Biilion of State Prop1A Bond funds – all of which was blocked by court rulings from 2013
    - **Cap & Trade Funds (through 2024)** – $5.3Billion – but SB826 only commits a percentage of Cap & Trade funds (25%) not a fixed amount and then only through 2020
    - **Long Term Cap & Trade Funds (through 2025-2050)** – $5.2Billion – but SB826 only commits only 25% of Cap & Trade funds, not a fixed amount and then only through 2020

The Authority assumed it has nearly $21billion. In reality it lacks about $17Billion to build VtoV Extension, and SB1029 constrained those available federal funds to the Madera-Bakersfield section. [72] In short, the Authority can only claim to have about 15% of the $21Billion needed to build VtoV Ext.

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[70] Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan, p. 12 [PDF 12]

[71] See Exhibit 6.2, p. 61 [PDF 61] of Draft 2016 Business Plan: Connecting and Transforming California, Section 6: Funding and Financing.

[72] Even the appropriated portion available is encumbered by SB1029 language restricting it to only the Initial Operating System as defined in the 2012 Business Plan, not the IOS of the 2016 Business Plan. SB1029 speaks specifically of the 2012 Business Plan as its reference document. SB1029, Appropriations for Initial Construction Segment (Items 2665-306-0890 and 2665-304-6043) says; "*This bill appropriates to the Authority $3.24 billion from the Federal Trust Fund and $2.61 billion from the High Speed Passenger Train Bond Fund for the construction and acquisition of a portion of the initial operating segment.* ***This initial construction segment constitutes the segment running for 130 miles between Madera and Bakersfield."*** [Emphasis added]

2.2 The Authority's Funds Are NOT Able To Build An Operating Railroad For the Initial Operating Segment (IOS), Only A Dirt Mound

– Since its inception, the high-speed rail project has badly needed and sought private capital investment. In June 2008 the Authority's search for private interest concluded with;

> *". . respondents argued that interest in equity investment would increase if the risk to the concessionaire were decreased, perhaps through some form of revenue guarantee* [prohibited under AB3034] *. ."* [73]

In September 2009 IMG and Goldman Sachs,[74] repeated the story,

> *"Private appetite for ridership risk is limited without revenue guarantee or until ridership proven."* [75]

Until 2014, the Authority's plan was to build IOS; test the project's financial viability by running the system, then sell a concession to a private operator or investor. Then, instead of The Authority alone financing the fixed infrastructure and rolling stock for IOS, the Authority admits it needs private at-risk capital **BEFORE** the IOS is competed. Specifically:

> *"The Authority will also rely on the private sector for the delivery and maintenance of the remaining elements of the infrastructure (i.e., track, systems, and power)."* [76]

The 2014 and 2016 plans contained another 'bombshell' for private investors.

> *"While the Authority will rely heavily* ***on the private sector to bring*** *innovation and* ***investment*** *into the project,* ***the state will*** *maintain its lead organizational role,* ***retaining ownership and governance functions."*** [77] [Emphasis added]

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[73] See: Report of Responses to the Request for Expressions of Interest For Private Participation in the Development of A High-Speed Train System in California by the Infrastructure Management Group (IMG) to the California High-Speed Rail Authority Board Financing Workshop, dated October 2008; page 2 of 17. The presentation was given in June but the printed report issued in October. *"A presentation summarizing the results of the RFEI was made before the Authority Board of Directors on June 11, 2008* "

[74] Raising $100Billion for a creditworthy project is no problem for Goldman Sachs. It led Vodafone's $183 billion purchase of Mannesmann. Vodafone AirTouch took control of Mannesman in February 2000. The £112bn ($183bn) all-share deal is still the largest corporate merger in history. See: http://news.bbc.co.uk/2/hi/business/630293.stm

[75] See p. 9 [PDF 9] of California High-Speed Rail Authority, Board Financing Workshop of September 2, 2009.

[76] See: Connecting California, 2014 Business Plan, April 30, 2014page 30 [PDF 30]

[77] See: Connecting California, 2014 Business Plan, April 30, 2014, pg. 31 [PDF 31]

> *The specific high-speed rail components that will be delivered under a potential* **[Design, Build, Finance and Maintain]** ***DBFM*** *or other contract are described in detail below.* [78] [Emphasis added]

No wonder that not one of the 36 private companies' responses in 2015's request for expressions of interest brought any form of capital commitment. Does the Authority not understand that the *sine qua non* of private investment is clear ownership and control over assets? With such onerous terms and conditions for a contract with private companies, the Authority will not receive private finance.

Without private investment the Authority's budget is only for a dirt mound from somewhere north of Bakersfield towards San Jose. That's not what the voters or Legislators were led to believe in 2008.

2.3 Three Years After Awarding The First Construction Contract, The Truth Is Not Much Of Anything Has Been Built Or Will Be Built –

The Authority's Draft 2016 Plan headlined its progress, saying

> *"Starting with our official groundbreaking in January 2015, there are now have more than 100 miles of construction-related activities underway with almost $3 billion in contracts that came in lower than our estimates."* [79]

While ". . *100 miles of construction-related activities underway . .* " is technically correct, by saying*, " . .we have acquired about 650 land parcels, and a have a few, scattered construction projects underway."* would have been much closer to the truth.

Digging into the Draft 2016 Plan reveals the Authority has serious problems executing the first 29miles of construction, called Construction Package 1

[78] See pp. 8-12 [PDFs 16-18] of the Request for Expressions of Interest for the Delivery of an Initial Operating Segment, RFEI HSR#15-02, Release date June 22, 2015. Found at: http://www.hsr.ca.gov/docs/about/doing_business/HSR15_02_RFEI.pdf

[79] See Section 1, p. 19 [PDF 19] of Connecting and Transforming California, Draft 2016 Business Plan, February 18, 2016.

(CP1) that was awarded in the spring of 2013. Among these are:

> In the nearly three years the Authority has tried to acquire land for CP1, only 44% has been acquired (642/1458 parcels) [80]
>
> The Authority touted that **"***On average, Construction Package 1 and Construction Package 2-3 bids came in approximately 30% below engineer's estimates."* It's too soon to know the history of CP 2-3 or CP4, but the Board abrogated both PUC and its own rules[81] to award to Tutor Perini (TPC), [82] the least financially[83] and technically[84] qualified of the five bidders, the CP1 contract. The Board should have expected such problems as they now have.

In rare admissions of problems, the Authority first admits CP1 costs are over the "*30% below engineer's estimates."* and behind schedule,

> *"Although the first construction packages came in under engineers' estimates, they also faced a number of problems in execution and delivery . . . . Execution delays associated with Construction Package 1 may impact the expected cost and schedule for completing the package."* [85]

Then the Authority admits that all is not settled with either the railroads or

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[80] See p. 20 [PDF 20] of Connecting and Transforming California, Draft 2016 Business Plan, February 18, 2016.

[81] See: Board Policies and Procedures, adopted, November 2011. As of June 2013, the most recent (February 2013) Policies and Procedures are found at <http://www.calhsr.com/wp-content/uploads/2009/05/Policies-and-Procedures-as-of-Feb-2012.pdf> and the now more-than-a-decade old Conflict of Interest Code is at: <http://www.calhsr.com/wp-content/uploads/2009/05/Conflict-of-Interest-Code.pdf

[82] On April 12th 2013, the Authority announced that Tutor Perini/Zachry/Parsons (TPC) was the wining consortium. The Authority's announcement at: http://www.cahighspeedrail.ca.gov/assets/0/134/7fd71c2f-cf92-45b8-aee6-7a4ce052f2c6.pdf also find, "Bullet Train Agency Gives $985-Million Contract to Tutor Perini" Los Angeles Times, Ralph Vartabedian, June 7, 2013 CA: as appeared in Mass Transit magazine, June 7th 2013. See: http://www.masstransitmag.com/news/10956798/tutor-perini-to-begin-construction-of-californias-bullet-train-system

[83] TPC's earnings report of August 6th 2012 said, *" . . the Company obtained a waiver of compliance with the covenants of the credit agreement for the period ended June 30, 2012 as the Company would otherwise have been out of compliance with certain ratios due to the impairment charge, current debt levels, and lower than expected income from operations."* This was done, *" . . to allow for more favorable ratios for the Company."* Changing the way accounting rules apply for credit analysis suggests TPC's prior set of accounting rules would not show the company in good standing

[84] The highest technical rating went to California Backbone Builders with a score of 27.6; the next highest to Dragados/Samsung/Pulice with 26.13; the third to California High-Speed Ventures with 21.41 and the fourth to California High-Speed Rail Partners with 20.70. The highest score was a third higher than TP's. The second highest was more than a quarter higher than TP's.

[85] See p. 21 [PDF 21] of Connecting and Transforming California, Draft 2016 Business Plan, February 18, 2016.

the government agencies contracted to move utilities.

> *"Negotiations for third party agreements (railroads, utilities and others) were more difficult than anticipated."* [86]

No timeframe is given for when these agreements will be reached, or when the agencies will complete the work that will allow the Construction Package contractors to complete their work.

But then comes another headline, which in view of the Authority's internal problems with CP1, it's glacial acquisition of properties, and its problems with utilities, freight railroads and government agencies, makes it almost risible.

> "*We are on schedule with respect to the Construction Package 2-3 and Construction Package 4 contracts."* [87]

This headline on CP2-3 and CP4 ignores that nothing has been built in these two Construction Packages therefore few if any problems have emerged.

2.4 Time Is Not On The Authority's Side – The DOT/FRA Agreement says the Authority will start ICS *". . . construction by the end of 2012, with construction completed by the end of September 2017."* [88] That Agreement also says; *"The Phase1 of this work is estimated to take 6 years to complete."* [89] Construction did not start two and a half years ago and the time to complete what was Phase 1 in 2011 has slipped from 2033[90] to an undesignated date for its equal, the Full Phase 1 Build Out.

The total length of CP2-3 and CP4 is more than three times the maximum 29miles of CP1. Making the very generous assumption that the Authority can

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[86] See p. 21 [PDF 21] of Connecting and Transforming California, Draft 2016 Business Plan, February 18, 2016.
[87] See p. 21 [PDF 21] of Connecting and Transforming California, Draft 2016 Business Plan, February 18, 2016.
[88] See the Grant/Cooperative Agreement; FR-HSR-0009-10-01-05; Amendment No. 5, dated 12/05/2012. Found at: http://www.hsr.ca.gov/docs/about/funding_finance/funding_agreements/FR-HSR-0009-10-01-05.pdf, pages 56-57 [PDF 58-59] or the Project Schedule table on page 88 [PDF 90]
[89] See page 60 [PDF 62] of Exhibit 1 to the Cooperative Agreement FR-HSR-0009-10-01-00, dated December 5, 2012.
[90] Before admitting that the intent of the Legislature to have Phase 1 operational by 2020, *"extending the date for completion of Phase 1 from 2020 to 2033"* the Authority then admitted that *"Phase 1 operating sections: the system will be completed by 2033"* See p. ES-8, [PDF 14] of the Californian High-Speed Rail Program, Draft 2012 Business Plan, November 1, 2011

acquire the remaining 816 parcels needed to build CP1, and that all parcels for CP2-3 and CP4 (± 5,000 parcels) can be acquired in the same three years as the remaining 56% of CP1, it will take at least three more years before the Authority has enough right-of-way to build where the Authority is already under legal contract to build.

That would be spring of 2019 about two years after contractors' invoices must be submitted in order for the Authority to claim those costs from federal funds.[91] But the ARRA grants stipulate that unspent funds must be returned to Congress by the close of the federal fiscal year FY'17 - about eighteen months hence. While the Authority has an unspent FY10 grant it can spend after the close of FY'17, it's likely that will be required for land acquisition, infrastructure relocation and dirt mound construction cost overruns, perhaps before the beginning of federal FY18. Time constraints on federal monies should not have encouraged the Authority to either continue assuming it has more time to complete C1 through CP4.

2.5 Nor Are Whole And Realistic Costs On The Authority's Side – The Authority holds that the costs of building CP1, CP2-3 and CP4 is $2.56Billion before overruns or change orders.[92] In 2013, the costs of moving infrastructure for CP1 were estimated to be about 1.4 times the costs of building only the substrate.[93] If the costs for CP2-3 and CP4 are only half the sections' construction cost, then moving infrastructure on CP2-3 and CP4's

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[91] See: 31 U.S.C. § 1552 (Grant/Cooperative Agreement, Amendment No. 5, Section 8, page 18 [PDF 20] says, *"FRA shall process all such materials, and complete final closeout and reimbursement by September 30, 2017, provided that FRA receives such materials from the Authority and determines those materials are consistent with the requirements above by July 31, 2017."* Page 57 [PDF 59] says; *"As described in Section 8 of Attachment 1B, the Authority must submit for reimbursement all expenses within the time specified in that Section 8 for FRA to make appropriate payments no later than September 30, 2017."* For all practical purposes the FRA must have the Authority's submissions by the end of July 2017, and the Authority must have them from contractors earlier. This assumes that the state's auditors can certify all invoices within three months; then federal auditors can do the same before making a payment to the state that will pay those contractors.

[92] See Exhibit 1.3, p. 21 [PDF 21] of Connecting and Transforming California, Draft 2016 Business Plan, February 18, 2016

[93] Column B of Figure 1 of Diminishing Prospects For the Authority's Initial Construction Section shows Californians Advocating Responsible Rail Design's (CARRD) findings on CP1. These are based on data from Public Works Agreements the Authority has with governments and utilities, plus the TPC-led consortium's contract. See: Figure 1 of Diminishing Prospects For the Authority's Initial Construction Section. Found at www.sites.google.com/site/hsrcaliffr

lengths will cost at least as much as those bids, or $1.25Billion.

Assuming the CP 2-3 and CP4 contracts do not run into financial difficulties due to oil wells and soil subsidence north of Bakersfield, and there are no overruns for property acquisition, infrastructure relocation and/or rebuilding and construction, the dirt mound and moved infrastructure for CP1, CP2-3 and CP4 together will cost around $4Billion. That exceeds the total Federal ARRA and FY10 funds.

Since, according to the DOT/FRA contract,[94] only FY10 funds can be spent north of Fresno, and ARRA grants are solely for work south of central Fresno,[95] that leaves the Authority in a legally difficult position if CP1 continues to overrun its estimates, as it has. The California High-Speed Rail Authority's 'window' to build and use available federal funds legally closes before its 'pivot to the north' to San Jose even starts construction.

2.6 Consequently, The Authority's Commitment To AB3034 Has Become Tentative And Tied To The Availability of Private Financing – Five years ago, the Authority stipulated to each operating segment being profitable and able to attract private capital. Its Draft 2012 Plan said,

[94] The Authority's only practical remedy is to use the ARRA obligated grants and matching Prop1A bonds for the Madera to Fresno section. The DOT/FRA has previously shown itself very pliable to amending its contractual and financial terms to help the Authority, particularly by abrogating its 2011 policy directive that altered the timing of spending Federal grant dollars from each dollar being a 1:1 match to being those 'first spent.' The May 25th 2011 ruling requiring a 1:1 match of Federal and State monies for the HSR project was made by then-Undersecretary Roy Kienitz in a letter to then-CEO Roelof van Ark. John D. Porcari, Deputy Secretary of the Department of Transportation, reinforced tis position in January 3rd 2012 a letter. The pliant behavior of the FRA is also exemplified by agreeing that the theretofore-assumed start date of September 2012 could slip to mid-2013, which was forced upon the FRA as the original date passed. For the section in the Amended Agreement where the FRA lets federal dollars be spent first: see: AGREEMENT NUMBER: FR-HSR-0037-11-01-00, Attachment 1, page 93, which says, *"The Parties acknowledge their mutual benefit in efficiently spending the Federal and state funds to complete the Project and that there is an opportunity for substantial cost saving in Task 8 if the Grantee is allowed to accelerate the expenditure of ARRA funds."* No attempt to document *"substantial cost saving"* was found in the Amended Agreement.

[95] These funds, terms and conditions are part of the Grant/Cooperative Agreement; FR-HSR-0009-10-01-05; Amendment No. 5, dated 12/05/2012. Found at: http://www.hsr.ca.gov/docs/about/funding_finance/funding_agreements/FR-HSR-0009-10-01-05.pdf

> *"Private-sector involvement is feasible because each of the operating sections generates a net operating profit."* [96]

Five months later its April 2012 Plan agreed with that supposition,

> *" . . the IOS is able to support operations without a subsidy . . . On its own, the IOS is a viable, profitable high-speed rail system."* [97]

Then strangely, the 2014 Plan mentions profitability only twice, and only as a key objective, not a legal requirement of the operator.[98]

The 2016 Plan never mentions the word 'profit' while it adopts 2014's illegal stance and zigzags away from the boldness of 2012 and only mentions 'commercially viable' twice:

> *"Early involvement of the eventual operator is key to establishing a commercially viable system over the long-term."* [99]

This most recent statement not only reinforces the need for private capital earlier than Plans up to 2014, it also backs off the AB3034 requirement and every Authority promise since 2011 that the IOS would be profitable.

This is another of the Authority's gradual shifts of 'moving the goalposts' (like the timing for private at-risk capital, and the morphing of the Blended System into becoming Phase 1 that diminish the Authority's credibility and reinforce the perspective that the project is nothing more than, as former Assembly Speaker Willie Brown said in 2013[100] another example of government-sponsored bait and switch projects.

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[96] California High-Speed Rail Program, Draft 2012 Business Plan; November 1, 2012; p. ES-8 [PDF 14]
[97] California High-Speed Rail Program; Revised 2012 Business Plan, April, 2012, Page 2-15 [PDF 59]
[98] *"A key objective of the operator will be to manage operating performance, i.e., matching revenues against operating costs, in order to enhance profitability while building the service."* See: Connecting California, 2014 Business Plan, April 30, 2014 page 53 [PDF 53].
[99] See: pp. 36 and 38 [PDF 36 and 38] of Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan
[100] See Former Assembly Speaker Willie Brown's column of July 28th 2013 column in the SF Chronicle

SECTION 3

HOW UNREALISTIC ARE THE AUTHORITY's FARES?

This section analyzes the reasonableness of the Authority's fares, (or lack of) that are half of the revenue part of the financial viability formula; Revenues (= **Fares** x Ridership), when greater than (>) Total[101] Operations and Maintenance (O&M) Costs equates to Positive Operational Cash Flow (Profitability or Financial Viability).[102] The Authority says its Revenues and Ridership are 99% closely correlated; i.e. a percentage movement up or down of one brings almost exactly the same movement of the other. [103] Since fares underlie half of the revenue portion of the equation, it seems logical to start by comparing the Authority's fares with historical and empirical data.

3.1 The Chosen Maximum HSR Fare Formula Is Arbitrary And Creates Distortions That Prohibit Private Operator/Investor Participation – In 2008 the Authority built a fare formula calculation trap for itself it has been unable to escape. In its two-month late 2008 Business Plan[104], the Authority said,

> "*With train fares at 50% of airfares, high-speed trains will carry an estimated 55 million trips in 2030 and generate $2.4 billion in ticket revenue in 2008 dollars for the Los Angeles/Anaheim to*

[101] The word 'Total' is used here because the US DOT, uses Generally Agreed Accounting Principles (GAAP) guidance, and requires all revenues and costs be in a single account.
[102] See: To Repeat – The Authority's Train Will Need A Subsidy Forever, August 22nd 2012. Found at: www.sites.google.com/site/hsrcaliffr Page. 35 [PDF 35] refers to France's and EU's rail accounting under Directive 91/440 that separates fixed infrastructure O&M accounts from rolling stock O&M accounts, as well as attributing at least part of health, pension and other benefits' costs to non-rail accounts. See: Réseau Ferré de France (RFF) History at http://www.fundinguniverse.com/company- histories/Reacute;seau-Ferreacute;-de-France-company-History.html
[103] The Authority treats revenue as a fixed multiple of ridership for each phase, including IOS: i.e. over or under estimated demand means revenue is over or under estimated .999%. See: page B-9 [PDF 80] of California High-Speed Rail Draft 2014 Business Plan: Ridership and Revenue Forecasting, draft technical memorandum: *"Revenue and ridership were closely correlated with a R^2 of more than 0.999 for each year."*
[104] AB3034, SECTION 1. 185033 reads *"The Authority shall prepare, publish, and submit to the Legislature, not later than September 1, 2008, a revised business plan . ."* an unfulfilled demand met with impunity.

San Francisco link." [105]

No reason was given as to why the 2008 Plan explored only the ridership impacts of LA-SF fares chosen by the Authority at 50% and 77% of airfares[106] and not the costs of operating the HSR system. In support of the 2008 Plan's claims, and probably the source of the "about $50" fare claim,[107] the Plan's technical document, said of fares:

> *Baseline high-speed train fares for trips between regions were set so that the Los Angeles to San Francisco fare would be half of the average air fare from the SCAG airports to Bay Area airports, or $55 in 2005$$. Fares for other trips between regions were then calculated using a formula derived from this fare . . ."* [108]

That fare structure strategy was arbitrary. To be financial viable, fares must exceed operations and maintenance (O&M) costs. But nowhere in the 2008 technical document, nor that year's Plan is there any indication of how *"Annual operation and maintenance costs by 2030 for the initial phase have been estimated at approximately $1.3 billion."* [109] was derived, and no publically available document from 2008 or later shows that conclusion.

In fact, the 2008 Plan admitted that there was no basis for establishing fares based on any ratio of airline fares, and postponed any fare decision:

> *"A comprehensive fare structure will be a policy determination in future years . . ."* [110]

2009's Business Plan estimated O&M costs in general, but neither that Plan,

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[105] See p.17 [PDF 21] of California High-Speed Train Business Plan, November 2008.
[106] A footnote to Figure 16, p.17 [PDF 21] of the California High-Speed Train Business Plan, November 2008 says, *"HST Fares at 50% and 77% of airfare as described in ridership and revenue document"*
[107] See: p. 2 of the Proposition 1A Arguments in the Voter Information Guide 2008.
[108] See: p. 4 [PDF 8] of California High-Speed Train Project, Ridership and Revenue Forecasts, prepared by Parsons Brinckerhoff, Cambridge Systematics and SYSTRA. No publication date is given, but tables on PDF 10, 11, 12, 13 and 15 say *"SOURCE: High-Speed Rail Authority Program Management Team, 2008."*
[109] See p.17 [PDF 21] of California High-Speed Train Business Plan, November 2008.
[110] The full text says, *"A comprehensive fare structure will be a policy determination in future years taking into account such factors as revenue needs, time and distance of travel, advanced purchase, type of service, weekend and holiday demand and other marketing considerations."* See p.17 [PDF 21] of California High-Speed Train Business Plan, November 2008.

nor any since has produced a publically available, line item O&M cost document.[111] In the 2009 Plan, the SF-LA HSR fare, set at *"83% of the airfare"* [112] effectively doubled to $105.[113]

The Authority's basis for determining fares became capricious. Within thirteen months, the SF-LA fare had gone from $55 to $105. 2009's Fare structure in 2009 was portrayed as only a scenario: again real fares to be determined later.

> *". . the average high-speed train fares are scenarios, and no policy decision has yet been made on how much a ticket will cost for the system. That decision will be made in the future . . ."*[114]

By 2012, the same *"83% of the airfare"* formula had shrunk the SF-LA high-speed fare over 20% to $81[115] – or $83[116] depending on what Authority document is referenced.

Earlier Plan's LA-SF fares[117] were sequentially $50, $105, $83, and $86, while 2016's fare is $89.[118] Within a space of eight years, HSR fares for SF-

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[111] See: Letter (by email only) to Mr. Robert Prantis, from Annie Parker, Public Records Request staff, dated December 27, 2013 denying Mr. Prantis such information saying, *"This is trade secret information pursuant to Evidence Code section 1060, incorporated into the California Public Records Act through Government Code section 6254(k) and, therefore, will not be provided."*

[112] See: Table C, p. 72 [PDF 74] of the California High-Speed Rail Authority, Report to the Legislature, December 2009.

[113] *"The fare is calculated in the same manner as the 50 percent, but is anchored by an LA-SF HST fare at 83 percent of the air fare, or in 2009 dollars a high-speed train fare of $105."* See: p. 65 [PDF 67] of the California High-Speed Rail Authority, Report to the Legislature, December 2009. This fare is the closest to date of a per mile fare for SF-LA based on the operations of European HSR or Acela Express' 44¢-62¢ per mile fares. For comparisons of European HSR and Acela per mile fares, see: Figure 5, Section 3 of: To Repeat – The THE AUTHORITY's Train Will Need A Subsidy Forever, August 22nd 2012. Found at: www.sites.google.com/site/hsrcaliffr

[114] See: ADDENDUM to the California High-Speed Rail Authority's "Report to the Legislature, December 2009" Approved by High-Speed Rail Authority Board: April 13, 2010 p. 15 [PDF 15].

[115] *"The average ticket fare between San Francisco and Los Angeles will be $81 (83 percent of anticipated airline ticket prices)"* See: p. ES-14 [PDF 22] Rail California High-Speed Rail Program Revised 2012 Business Plan, April 2012.

[116] See Table 5.2, p. 5-6 [PDF 42] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting

[117] The $50 SF-LA fare comes from p. 2 of the Proposition 1A Arguments in the Voter Information Guide 2008; the $105 fare from p. 65 [PDF 67] of the Report to the Legislature, December 2009; the $83 fare from p. 5-6 [PDF 42] of the California High-Speed Rail 2012 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting; and the

LA, had nearly doubled, then dropped by 20%, then risen by 4%, then risen again another 4%. In 2016 the present SF-LA fare is 60% higher than stated in 2008's Plan.

Whatever justification for the 83% of airfare strategy[119], the 'ratio of airfares' approach was an arbitrary decision. Under every scenario, whatever actual SF-LA airfares are or become, the HSR fare is irrevocably and ALWAYS 17% lower. That tautology set the concrete: from 2009 onwards, the Authority's fare strategy became claiming a 17% discount off LA-SF airfares, versus a real world approach that set fares to reflect the empirical evidence of operating costs plus profit, taxes, etc.

Consequently, HSR's fares also can never be higher than 83% of SF-LA airfares for shorter or longer routes, creating distortions. No explanation is given for why the '83% ceiling' somehow starts in Bakersfield for journey's southward from SFTBT or Merced for journeys northward from Anaheim.

Interestingly the two journeys are roughly 300miles in driving distance.[120] Even if the Authority's planners chose those cities to set the '83% ceiling' the Authority presents no evidence that at around 300 miles a private operator can recoup operating costs and pay taxes on profit when charging the $89 of the Draft 2016 Plan. To the contrary, while Acela Express' NYC-WDC trip

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$86 fare from p. 3-5 [PDF 28] of the California High-Speed Rail Draft 2014 Business Plan Ridership and Revenue Forecasting – Draft Technical Memorandum

[118] See Table 3.1, p. 3-3 [PDF 25] of the Authority's 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[119] *"Because of the importance of increasing the amount of private sector funding . . . the 83 percent fare scenario was adopted . . . The fare is . . . is anchored by an LA-SF HST fare at 83 percent of the air fare, or in 2009 dollars a high-speed train fare of $105 vs. a $125 air fare, and a $118 cost to drive."* [No evidence is given for how the cost to drive was calculated.] See p. 65 [PDF 67] of California High-Speed Rail Authority, Report to the Legislature, December 2009.

[120] Anaheim to Merced is 299miles; see: http://www.travelmath.com/drive-distance/from/Anaheim,+CA/to/Merced,+CA. SF to Bakersfield is 283miles, see: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Bakersfield,+CA

(228miles) is only three-fourths the Anaheim-Merced distance, the East Coast journey's fare is nearly twice ($161) the present ceiling.[121]

The 83% ceiling results in the absurdity that about a third of all Authority fares[122] in the 2012, 2014 and the Draft 2016 Plans are constrained by the arbitrarily fixed formula. In all three Plans, riders starting in SFTBT going south of Bakersfield get up to 40% of their ride for no more than the passenger to Bakersfield. But no private HSR operator would survive financially by charging travelers going the 407 miles[123] between San Francisco and Anaheim[124] the same $89 fare as the 283mile fare from San Francisco to Bakersfield.

The Authority speaks of the need to attract private capital. Such an arbitrarily fare formula choice of "freezing" fares at a percent of changing airfare ignores the need to pay the extra operating costs for extra miles and still be profitable. That doesn't make commercial sense, and according to AB3034[125] the train must have unsubsidized operations. The Authority's choice to constrain fares to 50% or 77% or finally 83% of SF-LA airfares is arbitrary and a formula for an operator's bankruptcy.

3.2 The Authority Attempts To Defend Indefensible Revenue and Ridership Forecasts – The Authority denied public records requests to analyze the ridership/revenue variables (including the PPM fares it used) and

[121] The Acela Express fare is based on four-day advance purchase, mid-morning Acela Express Value Fare. For Acela Express fares see: https://tickets.amtrak.com/itd/amtrak.
[122] In Table 5.2, p. 5-6 [PDF 42] 30 of the 91 (33%) fares are 83% constrained to $83. See: the California High-Speed Rail 2012 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting. In p. 3-5 [PDF 28] of the California High-Speed Rail Draft 2014 Business Plan Ridership and Revenue Forecasting – Draft Technical Memorandum, 30 of the 90 fares (33%) are constrained. In Table 3.1, p. 3-3 [PDF 25] of THE AUTHORITY 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting 25 of the 77 fares (32%) are constrained by the 83% 'ceiling' on HSR fares.
[123] Unless otherwise stated, miles are driving miles. See p. 65 [PDF 67] of California High-Speed Rail Authority, Report to the Legislature, December 2009.
[124] See: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Anaheim,+CA
[125] See: AB3034, 2704.08 (J*) "The planned passenger service by the Authority in the corridor or usable segment thereof will not require a local, state, or federal operating subsidy."*

the algorithms that its models used;[126] ignored the Legislative Analyst's Office (LAO) criticism on its lack of transparency,[127] and stalled CARRD's repeated requests for information.[128]

Five years ago, it hired a phalanx of paid-for ridership consultants, the Ridership Technical Advisory Panel (RTAP), while it kept the statutorily required PRG from accessing "internal" materials available to RTAP.[129] Its modelers have misused sophisticated analytics, such as sensitivity analyses and Monte Carlo technique to calibrate and adjust forecasts.[130] The Authority found its industry's association would not analyze its ridership forecasts;[131]

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[126] Public Records requests concerning access to the actually used data and assumptions on ridership, revenues, O&M costs and profits, and the algorithms used for its computation, have been met with responses that say: *"This is trade secret information pursuant to Evidence Code section 1060, incorporated into the California Public Records Act through Government Code section 6254(k) and, therefore, will not be provided."* See: email to Mr. Robert Prantis from Ms. Anne Parker of the Public Records Act Staff of the CA High-Speed Rail Authority, December 27, 2013.

[127] The LAO criticized the 2009 Plan's still unresolved lack of transparency and vagueness of ridership forecasts. See: PET#197 pg.8 of LAO 2009-10 Budget Analysis Series: Transportation: High-Speed Rail.

[128] See PET#029 and #030 Emails between CARRD and HSRA requesting Ridership Peer Review Group reports, April 8 2011 thru June 30 2011. Between April 8 and June 30, 2011 CARRD followed up on repeated public records requests on ridership; without legally required responses from the Authority.

[129] In January 2012, the PRG doubted the demand forecast of November 2011 Draft Plan; *"Unfortunately . . the demand forecasts remain an internal product of the Authority and its internal peer review panel* [Ridership Technical Advisory Panel (RTAP)]. Letter from the California High-Speed Rail Peer Review Group, Will Kempton, Chairman, January 3, 2012. See www.cahsrprg.com, pg. 5. The RTAP members include at least one person who worked on the Cambridge Systematics' model.

[130] Evan Porteus, Stanford University Business School (ret.) comments on intellectual dishonesty of the 2014 Business Plan's use of Monte Carlo analysis. *"In the Monte Carlo simulations that I looked at, the quantities simulated were assumed to be statistically independent. But in Section 6 of* [2014 Business Plan] *BP (pp. 51-52), the scenarios for revenue and O&M costs were assumed to be perfectly, positively correlated. That is, if the revenues were low, then so were the O&M costs. If one assumes statistical independence for this part of the analysis, too, one would need to recognize the possibility of low or medium revenue along with high O&M costs, as well as high revenue along with low or medium O&M costs. It is not intellectually honest to assume that (a) different O&M cost categories in the same year and O&M costs in the same category but in different years are statistically independent, (b) ridership in different routes within a year and revenues between years are statistically independent, and, in addition, (c) total O&M costs in a year are perfectly correlated with total revenues in that year."*

[131] See: UIC Peer Review of Operating & Maintenance Costs of the California High-Speed Rail Project; Final Report, January 2013. " . . *analyzing the project design and the ridership forecasts and evaluating their reasonableness were not in the scope of this review."* But UIC/IUR's Finding #6 points out that the Authority's ridership demand; "*. . . may lead to an understatement of the O&M costs or to an overstatement of the revenues*."

and frustrated the PRG's efforts to understand and verify[132] its ridership/revenue forecasts. But this bunker mentality cannot overcome facts inherent in the IOS.

3.3 Since The Authority Admits Its Fares Don't Compete With Per Mile Auto Travel Costs, How Can It Assume To Cannibalize The Auto Or Shared Ride Market For HSR Riders – In 2009 the Authority declared,

> *"Train fares were assumed to be somewhere between the cost of driving and of taking an airplane or train"* [133]

This is an admission that the Authority's fares can't compete with the costs per mile of auto travel. 2012 repeated the '83% of airfares' pricing principle:

> *"Fare levels are assumed to be comparable to those of other HSR services world-wide—somewhat below current airfares in the longer distance travel markets and well above the out-of-pocket cost of driving in the shorter distance travel markets*." [134]

Despite what was said, the Authority knows their fares can't compete against either short or long distance auto travel costs. Their only chance was and is to set HSR fares to compete for long-range airline travelers. That makes the forecasts shown in Figure 3, the Authority's only forecast of sources of auto drivers[135] defecting to HSR during IOS, nothing short of arbitrary.

After again admitting their fares don't compete with driving costs, how can the Authority have assume that its offerings will bring 6-9Million annual IOS riders or 19-29Million annual riders for Phase1 if it already ceded 91-99% of the potential HSR market to auto travel, as their consultants told them would be reality. It's not a reasonable conclusion.

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[132] "*These forecasts have not been subjected to external and public review, and many of the internal workings of the model, especially as applied to the IOS and Bay to Basin scenarios, remain unclear*." Letter from the California High-Speed Rail Peer Review Group, Will Kempton, Chairman, January 3, 2012. See www.cahsrprg.com, pg. 5

[133] See p. 64 [PDF 66] of the California High Speed Rail Authority: Report to the LEGISLATURE, DECEMBER 2009

[134] See: California High-Speed Rail Program Revised 2012 Business Plan, April 2012, page 5-11 [PDF 119]

[135] In no other business plan does the Authority list the shifts in transportation modes to HSR.

Figure 3 2012 Plan – Sources Of HSR Riders (#s and %)[136] By Transport Mode Source [137]								
	Source is Auto	**No. of 2012 HSR Pax From Auto**	**Source is CVR**	**No. of 2012 HSR Pax From CVR**	**Source is Airlines**	**No. of 2012 HSR Pax From Airlines**	**Source is Induced Ridership**	**No. of HSR Pax from Induced Ridership**
2012 IOS Low Est. – 7.3M	81.2%	5.75M	3%	0.213M	14.2%	1.00M	1.6%	0.114M
[138] **2012 IOS High Est. – 12.8M**	**70.3%**	**8.99M**	**11.7%**	**1.49M**	**16.1%**	**2.06M**	**1.9%**	**0.243M**
2012 Phase1 Low Est. – 25.8M	74.4%	19.2M	1.4%	0.36M	22.1%	5.7M	2.1%	0.542M
Phase 1 High Est. – 39.1M	67.5%	29.1M	4.7%	1.84M	25.4%	9.93M	2.4%	0.94M

The 2013/2014 Stated Preference/Revealed Preference (SP/RP) survey findings should have strengthened the fact-based conclusions about the importance of door-to-door costs reigning as first priority for travelers' decisions about the mode they will use. Prying travelers out of their (or others') autos, vans, etc. and convincing them to defect to high-speed rail is highly improbable.

But as much as the Authority would like not to have to, its train must compete with bus and auto travel costs[139] in a relatively cheap fuel

[136] See p. 5-8 [PDF 52] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting

[137] Nomenclature: Passengers (Pax), Conventional Rail (CVR), Induced Ridership is the Authority's estimate of additional travelers to "defect" to HSR solely because the HSR option is available 2025-2028.

[138] Since the 2012 High Estimate for IOS is equal to the 2016 Medium Estimate, these numbers are indicative of the origin of IOS riders.

[139] Comparing only an auto's operating cost per mile to a HSR rail fare per mile during the IOS is valid because like auto owners thinking only of costs, The Authority's calculations carry no capital cost amortization and defer maintenance and replacement costs until after IOS. Also according to the Authority's consultants, Cambridge Systematics: *"travelers will rarely consider the full range of auto operating costs in their trip decisions"* and that they tend to *"consider their cost of [automobile] travel to be only their out-of-pocket gas costs."* See Cambridge Systematics (2008), *Desert Xpress Ridership Forecast Review,* p. 17, Steer Davies Gleave, *Ridership and Revenue Audit,* page 5, Federal Railroad Administration, Final Environmental Impact Statement, Appendix B, http://www.fra.dot.gov/downloads/rrdev/Appendix_B_Ridership_Forecast_Review.pdf. Cited in the 2013 Reason Foundation Report, An Updated Due Diligence Report; Joseph Vranich,

market.[140] The Authority's fares must compete with driver-only or rideshare auto travel costs at 11¢/mile,[141] and a one person, intercity SF-LA bus fares as low as 12¢/mile.[142] the Authority claims its fares between the state's largest downtowns, are 23¢/mile,[143] but the Authority claims that autos' per mile total costs in 2025 and 2029 should be 26¢/mile.[144] These claims deserve inspection; both to the reality of the Authority's auto operating costs, and the reality of the Authority's SFTBT-LA Union one-way fare (23¢/mile).

3.3.1 Realistic per mile Auto Operating Costs Are Lower Than The Authority Would Wish –

Based on 2016 gasoline prices and the Authority's own Version 2 model for non-fuel costs,[145] and the Authority's only Plan (2012) estimate for 2030 fuel efficiency,[146] (33.6mpg) the total 2030 auto operating costs would be 8¢ per mile[147] [($2.60+$0.075)/33.6)].

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[140] The main operating cost of an auto is gasoline, and California's gasoline is relatively very cheap. Gas in the UK is about 92% more expensive than the US, Japan's 74% higher, France's 62% higher, Germany's 49% and Spain's 20% higher. See: http://www.nationmaster.com/graph/ene_gas_pri-energy-gasoline-prices

[141] For the 381miles between the downtowns, see http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Los+Angeles,+CA. For the cost of driving that 381miles for $42.50, see: http://www.travelmath.com/cost-of-driving/from/San+Francisco,+CA/to/Los+Angeles,+CA

[142] The BoltBus fare, SF-LA Union Station is $44 (12¢/mile). See: https://www.boltbus.com/

[143] Page. 3-4 [PDF 27] of the California High-Speed Rail 2014 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting says; *"HSR fares for all 2014 Business Plan scenarios were identical to those in the 2012 Business Plan . . with an $86 maximum in 2013 dollars (see Table 3.1)"*

[144] See Table 4.4, p. 4-4, [PDF 31] of the California High-Speed Rail 2016 Business Plan, Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Support Document

[145] *"The 2014 Business Plan used 7.5 cent per mile non-fuel cost."* See p. 4-6, [PDF 30] of the California High-Speed Rail 2016 Business Plan, Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Support Document

[146] See Table 2.6, p. 2-9 [PDF 29] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting. Costs are in 2011s.

[147] According to the Authority, in 2012 an auto's operating costs were 20¢-28¢ a mile, with gasoline in 2030 was $2.60 (low) to $6.11 (high). [See Table 2.6, p. 2-9 [PDF 29] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting. Costs are in 2011s.] In 2014, no gasoline price range was given. The Year 2029 auto operating cost range was 19¢-28¢/mile. See Table 4.4, p. 4-4, [PDF 42] of the California High-Speed Rail 2014 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting.] In 2016, no gasoline price range was given and the auto operating costs for 2029 were $26¢ per mile. [See Table 4-4, p. 4-4 [PDF 30] of the California High-Speed Rail 2016 Business Plan, Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Support Document.] The maximum decline over the three years of these assumptions is 8% (28¢ to 26¢). California's average gas prices in 2011 were $3.81/gallon: in

Obviously the higher per gallon fuel prices the Authority is counting on to justify total auto operating costs of 26¢/mile aren't reflected in this fact-based equation derived from California government records.

The Authority's use of non-fuel auto costs to compare with HSR fares are not justified either, because no capital equipment replacement is accounted for during the 2025-2028 IOS (VtoV Ext.). Therefore auto-driving costs during the same period should not need to account for capital replacement costs. Another bias to strengthen HSR's fares against auto travel's cost is the Authority's comparing todays HSR fares with auto driving costs 13-14 years hence.[148] Ultimately, those biases don't count, either mathematically, or as will be shown, in pragmatic decisions on what transport mode best fits the travelers' needs.[149] Comparing today's auto travel costs with today (2015) HSR fares is accurate 'apples-to-apples' accounting.

2012 $4.03/gallon. [See California Energy Commission, Fuels and Transportation Division, Fossil Fuels Office, Historic Yearly Average California Gasoline Prices per Gallon. Found at: http://energyalmanac.ca.gov/gasoline/gasoline_cpi_adjusted.html] In mid-March 2015, the average retail price for regular gasoline was $3.35/gallon: in March 2016 that was $2.60. [Found at: http://energyalmanac.ca.gov/gasoline/retail_gasoline_prices.html] That 2012-2016 drop was 65%.

[148] In the 2012 Plan, HST fares are in 2011 dollars. [See Table 5.2, p. 5-6, [PDF 42] of the California High-Speed Rail 2012 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting.] Yet auto-operating costs are assumed to be for 2030 and used for forecasts. [See Table 2.6, p. 2-9, [PDF 24] of the California High-Speed Rail 2012 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting.] In the 2014 Plan, HST fares are in 2013 dollars. [See Table 3.1, p. 3-5 [PDF 28] of the California High-Speed Rail 2014 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting] But the auto-operating costs for 2029 were used for ridership/revenue forecasts. ["*The approach for forecasting auto operating costs for the 2014 Business Plan is consistent with the methodology used for the 2012 Business Plan, with updates to the cost projections.*" See Table 4.4, p. 4-4, [PDF 42] of the California High-Speed Rail 2014 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting.] The 2016 auto costs computation methods were the same as prior Plans' for 2029. [See Table 4-4, p. 4-4 [PDF 30] of the California High-Speed Rail 2016 Business Plan, Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Support Document.] Yet HSR fares are assumed in 2015 dollars. [See Table 3.1, p. 3-5 [PDF 28] of the California High-Speed Rail 2014 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting.]

[149] Based on the 8¢/mile calculation, the one-way SFTBT-LA Union 381 mile driving costs ($30.50) is not only far less than a third the one-way $89 HSR fare, it makes the disinterested computer site's, travelmath.com, rate of 11¢-14¢/mile seem upwardly biased. According to travelmath.com in 2014 the SFTBT-LA Union auto driving cost was $56 or 14¢/mile. In 2016, that same 381mile auto driving cost is $42.50 or 11¢/mile. Even if a compound rate of growth of that 8¢, 11¢ or 14¢ is calculated at 3% annually, those per mile fares come out at 12¢, 17¢ and 23¢ per mile, still below the Authority's claims.

3.4 Gaining Growth From A Stagnant Air Passenger Market Is Unrealistic –

Unlike countries where gasoline prices are 60%-140% more than US prices[150] or France, Japan and the USA's Northeast Corridor (NEC), where HSR can 'piggyback' off of generations of conventional rail (CVR) riders, those contextual factors don't 'work' for California's high-speed rail project. Because annual conventional rail (CVR) ridership in California (<3Million) is so small[151] even radical growth before 2025, CVR is unlikely to fill many HSR seats. The Authority also 'shoots itself in the foot' because its fares are much, much higher than Caltrain or Metrolink's and The Authority will eliminate Amtrak subsidies along the San Joaquin Valley (SVJ) 'spine' of the system. These too give present CVR riders a serious disincentive to shift to HSR.

That leaves the potential 'pool' of HSR riders being airline travelers. But, if past airline travelers had put more weight on time convenience than travel costs, air traffic would have grown in the last decades, because airfares per mile are always higher than per mile auto operating costs. But as the Authority's consultants told them, air travel growth hasn't happened.[152] SF Bay Area-to-LA Basin annual air passenger traffic has stagnated at around 10Million.[153]

Even air travel between San Diego and the SF Bay Area, where airline trip's time convenience would most attract more flyers, a decade of evidence

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[150] In late March US gasoline prices were US59¢/litre, Japan US96¢/litre and France was 1.42¢/litre. See: http://www.globalpetrolprices.com/gasoline_prices/

[151] See p. 5-8 [PDF 52] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting

[152] Bay Area to/from Southern California airline travelers (both ways) between 2000 and 2009 averaged about 10Million (10.28) from a 2006 low of 9.84Million to a high of 11.9Million. See: Table 1, p. 10 [PDF 116] Appendix B, Potential Airline Response to High-Speed Rail Service in California, prepared by Aviation System Consulting LLC, for Cambridge Systematics, Inc. Found in California High-Speed 2012 Business Plan, Ridership and Revenue Forecasting, final technical memorandum, April 12, 2012.

[153] *CS* [Cambridge Systematics] *and ASC* [Aviation System Consulting LLC] *discussed the analytical approach and assumptions developed for the 2012 Business Plan, and concluded that the analysis performed in 2011 is still largely relevant since no significant changes have occurred since then in the airline industry.* See p. 4-1 [PDF 27] of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.

shows that passengers on those air routes decreased.[154] The Authority's own fare guideline, a maximum 83% of a forecasted air fare, shows the average fare will increase only $7 between the SF Bay Area and the LA Basin,[155] so airfare prices haven't and won't hinder the growth of air traffic. This too is evidence that door-to-door auto travel costs far outweigh the convenience of less travel time (by air) for the vast majority of travelers.

3.5 If The HSR System Conforms With the Law, The Authority's per Mile Fares Between SFTBT and LA Union Station Will Not Even Be Competitive With Airline Fares – The Authority's present-day $89 (23¢/mile) one-way SFTBT-LA Union fare claim is based on a 2008 marketing strategy. But empirical evidence in Figure 2 shows that European HSR systems charge about twice that per mile, and Acela Express even more.

The Authority has known for years that its per passenger mile fares are a fraction of worldwide operating experiences. In June 2011, Spain's high-speed rail (AVE) operator, RENFE, presented the Authority's Board evidence that its HSR (AVE) fares were about 55¢ [156] per passenger mile (PPM).[157]. In August 2011, the Authority received a one-page analysis of six existing HSR routes' fares similar to Figure 1. These ranged between 40¢-45¢/mile PPM, compared with the Authority's 2009 Plan's fare of 24¢/mile PPM.[158] In November 2011, three Authority Board Members received a private

[154] In 2000, there were 2.56Million air passengers between San Diego (SAN) and the three SF Bay airports: by 2009, that had dropped 7% to 2.37Million air passengers. See: Table 1, p. 10 [PDF 116] Appendix B, Potential Airline Response to High-Speed Rail Service in California, prepared by Aviation System Consulting LLC, for Cambridge Systematics, Inc. Found in California High-Speed 2012 Business Plan, Ridership and Revenue Forecasting, final technical memorandum, April 12, 2012.
[155] The 83% of average airfare marketing ploy to attract airline passengers to HSR was $83, $86 and $89, making the Authority's airfare calculations $100 in 2012, $104 in 2014 and $107 in 2016.
[156] See Figure A 6-1 To Repeat – The Authority's Train Will Need A Subsidy Forever, August 22nd 2012. Found at: www.sites.google.com/site/hsrcaliffr
[157] The Revenues Per Passenger Mile metric is the critical measurement of financial success or failure. It demonstrates the revenue (and therefore cash) generating ability of the HSR rail system, compared to other operators or routes; i.e. how many dollars or cents does the operator on each route get for carrying one passenger one mile. Without this basic metric, comparisons between different operators or routes are meaningless.
[158] On Evidence-Based High-Speed Rail Fares, July 5th 2011. Brief Note #14 Found at: www.sites.google.com/site/hsrcaliffr

presentation using then-available data on seven HSR fares PPM, ranging from 34¢ to 50¢ PPM, compared with the Authority's 2009 fare of 24¢ PPM. [159]

In early 2012 the Brookings Institute reported[160] Acela Express' revenue PPM was 49¢ PPM;[161] almost twice the revenue PPM (24¢) that the Authority planned to charge at the time.[162] In December 2012, this same type of existing HSR per passenger mile fare-to- the Authority's fare comparison was developed and is now updated as Figure 1. A 2012 study showed that the average HSR ticket price in the Madrid-Barcelona (MAD-BCN) corridor ranges from $186-$244 or 63¢ PPM (2012 prices). [163] Using fifteen route's PPM fares, the analysis showed the Authority's then-23¢ PPM, while existing HSR fare ranged 44¢-72¢ PPM, with the Acela's (72¢ PPM) being the highest.[164] The Authority's then-23¢ PPM fares were only a third to one half that shown by empirical evidence. Today's 28¢ PPM doesn't much change that conclusion.

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[159] See: Figure 5, Section 3 of 'To Repeat: The Authority's Train Will Need A Subsidy Forever' August 22 2012. Found at: www.sites.google.com/site/hsrcaliffr

[160] Acela operates on 308 miles of track and carried 3.395Million passengers. In 2012, the Brookings Institution reported that, Acela's (non-government) revenues were $510.3Million; and its operating costs were $331.6Million, leaving a $178.8Million profit. No other revenues or government subsidy came to Acela. See Robert Puentes, Adie Tomer, and Joseph Kane: A New Alignment: Strengthening America's Commitment to Passenger Railroad; Metropolitan Policy Program at Brookings, March 2013, Appendix B, Amtrak Route Performance, page 19, [PDF 25]. Found at: http://www.brookings.edu/research/reports/2013/03/01-passenger-rail-puentes-tomer

[161] O&M does not include capital charges (such as depreciation), interest, and other costs. See: See Robert Puentes, Adie Tomer, and Joseph Kane: A New Alignment: Strengthening America's Commitment to Passenger Railroad; Metropolitan Policy Program at Brookings, March 2013, Appendix B, Amtrak Route Performance, page 19, [PDF 25]. Found at: http://www.brookings.edu/research/reports/2013/03/01-passenger-rail-puentes-tomer

[162] The To Repeat report says Acela numbers fares 72¢ PPM and O&M 62¢. From See: p. 18 [PDF 18] of 'To Repeat: The Authority's Train Will Need A Subsidy Forever' August 22 2012. Found at: www.sites.google.com/site/hsrcaliffr

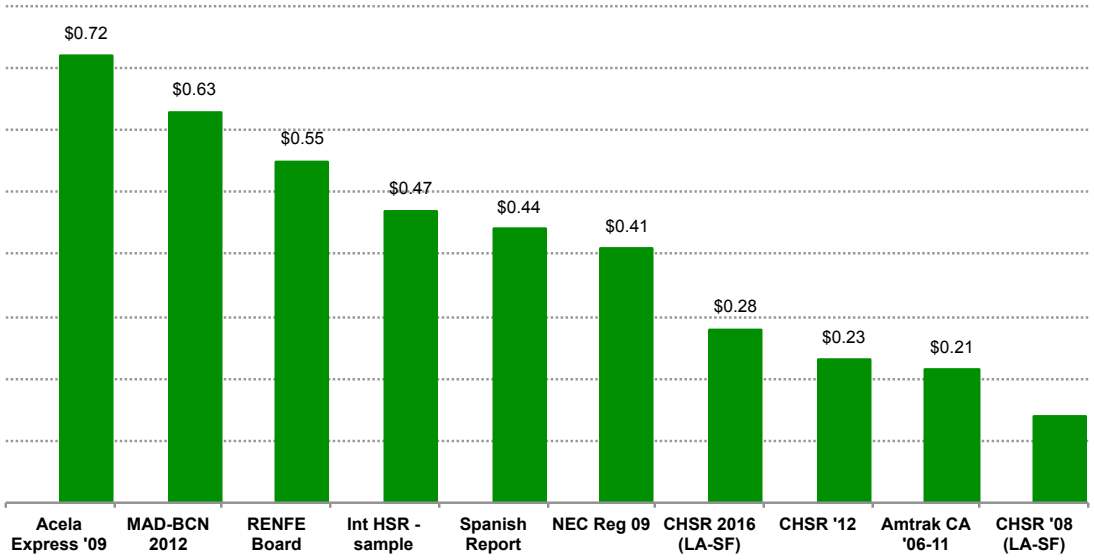
[163] See p. 471 [PDF 4] of Chuyuan (Viktor) Zhong, Suitability Analysis of Proposed High-Speed Rail Stations in Los Angeles Metropolitan Area. FN#1 of the article shows actual price and travel time for Madrid-Barcelona have been obtained from RENFE and Iberia –main airline in the corridor- web pages in June 2012. The website http://www.distance.to/Madrid/Barcelona shows the air and HSR distances. Dividing $186 fare by 385miles makes the PPM 48¢/mile. Dividing the $244 fare makes the PPM 63¢/mile (like Acela)

[164] See Figure 5, pg. 37 [PDF 37] of 'To Repeat: The Authority's Train Will Need A Subsidy Forever' August 22 2012. Found at: www.sites.google.com/site/hsrcaliffr

Figure 1

Fares/Mile Of Existing HSR Operations

And the Authority's Proposed Fares/Mile



While existing HSR operators' per mile fares, including Acela Express', vary between inspection dates largely because of yield management pricing, they are all multiples of the Authority's 2016 LA Union-SFTBT fare of 28¢ PPM.

Figure 1 shows the trap the Authority put itself into by not basing its fare estimates on existing HSR systems' or Acela Express' PPM fares. Once captured in that arbitrary, politically created trap, the Authority has been forced to defend an early-on bad decision against empirical evidence.

3.6 Getting To Profitability Kills HSR's Chances To Attract Airline Passengers – The '83% of airfare' formula doesn't work if the Authority's fares are raised to obey the law that underlies its existence[165] and be profitable. Here's why. In 2016, the $89 HSR fare between the metropolitan centers assumed the average airfare is $$107. Flight distance between SFO and LAX, the airports closest to the metropolitan centers, is 338miles.[166]

[165] AB3034, 2704.08 (J) requires that *"The planned passenger service by the Authority in the corridor or usable segment thereof will not require a local, state, or federal operating subsidy."*
[166] See: http://www.travelmath.com/flying-distance/from/SFO/to/LAX

Between Burbank (BUR) and San Jose (SJC), the flight distance is 296miles.[167] Mathematically that makes those airfares 32¢ and 36¢ a flight mile respectively. This looks good to the Authority IF it were exempt from the stricture of having its revenues (HSR fares x Ridership) exceed its operating costs. But the Authority can't operate without a profit. That would violate the Authority's foundation law, AB3034.

Examples show why. First, assume a best fare scenario case for California's HSR project. This scenario allows a private, not-for-profit operator to adopt the EU's multiple accounts rail accounting standards, ignore GAAP rules, avoid taxes and not pay fees to terminal operators. This would bring the Authority's present metro center-to-metro center fare up to only about what government-owned and operated HSR systems in Europe charge, around 45¢/mile. Figure 1's empirical evidence shows that. Unfortunately that makes the Authority's fare 25-40% higher than intra-CA airfares' of 32¢ and 36¢ per flight mile.

A second scenario says the Authority first finds a private, not-for-profit operator who obeys GAAP rules, but pays no taxes, and little if any fees to a parent company (for IT, ticketing, etc.) and rail terminal operators, like Acela does. To be profitable in this case the Authority must charge per mile fares similar to Acela. A 2016 advance purchase Acela fare to go the 227miles between WDC and NYC was $189 or $84¢ PPM.[168] That fare is $11 (6%) less than the fares found in 2012.[169] Figure 1 says the WDC and NYC fare was 72¢ PPM. 2016's PPM Acela fare is three time the 2016 Plan's PPM fare (84¢ vs. 28¢).

If the Authority raised its SF-LA fares PPM to only 2012's 72¢ they would still be twice the more expensive per passenger flight mile (BUR-SJC): and

[167] See: http://www.travelmath.com/flying-distance/from/SJC/to/BUR
[168] On March 26, 2016 the Acela Express Value Fare for April 6th, departing at 5am was $189. See: https://tickets.amtrak.com/itd/amtrak
[169] See: p. 18 [PDF 18] of 'To Repeat: The Authority's Train Will Need A Subsidy Forever' August 22 2012. Found at: www.sites.google.com/site/hsrcaliffr

today's 84¢ per passenger flight mile would be 2.3 times the BUR-SJC fare. The Authority expectation to be profitable and simultaneously attract airline passengers is a sterling example of cognitive dissonance.

3.7 Higher Per Mile Fares For Shorter HSR Rides Will Repulse Riders [170] – In 2009 AND 2014 the Authority said that shorter, intra-regional trips would have a lower fare per mile than interregional trips.

> *"Local trips within the LA Basin and within the Bay Area are much shorter than between-region trips, and have a lower per-mile fare, which accounts for the lower revenue from each local traveler."* [171]

> *"In developing these forecasts, the Authority's consultants have not assumed any revenue optimization that would result from adjusting fares to optimize yields on specific markets such as short distance and commuter trips either in the San Francisco Bay Area and/or in the Los Angeles Basin"* [172]

Those weren't misleading Authority statements: they're completely untrue. The Authority's fares comparatively worsen for shorter routes, and generally speaking, the shorter the ride, the higher the per mile fare. Instead of admitting, that San Joaquin Valley operations will need a subsidy [173] to keep passengers when IOS is introduced, per mile rail fares will increase dramatically after it eliminates Amtrak's subsidized San Joaquin[174] service[175]

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[170] This topic was analyzed in IF YOU BUILD IT THEY WILL NOT COME, March 11, 2014; found at www.sites.google.com/site/hsrcaliffr. It was also analyzed in the January 2014 report, 'FLEECING' LOCAL HIGH-SPEED TRAIN RIDERS WHILE BIG CITY EXECUTIVE RIDER CHEAPER. Found at: www.sites.google.com/site/hsrcaliffr and the April 2011 report, WILL THE HIGH-SPEED TRAIN BENEFIT CALIFORNIA'S MIDDLE CLASS; also found at www.sites.google.com/site/hsrcaliffr

[171] See: California High Speed Rail Authority: Report to the LEGISLATURE, DECEMBER 2009, PDF pg. 73

[172] See page 43 [PDF 43] of Connecting California, 2014 Business Plan, April 30, 2014

[173] 2008 Plan pg. 25 [PDF 29] *"Thereafter, segments linking the Central Valley with a major metropolitan area will provide an immediate benefit . . In many cases, such segments are projected to be "self supporting" over time and not require an ongoing operating subsidy."*

[174] The average operating costs of the CA Amtrak lines is $45¢ per passenger mile, while the average fare is 21¢ per passenger mile. See: To Repeat, The Authority's Train Will Need A Subsidy Forever, July 2012, page 20. Found at: www.sites.google.com/site/hsrcaliffr

[175] *"Note that the existing San Joaquin service south of Merced to Bakersfield is assumed to be discontinued upon the initiation of HST service."* See page 5-5 [PDF pg. 37] of Cambridge Systematics' (CS) final technical memorandum of Ridership and Revenue Forecasting of April 12, 2012, Section 5.2.

and offers HSR fares that don't with Caltrain's or Metrolink's0 in the two major metro areas.

For example, the Authority's Palmdale-LA Union $33 fare[176] of 2014 is 50¢/mile, while Metrolink's $14 fare[177] is less than half (22¢/mile). Eliminating Amtrak's San Joaquin service will bring higher per mile HSR fares for shorter trips to 27¢-76¢/mile [178] along the San Joaquin Valley (SJV) HSR corridor.[179] Doubling or tripling per mile fares on the HSR corridor's makes driving's 14¢-25¢/mile or a bus ride's 14¢/mile [180] or ridesharing on the same HSR corridor[181] a 'slam dunk' decision. Likewise a (SCAG-SCAG) Palmdale-LA Union Metrolink ticket is $14.25, the HSR and feeder bus ride is more than twice as much ($33).[182]

Continuous door-to-door auto travel also includes either not paying for local transport to or from a station, not paying parking fees at HSR stations, plus the nearly cost-free option of carrying 1-4 passengers. [183] Consequently

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[176] See Table 3.1 pg.3-3 [PDF 25] Ridership and Revenue Forecasting – Draft 2016 Business Plan, Technical Supporting Document

[177] See http://www.metrolinktrains.com/ticketspricing/pricefinderresults.html?from_station=114&to_station=131&fare_type=adult&viewticketoptions.x=128&viewticketoptions.y=15

[178] The HSR fare during IOS North to travel 300 miles between Merced and Burbank Airport is $86 (27¢/mile): for the 164 miles between Merced and Bakersfield the HSR ticket is $67 (39¢/mile): for the 95miles between Bakersfield and Palmdale $51 (53¢/mile) and for the 41miles between Palmdale and the Burbank Airport, the HSR ticket is $32, or 72¢ per mile. Per segment mileage is from travelmath.com. IOS fares are from Table 3.1, page 3-3 [PDF 25] of Ridership and Revenue Forecasting – Draft 2016 Business Plan, Technical Supporting Document

[179] This is discussed in depth particularly in Figures 4 and 5, in 'Fleecing' Local High-Speed Train Riders While Big City Executives Ride Cheaper: A Briefing Paper, January 29, 2014; found at www.sites.google.com/site/hsrcaliffr/home/briefing-papers/01- 2014-fleecing-local-high-speed-train-riders

[180] Fare calculated as 300miles divided by $43 fare. See: http://www.gotobus.com/

[181] To drive the 164 miles between Merced and Bakersfield costs $23 (14¢/mile): for the 95miles between Bakersfield and Palmdale $13 (25¢/mile) and for the 41miles between Palmdale and San Fernando, the HSR ticket is $6 (15¢ per mile). Per segment mileage and cost of driving is from travelmath.com.

[182] The Palmdale-LA Union station, one week advance purchase ticket can be found at http://metrolinktrains.com/tripplanner/ The Authority's fare is from Table 3.1, pg. 3-5 {PDF 28] of the Draft 2014 Business Plan Ridership and Revenue Forecasting-Draft Technical Memorandum

[183] Passengers could be a family or unrelated individuals or friends, carpools, or ride sharers using Uber, Wingz, Sidecar, etc. in a personal vehicle. Long distance for DOT is 100+ miles, for the Authority it's 50+ miles. The longer the distance, the lower auto travel per mile cost.

Authority-dependent trips during IOS will always be more expensive on a per mile basis than using autos or commercial buses.

Perhaps to compensate for the self-imposed "83% of average airline fare" ceiling, in 2012 the Authority moved to a fare structure that penalizes shorter rides in comparison to longer rides. Coupled with the elimination of subsidized Amtrak fares in California,[184] and the dramatic rises in per mile HSR fares versus Caltrain and Metrolink on the 'bookends' this strategic choice does not bode well for attracting riders.

The 2016 Plan's VtoV Ext., with its dependence on intra-SF Bay Area (MTC) and San Joaquin Valley (SJV) – SF Bay Area (MTC) ridership to provide nearly a quarter (23.4%) of the VtoV Ext. riders[185] makes lies out of 2009 and 2014's claims about not 'milking' shorter rides, and assures that:

> *"Moderate or high-speed rail would require everyone to subsidize trains that would serve only a small elite."* [186]

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[184] See: Attachment Pet No. 043.2 ACE Corridor Dan Leavitt, January 2014. *"Since 1990, the state has invested more than $1.3 billion in infrastructure and equipment for intercity passenger rail and about $1 billion in operating support."* [See: Amtrak California (http://amtrakcalifornia.com/index.cfm/news/press-releases/record-ridership-for-californias-san-joaquinc2ae-trains/ & http://amtrakcalifornia.com/index.cfm/news/press-releases/amtrak-californias-san- joaquin-corridor-reaches-more-than-a-million-riders/)] "The 2012/13 state costs for state-supported intercity rail services was just over $90 million ($29.4 million for Pacific Surfliner, $31.8 million for San Joaquin, and $29.1 million for Capitol Corridor)." [See: Caltrans, Oct 2013; Memo from William Bronte to CTC (Financial Allocation for FY 2013-14)] *"However, it should be noted that historically (until FY 2013/14) Amtrak paid 30% of the Pacific Surfliner total service cost as part of Amtrak's basic system."* [See: Under Section 209 of PRIIA, state is required to pay 100 percent by 2013/14. Based upon input from Caltrans and Amtrak, the LOSSAN Agency estimated that maintaining the Pacific Surfliner service would cost the state an additional $25 million annually for 2013/14 (for operations and maintenance and leasing Amtrak rolling stock)] *"By comparison, in 1997/98, the total state costs for the state supported intercity rail services was $48.4 million ($20.4 million for the Pacific Surfliner, $17.2 million for the San Joaquin, and $10.8 million for the Capitol Corridor)."* [See: Caltrans, California State Rail Plan 2007-08 to 2017-18] Found at: www.sjjpa.com and http://www.sjjpa.com/documents/SJJPA-Bus-Plan-2015-Final.pdf

[185] Ridership for VtoV Ext. is 12.8Million. See Table 6.3 [PDF 41] of the Authority's Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue

[186] "High-Speed Rail Is No Solution" Randal O'Toole, 2009. Found at http://www.cato.org/publications/commentary/highspeed-rail-is-no-solution A three page PDF on internet: In the last paragraph, after commenting: *"That's $82 million per mile for true high-speed rail (partly because the California project goes through some mountains) and only $2.4 million for moderate-speed rail."* The author also says: *"Moderate or high-speed rail would require everyone to subsidize trains that would serve only a small elite."* This supports

The Authority is fleecing local riders to cross subsidize long distance travelers. This strategic decision was never made in the public arena, is arbitrary and ultimately will help the project conform to the theory that the worst projects get built.[187]

3.7.1 Expensive Intra-MTC and Intra-SCAG HSR Fares (and per mile fares) Will Defeat The Authority's Need For Riders –

During 2025-2028, 1.8Million annual intra-MTC riders supposedly choose HSR over Caltrain. By 2040, annual intra-MTC ridership supposedly grows to 2.3Million. In Southern California, no traveler will use HSR between 2025 and 2028, a curious but prudent forecast, as further analysis will show. By 2040, the Southern California Area Government (SCAG) domain's ridership has grown from zero to 6.4Millon per year – somehow choosing HSR over Metrolink.

How either of those phenomenal growth rates happens is not revealed by the Authority, but it couldn't be based on HSR's price competitiveness over the regional rail carriers (Caltrain and Metrolink).

In 2009, the Authority said:

> "*Local trips within the LA Basin and within the Bay Area are much shorter than between-region trips, and have a lower per-mile fare*" [188]

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the thesis that HSR largely serves reimbursed business travelers. See Attachment Pet No. 087, Accessibility Analysis of Korea HSR.PDF. *"The price quotations for building the California High-Speed Rail Authority's first miles (Merced-towards-Bakersfield) of conventional, non-electrified rail without Positive Train Control or rolling stock – but including the costs of land and moving existing public infrastructure (roads, highways, irrigation channels, electrical and telephone transmission equipment) already exceed $90 million a mile.*

[187] See: Flyvbjerg, Bent, Oxford Review of Economic Policy, Volume 25, Number 3, 2009, pp.344–367. Survival of the unfittest: why the worst infrastructure gets built – and what we can do about it. Page 351 says, *"The existence of optimism bias in managers and promoters would result in actual costs being higher and actual benefits lower than those forecasted."* Found at: http://arxiv.org/ftp/arxiv/papers/1303/1303.6571.pdf or, http://oxrep.oxfordjournals.org/content/25/3/344.full.pdf+html

[188] See: California High Speed Rail Authority: Report to the LEGISLATURE, DECEMBER 2009, Figure 2, p. 71, [PDF 73].

Figure 4 HSR & Caltrain Intra-MTC Fares and Times Saved [189]						
	Elapsed Miles [190] From SFTBT	**HSR Fares [191]**	**HSR Fare per mile**	**Clipper Card Caltrain Fare [192]**	**Clipper Card Caltrain Fare/mile**	**Minutes Saved Using HSR [193] (Caltrain Baby Bullet – HSR)**
SFTBT-Millbrae	13	$18	$1.38	$5.20	40¢	(18min-16min)=2min
SFTBT-San Jose	46	$23	50¢	$9.20	20¢	(62min-48min)=14min
SFTBT -Gilroy	76	$25	33¢	$13.20	17¢	No Baby Bullet to Gilroy
Figure 4 **HSR & Metrolink Intra-SCAG Fares and Times Saved**						
	Elapsed Miles [194] From LA Union	**HSR Fares**	**HSR Fare per mile**	**Regular Metrolink Fares**	**Metrolink Fare/mile**	**Travel Time** (Sources)[195]
LA Union-BUR [196]	13	$27	$2.07	$6.75	52¢	(23min-9min)=14min
LA Union-Palmdale	49	$33	$1.48	$14.25	29¢	(93min-38min)=55min

As Figure 4 shows, this claim is as patently untrue in 2016 as in 2009; i.e. the shorter the HSR ride, the higher the fare, and the higher the per mile fare – refuting the Authority's claim for lower fares for shorter rides.

[189] HSR fares expressed in 2015 $s, while Caltrain Clipper Card fares, in 2016 $s, are more current.
[190] The elapsed miles southwards from SFTBT are shown in California High Speed Rail Version 2 Ridership and Revenue Model, Calibration and Validation Briefing Book, p. 56 [PDF 56] (of AG015004) Cambridge Systematics, January 10th 2014.
[191] See Table 3.1 p. 3-3 [PDF 25] of the California High-Speed Rail Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue
[192] For Caltrain fares, see: http://www.caltrain.com/Fares/farechart.html
[193] Caltrain's Baby Bullet schedule is found at: http://www.caltrain.com/schedules/weekdaytimetable.html. HSR elapsed time found at Appendix A-3, p. A-3 The Authority's Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue
[194] The elapsed miles north of LA Union Station were computed from data found in the California High Speed Rail Version 2 Ridership and Revenue Model, Calibration and Validation Briefing Book, p. 59 [PDF 59] (of AG015004) Cambridge Systematics, January 10th 2014.
[195] Travel time sources are: HSR = HSR elapsed time found at Appendix A-3, p. A-3 of the Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue. Metrolink= http://www.metrolinktrains.com/pdfs/Timetables/Metrolink_OC_91_IEOC_timetable.pdf
[196] The Bob Hope, Burbank Airport Code is BUR. Metrolink fares between LA Union and Burbank Airport are found at: http://www.metrolinktrains.com/ticketspricing/pricefinderresults.html?from_station=131&to_station=85&fare_type=adult&viewticketoptions.x=84&viewticketoptions.y=18. Travel time between LA Union-Burbank Airport and LA Union-Palmdale is found at http://www.metrolinktrains.com/schedules/stationtostation/?from=85&weekday=1&to=131&submit.x=58&submit.y=13.

3.7.2 Forecasted Intra-MTC Riders Will Remain Caltrain Riders –

The SFTBT to Millbrae (SFO) rider using HSR is assumed to be willing to pay 3.5times what a Caltrain Baby Bullet rider pays in order to gain two minutes. The difference in annual commuting cost between Millbrae and downtown SF would be $6,656.[197] For teachers or mid-level civil servants earning three-times the state's minimum wage ($10/hour)[198] of $64,200/year; making that commute by Caltrain and saving a non-tax deductible 10% of their gross salary is significant.

Then there's the SFTBT to San Jose, intra-MTC connection. The HSR rider saving 14minutes is assumed to be willing pay 2.5 times the Caltrain Clipper Card rider on the Baby Bullet. The annual commuter using HSR would pay nearly $10,000 more ($9,776) than the Caltrain Baby Bullet commuter.[199] A Psychiatric Nurse in San Jose, being paid $81,000/year[200] would have to think twice about giving up 12% of his/her pre-tax earnings, while a high school teacher in San Jose[201] would give up 15% of his/her pre-tax salary to get to work a bit quicker by HSR.

3.7.2.1 The Nonsensical HSR ride to SFO –

There's also a big problem with using assuming HSR travelers will use the SFTBT-SFO section: namely, there are no mentions in the 2009, 2012, 2014 or 2016 Business Plans for building a dedicated SFTBT to SFO rail line.

If travelers today could take HSR from downtown SF to the airport, they would find the fare to be more than three times the Caltrain fare. They would also find the BART fare half HSR SF-SFO fare.[202]

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[197] Over the course of a 260 day working year, the HSR rider's commute would cost $9,360; the Caltrain rider's $2,704. The difference is $6,656.

[198] Effective January 1, 2016, the minimum wage in California is $10.00 per hour. Found at http://www.dir.ca.gov/dlse/faq_minimumwage.htm

[199] During a 260 workday year, the SFTBT-San Jose Diridon commuter would pay $14,650 using HSR. See: Table 3.1 p. 3-3 [PDF 25] of the Authority's Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting. The Caltrain Clipper Card user on that same sector would pay $4,784. The difference is $9,776. See: Fares from Zone 1 to Zone 4 (or vice versa) found at http://www.caltrain.com/Fares/farechart.html

[200] See: http://www.indeed.com/salary/q-RN-I-San-Jose,-CA.html

[201] The median annual high school teacher salary in San Jose (February 2016) was $67,240. See: http://www1.salary.com/CA/San-Jose/high-school-teacher-salary.html

[202] The one-way 16th & Mission St to SFO fare is $8.90. Found at: https://www.bart.gov/tickets/calculator. The HSR fare is $18.

But the deeper problem would be inconvenience. Having stopped at HSR's first stop south of downtown San Francisco, Millbrae, the HSR traveler would wait, then board a BART train for northbound ride back to San Bruno, wait, then board a southbound BART train back to SFO. It seems probable that few if any travelers would choose HSR over BART that goes directly from downtown SF to SFO.

3.7.2.2 Building HSR North of San Jose Makes Little Commercial Sense –

Once the comparative costs and time advantages of commuting southward from San Francisco are analyzed, it's fair to ask why the Authority plans to offer services along the SF Peninsula. If any guide, Caltrain's daily ridership south of Redwood City plunges a quarter – from about 24,000/day to about 18,000/day from Palo Alto.[203] South of there it's even more miserable, Sunnyvale (38miles south of SF) at about 8,000/day, and San Jose Diridon around 1,000/day. From the commercial point of view a private concessionaire/operator must assume, there's no profit in running HSR trains north of San Jose Diridon: Caltrain offers a cheaper ticket and competitive travel times.

Finally, there's the question of why there's a planned HSR station in Gilroy. Both Caltrain's ridership records and the MTC model show that south of Palo Alto daily ridership plunges. Only three of Caltrain's weekday northbound service starts in Gilroy, and no southbound train ever reaches Gilroy.[204]

3.7.2.3 What value is San Francisco's Central Subway if the HSR train isn't planning to stop there? –

In Phase 1, when The Authority is legally required to go between SFTBT and Los Angeles Union Station[205] in 2hrs 40mins, its 2016 Plan makes no mention of stopping

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[203] See: the California High Speed Rail Version 2 Ridership and Revenue Model, Calibration and Validation Briefing Book, p. 56 [PDF 56] (of AG015004) Cambridge Systematics, January 10th 2014

[204] See: http://www.caltrain.com/schedules/weekdaytimetable.html

[205] AB3034 Section 2704 (b) 2) says "As adopted by the Authority in May2007, Phase1 of the high-speed train project is the corridor of the high-speed train system between San Francisco Transbay Terminal and Los Angeles Union Station and Anaheim."

at the 4th & King station – the subway's terminus.[206] Are our state's transport planners going to allow nearly $2Billion to be wasted if Central Subway passengers can't board a HSRF train at 4th & King? This isn't an erroneous oversight. Construction began in 2010, and the connection from the 4th & King station is scheduled to open in 2019, long before VtoV Ext. or Phase 1 is scheduled to be operational.

3.7.3 Forecasted Intra-SCAG HSR Riders Will Remain Metrolink Riders –

As Figure 4 also shows that the shorter the HSR ride, the higher the fare and the higher the per mile fare. Boarding at Burbank Airport (BUR) the HSR rider will pay four times as much ($27) as the Metrolink passenger ($6.75) to arrive at LA Union 14minutes faster. IF the HSR can go the 62miles between Palmdale and LA Union in 38minutes,[207] an average of 100mph through tunnels and urban areas, the HSR rider paying $33, more than twice (2.3times) the $14.25 paid by the Metrolink rider to save slightly less than an hour[208] (55min).

For a non-reimbursed commuter to pay an extra $7,020-$9,750 per year for the shorter or longer commute respectively, to save an hour a day would to be a questionable decision. For a Los Angeles high-school teacher making $62,460[209] the savings would represent 11-16% of their pre-tax, non-deductible income. For a Grade II carpenter[210], those savings represent 13-18% of their pre-tax, non-deductible income, for an entry level (Grade I)

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[206] Although the Millbrae HSR stop is shown, the 4th & King Station is not shown as a HSR stop during Phase 1 in Figure 3.2, p. 3-2 [PDF 24] of Ridership and Revenue Forecasting, Draft 2016 Business Plan, Technical Supporting Document.
[207] The 62 miles is calculated from graphics on p. 59 [PDF 59] of Version 2 Ridership and Revenue Model, Calibration and Validation Briefing Book, p. 56 [PDF 56] (of AG015004) Cambridge Systematics, January 10th 2014. Consulting travelmath.com says the distance is 63miles, see: http://www.travelmath.com/drive-distance/from/Palmdale,+CA/to/Los+Angeles,+CA
[208] Metrolink train #285 leaves LA Union at 5:35, arrives at Palmdale at 7:08. See: http://www.metrolinktrains.com/pdfs/Timetables/Metrolink_OC_91_IEOC_timetable.pdf
[209] This is the median annual salary for a high-school teacher in Los Angeles. See: http://www1.salary.com/CA/Los-Angeles/high-school-teacher-Salary.html
[210] The median annual Grade I carpenter's salary in LA is $56,092. See: http://www1.salary.com/CA/Los-Angeles/Carpenter-II-salary.html

carpenter[211], the savings represent 16-22% of that income. Lower and middle income Angelinos, who benefit from the subsidized Metrolink fares are very unlikely to rank the convenience of time saved over savings on their commuting costs.

3.7.4 HSR Won't Become the San Joaquin Valley (SJV) – Silicon Valley (SV) Commuter Train – The 2016 Plan positions HSR as a 3Million rider/year [212] mode to connect Silicon Valley's (SV) thriving economy to the un-or-underemployed of the San Joaquin Valley (SJV). [213]

> *". . . a trip from Fresno to San Jose will take about an hour on high-speed rail which is a game changer . . . New job markets will be opened up for people living in the Central Valley . . ."* [214]

But the Authority's headline parses the truth: it doesn't compare HSR commuting's door-to-door times or costs with autos or ridesharing.[215] While the Authority's 'headlines' claim sounds beneficial to SJV and SV residents, the reality is the reverse.

The Authority's 2016 Plan's general access (25min) and egress times (25min)[216] must be added to HSR travel times between the Fresno and San Jose HSR stations to get to that new job. Adding those 50minutes to the

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[211] The median annual Grade I carpenter's salary in LA is $43,649. See: http://www1.salary.com/CA/Los-Angeles/Carpenter-I-salary.html

[212] See: Table 6.3, p. 6-5 [PDF 41] of the California High-Speed Rail 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[213] Again the reality does not match the headline. Page 12 [PDF 12] of the California High-Speed Rail Draft 2016 Business Plan says, *"With this new connection, a trip from Fresno to San Jose will take about an hour on high-speed rail which is a game changer both for the people and the economy of the Central Valley and for Silicon Valley as well. New job markets will be opened up for people living in the Central Valley and creating a high-speed connection to the Central Valley would help address the affordable housing crisis in the Bay Area." However,* AB3034, 2704.09 (i), says, *"The high-speed train system shall be planned and constructed in a manner that minimizes urban sprawl and impacts on the natural environment."* By supposedly creating a more affordable housing area for Silicon Valley employers, the Authority is violating AB3034.

[214] See: p. 12 [PDF 12] of the California High-Speed Rail 2016 Business Plan.

[215] This seems to have been a concern of RTAP, expressed on p. 4 [PDF 5] of their May 17, 2014 Findings and Recommendations from the October 2014-January 2015 Review Period

[216] Table 7.4 [PDF 64] of the California High-Speed Rail Draft 2014 Business Plan Ridership and Revenue Forecasting—Draft Technical Memorandum

72minute HSR journey between Fresno and San Jose,[217] the door-to-door travel time to the *"New job markets"* doubles to two hours (2.03hrs). Driving that particular route takes 2.5hours,[218] but CV towns with shorter driving times to SV, like Los Banos[219] (1hr 22min), Chowchilla, Madera and Merced (±2hrs)[220] are already rapidly growing SV bedroom communities.

Figure 5
VtoV and VtoV Ext. HSR Fares vs. Driving Costs-San Joaquin Valley to San Jose)

	One-way, one person HSR Fares [221]	**Annual fare (one person-260 days)**	**One-way, One Person Driving Costs** [222]	**Annual driving $s (one person-260 days)**	**Annual one person, shared-ride[223] cost** [224]
[225] **Merced**	$56	$29,120[226]	$13	$6,760	$2,704
Fresno	$63	$32,760	$17	$8,840	$3,536

The Authority's headline also fails to mention SJV-SV commuters' costs. The above table shows that a daily HSR commute cost about 4.5times the auto driver's commute between San Jose and one of the two SJV cities. Even using the Authority's auto operating expenses, roughly double those in the table, a HSR commute is still more than twice an auto driver's costs.

[217] See: p. A-2 [PDF 60] of the California High-Speed Rail 2016 Business Plan.
[218] See: http://www.travelmath.com/driving-time/from/Fresno,+CA/to/San+Jose,+CA
[219] See: http://www.travelmath.com/driving-time/from/Los+Banos,+CA/to/San+Jose,+CA
[220] See: http://www.travelmath.com/driving-time/from/Merced,+CA/to/San+Jose,+CA
[221] See Table 3.1, p.3-3 California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting
[222] The costs of driving using http://www.travelmath.com are based on gasoline costs as of early 2016 as HSR fares are based on 2015 $s. Using the Authority's formula for driving costs approximately doubles those costs. But the 'fuel only' to HSR fare comparison is accurate for the VtoV Ext. period, because the Authority's plans also do not include rolling stock replacement costs. For the costs of driving Merced-San Jose see http://www.travelmath.com/cost-of-driving/from/Merced,+CA/to/San+Jose,+CA For the costs of driving Fresno-San Jose see: http://www.travelmath.com/cost-of-driving/from/Fresno,+CA/to/San+Jose,+CA
[223] The Authority found, and William Warren's comments on the 2016 Plan concur that the average load per shared ride vehicle is 2.5persons.
[224] The Authority's 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting. p. 2-1 [PDF 21] says, *"The model also includes an adjustment to divide auto costs by an assumed average auto occupancy of 2.5 for those who travel in groups."* Therefore dividing auto-driving costs by 2.5 is logical for this analysis.
[225] For illustrative purposes only: during IOS the HSR train does not operate to or from Merced.
[226] Does not include transport costs to and from the Merced or Fresno station.

By definition, most Silicon Valley (SV) jobs that pay enough to afford SV's expensive housing are highly skilled, managerial or executive jobs. If San Joaquin Valley (SJV) residents had those incomes, they would not commute to SV; therefore most SJV-SV commuters are middle class, lower-paid and budget-conscious.

The Authority wants nearly a quarter (23.4%) of its 12.8Million VtoV Ext. riders[227] to make that SJV-SV trip, but when fares and the costs of driving alone or ridesharing are compared, that argument becomes a chimera.

3.7.4.1 Empirical Examples Deflate the Authority's SJV-SV Headline Claim –

Not counting the costs of getting from the San Jose Station to the workplace, even a Merced resident whose gross income is $62,400 (more than three times California's minimum wage) would pay half (47%) of his/her pre-tax income for an HSR commute to and from San Jose: a Fresno colleague, over half (53%).

A lower income Merced commuter, earning $41,600 (twice California's minimum wage) would pay three-fifths (70%) of their annual income to commute to SV, while a Fresno colleague's annual HSR fare would take nearly four-fifths (79%) of his/her pre-tax income. This seems irrational behavior and consumers, particularly low and moderate-income consumers presented with other choices for the same or similar service, are not irrational for long.

Likewise, why would a Registered Nurse in Fresno, with gross annual earnings three times minimum wage ($62,000)[228] or an administrative support worker there, grossing twice California's minimum wage ($35,460)[229] choose to commute to SV? Commuting costs are not tax deductible, so why

[227] See: Table 6.3, p. 6-5 [PDF 41] of the California High-Speed Rail 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting
[228] See: http://www.indeed.com/salary/q-RN-l-Fresno,-CA.html
[229] See: http://www.bls.gov/oes/current/oes_23420.htm#43-0000

not stay in Fresno and not face the door-to-door transit time or HSR's expensive commute?

3.7.4.2 Ridesharing, Not HSR, Is The Real Benefit For SJV's Middle and Lower Income Workers To Get To SV – While door-to-door commute times during IOS between Fresno and San Jose are about equal, by contrast, a Fresno-based driver alone would pay about one-fourth (27%) of the HSR commute to and from San Jose, and a Merced-based driver alone would pay about one-fifth (23%) of the HSR costs to drive door-to-door.

But the real auto or van commuting cost advantage comes today and tomorrow by auto-or-van-pooling. As Figure 5 shows, commuting together from Merced or Fresno would cost each occupant $10-12 per working day; less than a tenth (9-9.5%) of the HSR door-to-door commuting cost. A shared ride's cost makes it feasible for even construction helpers in Fresno, earning $14-16/hr.[230] to take advantage of another SV construction boom, as they did before 2008 and have in recent years. Workers earning $33,000/year are unlikely to travel by HSR from Fresno to and from San Jose if their only option costs nearly all of their annual salary.[231]

HSR is not the panacea for creating even a small number of SV jobs for SJV residents, mainly because the markets in the distinctly different economies have already sorted out how workers living in SJV can commute to SV. The claim that the presence of HSR starting in 2025 will create 3million MTC-SJV riders/year rings hollow and comes from calibrated computer models, not a comparison of empirical evidence.

3.7.5 The Authority's Fares Are A Disincentive To Present-day Amtrak (SJV) Riders To Use HSR – In 2008, the Authority admitted

[230] See: http://www.bls.gov/oes/current/oes473015.htm
[231] See Annual mean wage of $28,450 for building equipment contractors in http://www.bls.gov/oes/current/oes473015.htm

that its San Joaquin Valley operations will need a subsidy.[232] When IOS is introduced, per mile rail fares will increase dramatically after San Joaquin fares are discontinued and The Authority eliminates Amtrak's subsidized San Joaquin Valley (SJV) route. [233]

> *"Note that the existing San Joaquin service south of Merced to Bakersfield is assumed to be discontinued upon the initiation of HST service."*[234]

Fare costs per mile on anything less-than-SF-LA tickets drastically increase present day Amtrak-subsidized[235] per mile fares.[236] In 2012, HSR fares for Merced-Visalia ($48) and Merced-Bakersfield ($63) were 100-150% higher than Amtrak's Value Fares of $22.50 for the first[237] and $26 for the second trip. By 2014 HSR fares on Merced-Visalia ($50) and Merced-Bakersfield ($65) were 120-180% higher than today's Amtrak fares.

As Figure 6 shows, in 2016's Plan, the HSR fare from Merced to the stop nearest Visalia (Kings/Tulare) costs $52; and between Merced- Bakersfield costs $67, making the 2016 HSR fares 130-150% of Amtrak's present day fares. Figure 6's per mile comparison reinforces this conclusion: HSR fares/mile are 60-130% higher than present day Amtrak for both the longest route (SF-Anaheim) and intra-San Joaquin Valley routes.

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[232] California High-Speed Train Business Plan, November 2008.p. 25 [PDF 29] *"In many cases, such segments are projected to be "self supporting over time and not require an ongoing operating subsidy."*

[233] The average operating costs of the CA Amtrak lines is $45¢ per passenger mile, while the average fare is 21¢ per passenger mile. See: To Repeat, The Authority's' Train Will Need A Subsidy Forever, July 2012, page 20. Found at: www.sites.google.com/site/hsrcaliffr

[234] See: Cambridge Systematics' (CS) final technical memorandum of Ridership and Revenue Forecasting of April 12, 2012, Section 5.2, page 5-5 [PDF pg. 37]

[235] In 2009 the average fare for the three California Amtrak lines was 21¢ per passenger mile (PPM), while the average operating and maintenance cost for the three was about 45¢ PPM. The subsidy to each San Joaquin line ticket averaged 46% – nearly half what it cost to run that train along that route: See: 'FN 107, page 39 in To Repeat: The Authority's Train Will Need A Subsidy Forever. Found at: www.sites.google.com/site/hsrcaliffr

[236] As pointed out in a 2014 report, this creates a hidden subsidy for travelers between the metropolitan centers. The $50 promise of a one-way fare for the 381miles between the centers of SF and LA would have cost 13¢/mile; 2012's $83 would have cost 22¢/mile; 2014's $86 would have been 23¢/mile, while 2016's $89 fare would be 24¢/mile. See: William Grindley and William Warren; Fleecing Local Riders While Big City Executives Rider Cheaper; January 29, 2014; Figure 2 and Figure 3. Found at; www.sites.google.com/site/hsrcaliffr

[237] For Merced-Visalia, see: https://tickets.amtrak.com/itd/amtrak

Figure 6 **Comparisons Of HSR and Amtrak San Joaquin Valley Fares** (based on 2016 Plan, Table 3.1 and Amtrak's Fare Schedules)						
	Fare in $s SFTBT-Anaheim	**¢/mile of SFTBT-Anaheim fare[238]**	**Fare in $s Merced-Visalia [239]**	**¢/mile of Merced-Visalia fare [240]**	**Merced – Bakersfield fare**	**¢/mile of Merced - Bakersfield fare [241]**
HSR Fares [242]	$89	24¢/m	$52	56¢/m	$67	40¢/m
Amtrak Fares [243]	$59[244]	15¢/m	$22.50	24¢/m	$26	16¢/m

This drastic uplift in fares is a serious financial disincentive for San Joaquin Valley residents to ride the HSR during the IOS or afterwards.[245] Presently travelers take a subsidized train ride to Bakersfield, and change to a 2-hour 10minute Amtrak bus over the Tehachapi's to LA's Union Station, also part of their subsidized trip. When VtoV/VtoV Ext. opens, The Authority's fares and busses take over.

If the Authority's train ride is considerably more expensive in the San Joaquin Valley, and can't offer a time convenience incentive, how can the Authority assume HSR during the IOS offers San Joaquin Valley residents any incentive to abandon their auto, trucks or shared rides. Travellers will vote with the pocketbooks, and use modes such as ride sharing, buses or jitney services.

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[238] Based on 381 miles. Found at http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Los+Angeles,+CA

[239] In 2016, the kings/Tulare station was substituted for the Visalia station.

[240] The 98 miles between Merced and Visalia is found at http://www.travelmath.com/drive-distance/from/Merced,+CA/to/Visalia,+CA

[241] The 164 miles between Merced and Bakersfield is found at http://www.travelmath.com/drive-distance/from/Merced,+CA/to/Visalia,+CA

[242] From: Table 3.1 [PDF 25] of the Authority's Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[243] Amtrak's pull-down website for individual, point-to-point fares is at: https://tickets.amtrak.com/itd/amtrak

[244] Requiring two bus rides over 10hours of travel, the SFTBT-LA Union Amtrak fare is found at https://tickets.amtrak.com/itd/amtrak

[245] For a detailed discussion about the depth of subsidies on California's passenger rail lines, compared with what the Authority intends to charge, see 'To Repeat: The Authority's Train Will Need A Subsidy Forever' August 22 2012. For a discussion on revenues see pp. 20. For discussion on operating costs see pages 27/28. Found at: www.sites.google.com/site/hsrcaliffr. Appendix 10 (starts on page 186) deals specifically with the operating economics of Amtrak's San Joaquin route.

For the Authority to assume it will capture any visible percent of the present day Amtrak San Joaquin riders is unreasonable.

3.8 Shared Rides Always Defeat The Choice of HSR Fares – If travelers are rational in their transport mode choice, The Authority will not gain much any share of the families traveling by auto or commuters sharing rides (paid for or not) of the intra-California's travel market.

Auto distance between SF and LA's centers is 381miles.[246] An unbiased website says auto costs of that journey is slightly less than $43[247] or 11¢ per mile. If it is an average California household of 2.90persons[248] traveling, the cost per traveler is less than $15 ($14.82) or less than 4¢ a mile. The Authority claims that autos' per mile total costs in 2025 and 2029 should be 26¢/mile.[249] Doing the math of this claim shows a single driver between SF and LA's centers will pay about $100 ($99.06) to make the journey. That makes the per person costs of average California household $34 ($34.15) or 12¢ per mile.

By contrast, the one person, one-way ticket between SFTBT and LA Union is $89. Instead of a $43 or $100 cost the California household will pay $258 to use HSR between SF and LA's centers. That's a 'no-brainer' for rational traveling households.

What is shared ridership's impact on The Authority's forecasts for its two most important inter-regional travel routes in the 2016 plan, – MTC-SJV and

[246] See http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Los+Angeles,+CA
[247] On March 26th 2016, that one-way cost is $42.18. The day before it was $42.50, so bias doesn't enter into portraying current auto driving costs. See: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Los+Angeles,+CA
[248] See https://www.census.gov/newsroom/releases/archives/2010_census/cb11-cn137.html
[249] See Table 4.4, p. 4-4, [PDF 31] of the California High-Speed Rail 2016 Business Plan, Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Support Document

MTC-SCAG? The Authority notes there are 43Million MTC-SJV annual trips.[250]

> *"The MTC to San Joaquin Valley market is also dominated by autos, which are forecasted to carry about 93 percent of the overall demand . . . because high-speed rail is not as competitive in shorter-distance markets where autos are the dominant mode."*[251]

After this statement and the previous pages' review of the lack of comparative reasonableness of HSR fares in the SJV-SV market, it's proper to ask how the Authority can forecast 3Million MTC-SJV annual riders for the VtoV Ext. period.[252]

The math tells that about 40Million (39.9M) of those MTC-SJV trips are by auto. A recent analysis determined that about two-thirds (64%) of all auto trips are multiple passenger, ride sharing trips with an average of 2.5 persons/vehicle.[253] Using that ratio, shows that about 26Million annual trips (25.6M) are shared rides of one form or another. If each those shared rides reflect an average of 2.5passengers per, nearly 64Million (63.9M) passengers are transported annually from the Bay Area to the San Joaquin Valley (MTC-SVJ). Those ride-sharing travelers are lost to the Authority.

The remaining 36% of the 40Million annual MTC-SJV trips (14.4Million) might be considered a target market for the Authority if it were not for the stark comparison of the small, time inconvenience versus the large cost differences. For example, to gain a half-hour each way using HSR during IOS, the Fresno – HSR's first SJV stop outside MTC during VtoV Ext. – the single person traveler would have to pay HSR's one-way ticket of $63 versus

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[250] See p. 6-3 [PDF 39] of the California High-Speed Rail Authority, 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[251] See p. 6-3 [PDF 39] of the California High-Speed Rail Authority, 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[252] See Table 6.3. p. 6-5 [PDF 41] of the California High-Speed Rail Authority, 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[253] *"What is striking is that these conclusions show that the mix of people in the auto market place are: 1) 36% in a car with just a driver, at a cost of 28 cents per mile, and 2) 64% are in cars that have an average of 2.5 people per car, with an average cost of about 11 cents per mile."* See p. 2, William H. Warren, Comment Regarding Draft 2016 Business Plan, Topic – Ridership Model Auto Group Factor Maybe Overstating Auto Market March 28, 2016.

an out-of-pocket driving cost of $14.[254] Few, if any auto users are likely to choose this option.

The Authority also notes there are 21Million annual MTC-SCAG trips. The Authority's fares must compete with driver-only or rideshare auto travel costs about $43, or 11¢/mile.[255] Even using the 'ceiling fare' of $89 (2016), a one-way SCAG-MTC HSR rider will pay twice what the auto driver pays, and not experience the inconvenience or anxieties of changing between CVR, HSR and dedicated busses (or reverse) between 2025 and 2029. Very few single passenger auto drivers are likely to defect to HSR under that scenario.[256]

IF the Authority raises its '83% of airfare' fares to reflect real world conditions[257] why would any driver defect during the IOS North (aka. VtoV Ext.) the Authority's fares would be 45¢-72¢ PPM as shown in Figure 1,

[254] Comparing only an auto's operating cost per mile to a HSR rail fare per mile during the IOS is valid because like auto owners thinking only of costs, The Authority's calculations carry no capital cost amortization and defer maintenance and replacement costs until after IOS. Also according to The Authority's consultants, Cambridge Systematics: *"travelers will rarely consider the full range of auto operating costs in their trip decisions"* and that they tend to *"consider their cost of [automobile] travel to be only their out-of-pocket gas costs."* See Cambridge Systematics (2008), *Desert Xpress Ridership Forecast Review,* p. 17, Steer Davies Gleave, *Ridership and Revenue Audit,* page 5, Federal Railroad Administration, Final Environmental Impact Statement, Appendix B, http://www.fra.dot.gov/downloads/rrdev/Appendix_B_Ridership_Forecast_Review.pdf. Cited in the 2013 Reason Foundation Report, An Updated Due Diligence Report; Joseph Vranich, Wendell Cox and Adrian Moore, Ph.D. Found at: http://reason.org/files/california_high_speed_rail_report.pdf

[255] For the 381miles between the downtowns, see http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Los+Angeles,+CA. For the cost of driving that 381miles for $42.50, see: http://www.travelmath.com/cost-of-driving/from/San+Francisco,+CA/to/Los+Angeles,+CA

[256] Using the Authority's 25minute access time to the first station, the following were computed as the door-to-LA Union travel times: 1) SJ-Oakland-LA Union via ACE and Amtrak –3 changes, 10 stops, 8hours 15minutes (495minutes), 2) Oakland (Amtrak to Stockton) - 3 changes, 13 stops, 8 hours (474minutes), 3) SFTBT to LA Union via San Jose – 3 connections and 6 hours (360minutes), 4) San Jose to LA Union – 2 connections, 5 hours (300minutes). Only the SJ-LA Union trip takes less time (8 minutes shorter) than driving. Not counting the BabyBullet, Amtrak or ACE train fares, the costs of using the VtoV Ext. services, including HSR is a minimum of 2.5 times the cost of driving.

[257] Although not officially adopted for the Draft 2016 Plan, an adjunct technical document explores raising San Jose to N. of Bakersfield fare from $83 to $106: the 2029 SFTBT-LA Union fare from $89 to $113, and the 2040 SFTBT-LA Union fare from $89 to $167. This change would likely bring about not only calls of 'bait and switch' but more importantly would doom the HSR train's ability to compete against airfares. See: Table 3.3, p. 3-9 [PDF 27] of the Draft 2016 California High-Speed Rail Business Plan Ridership and Revenue Risk Analysis

versus airfares of 32¢-36¢ PPM. Both airline and HSR public carrier transport require arriving at a terminal, purchasing a ticket, then to get from SCAG to MTC, riding a bus, then HSR, then conventional rail (CVR). Once a traveler weighs the real door-to-door times and includes the dedicated bus missing a HSR connection time and the possible hassle of non-courteous staff, the luster of the first high-speed rail ride disappears.

3.9 Conclusion: The Authority's Fares Guarantee Its Financial Failure – The Authority has set up it's own financial failure whether or not it follows AB3034's financial viability stricture and raises fares to commercially profitable levels. If it proceeds, the use of its present estimated fares will thwart any private sector investment or bankrupt the operator. If it raises fares to cover real, not imaginary Operations and Maintenance (O&M) costs, HSR fares will not be competitive with airfares. The Authority designed this fatal flaw in 2008, when the Legislature required the HSR system to not require an operating subsidy. Some details:

– The Authority's Procrustean Bed for SFTBT-LA Union/Anaheim fares – '83% of airfares' – is the maximum an HSR fare can be. In 2016, that's $89 or 28¢ per passenger mile (PPM). A third of all HSR fares are constrained by this formula. As Figure 1 makes clear, IF the Authority's fares reflected EU or Acela's PPM fares, 45¢-72¢ PPM, HSR can't compete with airfares.

– The Authority eliminates subsidized Amtrak fares in the San Joaquin Valley (SJV). The new 100%-150% higher than Amtrak point-to-point fares, and higher fares per passenger mile (PPM), are strong disincentives for SJV travelers to use HSR.

– As Figure 4 shows, the Authority's fares in the SF Bay Area (MTC) are more than double Caltrain's Baby Bullet. The HSR rider between Palmdale and LA Union will pay more than twice that paid by the Metrolink rider. HSR cannot compete with Caltrain's or Metrolink's. Period.

– Three million riders [258] nearly a third of all IOS (VtoV Ext.) riders are expected to commute between SJV and SV at one-way fares ($63) that are nearly five times the costs of driving ($14) between Fresno and San Jose. Given the evidence, that's unrealistic to the point of being absurd.

– By 2008, the Authority knew the competitive out-of-pocket costs of driving forbade their ability to get some if any drivers, and no rideshare passengers to defect to high-speed rail during any of its phases.

– By 2012, it knew its arbitrary[259] '83% of airfare' formula had to compete for airline passengers in a stagnant SF Bay Area-LA Metropolitan Area market.

These relative costs-of-travel-by-mode facts were ignored, in the blind hope that its modelers would produce convincing enough forecasts that would keep the project's construction alive until it became too late to halt.

[258] Total VtoV ridership is forecasted at 12.8Million; MTC-SJV ridership is 3Million of that. See Table 6.3. p. 6-5 [PDF 41] of the California High-Speed Rail Authority, 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[259] The 83% is arbitrary because, starting with the 2008 Plan, the potential of a 50% or 70% of airfares formula had been analyzed and discarded.

SECTION 4
THE AUTHORITY'S RIDERSHIP FORECASTS FLY IN THE FACE OF ITS FARES' LACK COMPETITIVENESS

This section focuses again on the formula, Revenues (= Fares x **Ridership**), when greater than (>) Total[260] Operations and Maintenance (O&M) Costs equates to Positive Operational Cash Flow (Profitability or Financial Viability). It analyzes evidence to find whether the Authority's ridership forecasts seem authentic when compared with historical and empirical data.

4.1 Where Exactly Does The Authority Think Riders Will Come From? –

How is the Authority to attract and grow ridership by over 16% per year (35Million) in the 11 years between 2028 (7.3Million) and 2040 (42.2Million)?[261] Its commissioned RP/SP surveys show 16% less interest to ride HSR than a decade ago;[262] while in those same surveys driving increases it share of trips at least 14%.[263] The premise of taking market share from auto travel seems futile. Nearly all of the 21Million metro center-to-metro center trips (MTC-SCAG)[264] are made by auto. But according to the 2016

[260] The word 'Total' is used here because the US DOT, uses Generally Agreed Accounting Principles (GAAP) guidance, and requires all revenues and costs be in a single account.
[261] See Table 6.3, p. 6-6, [[PDF 42] of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document. The year 2028 is the last year of IOS (VtoV Ext.) operations and therefore the "mature ridership
[262] Table 1.1 of Cambridge Systematics, California High Speed Rail Ridership and Revenue Forecasting, Survey Data and Inputs to Version 2/Version 3 Preliminary Choice Patterns and Traders/Non-traders; Prepared for California High Speed Rail Authority and Ridership Technical Advisory Panel, March 20, 2014. This document contrasts findings of the 2013/2014 RP/SP versus the 2005 survey.
[263] Table 1.1 of Cambridge Systematics, California High Speed Rail Ridership and Revenue Forecasting, Survey Data and Inputs to Version 2/Version 3 Preliminary Choice Patterns and Traders/Non-traders; Prepared for California High Speed Rail Authority and Ridership Technical Advisory Panel, March 20, 2014. This document contrasts findings of the 2013/2014 RP/SP versus the 2005 survey.
[264] "*The lower high-speed rail mode share in the MTC to San Joaquin Valley market is partially explained by the size of the market, which has about twice the number of total person trips as MTC to SCAG (43 vs 21 million). The MTC to San Joaquin Valley market is also dominated by autos, which are forecasted to carry about 93 percent of the overall demand*." See: p. 6-3 [PDF 39] California High-Speed Rail Authority, Draft 2016 Business Plan: Technical Supporting Document

ridership report, 42% or 9Million (8.99M) of those auto travelers are to defect to HSR in 9-to-12 years during IOS North.[265]

Simultaneously, a separate Authority consultant's report[266] showed an intra-California air passenger market stagnant at about 10Million passengers between southern California airports and the SF Bay Area airports.

Given the many disadvantages California HSR faces, both admitted to by the Authority and found in their consultants' surveys, meeting the Pollyannaish ridership and revenue forecasts will be tough enough. As a start-up company, competing with established providers whose market shares have been fixed for decades, the Authority's HSR offerings face the even more daunting task of convincing travelers to abandon their autos in the face of survey evidence to the contrary, while simultaneously *"squeezing blood from the turnip"* to capture a share of the stagnant airline ridership figures.

4.2 Historical Evidence Should Induce Extreme Caution In Agreeing With Ridership Forecasts – Several major studies have concurred that rail ridership demand is always inflated. First, World Bank financiers documented HSR promoters' propensity to overestimate demand.

> *"High-speed projects have rarely met the full ridership forecasts asserted by their promoters, and in some cases have fallen woefully short."*[267]

[265] Both page 5-8 [PDF 52] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting and Table 6.3 [PDF 41-42] of Ridership and Revenue Forecasting; Draft 2016 Business Plan: Technical Supporting Document show IOS ridership as 12.8Million, although the 2012 figure is a high estimate, while the 2016 estimate is supposedly a Medium Level Scenario. Page 5-8 of the 2012 report gave sources of IOS riders, auto, air and CVR. The 2016 Draft Plan gave no sources; i.e. no estimate of how many travelers were to defect from their present mode to HSR.

[266] See: Table 1, p. 10 [PDF 116] Appendix B, Potential Airline Response to High-Speed Rail Service in California, prepared by Aviation System Consulting LLC, for Cambridge Systematics, Inc. Found in California High-Speed 2012 Business Plan, Ridership and Revenue Forecasting, final technical memorandum, April 12, 2012.

[267] A World Bank study: Paul Amos, Dick Bullock and Jitendra Sondhi; World Bank Report No. 55856; July 2010; pg.14

Second, the Authority's 2012 Plan cited Bent Flyvbjerg,[268] the doyen of megaproject analyses, who in 2003 described overestimated demand for the privately operated Eurostar,[269] and also said,

> *". . for two-thirds of the rail projects, forecasts are overestimated by two-thirds; . . on the average by 65 percent . . a massive and highly significant problem."* [270]

A 2005 Flyvbjerg study of rail projects' inflated demand forecasts concluded:

> *"Rail passenger forecasts were overestimated by an average of 105.6% . . . resulting in actual traffic that was on average 51.4% . . lower than forecasted traffic . ."* [271] and " *Furthermore, for a quarter of the projects, ridership was at least 70 percent lower than estimated."* [272] and "*Rail passenger forecasts are as inaccurate—that is, inflated—today as they were 30 years ago. . ."* [273]

Third, twenty-six years ago a DOT transit forecasting study found that

> *Ridership forecasts always tended to be high, while capital and operating costs almost always tended to be low. The net effect is that actual costs per passenger tended to be much higher than forecast, sometime as much as an order of magnitude."* [274]

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[268] California High-Speed Rail Authority, Revised 2012 Business Plan, p. ES-15 [PDF 23]

[269] See p. 22, Flyvbjerg, Bent; Bruzelius, Nils and Rothengatter, Werner: Megaprojects And Risk, An Anatomy of Ambition; Cambridge University Press, 2003. In 1994 Eurostar HSR was projected to carry 15.9Million passengers its opening year: the reality was 2.9Million, 18% of the prediction. Six years after operations started in 2001 Eurostar carried 6.9Million, 43% of the prediction.

[270] See: Megaprojects and Risks: An Anatomy of Ambition, Bent Flyvbjerg, Cambridge University Press, 2003 page 26

[271] p. 133 [PDF 3], Bent Flyvbjerg, Mette K. Skamris Holm, and Soren L. Buhl; How (In)accurate Are Demand Forecasts in Public Works Projects? The Case of Transportation; Journal of the American Planning Association, Vol. 71, No. 2, Springe 2005. Found at: http://flyvbjerg.plan.aau.dk/Traffic91PRINTJAPA.pdf

[272] See: Bent Flyvbjerg, Massimo Garbuio, Dan Lovallo; California Management Review, Vol. 51, No. 2, Winter 2009. Delusion and Deception in Large Infrastructure Projects: Two Models for Explaining and Preventing Executive Disaster. Downloaded from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2229781

[273] p. 138 [PDF 8] Bent Flyvbjerg, Mette K. Skamris Holm, and Soren L. Buhl; How (In)accurate Are Demand Forecasts in Public Works Projects? The Case of Transportation; Journal of the American Planning Association, Vol. 71, No. 2, Springe 2005. Found at: http://flyvbjerg.plan.aau.dk/Traffic91PRINTJAPA.pdf

[274] Citing Donald H. Pickrell, *Urban Rail Transit Projects: Forecast vs. Actual Ridership and Costs*, U.S. Department of Transportation, Urban Mass Transportation Administration report (U.S. Government Printing Office, Washington, D.C.,1990). *"The US Department of Transportation issued a report (Pickrell, 1990) comparing the actual ridership and costs for when rail service starts to the forecast values used to justify these investments . . . Ridership forecasts always tended to be high, while capital and operating costs almost always tended to*

Fourth, academic authors studying worldwide HSR systems cited demand forecasts' inflation with specific examples.

> *" . . ridership projections have been overly optimistic in most countries with operating HSR, particularly in China, Spain. . Italy . . Taiwan . . and Korea . ."* and *"The number of HSR passengers in the Madrid-Barcelona corridor in 2011 (the fourth year in which the service was operating), has still only reached 70 - 75% of demand forecasts."*[275]

Other authors have directly cited the Authority's overestimated demand forecasts.

> *". . . the 2035 interregional ridership would be 77% below the CHRSA forecast . . . Additional factors could lead to a larger gap between the forecasts and actual ridership . ."*[276]

In 2011 the Peer Review Group (PRG) recommended that the Authority ask its forecasting consultants, Cambridge Systematics (CS), to make

> *"Comparisons of forecasted ridership to actual ridership on HSR systems in other parts of the world . ."*[277]

Warning flags about the history of inflated rail ridership forecasts have been available to the Authority for at least thirteen years; yet they continue to claim their ridership forecasts solidly underpin their project's financial viability. The Authority chose to ignore this 'deep and wide' history of overestimated demand in rail projects.

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be low. The net effect is that actual costs per passenger tended to be much higher than forecast, sometime as much as an order of magnitude." Found at PDF 5, in Ten myths about US rail transit systems, Transport Policy 6 (1999), by Thomas Rubin, James Moore and Shin Lee. Found at: http://reason.org/files/8b6432296d935e9975583a74608c93bd.pdf

[275] Chuyuan Zhong, Germà Bel, and Mildred Warner: High-Speed Rail Accessibility: What Can California Learn From Spain? 2013, page 2 and p. 7 Found at: http://mildredwarner.org.s3.amazonaws.com/2012/09/20/Zhong_Bel_Warner_HighSpeedRail_2012-b19b0817.pdf

[276] *"Assuming realistic automobile costs and more plausible outside-the-corridor ridership, the 2035 interregional ridership would be 77% below the CHRSA forecast . . . Additional factors could lead to a larger gap between the forecasts and actual ridership such as slower population growth and excessive air travel delay bias in forecasts."* See: pg.4 [PDF 4] California High Speed Rail: An Updated Due Diligence Report; Reason Foundation, March 2013, Joseph Vranich and Wendell Cox Project Director: Adrian T. Moore, Ph.D.

[277] See: FINAL REPORT of the Independent Peer Review of the California High-Speed Rail Ridership and Revenue Forecasting Process: Findings and Recommendations from the January-March, 2011 Review Period; July 22, 2011.

In 2008 a non-profit organization concluded the Authority's demand forecasts to be three times reasonable calculations.[278] In 2010, a CA Senate-authorized review found the Authority's ridership and revenue forecasts unreliable:[279] that same year independent analysts concluded ridership forecasts were far too optimistic.[280] World Bank financiers also found 'optimism bias' in high-speed rail forecasts.

> *"A whole new area of behavioral research has been generated by the phenomenon of over-forecasting in transport, known as 'optimism bias'* [281]

In 2011 years ago the Legislature's watchdog, the Peer Review Group (PRG), noted that the Authority's IOS forecasts were not verifiable,[282]

> *". . many of the internal workings of the model, especially as applied to the IOS and Bay to Basin scenarios, remain unclear."*

Within months, the PRG again warned the Authority on the history of overestimated demand.[283]

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[278] Table 24 pg.140 [PDF 163] of the 2008 Reason Foundation Report, A Due Diligence Report; Joseph Vranich, Wendell Cox and Adrian Moore, Ph.D. shows that the Authority forecasted 96.5Million Phase 1 riders, whereas the authors estimated less than a third (31.0Million). Found at: http://reason.org/files/california_high_speed_rail_report.pdf: Seven years later, Table 7.2 [PDF 60] of the California High-Speed Rail Draft 2014 Business Plan Ridership and Revenue Forecasting—Draft Technical Memorandum has a Mid-Range ridership forecast of 33.1Million; only 6% more than the Reason Foundation authors.

[279] The Institute for Transportation Studies (ITS) Berkeley was skeptical about the Authority's ridership demand. ""*The forecast of ridership is unlikely to be very close to the ridership that would actually materialize . . .we have found some significant problems that render the key demand forecasting models unreliable for policy analysis."* See: Review of "Bay Area/California High-Speed Rail Ridership and Revenue Forecasting Study" David Brownstone, Mark Hansen and Samer Madanat; June 30, 2010 page 2 [PDF 3], found at: http://www.its.berkeley.edu/publications/UCB/2010/RR/UCB-ITS-RR-2010-1.pdf

[280] See page ES-15 [PDF 23] and [PDF 131] of the Revised 2012 Business Plan (April 2012) that cites Megaprojects and Risks and says, *"This report found that a common element in projects that failed to reach forecast results was an optimistic assumption of a particular event that would lead to higher ridership."*

[281] See Paul Amos, Dick Bullock and Jitendra Sondhi; World Bank Report No 55856; July 2010; pg.14. Found at: http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2012LibraryCh3Fast_Track_Dev.pdf

[282] Commenting on the Draft 2012 Plan's (November 2011) demand forecasts, PRG said, *". . many of the internal workings of the model, especially as applied to the IOS and Bay to Basin scenarios, remain unclear."* See: Letter from the California High-Speed Rail Peer Review Group, Will Kempton, Chairman, January 3, 2012. Found at: www.cahsrprg.com. Page 5

[283] Then PRG said about the Revised 2012 Plan, *"Even so, virtually all initial rail passenger forecasts, including HSR, have turned out to be optimistic, with actual demand averaging about 60 percent of forecast and an unusually wide range of errors from projections."* See pg.7, Letter from the California High-Speed Rail Peer Review Group, Will Kempton, Chairman; May 18, 2012; found at: www.cahsrprg.com

> *"Even so, virtually all initial rail passenger forecasts, including HSR, have turned out to be optimistic, with actual demand averaging about 60 percent of forecast and an unusually wide range of errors from projections."*

As with authors citing empirical evidence[284] the Authority chose to ignore its own independent advisory group. One must question why the Peer Review Group exists, and warn this arbitrary demand forecasts can only end in tears.

4.3 Why Did The Authority Trade A Much Larger Potential IOS Ridership Market For A Market One-Third Its Size? – The Authority's November 2011 Draft Plan noted that it selected IOS-South because:

> *"The IOS-South has stronger projected ridership and net operating profits when compared to the IOS-North."* [285]

Five months later the rationale for an IOS South choice was repeated.

> *"The LA Basin-Bay Area is the most consistent market with the highest HST ridership across all scenarios (Tables 5.6 and 5.7) ranging from 1.2 million per year on the IOS scenario to 5.6 million per year* [Low Scenario] *in the full Phase 1 scenario for the low scenario. HST is forecast to capture nearly 7 percent of the LA Basin to Bay Area travel market with the IOS scenario."* [286]

To capture 7% of the annual LA Basin to SF Bay Area trips within five years meant growing HSR ridership of the IOS South by about 36% each year to get from 1.2Million in 2026 to 5.6Million in 2040. An audacious goal!

Then in 2016, instead of 'staying the course' and using the 21Million residents of the LA Basin[287] (SCAG) as its ridership 'pool,' the Authority

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[284] In 2013 the Authority's commissioned review of its O&M by the Union International des Chemins des Fer (UIC/IUR) declined to comment on the Authority's ridership forecasts. See: UIC Peer Review of Operating & Maintenance Costs of the California High-Speed Rail Project; Final Report, January 2013"*Ridership forecasts and project design have been considered as exogenous inputs."*

[285] See p. ES-9 [PDF 15] of the California High-Speed Rail, Draft 2012 Business Plan.

[286] See page 5-12 [PDF 48] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting

[287] The six counties of the Southern California Area Government's (SCAG) jurisdiction were 20,826,000. See:

becomes even more unrealistic with its IOS building program northward to first attract riders from a Bay Area (MTC) population only a third (7.4Million) of the LA Basin's (MTC).[288]

If four years and two years earlier it took a 21Million population and compound growth rates of more than 30% per year to reach a critical mass of riders to support a profitable HSR system, how can the Authority think that potential riders from a pool only a third that size will make its operations profitable? The Authority has chosen an even harder case to prove than IOS South, a choice that is fundamentally capricious.

4.3.1 The Authority Acts More Like Tom Sawyer Than Transport Planners –

The Authority's decision to shift to an IOS North is like Mark Twain's story where Tom Sawyer searches for something he lost in a lighted place rather than where he thought he lost it. In the Authority's case, its plans to build northwards because it thinks it can find enough construction funds to complete an IOS North – and not towards where the population and potential ridership is (IOS South) – is just as half-baked. The motto 'if you build it they will come' is an illogical planning tool.

But the Authority's 2016 IOS decision is well explained by a former Speaker of the Assembly, who said,

> *"In the world of civic projects, the first budget is really just a down payment. If people knew the real costs from the start, nothing would ever get approved. The idea is to get going. Start digging a hole and make it so big, there is no alternative to coming up with the money to fill it in."* [289]

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http://www.sandag.org/resources/demographics_and_other_data/demographics/fastfacts/regi.htm

[288] MTC, which plans transportation for the nine-county SF Bay region says the MTC population is 7.44Million. See: http://inrix.com/metropolitan-transportation-commission-san-francisco-bay-area/

[289] In his July 28th 2013 column in the SF Chronicle former Assembly Speaker Willie Brown described how civic megaprojects that don't work get built. The full column says, *"News that the Transbay Terminal is something like $300 million over budget should not come as a shock to anyone. We always knew the initial construction estimate was way under the real cost. Just like we never had the real cost for the Central Subway or the Bay Bridge or any*

Disastrous financial results will ensue. And while embarrassing results such as the TransBay Terminal and the east span of the Bay Bridge may be measured in extra millions or billions of dollars, these are contained disasters. If built, the HSR project will require annual operating subsidies that will make those cost overruns insignificant.

4.4 The Train's Ridership Forecasts are Arbitrary If An Oakland HSR Station Is Missing In Action (MIA) – The City-County of San Francisco has some 865,000 residents[290]. Alameda County alone, of which Oakland/Berkeley is about a third (533,000)[291], has almost twice (1.68M)[292] the population of the City-County of San Francisco. Immediately northward, Contra Costa County, (1.13M) has nearly a third more residents than San Francisco County,

Alameda and Contra Costa counties' populations are counted as part of the SF Bay Area's (MTC) ridership. If HSR priorities were based on a commercially derived response to population characteristics, Alameda and Contra Costa counties should be high priority target markets. They aren't.

Legally AB3034, Section 2704.09 says about Oakland,

> *"The high-speed train system to be constructed pursuant to this chapter shall be designed to achieve the following characteristics: . . . (2) Oakland-Los Angeles Union Station: two hours, 40 minutes."* [293]

That statement, and other parts of the Authority's foundation document [294]

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other massive construction project. So get off it. In the world of civic projects, the first budget is really just a down payment. If people knew the real cost from the start, nothing would ever get approved. The idea is to get going. Start digging a hole and make it so big, there is no alternative to coming up with the money to fill it in."

[290] See http://www.census.gov/quickfacts/table/PST045215/06075,00

[291] For Oakland's 414,000 (2014), see http://www.census.gov/quickfacts/table/PST045215/00 For Berkeley's 119,000 (2014), see: http://www.census.gov/quickfacts/table/PST045215/0606000,0653000,06013,06075,00

[292] See https://www.census.gov/quickfacts/table/PST045214/06001

[293] See: Section 2704.09 (b) (2) of AB3034

[294] See AB3034 Section 2704.04 (b) (3) (C) and (G). 2704.04 (b) (3) says "*. . the Legislature may appropriate funds . . . to be expended for any of the following high-speed train corridors:*

certainly require a high-speed rail station in Oakland.

Oakland is Missing In Action in the 2016 Plan. Oakland, or Oakland/Berkeley isn't found in the diagrams showing HSR termini[295] or in the text.[296] Nor is there any mention of an East Bay HSR terminal in any Phase 1 or prior phase diagram.

The East Bay is the orphan in the Authority's Plan to connect Northern and Southern California. Oakland/Berkeley and East Bay residents in general are expected to make their way to SFTBT or San Jose to begin their HSR experience.[297] But there is no mention of a BART to SFTBT connection (which it doesn't) during the VtoV or VtoV Ext. or Phase 1.

Perhaps the Authority is thinking that the SF Peninsula and Santa Clara County's population were large enough to create a higher priority for HSR service to downtown SFTBT. However, disregarding that fact that rapidly growing Santa Clara County straddles the Bay, adding up the populations of the three SF Peninsula counties (SF, San Mateo and Santa Clara) yields about a quarter (27%) more residents (3.53M vs, 2.77M)[298] than the East Bay's two counties. The choice to ignore the East Bay was arbitrary from both market and legal standpoints.

(C) Oakland to San Jose . .and (G) says *. (G) Merced to Stockton to Oakland and San Francisco via the Altamont Corridor."*

[295] It isn't in diagrams on PDF 8, nor PDF 44, nor PDF 76 of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document

[296] In the Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document, Oakland is mentioned four times: 1) as Cambridge Systematics offices [PDF 5], 2) in an air service table [PDF 27], 3) on PDF 28 as part of an enhanced ACE Train service (*"the enhanced San Joaquin trains were assumed to connect from Sacramento and Oakland to high-speed rail at Fresno.")* and it is 4) shown on Table 4.3 [PDF 29] as part of Conventional Rail (CVR) services in 2025/2029-2040. Those are the only instance mentioning the City.

[297] Oakland appears in Figure 3.1 and 3.2 [PDF 32-24] of the Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document

[298] 2014/2015 population statistics were found at http://www.census.gov/quickfacts/table/PST045215/00: San Francisco County at: http://www.census.gov/quickfacts/table/PST045215/06075,00, San Mateo County at: http://www.census.gov/quickfacts/table/PST045215/06081,06075,00, Santa Clara County at: http://www.census.gov/quickfacts/table/PST045215/06085,06081,06075,00 Alameda County at: http://www.census.gov/quickfacts/table/PST045215/06001,06085,06081,06075,00 Contra Costa County at: http://www.census.gov/quickfacts/table/PST045215/06013,06001,06085,06081,06075,00

4.5 The Authority's Modelers Aren't Above 'Inventing' Riders –

The Authority needs riders generating revenue during IOS and beyond. For example, when an Authority-commissioned 2011 Harris panel concluded that each Californian made 6 long distance (100 miles +) trips per year, the Authority's modelers "recalibrated" their model to use 7.36 long distance trips/year.[299] This increased the statewide "pool" of potential IOS travelers at least 20%.

Likewise, Cambridge Systematics' (CS) ridership model defines all trips within California, except those involving Lake Tahoe, as part of the potential ridership "pool" for the Authority's train, [300] whether or not the travelers might be anywhere near a HSR station. For example, trips like Eureka-to-Sacramento would be counted in the CS model. Almost 30% of Californians live in counties nowhere near where the IOS' HSR train service will be offered. However, the Authority's modelers know that a given percent of a bigger "pool" leads to higher ridership and chose to inflate ridership by the assumption that nearly all intra-state trips are part of HSR's market.

Then, after using a national norm on long distance travel, the Authority's modelers switched to counting travelers where high-speed rail's travel times (including access/egress time) make HSR non-competitive. In 2012, the Authority built its 'pool' of potential HSR riders using a DOT/ DOC survey's approach[301] of a minimum travel distance base where HSR would likely have a travel time advantage against auto or bus travel.

> *"One hundred miles was chosen as the breakpoint for segmenting short distance from long-distance trips. . . This value was also used in*

[299] See pg.6-11 [PDF 54] of 2014 Ridership and Revenue Forecasting – Draft Technical Memorandum

[300] Pg. 1 CARRD Memo to Ridership Panel, September 2011 http://www.calhsr.com/wp-content/uploads/2010/02/Ridership-peer-review-letter-v1.1.pdf

[301] The California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting says; *The ATS represents the only large-scale travel survey conducted to date in the United States."* DOT is the US Department of Transportation, and DOC is the US Department of Commerce.

the past as the lower limit for long-distance trips in the 1995 American Traveler Survey (ATS) conducted by the U.S. Departments of Transportation and Commerce." [302]

In 2014, with no substantial evidence to support a change from a national norm adopted in 2012, the Authority abrogated that logical approach and included shorter trips (>50 but <100miles) in the 'pool' from which it draws HSR riders and revenue.

"We combined long-distance and short-distance interregional trips into one model of long distance trips (trips 50 miles or more from the trip-maker's home)." [303]

Without question, this 2014 choice increased the statewide travelers 'pool' for HSR since many of those traveling 50-100miles are commuters whose daily, round-trip journeys get counted twice. The 2016 Plan continues to use journeys greater than 50miles during each development phase in its ridership base.[304]

Trips of less than 50miles (<50miles) do not get counted during the VtoV and VtoV Ext. period[305] because the Authority recognizes:

". . the [VtoV Ext. period's HSR] *mode share is lower because high-speed rail is not as competitive in shorter-distance markets where autos are the dominant ."* [306]

But that first phase's ridership still includes trips over 50miles, as decided in

[302] See p. 1-4 [PDF 14] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting. The full quote is, *"One hundred miles was chosen as the breakpoint for segmenting short distance from long-distance trips. This breakpoint was selected based upon an evaluation of the trip length frequency distributions for interregional trips for each trip purpose from the surveys along with judgment about behavior for short versus long trips. This value was also used in the past as the lower limit for long-distance trips in the 1995 American Traveler Survey (ATS) conducted by the U.S. Departments of Transportation and Commerce."*

[303] See p. 2-1, [PDF 21] of California High-Speed Rail Draft 2014 Business Plan Ridership and Revenue Forecasting—Draft Technical Memorandum

[304] See Table 6.3, p. 6-5and 6-6 [PDFs 42-43] of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting document, where only journeys of <50miles are excluded starting in 2029.

[305] See Table 6.3, p. 6-5 and 6-6 [PDFs 42-43] of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting document, where only journeys of <50miles are excluded starting in 2029.

[306] See p. 6-4 [PDF 40] of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting document

the 2014 Plan. Consequently, tens of thousands of weekday Caltrain commutes[307] between San Francisco and Gilroy (80miles)[308] and/or Gilroy-Millbrae (65miles)[309], and perhaps SF and San Jose (49miles)[310] get included in the VtoV Ext. ridership. Because these are rides (not riders) which largely counts round-trip commuters, the skew towards increasing the high-speed rail ridership 'pool' and therefore HSR ridership is even more pronounced.

The 2016 Plan claims it does not include less than 50mile trips (<50miles) in ridership forecasts starting in 2029, but it does.

> *Short-distance trips of less than 50 miles in length within SCAG and MTC contribute 0.6 million in ridership in years 2029 and 2040. This short-distance ridership was added to the year 2029 and year 2040 long-distance ridership for all probability levels to obtain total high-speed rail ridership.* [311]
>
> *"Short-distance trips of less than 50 miles in length within SCAG and MTC contribute approximately $12 million (2015 dollars) in revenue in year 2029 and 2040. This short-distance revenue was added to the year 2029 and year 2040 long-distance revenue for all probability levels to obtain total high- speed rail revenue."* [312]

The Authority arbitrarily violated not only the national norms about counting potential high-speed rail travelers; it violated its own rule based on that norm. And while one part of its ridership and revenue calculations denies using short, generally commuter trips, the Authority actually uses almost any length of trip to gain the ridership and revenues it needs to supposedly justify its financial viability. This decision alone should be substantial

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[307] Caltrain provides weekday service to over 47,000 riders. See: p. 2 [PDF 3] of Caltrain, February 2013 Caltrain Annual Passenger Counts, found at http://www.caltrain.com/Assets/Stats+and+Reports/Ridership/2013+Annual+Ridership+Counts.pdf

[308] Using Travelmath.com data on train and bus distances, the SF-Gilroy distance is 80miles. See: http://www.travelmath.com/transit/from/San+Francisco,+CA/to/Gilroy,+CA

[309] Using Travelmath.com data on train and bus distances, the Millbrae-Gilroy distance is 65miles. See: http://www.travelmath.com/transit/from/Millbrae,+CA/to/Gilroy,+CA

[310] Using Travelmath.com data on train and bus distances, the San Francisco-San Jose distance is 49miles. See: http://www.travelmath.com/transit/from/San+Francisco,+CA/to/San+Jose,+CA

[311] See p. 7-13 [PDF 55] of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.

[312] See p. 7-2, 7-3 [PDF 54-55] of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.

evidence to reject the credibility of any HSR forecast for any period.

4.5.1 Finding Riders From Where There Are None – The Authority cannot explain, except by admitting biased modeling, how its forecasts for differ so greatly from what survey-based, empirical findings conclude for time sensitive, largely business travel (airlines and HSR) and non-time sensitive travel, largely recreation/other (personal vehicle). On the one hand, the National Household Travel Survey (NHTS) put Business/Commute travel that is greater than 50miles at 13%-29%.[313] Conversely, the Authority's model predicted that Business/Commute travel would be 50%-55% – a 21-42 point difference. Likewise, the California Household Travel Survey (CHTS) that the Authority refers to in the 2016 planning exercise, found that 97% of Business travel was group travel by auto. But the Authority's model decreased that 19%.[314] No explanation is given for these significant differences.

The CHTS also found that 99%-100% of recreation/other travel, whether alone or in a group is by auto.[315] The NHTS work that the Authority cited in 2012 also shows that 71-87% of all trips were recreation/other trips, including visiting family and friends.[316] But the Authority's model predicted

[313] See Table 19. Percentages of Trips by Trip Purpose [PDF 195] of the California High-Speed 2012 Business Plan, Ridership and Revenue Forecasting, April 12, 2012
[314] See p. 38 [PDF 38] of the California High-Speed Rail Version 2 Ridership and Revenue Model, Calibration and Validation Briefing Book. Cambridge Systematics, January 10th 2014.
[315] See p. 38 [PDF 38] of the California High-Speed Rail Version 2 Ridership and Revenue Model, Calibration and Validation Briefing Book. Cambridge Systematics, January 10th 2014.
[316] Table 19. Percentages of Trips by Trip Purpose [PDF 195] of the California High-Speed 2012 Business Plan, Ridership and Revenue Forecasting, April 12, 2012 shows that various editions of the National Household Travel Survey (NHTS) (sample size 100,000 *BTS National Household Travel Survey - Long Distance Travel Quick Facts*) show that between 71% (2001) and 87% (2009) of all travel is recreational/other. A 2010 long distance travel survey cited by Cambridge Systematics (*Surveying and Modeling Long Distance Trips)* showed recreational/other travel to range between 80% and 83% of long distance travel. This body in information was provided to the Authority in a separate Comment to the Draft 2016 Business Plan, by William Warren, dated March 30, 2016, "Ridership Model Auto Group Factor Could Be Overstating Auto Market." Mr. Warren's analysis of this data shows that in the US in 2009, for trips of 100 miles or more in autos, there are 1.9 passengers per auto. See Mr. Warren's analysis, Exhibit 1, cell H8. In addition, for trips of 50 miles and more, the number of passengers per auto only drops to 1.7; see Exhibit 1, cell H34. To achieve this average ratio of 1.7, only about 36% of the autos can have only one person in the auto (the driver), see Exhibit 2, cell H17. Therefore, about 64% of the auto market place is spreading the cost of the trip over multiple passengers, (see Exhibit 2, cell H24) making the Authority's pricing plan

recreation/other trips at only 45-50% of total trips.[317] The Authority has no substantial evidence to explain the 21-42 point difference its modelers chose to use in ridership/revenue forecasts, particularly given the likelihood that recreation/other travel is less time sensitive than airline or HSR travel during IOS and therefore should be assumed to be by personal vehicle. The Authority's modelers do not explain these 21-42 point differences, but rather try to use a HSR Constant to prove how desirable high-speed rail is.[318]

In the 2016 Business Plan Business/Commute riders are 27-28% of all reasons to travel.[319] While 28% is closer to upper end of the NHTS' findings for Business/Commute travel (29%), the public is unable to confirm or challenge that assertion.[320] The Authority also 'calibrates' its ridership model using a Trip Frequency Constant[321] that attempts to show the differences

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of about 23 cents per passenger mile extremely non-competitive. Tos – Authority lawsuit Administrative Record document AG 453 introduces the use of multiple outside sources of travel survey data, including the California Statewide Household Travel Survey (CSHTS), the Harris survey, and this DOT National Housing and Transportation Survey (NHTS). See Section 4.1.1 on pages 16 and 17 (PDF pages 22 and 23). Based on the Authority's use of the NHTS survey data, this additional reference to the NHTS survey data is being made. This NHTS survey data is also provided as part of Mr. Warren's Comment of March 30, 2016. This source of information may also be found at: http://nhts.ornl.gov/2009/pub/stt.pdf

[317] See Table 19. Percentages of Trips by Trip Purpose [PDF 195] of the California High-Speed 2012 Business Plan, Ridership and Revenue Forecasting, April 12, 2012

[318] For *"The unexplained variation component represents the desirability to choose HSR that is not captured directly by the system variables (e.g., travel time, cost, etc.) included in the model."* see: p. 3-2 [PDF 20] of the California High-Speed Rail Business Plan Ridership and Revenue Risk Analysis, draft technical report, Cambridge Systematics, Inc. February 17, 2016. Then, p. A-2 [PDF 50] of the same document says, *"The HSR constants are asserted based on results of stated- preference surveys and cannot be calibrated; as a result, there is uncertainty with the constant itself."* Although used throughout the Risk Analysis report, this appendix statement dismisses the HSR Constant as useless.

[319] See Table 3.1, p. 3-5 of the Draft 2016 California High-Speed Plan Ridership and Revenue Risk Analysis

[320] Public Records requests concerning access to the actually used data and assumptions on ridership, revenues, O&M costs and profits, and the algorithms used for the Authority's computations, have been met with responses that, for example, say: *"This is trade secret information pursuant to Evidence Code section 1060, incorporated into the California Public Records Act through Government Code section 6254(k) and, therefore, will not be provided."* See email to Mr. Robert Prantis from Ms. Anne Parker of the Public Records Act Staff of the CA High-Speed Rail Authority, December 27, 2013.

[321] See the California High-Speed Rail Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting, Table 7.2, p. 7-5 [PDF 47] For both Business/Commute and Recreation/ Other types of trips. *"The trip frequency constants capture the unexplained variation in the number of long-distance trips that travelers will take after accounting for household demographics and the accessibility of available destinations. Also, risks associated with the state of the economy are accounted for within the trip frequency constant risk variable*

between business/commuter and recreation/other types of trips. However the model's Trip Frequency Constant for both types of trips vary between 32% and 40% [322] making the outcomes inaccurate to useless. If the Authority's models' statistical variability swings between a third and two fifths, it would be logical to use empirical evidence and dismiss the model's predictions as unreliable.

4.6 From 2008 To 2014, Phase 1 Ridership Forecasts Decreased, Then Mysteriously Increased – In 2011, before becoming Chair of the California High-Speed Rail Authority's Independent Peer Review Group (PRG), Louis Thompson co-authored a paper on high-speed rail's (HSR) prospects in the US [323] saying,

> *"New HSR systems have an inherently high-demand risk because there is not past experience available."* [324]

No case could be truer than demand forecasts for the California unique HSR train. No other HSR system's trains operate at or above 200mph (320km/hr.), almost all are government owned-and-operated, and no system operates without some form government ownership and/or operating subsidy. Caution born of PRG guidance and history should be the watchword in forecasting the ridership variable, half the revenue portion of the equation. But the opposite seems true.

Before the 2008 Prop1A vote, demand for HSR between the downtowns of Los Angeles and San Francisco supposedly was nearly 100Million riders,[325]

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[322] See the California High-Speed Rail Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting Table 7.7, p. 7-15 [PDF 57]

[323] Section 2 *Section 185035 (a) of the Public Utilities Code reads: "The Authority shall establish an independent peer review group for the purpose of reviewing the planning, engineering, financing, and other elements of the Authority's plans and issuing an analysis of appropriateness and accuracy of the Authority's assumptions and an analysis of the viability of the Authority's financing plan, including the funding plan for each corridor required pursuant to subdivision (b) of Section 2704.08 of the Streets and Highways Code.* "

[324] Thompson, Louis and Tanaka, Yuki: High Speed Rail Passenger Services: World Experience and U.S. Applications; Prepared with the support of the Institution for Transport Policy Studies (a non-profit organization fully supported by the Nippon Foundation), September 20, 2011, p. 31 [PDF 35].

[325] The Authority's 2008 Business Plan, page 7 [PDF 11] says, *"A high-speed train system between Los Angeles/Anaheim and San Francisco with extensions to Sacramento and San*

while EIR/EIS estimates that year put 117Million riders on the HSR train.[326] After the 2008 successful passage of Prop1A, the demand forecast for the complete LA-SF high-speed rail ride, known as Phase 1, fell until 2014.[327] By 2009's Business Plan, LA Basin to San Francisco ridership was 41Million in 2035.[328] The 2008 and 2009 ridership forecasts must have been arbitrarily derived, as no explanation is given as to how nearly 60million riders disappeared within a year.

By the end of 2011, Cambridge Systematics lowered its Phase 1 ridership to 37.1Million,[329] four million short of the prior estimate and slightly over a third of 2008's estimate. Without explanation for the 63Million rider decline from 2008, this too was an arbitrarily selection of a computer model's output.

The Peer Review Group (PRG) was concerned about this. Its comments on the April 2012 Business Plan the PRG noted a dramatic drop in ridership from the November 2011 Plan's ridership forecasts, and said,

> *"As a result, the Authority notes that the forecasts used for the Revised Plan are only 63% of the August 2011 forecasts (72% for the medium case).* [330]

Two years later its 2014 Plan the Authority acknowledged,

Diego will carry more than 90 million passengers"

[326] See: Volume 1 Bay Area to Central Valley HST Final Program EIR/EIS of 2008. Table 2.3-3; "2030 Ridership Forecasts", on page 2-12 [PDF 121], says in the year 2030, 117 million trips, including 36 million commuter trips, will be made; and that is " *. . a representative worst-case scenario. . ."* Or from the same document, page S-5 [PDF 42] that says; *"A representative statewide system evaluated in this Program EIR/EIS was forecast to carry between 88 and 117 million passengers in 2030, with the potential to accommodate higher ridership by adding trains."* Again in that document, page 2-11 says *"Analyses were also performed as part of the independent ridership and revenue forecasts (Cambridge Systematics 2007), using different assumptions for a 50% real increase in the costs for air and automobile travel, which resulted in a high forecast of potential ridership for the HST system of 117 million annual passengers for 2030 (36 million riders would be commuters) (Table 2.3-3)."* This document is found at http://www.hsr.ca.gov/Programs/Environmental_Planning/bay_area_2008.html.

[327] The declines then rises in ridership are the product of Cambridge Systematics (CS). The firm has been the sole consultants for ridership and revenue forecasting since 2008.

[328] See: The Authority's 2009 Business Plan; Table C, page 72 [PDF 74]

[329] See Table 5.5, p. 5-11 [PDF 39] of California High-Speed Rail 2012 Business Plan Draft Technical Memorandum – Ridership and Revenue Forecasting

[330] See: Draft 2014 Business Plan, February 7, 2014, page 7 of the Peer Review Group Comment on the 2012 Plan [PDF 87 of the 2014 Plan].

"The updated forecasts show higher ridership than projected in the 2012 Business Plan, 25 percent higher in the Medium scenario." [331]

By 2012, the Phase 1 (Full Build) ridership ranged from 25.8 to 39.1Million – about a quarter to a third of what helped win the 2008 vote.[332] 2014's Plan reversed the downward trend and "found" 34.7Million Year 2040 riders. In 2016, the 2040 forecast clawed back another 8Million riders bringing the 42.8Million Phase 1 riders[333] to within earshot of the 2009 estimate.

The ridership model's inputs and assumptions, and therefore their outputs, change in each Plan. No "outsiders' including the LAO, GAO or non-government organizations have been allowed to inspect the underlying data, assumptions and algorithms that produce such varying forecasts.[334] The logical conclusion from this analysis is that 2008's ridership forecast was not arbitrary; it was politically driven. Subsequent, lower forecasts may have improved, but by 2014, enough was known about the inability to attract enough riders to meet operating costs, that ridership had to increase – and did by a third (32%) after 2012. Such decreases, then rises can only be labeled unconvincing and arbitrary.

4.7 The Authority Never Conducted A Survey That Gave An Empirical Base To Its IOS Ridership And Revenue Forecasts – The Authority's Phase 1 ridership and revenue figures are based on survey data either commissioned or publically available. But there no evidence in any Plan or its supporting documentation that the Authority conducted any form of survey that asked about travelers' reactions to using and making changes

[331] See page 10 [PDF 11] of the 2014 Plan
[332] See: California High-Speed Rail Program; Revised 2012 Business Plan, April 2012, Figure 5.4, p. 5-10 12, p [PDF 46]
[333] See: Table 6.3 p. 6-3 [PDF 41] of the Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.
[334] Public Records requests concerning access to the actually used data and assumptions on ridership, revenues, O&M costs and profits, and the algorithms used for their computation, have been met with responses that, for example, say: *"This is trade secret information pursuant to Evidence Code section 1060, incorporated into the California Public Records Act through Government Code section 6254(k) and, therefore, will not be provided."* See: email to Mr. Robert Prantis from Ms. Anne Parker of the Public Records Act Staff of the CA High-Speed Rail Authority, December 27,2013.

between two or three modes (conventional rail, bus and HSR) during the IOS periods – whether IOS South (2022-2026) or IOS North (aka. VtoV or VtoV Ext.) that supposedly opens in 2025.[335]

The seminal definition of an IOS trip will be the multiple changes in transport modes. Using public transit for starting involves a bus, trolley, conventional or light rail. Then comes the HSR ride; followed by using similar public transit or an auto from the HSR terminus to the destination. This is known as multi-modal travel. There is evidence that the Authority knew of French data on the negative impact on high-speed ridership of multi-modal travel, and tested its impact on ridership. The important test finding was:

> *"The French experience was tested by modifying the transit access/egress constants to reflect the 90-minute penalty for a trip between San Francisco and Los Angeles on a VtoV system.* ***The added penalty resulted in a 16-percent decrease in HSR ridership and revenue****."*[336] [Emphasis added]

Then the Authority's consultants dismissed the findings. That exhibits bias.

The Authority did ridership forecasts for the Phase 1 offerings, which offers HSR travel between downtown SF (SFTBT) to downtown LA (LA Union). But Phase 1 HSR offerings, with few modal changes, create a vastly different travel experience than changing to/from conventional rail or bus to HSR then back to one or both of those modes during IOS.

The Authority has no substantial evidence that it, or its consultants, conducted a consumer survey that would have recorded and used potential

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[335] *"Given that the revealed-preference data did not include transferring from CVR (or other transit modes) to HSR, we do not have observed data to directly estimate a coefficient for HSR. Thus, the magnitude of this coefficient is inherently uncertain for HSR."* See: p. A-4 [PDF 52] of the Draft 2016 California High-Speed Rail Business Plan Ridership and Revenue Risk Analysis, draft technical report, Cambridge Systematics, Inc. February 17, 2016.

[336] Page A-4 [PDF 52] of the California High-Speed Rail Business Plan Ridership and Revenue Risk Analysis, draft technical report, Cambridge Systematics, Inc. says *"Note, modifying the access/egress constant directly is not how we accounted for the "French Experience" risk; however, the results of the test indicate the risk should be analyzed.*

travelers' preferences as the basis for IOS ridership/revenue forecasts. Such an IOS survey would have been easy to do in 2012-2013 because the Authority knew the details of its IOS (South) offering,[337] and did a Revealed Preference/Stated Preference (RP/SP) survey in 2013[338] to update the 2005 RP/SP Survey.[339] Questions concerning the attractiveness of IOS travel could have been included. But the Authority chose to not know the empirical results of asking travelers about the relative attractiveness of those offerings.

There is still no substantial evidence from any survey that included descriptions of an HSR journey during IOS. [340] Such data would have indicated the number or percent of travelers who would "trade" from autos to HSR, if the HSR option during IOS were described as requiring access to bus-then HSR then-egress-to-bus-to-mode to final destination.[341] The Authority's ridership (and therefore revenue) modelers were missing author Bent

[337] The 2012 Plan gave specific details on the prices and routes of HSR and the feeder busses. Those data are in Table 5.2 and Figure 5.2 of Final Technical Memorandum on the Ridership and Revenue Forecasting of April 2012. Comparisons could have been made by responders with auto travel times and costs though websites such www.travelmath.com

[338] California High-Speed Rail Authority, Connecting California, Draft 2014 Business Plan, pg.40 [PDF 40] In the 2014 Plan the Authority said; *"A new 2013 Revealed/Stated Travel Preference survey has been conducted in California."* An RP survey asks about a trip actually made by the respondent, while a SP survey pivots off of the actual trip, but asks the respondent to consider hypothetical trip attributes and make hypothetical mode choices from which high-speed rail is one option.

[339] Ridership Peer Review Panel, Independent Peer Review of the California High-Speed Rail Ridership and Revenue Forecasting Process, Findings and Recommendations from the January-March 2011 Review Period, July 22, 2011. Cited on page 1 [PDF 2] of the April-June 2013 'Final Report' of the Peer Review Group. In November 2013 the statutorily required Peer Review Group (PRG) concluded, *"Original model specified by the Panel for use in the 2014 Business Plan, based upon assumption that the 2013 RP-SP survey results would be available and used to re- estimate all long-distance model components. This concept has been abandoned."*

[340] After a request on whether an IOS survey was done, I was directed to by the Authority's Public Records staff on ridership and revenue; i.e. http://hsr.ca.gov/About/ridership_and_revenue.html. After searching twelve Authority documents, including those discussing recent and former RP/SP surveys, there was never a Revealed or Stated Preference survey, or any other survey type, conducted that asked travelers their interest in traveling by conventional rail (Caltrain/Metrolink), the Authorty's bus and high-speed rail during either the IOS South (2022-2025) or IOS North (2025-2028) versus other travel modes between San Francisco TransBay Terminal and LA Union Station.

[341] This could have been done because the comparative travel times and costs of HSR and autos were known as early as April 2012.

Flyvbjerg's "outside view" reality tests. [342] Without an underlying data set to understand travelers' reactions to a multi-modal IOS journey is that all IOS ridership forecasts are second order derivatives of some unknown formula and must be dismissed as arbitrary.

4.7.1 IOS Ridership Forecasts Ignored The Caution That Rail Demand Studies Should Have Induced – The Authority's consultants calibrated[343] their computer models more than 100 times to claim 'ramped up'[344] 2014 Plan's IOS forecasts of 11.4Million riders[345] as its 'mature' 2026 forecast. That was over 4Million more IOS riders than the 2012 Low Estimate.[346] By 2016, the mature medium level IOS forecast (VtoV Ext.) equaled the prior Plan's High Estimate.

The Authority gives no reason as to how that 12% ridership rise happened between the two Plans. Both drew from the same population and socio-economic base, traveling along the same routes with the same modal changes and uncompetitive HSR fares and travel times during IOS.

In 2012 and 2014 the Authority ignored independent researchers' findings that existing HSR systems' main clientele will be time-sensitive business travelers.[347] With HSR service during IOS only between the agricultural San Joaquin Valley (Merced-to-Bakersfield) with low population density, low

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[342] See Note 8, p. 35 of "Quality Control and Due Diligence in Project Management: Getting Decisions Right by taking the Outside View", Bent Flyvbjerg, November 2012. Found at: http://arxiv.org/ftp/arxiv/papers/1302/1302.2544.pdf

[343] AG013633, In the California High-Speed Rail Ridership and Revenue Model, *Version 2.0 Model Documentation,* Final report, April 11, 2014 the term "adjusted" is used over twenty times, and "calibrated" used over one hundred times.

[344] AG011047, see AG11088 Connecting California, 2014 Business Plan, April 30, 2014, p. 42 [PDF 42] *"A five-year ramp-up assumption was assumed when each segment opens to revenue service according to the following schedule: 40 percent of the long-term ridership potential is achieved in year 1; 55 percent in year 2; 70 percent in year 3; 85 percent in year 4; 100 percent in year 5"*

[345] Document# AG010724, see AG010787 p. 7-7 Table 7.4 The California High-Speed Rail Draft 2014 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[346] See Table 5.6 p.5-13 [PDF 49] of the California High-Speed 2012 Business Plan; Ridership and Revenue Forecasting

[347] Document# AG015418, see AG015435"*Business trips usually take up a significant proportion of HSR trips (Chang & Lee, 2008; Levinson, 2004)"* quoted in Chuyuan Zhong, Germà Bel, and Mildred Warner: High-Speed Rail Accessibility: What Can California Learn From Spain? 2013.

incomes and high unemployment; and lightly populated, northern LA County (Palmdale-to-San Fernando) there were few reasons that would attract time-sensitive business travelers to HSR. Yet 3.8Million SCAG-originated riders are destined only for the San Joaquin Valley (SJV) in the 2012 Plan[348] and 2.8Million in the 2014 Plan.[349] Those projections seem optimistic in the extreme.

In the 2016 Plan, the Authority's IOS strategy did and about-face and shifted northward[350] with HSR service terminating in San Jose. Whereas 2012 and 2014's Plans had intra-SJV ridership between 0.1Million and 1.2Million, the 2016 Plan's was 3.0Million. The public is supposed to believe that 2012's IOS ridership only within the San Joaquin Valley (intra-SJV) drops to about half of what it was[351] before subsidized Amtrak services are suspended,[352] then grows at over 30% per year, tripling ridership in the four IOS years, 2025-2028. No market survives a doubling of prices within one year; then surges in four years to three times the starting year's estimate. That's not credible.

4.7.2 Without A Survey For Empirical Evidence, IOS Ridership Somehow Falls, Then Rises And Again

Ridership Somehow Falls, Then Rises And Again – In the Draft 2012 Plan (November 2011) the 'Medium' scenario for the IOS (South) had 9.1Million riders: those riders helped produce a profit of $464Million. [353] But five months later (April 2012) ridership had dropped by a million to 8.1Million

[348] See Table 5.6 p.5-13 [PDF 49] of the California High-Speed 2012 Business Plan; Ridership and Revenue Forecasting
[349] See: p. 7-7 Table 7.4 The California High-Speed Rail Draft 2014 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting
[350] Construction north and west of Madera towards San Jose will be started after completion of the sections southward presently under contract.
[351] See: Figure 1 pg.4 [PDF 4] of If You Build It They Will Not Come. Found at: www.sites.google.com/site/hsrcaliffr. A compound growth rate of 6.6% from 2013-2021 on Amtrak's San Joaquin service brings ridership to 2Million the year before IOS opens.
[352] Document# AG011047, see AG011090 Connecting California, 2014 Business Plan, April 30, 2014 Exhibit 4.4 PDF 43, of The Authority's, Draft 2014 Business Plan, February 7 2014. AG#002401, see 002436 Cambridge Systematics' (CS) final technical memorandum of Ridership and Revenue Forecasting of April 12, 2012, Section 5.2, p. 5-5 says *"Note that the existing San Joaquin service south of Merced to Bakersfield is assumed to be discontinued upon the initiation of HST service."*
[353] California High-Speed Rail Program, Draft 2012 Business Plan; November 1, 2011; Exhibit ES-3, pg. ES-9 [PDF 15]

riders (11% fewer) and the 'Medium' scenario only had $345Million of net cash flow from IOS operations[354] a fall of over a quarter five months earlier.

By the time of the 2014 Plan, without explanation, IOS ridership in the Medium scenario miraculously rose to 11.4Million about 3.3Million more than April 2012 Plan's (8.1Million) – a 36% increase. That means the HSR ridership's increased annual at a rate of 8.8%, commendable but questionable. It's miraculous because there were no changes in the travel time or cost advantages to using the Authority's offerings during the IOS South period during the 2012 or 2014 Plans.

Even more miraculous is the claim that while 2014's ridership increased about a third (8.1M vs. 11.4M), the 2014 the cash flow from the IOS South's Medium scenario (2022-2026) increased three fold ($345M vs $1,190B) over the 2012 cash flow! [355] How ridership can increase 36% and net cash flow from operations increase about 250% – more than doubling each of the four IOS years after 2022 – is never explained.

Then in 2016, the VtoV Ext. ridership increases 12% to 12.8Million.[356] How this can happen by drawing on an IOS North population one-third the size of that in IOS South's LA Basin population goes unexplained. Even less cogent is the conclusion the VtoV Ext. revenues drop over 40% ($1,190B in 2014 vs $698M in 2016[357]) and the IOS is still called profitable.

4.7.3 Forecasted IOS Ridership Between LA and SF Lack Credibility –

The Authority asked Californians to believe two separate

[354] California High-Speed Rail Program, Revised 2012 Business Plan; April 2012; Exhibit ES-7, pg. ES-17 [PDF 25]
[355] This is the sum of the five years 2022-2026, starting with $24Million in 2022 and closing with $481M, a annual compound growth rate for net cash flow from operations of 150%. For 2014 cash flow see: Cambridge Systematics' (CS) final technical memorandum of Ridership and Revenue Forecasting of February 6, 2014, Exhibit 6.2, page 52 [PDF b52]
[356] See: Table 6.3 p. 6-5 [PDF 41] of the Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.
[357] See: Table 6.3 p. 6-6 [PDF 42] of the Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.

estimates of LA Basin-SF Bay Area travel. In 2012 Authority claimed the IOS would capture about 7%[358] of annual trips between the state's two metropolitan centers in its first few years of service. This claim assumes the travel market between the LA Basin and the SF Bay Area was either 91Million or 173Million.[359]

In 2016, the Authority's estimate of the annual SF-LA travel market dropped to 21Million, less than a quarter of the lower 2012 estimate.[360] Yet 2016's HSR ridership during IOS was either equal 2012's estimate or increased. Either the Authority's consultants aren't consulting their predecessors' assertions or the LA Basin-SF Bay Area travel market has shrunk drastically, or the Authority's IOS forecasts are invented and arbitrary.[361]

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[358] *"HST is forecast to capture nearly 7 percent of the LA Basin to Bay Area travel market with the IOS scenario."* See page 5-12 [PDF 48] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting

[359] According to Table 5.6 and 5.7 of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting, the Low forecast for IOS South in 2012 was 6.4Million. If HSR is to capture 7% of the MTC-SCAG market, that makes total LA Basin to Bay Area travel market 91Million. The High forecast was 12.1Million for IOS South was 12.1Million, which makes the LA Basin to Bay Area travel market 173Million.

[360] See: p. 6-3 [PDF 39] California High-Speed Rail Authority, Draft 2016 Business Plan: Technical Supporting Document says *"The lower high-speed rail mode share in the MTC to San Joaquin Valley market is partially explained by the size of the market, which has about twice the number of total person trips as MTC to SCAG (43 vs 21 million).*

[361] As a demonstration of how arbitrary IOS North ridership can be, follow this logic trail. There are two primary sources as to where the 2.5 M passengers will come from for the first year of IOS North operations. Most may come from the current automobile traffic using Pacheco Pass, while some may be Amtrak San Joaquin's current customers. To better understand the traffic volumes on State Highway 152 between Gilroy and I-5, which includes Pacheco Pass, The California Department of Transportation's (CalTrans) reports include traffic volumes (counts) "2014 TRAFFIC VOLUMES ON THE CALIFORNIA STATE HIGHWAY SYSTEM." Attached as Traffic Counts 2014 aadt volumn.PDF. Also available and available at: http://traffic-counts.dot.ca.gov/docs/2014_aadt_volumes.pdf Page172 [PDF 181] of that report (bottom row) shows traffic volumes at the Casa de Fruta location on Highway 152. The annual average of the daily traffic (AADT) is about 34,000 (right most columns). Annual traffic is about 12.4Million vehicles are being counted each year. Assuming no trucks, 12.4M vehicles are autos, cars vans, each with one or more passengers. Based on the work contained in William Warren's Comment for the Draft 2016 Business Plan "Ridership Model Auto Group Factor Could Be Overstating Auto Market", dated March 30, 2016, it appears his best estimate of passenger volumes appear on Exhibit 2, [PDF 9]. His analysis shows that about 60% of all the vehicles pass by a location contain, on the average one person, the driver. The remaining 40% have at least one other person in the vehicle. Therefore, it would appear that about 60% of the 12.4 Million vehicles contain one person, or about 7.5 Million people who may be potential HSR riders. The analysis of William Warren in his Comment for the 2016 Business Plan "Amtrak Actual and Authority Projected Operating Results" dated April 7, 2016, showed in Exhibit 3, that the annual ridership for the San Joaquin route is about 1.2 Million per year. The key question becomes what penetration would the Authority need to achieve in these two market segments to achieve their ridership forecast, in 2025 and in 2028, i.e. the beginning

4.7.3.1 Nothing Justifies The Wide Fluctuations of Biannual IOS Ridership Forecasts And the 'Spread' Within Each Plan Between High And Low Forecasts –

The Initial Operating Segment (IOS) – first introduced in November 2011 – should be expected to have the most accurate ridership revenue forecasts because it is the nearest-term forecast. Another reasonable expectation of IOS forecast would be that subsequent business plans would lower the 'spread' between IOS ridership (and revenue) forecasts twice (in April 2012 and April 2014).

Yet, the Authority's computer modelers produce inconsistent IOS forecasts. Four plan's IOS ridership forecasts (2011, 2012, 2014, 2016) do not converge; nor do individual Plan's high and low estimates for IOS converge.

For example, the PRG noted of the 2014 Plan versus 2012 ridership forecasts:

> "*. . the low/high range increased from a 40 percent interval to a 60 percent interval . .*" [362]

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and the end of the IOS North period of operations? The CalTrans report shows on page ii, [PDF 4] that over the past 4 years vehicular traffic growth has been about 1% per year. Likewise, the Amtrak San Joaquin data on the same Exhibit 3 show that ridership is also slow to none. The Authority says they will get 2.5M passengers in the first IOS North year, 2022, and 6.2 M passengers in 2028, as displayed below. It is possible that to get 50% of the Amtrak market, growing to 60% in 2028, but only if they keep the subsidies illegal under Prop 1A/AB3034. That means the Authority would have to take 30% of the single occupancy autos off the Pacheco Pass Route in 2022, and penetration would have to grow to 73% of the single occupancy auto market by 2028; a seemingly impossible target to meet.

Figure 7
Ridership Market Penetration to Meet 2016 Business Plan Projections

IOS - North	2022		2028	
Ridership Projection		2.9M		6.2M
Amtrak Market	1.2 M		1.2M	
Penetration	50%	0.6M	60%	0.7M
Pacheco Pass	7.5 M		7.5M	
Penetration Needed	30%	2.2M	**73%**	5.5M
Possibility of Achieving	Maybe		Impossible	

The more likely result is achieving, or almost achieving, the 2022 objective, but failing to grow from 2.9M riders to 6.2 M riders in 2028. The impact on being able to secure the financing to build out Phase 1 is very uncertain, at best.

[362] See: Draft 2014 Business Plan, February 7, 2014, PDF 87.

Figure 8 shows what the PRG noted. The 'spreads' between highest and lowest ridership forecasts in subsequent Plans increased. April 2014's 'High' IOS forecast is 84% than in April 2012's 'High' yet April 2012 and April 2016's 'High' estimates are equal. 2014's Low is and a 30% lower than April 2012's Low estimate. While 2016's Low Estimate rises to exceed that of April 2012[363] it's still more than 30% lower than November 2011's Low Estimate. We are told to believe these 20-30% biannual swings without explanation, but they must be assumed to be arbitrary.

Figure 8
Analysis of Variations in IOS Ridership of the 2011, 2012,2014 and 2016 Business Plans of the High-Speed Rail Authority

Month and Year of Business Plan	Low Forecasts (MMs)	High Forecasts (MMs)	Low to High% 'Spread' within Each Plan	% Plan to Plan Change	
				Low to Low Forecasts	High to High Forecasts
Nov. 2011	10.7	13.1	+22%	Na.	Na.
April 2012	7.1	12.8	+80%	-33%	-2%
April 2014	5.1	23.8	+360%	-28%	+120%
April 2016	7.3	12.8	+75%	+43%	-45%

Simultaneously, the 'internal spreads' of high and low IOS ridership forecasts inside the Authority's 2014 Business Plan varied more greatly than inside either the 2011 or the 2012 Plans' spreads.[364] While the earlier two IOS spreads were 47% and 80% respectively, the 2014 IOS forecast 'spread' –

[363] See: California High-Speed Rail 2012 Business Plan Draft Technical Memorandum – Ridership and Revenue Forecasting, October 19, 2011 Table 5.2, page 5-6 [PDF 34]. The 'spread' is calculated by using the note in Table 5.2 that shows the 13.1Million ridership number has increased by 18% (from 10.7Million). For 2012 see: Cambridge Systematics' (CS) final technical memorandum of Ridership and Revenue Forecasting of April 12, 2012, Figure 5.3 [PDF 46]. For 2014 see: Cambridge Systematics' (CS) final technical memorandum of Ridership and Revenue Forecasting of February 6, 2014, page 7-3 [PDF 60]. For example, the highest IOS ridership forecast in the 2014 Plan is almost double the 2012 IOS high forecast.[363] In November 2011, the highest IOS (South) estimate was 13.1Million. Five months later (April 2012) it had decreased to 12.8Million; but by 2014 the IOS high estimate was 23.8Million. Low ridership forecasts were consistently lower. In November 2011 the lowest ridership was 10.7Million. Five months later (April 2012) the low was 7.1Million IOS riders. Two years later (April 2014) the IOS low forecast, 5.1Million, was less than half that of November 2011. In November 2011, the Authority had not chosen whether to build northward of southward of Merced-Bakersfield. Table 5.2, page 5-6 [PDF 34] shows both, but for purposes herein IOS South is chosen. See: California High-Speed Rail 2012 Business Plan Draft Technical Memorandum – Ridership and Revenue Forecasting, October 19, 2011.

[364] The November 2011 the 'spread' during the IOS was 9.5Milllion to 14Million – the higher being 47% more than the lower. See Draft 2012 Business Plan, Exhibit 6-8, pg. 6-13 [PDF 111]. As Figure 1 shows, in the April 2012 Plan the IOS ridership forecasts higher estimate was 80% more than the lower.

from a 5.1Million low to a 23.8Million high – is nearly five-fold.[365] Since the 2014 Plan's low-to-high varied even more than in 2011 or 2012, even less confidence should be put in 2014 Plan's IOS forecasts than in the 2012 Plan's forecasts. [366]

Without evidence to show why there would be an increase of SF-LA riders when travelers are offered similar HSR transport costs and modes, Figure 9 shows the 2016 Mid-level IOS forecast is somehow 2012's High IOS ridership estimate; while 2016's was 80% higher than 2012's Low forecast.

Figure 9
SFTBT-LA Union IOS Ridership In The 2012, 2014 and 2016 Business Plans

	IOS Riders (Ms.)	Increase Over Prior Plan	Increase Over Prior Plan	Compound Annual Growth Rates Over 2012 Forecasts
2012 Low [367]	7.1	–	–	–
2012 High	12.8	–	–	–
2014 Mid-Level [368]	11.4	1.45Million	15%	Over 2012 Avg.-20% p.a.
2016 Mid-Level [369]	12.8	1.4Million	12%	Over 2012 Avg.-30% p.a.

To gain such ridership increases means that in the two years between 2012 and 2014, the annual compound growth rate was over 20% per year over a 9.5Million ridership average. Between 2012's Low forecast and 2016's Mid-Leven, the annual compound growth rate needs to be over 50% per year: another audacious statement, entirely lacking evidentiary support.

Although considerable resources have been spent on Cambridge Systematics and RTAP over the last five years, during the intervals between the four

[365] See Cambridge Systematics' (CS) final technical memorandum of Ridership and Revenue Forecasting of April 12, 2012, Figure 5.3 [PDF 46]
[366] The statutorily required Peers, in their comments on the 2012 Business Plan said *"As a result, the Authority notes that the forecasts used for the Revised Plan are only 63% of the August 2011 forecasts (72% for the medium case). In addition, the low/high range increased from a 40 percent interval to a 60 percent interval, which may give a better measure of the potential variability in the results."* See: Draft 2014 Business Plan, February 7, 2014, PDF 87.
[367] For 2012 IOS ridership forecasts, see: Figure 5.5, and 5.7 [PDF 49-50] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting.
[368] See: Table 7.4, p. 7.7, of the Authority's 2014 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting.
[369] See: VtoV Ext. Table 6.3, p. 6-5, California High-Speed Rail Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting.

Plans, the Authority's consultants seem unable to convince themselves that their prior IOS ridership forecasts are credible. Flyvbjerg and colleagues are right: forecasts are made to meet clients' needs at the time.

> ". . *the patronage estimates used by planners of rail infrastructure development are highly, systematically, and significantly misleading (inflated)."* [370]

Why should anyone believe the Authority's 2016 or subsequent IOS forecasts would be credible?

4.7.3.2 Distinctions Without Differences – The Authority says each of its two Initial Operating Segment (IOS) proposals is profitable.[371]

> *"On its own, the IOS is a viable, profitable high-speed rail system."*

It's worth exploring that claim in the 2016 Plan. That Plan's ridership forecasting document[372] says that ridership for VtoV is 1.4Million, while

[370] p. 144 [PDF 14] Bent Flyvbjerg, Mette K. Skamris Holm, and Soren L. Buhl; How (In)accurate Are Demand Forecasts in Public Works Projects? The Case of Transportation; Journal of the American Planning Association, Vol. 71, No. 2, Springe 2005. Found at: http://flyvbjerg.plan.aau.dk/Traffic91PRINTJAPA.pdf

[371] *"On its own, the IOS is a viable, profitable high-speed rail system."* See: California High-Speed Rail Program, Revised 2012 Business Plan; April 2012; pg. 2-15 [PDF 59].

[372] The comparisons in this figure compare "apples to apples" because both the Plan and the R&R technical document speak of VtoV being from San Jose to north of Bakersfield and VtoV Ext. being from San Francisco to Bakersfield. In the 2016 Draft Plan document, the VtoV Medium Ridership in 2025 is 2.9Million: in 2028, it's 6.2Million. See: Exhibit 7.1 p.69 [PDF 69] in Connecting and Transforming California, Draft 2016 Business Plan, February 18, 2016. In the ridership forecasting technical document, VtoV Medium ridership is 7.3Million; VtoV Ext. Medium ridership is 12.8Million. See: Table 6.3 p. 6-3 [PDF 41] of the Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.

Figure 10
Comparing Two Sources of VtoV and VtoV Ext. Ridership In the 2016 Plan

2016 Draft Plan Data Sources	2005 VtoV Medium Ridership Estimate (Ms.)	2008 VtoV Medium Ridership Estimate (Ms.)	2025 VtoV Ext. Medium Ridership Estimate (Ms.)	2028 VtoV Ext. Medium Ridership Estimate (Ms.)	2029 Phase 1 Medium Ridership Estimate (Ms.) – based on VtoV Ext.
Business Plan	2.9M	6.2M	5.1M	11.0M	22.6M
R&R Forecasting	Na.	7.1M	Na.	12.8M	37.1M

These forecasts are considered the "ramped up" ridership estimates. See: Table 6.3 p. 6-3 [PDF 41] of the Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.

ridership for VtoV Ext. is 2.1Million.[373] The two labels are distinctions without differences. They start and finish in the same years (2025-2028). The Authority's 2016 Plan says an HSR journey to Los Angeles via San Jose will start from an unspecified point in San Francisco.[374] While the elapsed time of the SF-SJ ride on HSR is one minute faster[375] the HSR fare between those ($23)[376] points is more than twice the Caltrain Clipper Card fare ($9.20).[377]

South of San Jose, VtoV and VtoV Ext. have the same services except the later goes into Bakersfield while the former stops at a temporary terminal near Shafter. [378] Then both Authority services offer busses to Los Angeles. The difference in elapsed times SF-LA during VtoV (using Caltrain) and VtoV Ext. is 28minutes, or 8% of the on-board times.[379]

Given the 16% SF-SJ cost difference ($13.80) to start the southward journey during VtoV, these hardly seem reasons for the Authority to have increased ridership by 50% for the VtoV Ext. over the VtoV estimate.

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[373] See Table 6.3, p. 6-5 [PDF 41] of the Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue

[374] See Appendix A, tables A.1 and A.2 (and for Phase 1) A.3 of the Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue

[375] The Authority plans its VtoV Ext. service to leave an undisclosed place in San Francisco and only stop in Millbrae en route to San Jose. Since there is no mention of the SFTBT in the technical document's Appendix A analyses of elapsed times during the three phases, the proper assumption is that the starting point is 4th & King. Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Appendix A.2 says than in 2025 the elapsed time from SFTBT to San Jose (only stopping at Millbrae) during VtoV Ext. will be 52minutes. Today, Caltrain's weekday Baby Bullet makes six stops between SF (4ht & King) to San Jose Diridon and takes 63minutes. See: http://www.caltrain.com/schedules/weekdaytimetable.html. If each of the Baby Bullet stops were on two minutes, and five of those were eliminated to equal only one (the number of stops south that Authority says will happen) then the HSR train gains only 1 minute of elapsed time over Caltrain's Baby Bullet's elapsed time from SF to San Jose.

[376] See Table 3.1, p. 3-3 [PDF 25] of the Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue

[377] For Caltrain fares, see: http://www.caltrain.com/Fares/farechart.html

[378] See: Table 3.2, p.3-4 [PDF 26] of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.

[379] The VtoV time, using Caltrain's Baby Bullet schedule and Appendix A of the Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document is 28 minutes,

4.7.3.3 Looking For Consistency In IOS

Ridership Forecasts' Is Hopeless – As Figure 11 shows, the Authority's forecasters were not concerned that one year's forecasts bore no resemblance to the next year's (or vice versa).

Figure 11
2012, 2014 and 2016 Intra-Regional Ridership
From the Two Largest Regions During IOS Period [380]
No. in Millions (M) & %

	2012 Plan	***% of total 2012 Plan***	**2014 Plan**	***% of total 2014 Plan***	**2016 Plan (VtoV Ext.)**	***% of total 2016 Plan***
MTC-MTC+MTC-SJV	0.2-0.9M	*3%-7%*	0.6M	*5%*	4.8M	*38%*
SCAG-SCAG+SCAG-SJV	0.7-4.5M	*11%-37%*	5.5M	*48%*	0.8M	*6%*

The combination of intra-MTC and MTC-SJV ridership goes from 2014's low of 5% to 2016's 38% of all IOS riders. That swing from a low of 200,000 riders (2012) or 2014's 600,000 riders to 2016's 4.8Million riders lacks a logical or empirical base.

Similarly, there's a leap then crash of intra-SCAG and SCAG-SJV riders. Going from a 2012 average ridership of 5.2Million, nearly equaling 2014's 5.5Million, is indefensible: even less so when that combination drops almost to 2012's Low forecast. How can ridership in 2014 be nearly half of all IOS ridership, then drop to 6% of the IOS total two years later?

How can these major swings in IOS ridership happen in the short space of four or two years? The travelers are still going to or from the same end points (MTC or SCAG), have equally lengthy HSR rides and the equal inconvenience of changing to busses going southwards to LA Union, and changing from busses, to HSR going northwards.

[380] 2012 ridership comes from Table 5.6, p. 5-13 [PDF 49] of the Californian High-Speed Rail 2012 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting. 2014 ridership comes from Table 7.4, p. 7-7 [PDF 64] of the Californian High-Speed Rail 2014 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting. For 2016 ridership see Table 6.3 [PDF 41] of the Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue

4.7.3.4 From Zero To Two Million Intra-MTC Riders In Two Years Shows How Arbitrary IOS Ridership Forecasts Are –

As Figure 12 shows, 2012 and 2014 there were no intra-MTC riders during the IOS South (2022-2026).[381] That abruptly changed in the 2016 Plan: 1.8Million MTC riders (San Francisco to Gilroy) appeared.[382]

Figure 12
2012, 2014 and 2016 Intra-Regional Riders During IOS Period [383]
No. in Millions (M) & %

	2012 Plan	***% of total 2012 Plan***	**2014 Plan**	***% of total 2014 Plan***	**2016 Plan**	***% of total 2016 Plan***
MTC-MTC	None	*0%*	none	*0%*	1.8M	*20%*
SCAG-SCAG	0.7M	*11%*	2.7M	*44%*	none	*0%*

All three Plans (2012, 2014, 2016) for the IOS blend HSR rides with dedicated busses and/or local commuter rail rides (Caltrain and Metrolink). None provide a +200mph link to either SFTBT or LA Union station. All three require travelers to change for rail and/or busses to HSR and back to busses and/or commuter rail. In the 2012 and 2014 Plans, travelers during the IOS South period took busses from SFTBT to Merced, then HSR to San Fernando, then busses to any southward destination.[384] For the potential[385] VtoV Ext., shown in the 2016 Plan, travelers from SFTBT use commuter rail (or high-speed rolling stock traveling at commuter rail speeds), then HSR to

[381] For 2012, see Table 5.5, p. 5-13 [PDF 49] of the California High-Speed Rail 2012 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting. For 2014, see: Table 7.4, p. 7-7 [PDF 64] of the California High-Speed Rail Draft 2014 Business Plan Ridership and Revenue Forecasting—Draft Technical Memorandum

[382] See Table 6.3 [PDF 41] of the Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue

[383] 2012 ridership comes from Table 5.6, p. 5-13 [PDF 49] of the Californian High-Speed Rail 2012 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting. 2014 ridership comes from Table 7.4, p. 7-7 [PDF 64] of the Californian High-Speed Rail 2014 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting. For 2016 ridership see Table 6.3 [PDF 41] of the Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue

[384] For 2012, see Figure 5.2, p. 5-3 [PDF 39] of the California High-Speed Rail 2012 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting. For 2014, see Figure 3.1, p. 3-2 [PDF 25] of the California High-Speed Rail Draft 2014 Business Plan Ridership and Revenue Forecasting—Draft Technical Memorandum

[385] Potential extensions to the Silicon Valley to Central Valley phase would extend high-speed rail service from San Jose to San Francisco in the north and from the assumed southern terminus to Bakersfield. See p. 3-1 of [PDF 23] the California High-Speed Rail 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue.

Bakersfield then a 2hr.40minute bus ride to LA Union.[386] Assuming that the Authority isn't fantasying about building dedicated tracks between San Jose and San Francisco for the VtoV Ext. phase, neither travel times nor the cost of HSR travel change substantially during the Initial Operating Segments (IOS), whether from the San Joaquin Valley southwards or northwards.

The decision to insert nearly two million (1.8M) intra-MTC riders into the 2016 revenue producing equation (or not have had a similar number in 2012 and 2014) exemplifies how arbitrary the Authority's forecasting system is.

4.7.3.5 Seismic Shifts in Origin-Destination Data Within Two Years Show How Arbitrary IOS Ridership Forecasts Are –

In 2014, about half of all IOS South riders (6.2Million) either originated or were destined to the Los Angeles Basin (SCAG). Two years later, when the IOS (VtoV Ext.) ridership has grown by 12% to 12.8Million, only 1.2Million travelers originate or are destined for SCAG. The Authority does not explain how that number dropped by 5Million riders to only 9% of all origins and destinations during the IOS North.

Conversely, in 2014 the SF Bay Area only counted for 2.2Million riders, a fifth of the 11.4Million total originating and arriving during IOS South. By making the assumption that 3Million riders – nearly a quarter (23%) of all IOS North period riders – would travel between MTC and the San Joaquin Valley (SJV) and pay an average of $63 for a one-way ride between San Jose and Fresno, MTC's O-D share jumps nearly 50 points.

That four-fold increase in MTC-SJV riders and the decline of 5Million riders starting or finishing their journeys in the SCAG region are not backed by specific survey data using the characteristics of IOS South or IOS North. Nor

[386] See p. 3-1 [PDF 23] and A.2 p. A-2 [PDF 60] of the California High-Speed Rail Authority Draft 2016 Business Plan; Ridership and Revenue Forecasting, Technical Supporting Document

can the Authority provide empirical logic that riders will pay 2-4times the cost of driving the MTC-SJV route to take the HSR train.[387] ????????

Figure 13

IOS North and IOS South - Main Categories of Origin-Destination

MAIN O-D CATEGORIES	2014 riders million	% of 2014 riders	2016 riders million	% of 2016 riders
SACOG	0.7	6%	0.9	7%
SANDAG	0.7	6%	0.3	2%
MTC	2.2	19%	8.8	68%
SCAG	6.2	54%	1.2	9%
SJV	1.6	14%	1.6	12%
Other Regions	0	0%	0.1	1%
TOTALS	11.4	100%	12.9	100%

The fact that the Authority's Ridership Technical Advisory Panel (RTAP) concurred with 2013/2014 RP/SP survey findings that interest in riding a high-speed train had decreased 17% in five years,[388] that personal vehicle users are less likely to change to HSR; [389] and that travelers cared less in 2013/2014 about travel times than they did five years earlier,[390] didn't seem to bother the Authority's forecasters. Figure 13 is testimony to the reckless and arbitrary assumptions underpinning the Authority's revenue and financial viability statements.

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[387] For the $63 one-way fare between San Jose and Fresno see [387] See: Table 6.3, p. 6-5 [PDF 41] of the California High-Speed Rail Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting. For the costs of driving Fresno-San Jose see: http://www.travelmath.com/cost-of-driving/from/Fresno,+CA/to/San+Jose,+CA

[388] See p.12 [PDF 10]; Cambridge Systematics, California High Speed Rail Ridership and Revenue Forecasting, Survey Data and Inputs to Version 2/Version 3 Preliminary Choice Patterns and Traders/Non-traders; Prepared for California High Speed Rail Authority and Ridership Technical Advisory Panel, March 20, 2014.

[389] See p. 2 [PDF 3] of the Ridership Technical Advisory Panel Review of the California High-Speed Rail Ridership and Revenue Forecasting Process, Findings and Recommendations from the May-June 2014 Review Period, September 17, 2014. *"Travelers appeared to be slightly less sensitive to differences in travel time and cost in 2013-14 than in 2005. Thus, mode changes are less likely to occur based only on those considerations."*

[390] See p. 3 [PDF 4] of the Ridership Technical Advisory Panel Review of the California High-Speed Rail Ridership and Revenue Forecasting Process, Findings and Recommendations from the May-June 2014 Review Period, September 17, 2014 *"Two issues of concern existed with respect to the results presented at the meeting: (1) lower than expected values of time, and (2) unexpected, significant increases in predicted recreational/other HSR ridership and revenue compared to previous V2 forecasts."*

4.8 Conclusions on Unconvincing HSR Ridership Forecasts – Somehow, with little or no credible competitive position against auto travel, and no substantial evidence that realistic HSR fares will draw 12.8Million IOS North riders, 37.1Million riders in Phase 1's first year and 42.8Million annual riders in 2040, the public is to risk at least $20-$64Billion building what may become not the USA's largest infrastructure project, but rather its largest White Elephant.

SECTION 5

ON THE LACK OF REASONABLENESS OF THE AUTHORITY'S OPERATIONS & MAINTENANCE (O&M) FORECASTS

This section focuses again on the formula, Revenues (= Fares x Ridership), when greater than (>) **Total** [391] **Operations and Maintenance (O&M) Costs** equates to Positive Operational Cash Flow (Profitability or Financial Viability).[392] It analyzes evidence to find whether the Authority's O&M forecasts seem authentic and able to withstand comparison with historical and empirical data and findings. It finds that the Authority's O&M forecasts are hidden from the daylight of public scrutiny and lack credibility when compared with publically available empirical evidence.

Public scrutiny of the Authority's O&M costs is not allowed.[393] But what can be gleamed from public documents shows that the Authority's O&M costs are 'outliers' to the worldwide HSR operating experience. The Authority knows this, again tried to defend the indefensible, and even its commissioned study of O&M pointed out substantial gaps. The Authority 'shaves' its costs by leaving out significant cost items, increasing its Load Factor and adopting European accounting rules that leave out large portions of fixed infrastructure maintenance costs.

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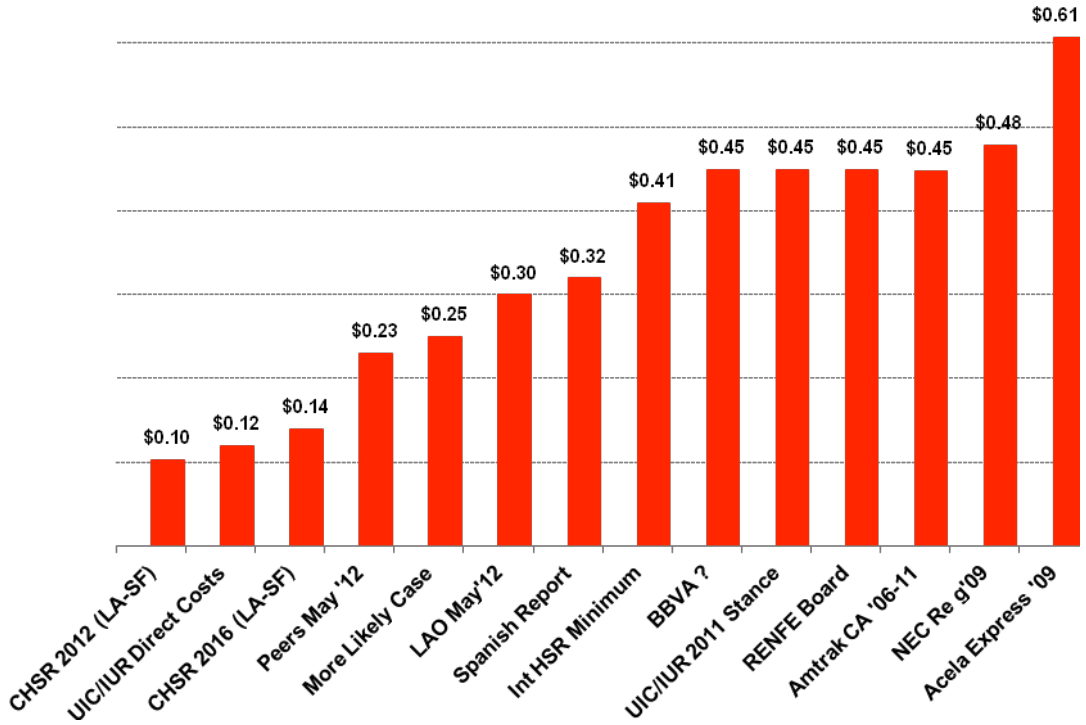
[391] The word 'Total' is used here because the US DOT, uses Generally Agreed Accounting Principles (GAAP) guidance, and requires all revenues and costs be in a single account.
[392] See: To Repeat – The Authority's Train Will Need A Subsidy Forever, August 22nd 2012. Found at: www.sites.google.com/site/hsrcaliffr Page. 35 [PDF 35] refers to France's and EU's rail accounting under Directive 91/440 that separates fixed infrastructure O&M accounts from rolling stock O&M accounts, as well as attributing at least part of health, pension and other benefits' costs to non-rail accounts. See: Réseau Ferré de France (RFF) History at http://www.fundinguniverse.com/company- histories/Reacute;seau-Ferreacute;-de-France-company-History.html
[393] Public Records requests concerning access to the actually used data and assumptions on ridership, revenues, O&M costs and profits, and the algorithms used for the Authority's computations, have been met with responses that, for example, say: *"This is trade secret information pursuant to Evidence Code section 1060, incorporated into the California Public Records Act through Government Code section 6254(k) and, therefore, will not be provided."* See email to Mr. Robert Prantis from Ms. Anne Parker of the Public Records Act Staff of the CA High-Speed Rail Authority, December 27, 2013.

5.1 The Authority Cannot Claim Being Unaware That Its O&M Costs Are Unreasonably Low – Transport planners, even Californian transport planners underestimating O&M costs is nothing new. Twenty years ago, a study of actual versus real O&M showed that for Los Angeles' metro (Red Line) the actual O&M costs were more than five times the planners' estimates, and the commuter rail's (Metrolink) as 60% higher than estimated.[394]

Figure 2

Actual O&M Expenses PPM Vs. The Authority's O&M PPM Forecasts



[394] See Figure 2a, p. 4, [PDF 8], in Ten myths about US rail transit systems, Transport Policy 6 (1999), by Thomas Rubin, James Moore and Shin Lee. The quote is, *". . .forecasts always tended to be relentlessly optimistic. Ridership forecasts always tended to be high, while capital and operating costs almost always tended to be low. The net effect is that actual costs per passenger tended to be much higher than forecast, sometime as much as an order of magnitude." Nearly 25 years later this warning is still not heeded by Authority officials.* Attached as Pet No, 082, Ten Myths About US Rail, Transport Policy 6, 1999.PDF. Also found at: http://reason.org/files/8b6432296d935e9975583a74608c93bd.pdf or at .http://ise.usc.edu/assets/007/64769.pdf

Figure 2's empirical evidence from four-five years ago evidence shows worldwide HSR operators' O&M costs being a far greater percent of revenues, and more than twice and up to six times the Authority's O&M costs on a per passenger mile (PPM) basis.

Depending on which Authority ridership scenario is chosen, the Authority's O&M costs were roughly 51%-54% of IOS revenues per passenger mile.[395]. Since downtown SF-to-downtown LA fare per passenger mile (PPM) in 2012 were $24¢ PPM, by inference O&M costs were around 12¢ PPM:[396] by 2016, O&M costs were 14¢ PPM.

How can the Authority not see its O&M costs are a quarter to a third of real world experience? No amount of claiming that their faster train will be used more frequently can make those huge differences go away. The worldwide standard for operating speeds, 185-186mph, is a balance between capability and higher power costs, rolling stock and fixed infrastructure costs. The Authority's train operates about 20% faster (220mph). The lesson of Formula 1 racing, where operating speeds reach the Authority's, should be a 'speed costs' lesson as higher speeds cause power costs to rise exponentially and wears out rolling stock much quicker. The Authority's O&M calculations are not real world based and cannot explain how its trains' per passenger mile (PPM) costs can be a quarter or a third of that known to worldwide operators.

In June 2011 Spain's high-speed rail (AVE) operator, RENFE, presented the Authority evidence that AVE's O&M costs were about 45¢ PPM.[397] That same year, an independent review of the Draft 2012 Plan pointed out that the Authority's 12¢ PPM *"will be less than 25% of existing worldwide HSR*

[395] See Exhibit ES-7, pg. ES-17 [PDF 25] Revised 2012 Business Plan, April 2012
[396] California High-Speed Rail, Draft 2012 Business Plan (November 2011) Exhibit ES-3, page ES-9 [PDF 15]. The Net Operating Profits for the IOS' High, Medium and Low ridership cases scenarios are 49%, 46% and 43% respectively; making the three scenarios' O&M costs 11.8¢, 12¢ and 13¢ PPM respectively.
[397] See: Figure A 6-1 To Repeat, December 2012 at: www.sites.google.com/site/hsrcaliffr

estimated costs"[398] and while the Plan said *"Composite unit prices for more than 300 separate cost items have been developed for the cost estimates."* none were issued, with comparisons to existing HSR systems O&M cost items with the 2012 Plan,[399] nor since.

In early 2012 the Authority recognized Acela as a profitable high-speed rail service.

> *"High-speed train services, on the other hand, generate positive cash flows around the world, including the Northeast Corridor;"*[400]

But the Authority has refused to recognize Acela's very much higher – ±60¢/PPM – O&M costs.

Also in 2012, the Authority received four reports comparing its O&M costs to empirical data. A March 2012 report analyzed eleven of Europe's HSR routes and found the O&M to be 48¢ PPP with one of France's TGV routes being lowest at 31¢ PPM and one of Italy's highest at 52¢ PPM.[401] An Authority document [402] cited a report on HSR by Spanish and UIC authors[403] incorporating data that showed 2002 per seat mile (PSM) costs. When analyzed, the data suggest an O&M cost of about 31¢ per seat mile,[404] or about 48¢/PPM,[405] four times that of the Authority's.

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[398] See: p. 25 [PDF 25] of California High Speed Rail Authority's Draft 2012 Business Plan Still Not Investment Grade. Source is California High-Speed Rail Program Draft 2012 Business Plan, November 1, 2011; pg. 7-1 at: www.sites.google.com/site/hsrcaliffr

[399] See: California High Speed Rail Authority's Draft 2012 Business Plan Still Not Investment Grade at: www.sites.google.com/site/hsrcaliffr, pg. 3-4. Source is California High-Speed Rail Program Draft 2012 Business Plan, November 1, 2011; pg. 7-1

[400] See p. 2-15 [PDF 59] of California High-Speed Rail Program; Revised 2012 Business Plan, April, 2012.

[401] See p. 5 [PDF 5] The Authority Knows Their Proposed High-Speed Train Will Forever Need An Operating Subsidy, March 17, 2012 at: www.sites.google.com/site/hsrcaliffr

[402] See Footnote 3, pg. 6 [PDF 7] of the Authority's 2012 Business Plan Estimating HST Operating and Maintenance Costs

[403] See [PDF 18- 19] Tables 1.2 and 1.3 in Albalte, Daniel and Bel, Germa: The Economics and Politics of High-Speed Rail, A Review of HSR Experiences Around The World

[404] See [PDF 5] in The Authority Knows Their Proposed High-Speed Train Will Forever Need An Operating Subsidy, March 17, 2012. Found at: www.sites.google.com/site/hsrcaliffr

[405] See Section 2, [PDF 4-6] of The Authority Knows Their Proposed High-Speed Train Will Forever Need An Operating Subsidy, March 17, 2012, at: www.sites.google.com/site/hsrcaliffr Using a very generous Load Factor of 75% (i.e. three-quarters of all seats aboard the HSR

A May 2012 Legislative Analyst's Office (LAO) letter to an Assembly Member said,

> *"Based on our analysis, we estimate that O&M costs for existing systems were in the range of 30 cents per passenger-mile."*[406]

A July 2012 report pointed out the Authority's low-ball O&M estimate[407] and that an earlier report showed the Federal Railroad Administration (FRA) said

> *"The operating cost per seat mile from the FRA study for the California corridor (2006$) is approximately 40 % higher than the Authority's projections."*[408]

A December 2012 report that expanded on the March 2012 report cited fourteen O&M costs, averaging 33¢ PPM in which the Authority's 10¢ PPM was the lowest and Acela's 61¢ PPM was the highest.[409] In 2013 the Brookings Institution said Acela's O&M was about 32¢ PPM;[410] three times the Authority's forecasted O&M (10-11¢).[411]

While these analyses have shown existing HSR systems operate at a cost of 32¢ - 61¢[412] PPM.[413] As Figure 2 shows, the Authority still proposes to

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systems studied were assumed to be always full) and uplifting for inflation, the PPM costs compute to 48¢ PPM.

[406] See "To Repeat – The Authority's Train Will Need A Subsidy Forever", August, 2012, Second Edition, December, 2012 at: www.sites.google.com/site/hsrcaliffr. Attachment 9, [PDF 180] is a LAO letter to Assembly Member Diane Harkey, dated May 4, 2012.

[407] Brief Note #15 "On Operating Costs Out of Sync with the FRA and Reality." Found at: at: www.sites.google.com/site/hsrcaliffr

[408] See p. 49 [PDF 62] California High Speed Rail: A Due Diligence Report; Cato Institute, Policy Analysis No. 625; Joseph Vranich, Wendell Cox, Adrian T. Moore, October 31, 2008. Source is Transportation Research Board, National Research Council, *In Pursuit of Speed: New Options for Intercity Passenger Transport,* Special Report 233, 1991, Table A-14 (operating cost items only). Found at http://www.trb.org/main/blurbs/153319.aspx Purchased from https://www.mytrb.org/Store/Product.aspx?ID=5283

[409] See Figure 5, [PDF 7] in "To Repeat – The Authority's Train Will Need A Subsidy Forever", August, 2012, Second Edition, December, 2012 at: www.sites.google.com/site/hsrcaliffr

[410] See Robert Puentes, Adie Tomer, and Joseph Kane: A New Alignment: Strengthening America's Commitment to Passenger Railroad; Metropolitan Policy Program at Brookings, March 2013, Appendix B, Amtrak Route Performance, page 19, [PDF 25]. O&M does not include capital charges (such as depreciation), interest, and other costs.

[411] Figure 5, pg. 7 says Acela were 72¢ PPM for fares and 62¢ for O&M. in To Repeat – The Authority's Train Will Need A Subsidy Forever, August, 2012, Second Edition, December, 2012 at: www.sites.google.com/site/hsrcaliffr

[412] See Figure 5, [PDF 7] of "To Repeat – The Authority's Train Will Need A Subsidy Forever", August, 2012, Second Edition, December, 2012 at: www.sites.google.com/site/hsrcaliffr

operate at a cost of about 13¢-14¢ per passenger mile PPM, about a third that in Europe, and a fifth that of Acela Express.

5.2 The Authority 'Hunkered Down' To Defend Its 'Low Ball' O&M Costs – In 2011 the Authority "baked in" profits when O&M costs were assumed to

> *" . . grow at 60 percent of the growth of ridership, so if ridership grew one percent, operating expense costs grew six-tenth of one percent . . "* [414]

This assertion always makes O&M about 40% less than revenues, since the Authority's declared revenues always correlate .999% with a multiple of ridership.[415] While this assumption sounds good, it is far from real world experience.

The Authority abhors Talthybius-like findings that differ from its public stance. The Authority publically disowned the Spanish and UIC authors' material used in its own report,[416] claiming the correct O&M data would be forthcoming. Four years on, this claim remains "under review."[417] Without substantial evidence to support his statement, in 2012 the Authority's then-CEO testified before the US Congress that all 2012 Draft Business Plan's price

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[413] See: U.S. Department of Transportation (the US DOT) document, 'Federal Subsidies to Passenger Transportation' of December 2004, prepared by the Transportation Bureau of Transportation Statistics. Examples on pages 1, 5, 8, and 10, and Tables 3 and 4 show per passenger mile (PPM) as the financial performance metric across a wide range of rail and air passenger modes. Available at http://www.bts.gov/publications/federal_subsidies_to_passenger_transportation/

[414] See California High-Speed Rail Program Draft 2012 Business Plan, November 2011; p. 7-3

[415] See: page B-9 [PDF 80] of California High-Speed Rail Draft 2014 Business Plan: Ridership and Revenue Forecasting, draft technical memorandum: *"Revenue and ridership were closely with a R^2 of more than 0.999 for each year."*

[416] See Footnote 3, pg. 6 [PDF 7] of the Authority's 2012 Business Plan Estimating HST Operating and Maintenance Costs

[417] The Authority's sentence, which footnoted the BBVA report, said: *"For the 2012 business plan, these items were compared to results reported for other high speed rail systems in Europe and Japan. European information drawn from the International Union of Railways (UIC), a worldwide railroad association headquartered in Western Europe, published work by Spanish researchers . . "* In an April 2012 Assembly hearing Vice Chair Mike Rossi stated that UIC would make the correct available. Shortly afterwards, accompanying an Authority press conference, he issued a letter saying the data used in the Tables 1.2 and 1.3 of the original BBVA-sponsored research document was "flawed" and *"under review."*

and cost projections had been checked and cross-checked against all HSR systems, and all of HSR systems were profitable.[418]

The Authority has denied public records requests to review its detailed O&M assumptions, data and calculations;[419] and stonewalled the Legislative Analyst's Office's (LAO) attempt to verify its O&M numbers.[420] Even the DOT's Office of Inspector General found (OIG) complained in 2011 that the level of detail for O&M costs were too general to be useful.[421] In 2012 and 2013 the US Government Accountability Office noted its lack of access to details on how the Authority computed O&M costs,[422] and noted in 2012 that,

" . . *over half of the operating costs are captured in a single category*

[418] PET#201 AG 131, Testimony CEO Roelof before the US House Subcommittee on Railroads, Pipelines and Hazardous Materials, December 15, 2011.

[419] Public Records requests concerning access to the actually used data and assumptions on ridership, revenues, O&M costs and profits, and the algorithms used for the Authority's computations, have been met with responses that, for example, say: *"This is trade secret information pursuant to Evidence Code section 1060, incorporated into the California Public Records Act through Government Code section 6254(k) and, therefore, will not be provided."* See email to Mr. Robert Prantis from Ms. Anne Parker of the Public Records Act Staff of the CA High-Speed Rail Authority, December 27, 2013.

[420] The Legislative Analyst's Office (LAO) letter of May 4, 2012 said. *"However, we were provided with no further information to independently verify this* [the 2012 Plan's O&M costs] *although we understand that a report on those findings by this group is forthcoming."* See Attachment Nine, [PDF 185] of To Repeat, The Authority's Train Will Need A Subsidy Forever. Found at: www.sites.google.com/site/hsrcaliffr

[421] *"Neither the costs for the maintenance of rolling stock nor any detail on examination frequency or staff and equipment required to undertaken them are presented."* See: See: p. 32, [PDF 43] of HSIPR Best Practices: Operating Costs Estimation, prepared for: Office of Inspector General US Department of Transportation, prepared by: Steer Davies Gleave, June 2011. Attached as Pet No. 421, OIG-HSR-Best-Practice-Operating-Cost-Report June 2011.PDF or see https://www.oig.dot.gov/sites/default/files/files/OIG-HSR-Best-Practice-Operating-Cost-Report.pdf

[422] In 2012 Congressional testimony, the GAO Infrastructure Director chided the Authority for failing to provide more than *"half of the operating costs are captured in a single category called Train Operations and Maintenance. In addition, the Authority did not clearly describe certain assumptions underlying both cost estimates."* See: Susan A. Fleming, Director of Physical Infrastructure Issues, Testimony Before the Committee on Transportation and Infrastructure, House of Representatives on High-Speed Passenger Rail, December 6th 2012 Found at: http://gao.gov/assets/660/650608.pdf . GAO's March 2013 report on the project, said, *"The O&M model includes relevant data, but sources and variables can only be described as somewhat documented . ."* *"No comprehensive document exists that explains the O&M model element by element."* and *"In addition, the O&M cost estimate is not based on an approved technical baseline document."* and ". . *O&M models. . .do not appear to be based on historical data or analogous sources."* See: GAO-13-304, Report to Congressional Requesters, California High-Speed Passenger Rail, Project Estimates Could Be Improved to Better Inform Future Decisions, March 2013, pg.74 [PDF 79] and pg.76 [PDF 81]. Found at: http://www.gao.gov/products/GAO-13-304

> *called Train Operations and Maintenance. In addition, the Authority did not clearly describe certain assumptions underlying both cost estimates."* [423]

Subsequently, the GAO's March 2013 report says;

> *". . .operating costs were not sufficiently detailed (comprehensive), the development of some cost elements were not sufficiently explained (well documented). ."* [424] *"For example, we were unable to identify the basis for how the operating costs from analogous foreign high-speed rail projects were adjusted for use in California.*[425]

GAO extended it incredulity about the Authority's O&M costs, saying,

> ". . *no comprehensive document exists that explains the O&M model element by element."* and ". . *the O&M cost estimate is not based on an approved technical baseline document . . ."*[426]

Although the PRG stressed that O&M is an equally important variable in calculating financial viability, [427] it too has been denied access[428] to the Authority's O&M data, assumptions and algorithms. PRG said the Authority exercised an optimism bias,[429]

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[423] Statement of Susan A. Fleming, Director Physical Infrastructure Issues; Testimony Before the Committee on Transportation and Infrastructure, House of Representatives; HIGH-SPEED PASSENGER RAIL; Preliminary Assessment of California's Cost Estimates and Other Challenges; GAO-13-163T; Thursday, December 6, 2012, page 8 [PDF 10]. Found at: http://www.gao.gov/products/GAO-13-304

[424] United States Government Accountability Office; Report to Congressional Requesters; CALIFORNIA HIGH- SPEED PASSENGER RAIL; Project Estimates Could Be Improved to Better Inform Future Decisions; GAO-13-304; March 2013, [PDF 2] Found at: http://www.gao.gov/products/GAO-13-304

[425] See United States Government Accountability Office; Report to Congressional Requesters; CALIFORNIA HIGH- SPEED PASSENGER RAIL; Project Estimates Could Be Improved to Better Inform Future Decisions; GAO-13-304; March 2013, , page 18 [PDF 23] Found at: http://www.gao.gov/products/GAO-13-304

[426] See: GAO-13-304, Report to Congressional Requesters, California High-Speed Passenger Rail, Project Estimates Could Be Improved to Better Inform Future Decisions, March 2013, pg.76 [PDF 81]. Found at: http://www.gao.gov/products/GAO-13-304

[426] See GAO-13-304, Report to Congressional Requesters, California High-Speed Passenger Rail, Project Estimates Could Be Improved to Better Inform Future Decisions, March 2013, page 18 [PDF 23] Found at: http://www.gao.gov/products/GAO-13-304

[427] On page b98 [PDF b98] of the 2014 Business Plan the PRG recognizes that O&M costs are as important as ridership/revenue in determining financial viability. *"Since the O&M costs are as important as the demand and revenue forecasts in determining the financial and economic justification of the project . . ."*

[428] Letter from the California High-Speed Rail Peer Review Group, Will Kempton, Chairman, January 3, 2012. See www.cahsrprg.com, pg. 5

[429] See Appendix 2, or see pgs 7-8 of the May 18, 2012 Peer Group Report found at http://www.cahsrprg.com/files/bus_plan.pdf that says,". . *the overall results of the* [THE AUTHORITY's O&M] *model appear optimistic by comparison with readily available data on the*

> *"These* [O&M] *forecasts have not been subjected to external and public review, and many of the internal workings of the model, **especially as applied to the IOS** and Bay to Basin scenarios, remain unclear*." [Emphasis added]

In a separate report, GAO questioned the accuracy of Amtrak's accounting, noting the railroad operator may have omitted O&M items[430], implying the Authority's O&M accounts are missing seriously large expense items.

The Authority also ignored transportation academics' conclusions[431] and GAO's recommendation for independent analyses.[432] It commissioned the hardly-independent[433] International Union of Railways (UIC) to analyze O&M costs.[434] But UIC said the Authority's explanation

> *". . may lead to an understatement of the O&M costs or to an overstatement of the revenues*" since it could only review "*aggregated costs categories*"[435] not detailed O&M costs.

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closest comparable U.S. HSR operations (Amtrak's operations in the Northeast Corridor)"

[430] GAO-06-145; Report to the Chairman, Committee on Transportation and Infrastructure, House of Representatives; AMTRAK MANAGEMENT Systemic Problems Require Actions to Improve Efficiency, Effectiveness, and Accountability; October 2005. Attached as Pet No. 008, GAO-06-145 Amtrak Mgmt Systemic Problems 10-2005.PDF. Also found at: http://www.gao.gov/products/GAO-06-145. Although Amtrak's revenues and expenses must be in a single account (unlike European rail systems) GAO found that *". . Amtrak had omitted or misallocated key expenses in several areas, substantially understating operating expenses in reports."* and seriously underestimated depreciation costs. See pages 2 (second and third point), 66 (first paragraph), and 81 (first paragraph), (PDF pages 8, 72, and 87).

[431] Commenting on the history of O&M costs being greater than forecasted, Professor Ibbs says *". . .if we have that type of experience on this project, it's going to eat future generations alive; its going to eat our grandchildren's wallets alive . ."* See: Video of testimony of Professor William Ibbs, UC Berkeley at CA Senate Hearing on High-Speed Rail, March 27 2014; found between minutes 9:33 and 10:01.

[432] The March 2013 GAO report said*; "The Authority also did not compare its operating cost estimate to an independent cost estimate or conduct a risk and uncertainty analysis."* Found at: United States Government Accountability Office; Report to Congressional Requesters; CALIFORNIA HIGH- SPEED PASSENGER RAIL; Project Estimates Could Be Improved to Better Inform Future Decisions; GAO-13-304; March 2013, page 20 [PDF 25]

[433] The UIC mission is **"***to promote rail transport at world level and meet the challenges of mobility and sustainable development."* See http://www.uic.org/spip.php?article528&lang=en

[434] In 2013, the GAO said, *"For example, we were unable to identify the basis for how the operating costs from analogous foreign high-speed rail projects were adjusted for use in California. Authority officials said that the operating cost estimate was used at a high level to determine whether or not the California system will operate with an operating surplus."* See GAO-13-304, Report to Congressional Requesters, California High-Speed Passenger Rail, 'Project Estimates Could Be Improved to Better Inform Future Decisions', March 2013, page 18 [PDF 23]

[435] The UIC comment on the Authority's explanation of ridership demand said it *". . . may lead to an understatement of the O&M costs or to an overstatement of the revenues*." it reviewed

5.3 The Authority Minimizes O&M Costs Through Biased Modeling –

The Authority's memory is selective about what constitutes O&M costs. Despite needing private capital to operate and maintain the IOS, its 2014 Plan does not include a private operator's or investor's profit;[436] nor are taxes the private operator must pay on the profit part of the Authority's accounting formula.[437] It contradicts itself on the number of daily operating hours per year, (5,840 vs. 6,570) which could increase O&M costs 13%. [438]

The Authority also forgot landing and parking fees – for its trains. SF TransBay Terminal (SFTBT) or LA Union Station are city-owned and operated terminals. They are unlikely to waive their equivalent of landing or parking fees for HSR trains using their terminals, particularly since those trains will be operated by private, for profit companies. However, the Authority chose to exclude these operating costs from its five business plans.

An HSR example: In the SFO case, the operators' cost $6.40 per passenger; at LAX that's $6.55 per passenger. HSR train sets carry 450 passengers. [439] That's 2.78 times the 162-passenger 737-800. Train's "land" and park. If the SFO SF TransBay Terminal (SFTBT) charged fees similar to SFO ($6.40 per passenger) the fees could be $2,880 to land plus $325 to park and turnaround: a total of $3,200 per HSR arrival. With nearly 800 trains/day

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only *"aggregated costs categories."* See: UIC Peer Review of Operating & Maintenance Costs of the California High-Speed Rail Project; Final Report, January 2013.

[436] See: William Warren's comments on 2014 Plan pg.7 of 11

[437] See Warren comments on 2014 Plan, pp.7-8 of 1. The tax liability of the operator starting with the Bay to Basin Phase is part of the operator's profit equation. Either a gross profit (including the operator's tax liability) needs to be included in 10.4, or a net profit can be computed in 10.4 and the tax liability shown in 10.5.

[438] See William Warren comments on 2014 Plan paragraph 3.0, Figure shows 16 hours per day of operations, but Paragraph 4.3 states the Revenue Service Hours are 0600 to 2400, which is 18 hours.

[439] *"Trainsets were assumed to be approximately 660 feet in length with 450 passenger seats."* See: p. 10, [PDF 14] of 2014 Service Planning Methodology, Draft 2014 Business Plan, February 2014, prepared by Parsons Brinckerhoff.

(788) the fees could be over $5,000 per train or over $800Million/year. The terminal operators' income potential is too large for them to ignore.[440]

The Authority also defers maintenance, and the operation of maintenance facilities, in its O&M estimates until after the IOS. Consistent with US and state tax codes, the GAAP accounting practices used by DOT calculate a depreciation charge towards what an eventual asset replacement would cost and include a *pro rata* portion of such calculation in each annual O&M expense.[441]

But the Authority does not treat capital asset renewal as a component of O&M costs. It says,

> *"Finally, the system will require capital asset renewal expenditures over its life reflecting the need to renew or replace assets over time."*[442]

The Authority has no such calculation for IOS, and perhaps for any phase. This means the inclusion of such replacement costs are not in IOS's annual

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[440] At the City-owned and operated SFO airport, the landing fee varies $4.01 - $5.01/1,000 pounds of aircraft weight, and parking fees above or below 250,000lbs. See: p. 3 [PDF 6] of SFO, Summary of Airport Charges, Fiscal Year 2012/13. Found at: https://sfoconnect.com/sites/default/files/legacy/summarychargesfy1213_0.pdf For example, a 162 passenger See: https://en.wikipedia.org/wiki/Boeing_737_Next_Generation Boeing 737-800 at 174,000lbs See: Axlegeeks at: http://planes.axlegeeks.com/l/269/Boeing-737-800 would pay $713 to land, and $325 to park at a gate for an hour. Since that 737 is a fairly common intra-California carrier, it's safe to say that SFO charges the intra-CA airlines landing at SFO nearly $100,000 a day, or $25Million/year to land, park and leave. Each 737-800 would incur SFO's $1,038 landing and parking fees. There are 183 daily take offs and landings to/from seven Southern California airports, or 91 landings. Excluding weekends, the 261 operating days yields $24.65Million for SFO operations. For air traffic see: See: Table 1, p. 10 [PDF 116] Appendix B, Potential Airline Response to High-Speed Rail Service in California, prepared by Aviation System Consulting LLC, for Cambridge Systematics, Inc. Found in California High-Speed 2012 Business Plan, Ridership and Revenue Forecasting, final technical memorandum, April 12, 2012. LAX, another City-owned and operated airport, the 162 passenger B737-800 would pay $762/landing, and assuming a five minute wait for ramp access ($100) and 30minutes unloading and loading at the ramp ($200), the airplane's cost for that turn-around would be $1,062. [See letter from LAX's CFO Yabubik to airlines of June 22, 2015. Found at: http://www.lawa.org/uploadedFiles/AirOps/pdf/FY%202015-16%20Landing%20Fees%20at%20LAX.pdf] LAX send and receives 123 aircraft a day from (61 landings/day) and to the three SF Bay Area airports. That's $17Million a year ($16.9M) of revenue for LAX, solely derived from airplanes coming in from the Bay Area.

[441] See p. 29 [PDF 29] of California High Speed Rail Authority's Draft 2012 Business Plan Still Not Investment Grade. Source is California High-Speed Rail Program Draft 2012 Business Plan, November 1, 2011

[442] See p. 7-1 [PDF 121] of the California High Speed Rail Authority's Draft 2012 Business Plan

profit equation over all the years of the equipment's' use, rather are totally dependent on positive cash flows only in the years the assets are to be replaced.

The Authority-authorized UIC report on O&M pointed out several biases that keep O&M costs low. It said the Authority forgot to include marketing and advertisement budgets as well as the costs of distribution channels.[443] Among the missing variable costs that UIC could not find in the Authority's O&M costs were sales, marketing and station costs.[444] According to Amtrak's Vision to expand its very similar high-speed rail service, sales and marketing represents 15% and station services another 13% of forecasted O&M costs of its NEC Next-Gen project.[445] UIC also said that the Authority's cost escalation factors needed to be linked to income growth during the service ramp-up period, not the full service, mature income;[446] that O&M prices should reflect the "full" costs of O&M activities; suggesting UIC did not consider the Authority's O&M estimates complete.[447] UIC closed its analysis of the Authority's O&M costs disappointed at the inconsistencies, *"Finally, consistency between ridership forecasts, the operating plan, and the O&M cost evaluation should be more deeply analyzed."* [448]

Ultimately UIC fails. Although UIC has access to worldwide and the Authority's O&M data, it's report contained no side-by-side comparisons of those O&M cost data sets from different HSR operators, as several

[443] See pg. ii of International Union of Railways; UIC PEER REVIEW OF OPERATING ?? & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013
[444] p. 5.5 Finding #2 in UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013
[445] See pg.21 [PDF 23] A Vision for High-Speed Rail in the Northeast Corridor, September 2010. Found at: https://www.amtrak.com/ccurl/214/393/A-Vision-for-High-Speed-Rail-in-the-Northeast-Corridor.pdf
[446] See p.6 [PDF 11] of UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013
[447] See p.6 [PDF 11] of UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013
[448] See: pp.9 [PDF 14] of UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013

independent reports, including that by Spanish authors and a UIC staff member displayed earlier.[449]

Another way to make O&M costs seem reasonable is to increase the Load Factor used in the per passenger mile (PPM) equation. With more passengers the PPM operations and maintenance charges get spread over a larger number of riders in the denominator of the O&M cost equation. The Authority's modelers of IOS 'ratcheted up' successive Business Plans' passenger Load Factors, ignoring empirical evidence on existing passenger rail's Load Factors.

Initially the Authority tried to use Per Seat Miles (PSM) to measure financial performance;[450] but this is only correct when all train seats are 100% revenue producing.[451] Load Factors (the ratio of paid-for seats to total seats) affect financial performance per passenger mile (PPM): i.e. higher Load Factors produce more revenue therefore better financial performance. Amtrak's Average Load Factor for its routes in California was 32% in 2009;[452]

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[449] See: Economic Analysis of High Speed Rail in Europe; Ginés de Rus (Ed), Iñaki Barrón de Angoiti, Javier Campos, Philippe Gagnepain, Chris Nash, Andreu Ulied and Roger Vickerman; Fundacion BBVA, 2009. Found at: http://www.fbbva.es/TLFU/dat/inf_web_economic_analysis.pdf

[450] PET#166 The Authority's criticism of the 'Forever' report for using PPM versus PSM is both in an Assembly Transportation Committee statement given by Board Member Mike Rossi on April 30 2012 found at http://youtu.be/yWU9uKUuHII and in a May 4, 2012 letter and the Authority's Press Release. PET#100 The letter and Press Release can be found at http://www.cahighspeedrail.ca.gov/ under the PDF file called: "Authority Responds to Flawed Report: Corresponds with Authors."

[451] DOT requires measuring the financial performance of a railroad (or airline) by dividing Seat Miles by a Load Factor. *"Load factor measures usage by capacity. It is calculated by dividing passenger miles (the aggregation of trip lengths for individual passengers) by seat miles (the sum of the products of total seats available and total miles traveled for individual trains*)." The seat miles measure assume a 100% Load Factor. See: http://www.rita.dot.gov and http://www.dot.gov/

[452] PET#061 Source is: The Authority's Train Will Need A Subsidy Forever, August, 2012, Second Edition, December, 2012 at: www.sites.google.com/site/hsrcaliffrFigure A3-1, PDF page 53.

while its conventional rail in the heavily trafficked NEC was 44% in 2009.[453] Even Acela's Load Factor was 56% in 2009.[454]

By comparison the Authority's April 2012 Plan's Load Factor could be calculated to be 78%-73%:[455] two years later its Load Factor had increased to an unreasonable 85%,[456] and since no mention of Load Factors can be found in the 2016 Plan, the 2014 assumption is assumed to stand. The Authority's modelers have repeatedly chosen Load Factors unforeseen in modern rail travel capriciously chosen and without substantial evidence to support the choice.

5.4 The Authority Has Long Had Evidence That Acela Express Was Its HSR System's Surrogate For Fares And O&M Costs – Since 2009, the Authority has measured its fares against Acela's.[457] That Plan also quoted a Pew Charitable Trust study about Acela Express's profitability. The Trust's calculations, based on GAO studies, had a calculated $40.50 "profit" (i.e. positive cash flow) per passenger on Acela, after depreciation and other unallocated costs.[458]

Prior to joining the statutorily required Peer Review Group, now PRG Chairman Lou Thompson found, that using Generally Accepted Accounting

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[453] PET#061 Source is: The Authority's Train Will Need A Subsidy Forever, August, 2012, Second Edition, December, 2012 at: www.sites.google.com/site/hsrcaliffrFigure A3-1, PDF page 53.
[454] PET#061 Source is: The Authority's Train Will Need A Subsidy Forever, August, 2012, Second Edition, December, 2012 at: www.sites.google.com/site/hsrcaliffrFigure A3-1, PDF page 53.
[455] Source is: To Repeat Report, Figure A4-1, PDF page 56. High case is 78%, Medium case is 75%, and Low case is 72%
[456] Source is: See the Authority's 2014 Business Plan, "Service Planning", PDF page 15. Note statement of *"Nominally 85% of the all passenger seats are occupied. This is a target seat occupancy typically assumed in the heavy passenger rail service planning in the United States"* This claim is not substantiated by any known Amtrak data.
[457] "*At the top end, weekend Acela fares in the New York to Washington market were higher than air fares . .* " p. 70 [PDF 72] of the California High-Speed Rail Authority, Report To The Legislature, December 2009.
[458] See: Studyscope, An Initiative of the Pew Charitable Trust, October 27 2009 [PDF 27, FN 28]. Found at http://subsidyscope.com/transportation/amtrak/] Found at: http://www.pewtrusts.org/en/research-and-analysis/reports/0001/01/01/subsidyscope-transportation-sector

Principles' (GAAP) 'single account' method required of U.S public transport systems,

> *". . . the NEC trains are the only ones in the Amtrak system that cover all their operating costs and cover their allocated capital. Acela Express service is significantly more "profitable" than NEC Regional."* [459]

The May 18, 2012 Peer Group Report said,

> ". . *the overall results of the* [the Authority's O&M] *model appear optimistic by comparison with readily available data on the closest comparable U.S. HSR operations (Amtrak's operations in the Northeast Corridor)"* [460]

In 2011 an independent report showed that, using the same per mile charge as Acela's NYC-WDC fares, the fare connecting SF-LA ($184) should be about double any of the four 'ceilings' in four different Authority business plans.[461]

For the 2012 Plan, the Authority did a comparison of what its fares would be based on studying "NEC (Northeastern Corridor) Like" fares.[462] The outcome was predictable, because the 2012 fares, which included some subsidized conventional rail fares, were close to those in both Figure 1 and Figure 14. For example, in Figure 14, the 2012 analysis said a 200mile fare would be $118, while the 228mile NYC-WDC Acela Express fare is $161, and the 100mile fare would be $94, while the WDC-Wilmington Acela Express fare was $111. To travel the 481 miles on France's TGV between Paris and Marseille would cost $151[463], on the hypothetical 2012 HSR trip, a 400mile trip's fare would be $163. The important point isn't whether these are exact matches between the 2012 analysis and outsiders' findings, it's that the

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[459] Thompson, Louis and Tanaka, Yuki: High Speed Rail Passenger Services: World Experience and U.S. Applications; Prepared with the support of the Institution for Transport Policy Studies (a non-profit organization fully supported by the Nippon Foundation), September 20, 2011, page 18 [PDF 21].

[460] Found at http://www.cahsrprg.com/files/bus_plan.pdf

[461] See: Figure D, p. 30 [PDF 30-] of Revisiting Issues in the October 2010 Report, The Financial Risks of California's Proposed High-Speed Rail Project, September 14th 2011. Found at: www.sites.google.com/site/hsrcaliffr

[462] See Table 6, p. 10 [PDF 92] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting document

[463] See Figure 1, p. 18 [PDF 18] of To Repeat, The Authority's Train Will Need A Subsidy Forever. Found at www.sites.google.com/site/hsrcaliffr

Authority's $89 one-way SFTBT-LA Union average fare is completely out of line for a profit-making organization.

Instead of heeding its own consultants' or outsiders' advice, the Authority reacted:

> *"The Acela fare structure is substantially higher than the planned CHSR fare structure, because the CHSR fares were designed to be 83 percent of airfares from the San Francisco Bay Area to the Los Angeles Basin, with lower fares for shorter trips."* [464]

Of course the Acela fare structure is higher: Acela's fares reflect its now fifteen-years of operating experience [465] and real world conditions that make Acela profitable[466], as the Authority's system must be. The Authority's fare structure doesn't reflect empirical data on existing HSR operating costs.

The Authority's fares are arbitrary and capricious because they have a politically chosen 'ceiling' to convince supporters that its fares would always be lower than airfare fares. The '83% of airfares' formula may have been a politically wise choice, but it holds disastrous consequences for making the HSR train financially viable.

The Authority "hoisted itself on its own petard" by its 2008 marketing message designed to capture travelers' votes. Admittedly uncompetitive with driving costs but designed to attract air travelers,[467] the 2008 ballot's SF-LA fare of "about $50"[468] was a political choice, but justified by the

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[464] See: 1.0 Summary [PDF 84] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting document

[465] Acela began commercial operations in December 2000. See: https://en.wikipedia.org/wiki/Acela_Express#Background

[466] On April 6th 2015, during a Assembly Budget Hearing, Authority Chair Dan Richard confirmed that Acela was profitable. However, he failed to mention that Acela's per mile fares are 2.5-3 times higher than the Authority plans to charge. See the discussion between the Chair and Member Patterson, starting at 12min. 30seconds in the following link: https://youtu.be/iBziL_H0xOc

[467] *"Train fares were assumed to be somewhere between the cost of driving and of taking an airplane or train."* p. 64 [PDF 66], California High-Speed Rail Authority, Report to the Legislature, December 2009.

[468] Prop1A proponents touted that HSR would allow *"Travel from Los Angeles to San Francisco in about 2 hours for about $50 a person."* See: p.2, Proposition 1A Arguments – Voter Information Guide 2008,

Authority as competitive with airfares after the election in the later-than-AB3034-demanded[469] Business Plan.[470] It wasn't. It wasn't and it isn't.

The Authority's 2009 Report to the Legislature, more than doubled[471] ($105) the 2008 pre- election assertion. The 2012 Business Plan 'lowered' a one-way SF-LA fare, but was still half again as much ($83)[472] as in 2008; then 2014's SF-LA fare was $86. The 2016 Plan's one-way fare is still 60% higher ($89)[473] than before Prop1A.

Ipso facto the fare 'ceiling' is sufficient cause for private investors to balk. In the three most recent business plans, about one-third of all HSR fares are constrained by the 2009 *"83 percent of airfares"* formula;[474] 32% in 2012[475], and 31% in 2014. Of the twelve Authority fares for 2016 from San Francisco's TransBay Terminal (SFTBT) southward, a third (25 of 77) (Bakersfield, Palmdale, Burbank, LA Union, Orange County and Anaheim) are constrained by the 83% formula to $89.[476] That arbitrarily derived formula makes no commercial sense.

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[469] SECTION 1. 185033 reads *"The Authority shall prepare, publish, and submit to the Legislature, not later than September 1, 2008, a revised business plan . ."* a demand not met with impunity.

[470] *"With train fares at 50% of airfares, high-speed trains . ."* See: p.17 [PDF 21] of the California High-Speed Train Business Plan, November 2008.

[471] *"Because of the importance of increasing the amount of private sector funding . . . the 83 percent fare scenario was adopted . . . The fare is . . . is anchored by an LA-SF HST fare at 83 percent of the air fare, or in 2009 dollars a high-speed train fare of $105 vs. a $125 air fare, and a $118 cost to drive."* [No evidence is given for how the cost to drive was calculated.] See p. 65 [PDF 67] of California High-Speed Rail Authority, Report to the Legislature, December 2009.

[472] See: Table 5.2 [PDF 42] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting document

[473] See Table 3.1, p. 3-3 [PDF 25] of the Authority's 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[474] *"The fare is . . . is anchored by an LA-SF HST fare at 83 percent of the air fare . . ."* See p. 65 [PDF 67] of California High-Speed Rail Authority, Report to the Legislature, December 2009.

[475] For the 2012 of constrained to total fares ratio, see: 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting document. For the 2014 ratio, see: Table 3.1, p. 3-5 [PDF 28] California High-Speed Rail Draft 2014 Business Plan Ridership and Revenue Forecasting – Draft Final Technical Memorandum. For the 2016 ratio, see: Table 3.1, p. 3-3 [PDF 25] of the Authority's Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[476] See Table 3.1, p. 3-3 [PDF 25] of California High-Speed Rail Authority Draft 2016 Business Plan; Ridership and Revenue Forecasting, Technical Supporting Document

An inspection of Acela Express' fares in Figure 14 from WDC to BAL, WIL, PHL and NYC shows how preposterous the 83% ceiling will seems to investors and operators. First, Acela's per mile fares are multiples of the Authority's proposed fares. No Acela per mile fare is less than about twice the fares for shorter distance Authority sections – and the average per mile fare is 86¢.[477]

Figure 14 [478]
Analysis of Acela Express And The Authority's Fares & Fares/Mile

	Acela Express Fare	Driving Miles Distance [479]	Acela Express Fare/mile
WDC-BAL	$44	39[480]	$1.28/mile
WDC-WIL	$104	111[481]	94¢/mile
WDC-PHL	$109	142[482]	77¢/mile
WDC-NYC	$161	228[483]	70¢/mile
WDC-BOS	$271	441[484]	61¢/mile
	2016 Authority Fares [485]	**Driving Miles Distance**	**Acela Express Fare/mile**
SFTBT - Bakersfield	$89	283[486]	31¢/mile
Bakersfield - LA Union	$56	112[487]	50¢/mile
SFTBT- Palmdale	$89	370[488]	24¢/mile
SFTBT - BUR	$89	370[489]	24¢/mile
SFTBT - LA Union	$89	381[490]	23¢/mile
SFTBT - Anaheim	$89	407[491]	22¢/mile

[477] Per mile fares analyzed for Acela's five stops between WDC and Boston averaged 86¢.
[478] All fares are based on four-day advance purchase, mid-morning Acela Express Value Fare. For Acela Express fares see: https://tickets.amtrak.com/itd/amtrak.
[479] All distances are measured in driving miles. There will be aberrations, the most pronounced being that Palmdale and Burbank Airport (BUR) are the same driving distance from SFTBT, while the HSR 'detour' of 70-75 miles from Bakersfield up to Palmdale and back down to Burbank is not counted. However, for consistency, and because the Authority has not set its alignment on that sector, driving miles are used.
[480] The 39miles between WDC and Baltimore is found at http://www.travelmath.com/drive-distance/from/Washington,+DC/to/Baltimore,+MD
[481] The 111 mile distance between WDC and Wilmington, DE is found at: http://www.travelmath.com/drive-distance/from/Washington,+DC/to/Wilmington,+DE
[482] The 142 mile distance between WDC and Philadelphia, DE is found at: http://www.travelmath.com/drive-distance/from/Washington,+DC/to/Philadelphia,+PA
[483] The 228 mile distance between WDC and NYC is found at: http://www.travelmath.com/drive-distance/from/Washington,+DC/to/New+York,+NY
[484] The 441miles between WDC and Boston is found at http://www.travelmath.com/drive-distance/from/Washington,+DC/to/Boston,+MA
[485] See Table 3.1, p. 3-3 [PDF 25] of the California High-Speed Rail Authority Draft 2016 Business Plan; Ridership and Revenue Forecasting, Technical Supporting Document
[486] The 283 miles between SFTBT and Bakersfield are from: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Bakersfield,+CA
[487] The 112 miles between Bakersfield and LA Union are from: http://www.travelmath.com/drive-distance/from/Bakersfield,+CA/to/Los+Angeles,+CA
[488] The 370 miles between SFTBT and Palmdale are from: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Palmdale,+CA
[489] The 370 miles between SFTBT and Burbank Airport (BUR) are from: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/BUR
[490] The 381 miles between SFTBT and LA Union are from: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Los+Angeles,+CA

Although the WDC-Wilmington and Bakersfield-LA Union routes are equal distances, Acela's fares and per mile fares are almost double the Authority's. This, despite the Authority's Bakersfield-LA Union 50¢ per mile fare being 125% more than a fare for the entire Phase 1 (SFTBT-Anaheim) route.

The Authority's November 2011 Draft Plan admitted;

> *"US labor and construction costs are 30 – 75% higher than in other developed countries with existing HSR systems such as France, Germany, Italy, the Netherlands, the UK and Japan."* [492]

This puts paid to any notion that comparisons to Europe or of operating cheaper than Europe. It is also affirmation of why, to remain profitable and have its revenues exceed its O&M, Acela must charge much more per passenger mile (PPM) than what the Authority plans to charge.

Second, as would be expected, Acela's per mile fares decrease as a journey's distance increases. That's rational, profit-producing pricing, since the fixed costs of serving each passenger becomes a smaller portion of longer distance passengers'. But the Bakersfield to LA Union per mile fare is more than twice that of SFTBT-Anaheim, which is a 70% longer trip. That Authority approach is both irrational and contrary to rail, bus and airline fare pricing strategies.

The '83% of airfares' rule shows the Authority has not consulted with private operators. Unless there were exogenous reasons for investing, none would be willing to charge the same $89 fare for a 407mile SFTBT-Anaheim ride, as

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[491] The 407 miles between SFTBT and Anaheim are from: http://travelmath.com/drive-distance/from/San+Francisco,+CA/to/Anaheim+CA

[492] See PET 213 and the California High-Speed Rail Authority Draft 2012 Business Plan, November 1, 2011. p. 3-13, [PDF 76]. This recognized the findings of the 2009 Amtrak report, Amtrak, Office of Inspector General; EVALUATION REPORT E-09-01; Comparison of Amtrak Infrastructure Labor Costs to European Railroad Averages; March 24, 2009 pages 2-3 [PDF 5-6]. That report said, *"1) The average annual labor cost of an Amtrak infrastructure worker is more than twice (2.3) that of the average European railroad infrastructure worker. 2) Amtrak's Base Wages per Worker are 1.3 times that of the Average European Worker. 3) Amtrak's Extraordinary Wages per Worker are 3.5 times that of the Average European Worker. 4) Amtrak's Annual Benefit Costs per Worker are 4.25 times that of the Average European Worker."* Found at: https://www.amtrakoig.gov/report-records/audit-reports/comparison-amtrak-infrastructure-labor-costs-european-railroad-averages

a 283mile SFTBT-Bakersfield ride. That 'ceiling' contradicts commercial economics as well as Acela profitability and the Authority's need to be profitable.

Acela's longer trips fares increase six fold over length of the HSR train's route. They don't 'hit a ceiling' because of a politically chosen fare formula. Their per mile fares also decrease up to half for the longest Acela trip, in keeping with fixed costs being a smaller portion of the total costs of serving passengers traveling that far. Under the Authority's fare structure, for the Kings/Tulare-Bakersfield section and the five south of Bakersfield, the 83% formula 'kicks in' without consideration of the actual costs of serving passengers traveling the remaining miles.

Inspect Figure 15 and consider the unreasonableness of the Authority's earlier fares[493] ($50, $105, $83, $86) or today's $89 fare[494] for over 400miles of HSR travel, nearly twice the 230miles between New York City (NYC) and Washington DC (WDC) where Acela's fare is almost twice ($161).

Then consider the risibility of such a claim in face of the need to pay the additional operating costs for an extra 138 miles of an HSR ride between Bakersfield and Anaheim,[495] and still be profitable. That doesn't make commercial sense, and first and foremost the train must be profitable. The Authority's politically driven fare structure is a formula for bankruptcy.

Figure 15 also shows the Authority failed to heed crucial 'top down' guidelines from Acela's now fifteen-year operating experience.[496] If the

[493] The $50 SF-LA fare comes from p. 2 of the Proposition 1A Arguments in the Voter Information Guide 2008; the $105 fare from p. 65 [PDF 67] of the Report to the Legislature, December 2009; the $83 fare from p. 5-6 [PDF 42] of the California High-Speed Rail 2012 Business Plan, Final Technical Memorandum – Ridership and Revenue Forecasting; and the $86 fare from p. 3-5 [PDF 28] of the California High-Speed Rail Draft 2014 Business Plan Ridership and Revenue Forecasting – Draft Technical Memorandum
[494] See Table 3.1, p. 3-3 [PDF 25] of the California High-Speed Rail Authority Draft 2016 Business Plan; Ridership and Revenue Forecasting, Technical Supporting Document
[495] See: http://www.travelmath.com/drive-distance/from/Bakersfield,+CA/to/Anaheim,+CA
[496] Acela began commercial operations in December 2000. See: https://en.wikipedia.org/wiki/Acela_Express#Background

Authority's fares reflected the statutory requirement to not need an operating subsidy, its per mile fares would resemble Acela Express'.

Figure 15 **Actual Acela Fares And Hypothetical Authority Fares** [497]			
Table 6 Data-Distance-in miles *(O-D and actual distance in driving miles)*	Authority fare based on Table 6 of 2012 Ridership and Revenue Forecasts	Proposed Authority Fare Structure or (2016 Fare proportioned to mileage [498])	Authority Fare based on "NEC-Like" Fares [499] and *(NEC-Like fares proportioned to actual miles)*
(SFTBT-Gilroy-79 miles) [500]		$25	
100miles – from Table 6	$29.95	$29.95	$94.40
(SJ-Fresno-153 miles) [501]	153mles = $46	$63	*($106)*
200miles– from Table 6	$41.18	$41.18	$117.54
(NYC-WDC-Acela Express-230miles) [502]	230miles = $54	*($189)*	*($146)*
NYC-WDC-Acela Express-To Repeat Report[503]	230miles = $54	*($200)*	*($154)*
(SFTBT-Bakersfield-283 miles)[504]	283miles = $59	$89[505]	*($122)*
300miles – from Table 6	$52.42	$52.42	$140.70
(SFTBT-Palmdale-370miles)[506]	$66	$89 [507]	*($142)*
400 – from Table 6	$63.65	$63.65	$163.84
(SFTBT-LA Union-381miles) [508]	381miles = $61	*$89*	*($149)*
SFTBT-LA Union – 2011[509] *and 2012 reports* [510]	–	*$89*	*($184-$178)*

[497] Based on Table 6, [PDF 92] "Hypothetical Fares by Distance" (in 2011 dollars) in California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting

[498] *Italicized fares* are from Table 3.1 [PDF 25] of the Draft 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[499] What the Authority's 2012 PDF 92 comparison does is mathematically lump together both a great number of short Northeast Corridor (NEC) trips by conventional rail (CVR) fares and Acela Express fares in the NEC to make their 83%-of-airline fare formula seem more reasonable.

[500] See: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Gilroy,+CA

[501] See: http://www.travelmath.com/drive-distance/from/San+Jose,+CA/to/Fresno,+CA

[502] The 230mile NYC-WDC train distance is from http://www.travelmath.com/transit/from/New+York,+NY/to/Washington,+DC. The $ Acela Express fare is a two advance purchase for April 19, 2016, based on mid-week morning fare found on March 12 2016, from: https://tickets.amtrak.com/itd/amtrak#

[503] See Figure 1, p. 18 [PDF 18] of -To Repeat-The Authority's Train Will Need A Subsidy Forever, August 2012. Found at: www.sites.google.com/site/hsrcaliffr

[504] See: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Bakersfield,+CA

[505] Bakersfield is the first destination south of SF in the Draft 2016 Business Plan where fares are limited to $89.

[506] See: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Palmdale,+CA

[507] Like Bakersfield, Palmdale, Burbank, LA Union, Orange County and Anaheim are constrained by the 2008 promise that HSR fares would be no more than 83% of airline fares.

[508] The 381 miles is driving distance and does not account for the 'detour' to Palmdale to cross the Tehachapi Range. From: http://www.travelmath.com/drive-distance/from/San+Francisco,+CA/to/Los+Angeles,+CA

The Authority's self-inflicted wounds from its 'maximum 83% fare trap' are again evident in Figure 15 when 2016's fares are compared with either 1) their own fare tables, or 2) the Northeast Corridor (NEC) fares, or the high-speed rail project's surrogate, Acela Express.

For example, based on hypothetical fares in 2012's Plan,[511] to go 153miles between San Jose and Fresno would cost only $46: adjusting for the extra 53miles would be $46. In 2012's fare table that ride (using HSR) would cost 44% more ($66).[512] In 2014 that ride using HSR would cost 48% more[513] ($68) and in 2016 40% more ($63).[514] An upward adjusted fare from the Authority's table to go the 300miles from SFTBT to Palmdale would be $66; but the Authority's own 2016 Plan says that fare is $89. Even more preposterous is the claim that a 400mile trip should cost $61, when the Authority's 2016 table shows $89.

Those differences in Authority-to-Authority comparisons are significant, but they're based on abstract computations and forecasts, influenced by human choice. Those divergences pale when comparisons are made between the Authority's hypothetical approximations and real world Acela fares proportionately adjusted for distances. For example, the 2012 Plan[515] says

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[509] See: Figure D, p. 30 [PDF 30-] of Revisiting Issues in the October 2010 Report, The Financial Risks of California's Proposed High-Speed Rail Project, September 14th 2011. Found at: www.sites.google.com/site/hsrcaliffr

[510] See Figure 1, p. 18 [PDF 18] of -To Repeat-The Authority's Train Will Need A Subsidy Forever, August 2012. Found at: www.sites.google.com/site/hsrcaliffr

[511] Table 6, [PDF 92] "Hypothetical Fares by Distance" (in 2011 dollars) in California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting

[512] See Table 5.2 p. 5-6 [PDF 42] of the California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting document

[513] See Table 3.1, p. 3-5 [PDF 28] of the California High-Speed Rail Draft 2014 Business Plan Ridership and Revenue Forecasting – Draft Final Technical Memorandum. Six of the thirteen fares are limited to $86.

[514] See Table 3.1, p. 3-3 [PDF 25] of the Authority's 2016 Business Plan; Final Technical Memorandum – Ridership and Revenue Forecasting

[515] Table 6, [PDF 92] "Hypothetical Fares by Distance" (in 2011 dollars) in California High-Speed Rail 2012 Business Plan Final Technical Memorandum – Ridership and Revenue Forecasting

(with spurious precision) that a 200mile fare should be $41.18. Increasing that for the 230miles between NYC and WDC, would suggest a $54 fare, while in 2011 and 2012, the fare would have been nearly double ($178-$184) the Authority's self-defeating ceiling. In April 2016 NYC-WDC Acela Express fare for those 230 miles ($146) is two thirds higher than the "83% of airline" fares. The Authority's private operator can't give away money.

Although the Authority will argue that their private sector operator will be able to offer more seats in any given time interval, thus lowering labor costs in that interval, given that the Authority's fares are a third of Acela's it will be hard for the Authority to demonstrate that its supposedly lower PPM revenues (fares x ridership) will overcome the deficit.

The Authority has no substantial evidence to deny that Acela; whose same accounting system and likely lower labor, electricity, maintenance of rolling stock and fixed infrastructure costs, is the most suitable existing example of how its own fares should be much higher to cover the extra costs resulting from longer distances and higher O&M due to its higher operating speeds (220mph vs 185mph).

5.5 Most Egregious Of All, The Authority Thought It Could Adopt An Accounting System That Is Illegal In The USA – As the Authority said, all segments of the HSR system are to be operated by a private firm;

> *"It is also the case that the California High-Speed Rail Authority will be "selling" a concession to a private operator, giving them the right to operate and maintain the system."* [516]

Consequently, whatever benefits the Authority may claim, the system's operating performance must meet the standards of financial viability according to Generally Accepted Accounting Principals (GAAP) as required of

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[516] Letter from then-Authority Chairman Tom Umberg to Legislators, dated January 3, 2012, Page 6 [PDF 6]

private companies and the US Department of Transportation (DOT).[517]

The Authority's accounting system cannot be for a government-owned-and-operated HSR system like the vast majority, nor claim "social profitability' as the UIC/IUR statement on European policy, nor receive hidden revenue guarantees like Eurostar.[518] Nor can the Authority split its accounting system into several parts as required by European Union Directive 91/440.[519] But the Authority uses the European Union's multi-account approach to O&M costs.[520]

The Authority's trade organization, UIC, admitted in a 2011 policy statement that not all O&M costs in Europe arrive on the HSR train's operators' accounts, which they must in the United States.

> *"The public authorities/society generally bear the costs of investing in new infrastructure, constructing and maintaining the infrastructure and*

[517] See: Amtrak's 2013 Operating, Capital Programs and Debt Service Expense Budget. Attached as "Pet No. 219, Amtrak 2013 Operating Budget.PDF". Also found in 2013 at About Amtrak, Reports and Documents via: https://www.amtrak.com/servlet/ContentServer?c=Page&pagename=am%2FLayout&cid=1241245669222 Unlike European rail systems' accounting that separate costs for operating and maintaining fixed and moving infrastructure as well as health and pension benefits into separate accounts, Table 4, p.13, [PDF 13] of the Amtrak Operating report shows Amtrak's revenues and expenses are accounted for in a single, unified account and conform to STB regulations. Note that Employee Benefits and Depreciation account for over a third of total Amtrak expenses. This is a crucial Amtrak report since it shows that, unlike European HSR accounting, Amtrak's accounting conforms to GAAP. Additionally under Section 209(a) of the Passenger Rail Investment and Improvement Act of 2008(PRIIA), the National Railroad Passenger Corporation (Amtrak) must implement a single, nationwide standardized method for allocating operating and capital costs among the States and Amtrak. The routes include high-speed rail corridors designated by the Secretary of Transportation (other than the Northeast Corridor). See: 49U.S.C. § 24102(5)(B).

[518] For the Official stance of UIC, the worldwide railway association on the profitability of the high-speed rail system, see pages 3-5 of UIC policy accompanying a letter to Mr. Roelof van Ark from Jean-Pierre Loubinoux, Director General of the UIC, Paris, dated 8 February 2011. For a discussion of Eurostar's hidden subsidies, see page 34 [PDF 34] of the report, To Repeat, The Authority's Train Will Need A Subsidy Forever, August 22, 2012. Found at: www.sites.google.com/site/hsrcaliffr

[519] For a detailed discussion of the differences in European railways accounting and the DOT requirements of GAAP, see To Repeat, The Authority's Train Will Need A Subsidy Forever, August 22, 2012, particularly pages 32-36. Found at: www.sites.google.com/site/hsrcaliffr

[520] Page 37 [PDF 37] of the Authority's 2014 Plan says, *"The 2014 lifecycle cost model methodology is based on research and best practice established by a part of the European Union-funded research program called MAINLINE. The 2014 lifecycle model also draws from lifecycle guidance by the UIC and the European Investment Bank (EIB), based on their experience with developing and funding existing high-speed rail systems around the world."*

related equipment such as safety, control-command and signalling, [sic] *etc."* [521]

The Lincoln Institute, for example reinforced this point.

"High-speed rail in Europe has been funded and financed by a variety of sources, including national governments and EU structural funds. The European Investment Bank (EIB) provides subsidized loans with favorable interest rates and long repayment periods, as well as loan guarantees and direct recruitment of private lenders." [522]

As discussed extensively in a December 2012 report, other authors have shown that HSR systems operate with subsidies and, at least in the EU, some O&M costs are 'off the balance' sheet' such a track maintenance and personnel benefits; reducing their reported O&M costs.[523]

Based on a review of four European HSR systems, in 2011, consultants to the DOT's Office of Inspector General found (OIG) that; as a proportion of overall maintenance costs ($90,000-$120,000 per single track mile) for High Speed Intercity Passenger Railroads (HISPR): the individual items of the fixed infrastructure costs should 'brake out' at 1) permanent way (rail beds) and supporting structures (bridges, viaducts, etc.) account for 40-67%; 2) signaling and telecommunications systems account for 10-35%; and 3) electrification equipment accounts for 8-19%%.[524] The OIG also reported that, for the San Francisco-Los Angeles corridor, the O&M costs would be $280Million per train mile[525] and that," *The average operating and*

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[521] See: Policy statement attached to a letter from Director General of UIC to the Authority's CEO Roelof van Ark of 8 February 2011, found in Attachment 11 of this report or at http://www.calhsr.com/wp-content/uploads/2010/02/IUR-Officials-Letter- to-the Authority-CEO.pdf

[522] See p. 48 [PDF 50] of Petra Todorovich, Daniel Schned and Robert Lane; Policy Focus Report, Lincoln Institute of Land Policy: High-Speed Rail, International Lessons for U.S. Policy Makers, 2011. Found at: https://www.lincolninst.edu/pubs/dl/1948_1268_High-Speed%20Rail%20PFR_Webster.pdf

[523] See [PDF 34-36] of To Repeat – The Authority's Train Will Need A Subsidy Forever, August, 2012, Second Edition, December, 2012 at: www.sites.google.com/site/hsrcaliffr

[524] *"Infrastructure maintenance costs are presented for four European HSR networks."* See: p. A-1, [PDF 161] of HSIPR Best Practices: Operating Costs Estimation, prepared for: Office of Inspector General US Department of Transportation, prepared by: Steer Davies Gleave, June 2011. Attached as Pet No. 421, OIG-HSR-Best-Practice-Operating-Cost-Report June 2011.PDF or found at https://www.oig.dot.gov/sites/default/files/files/OIG-HSR-Best-Practice-Operating-Cost-Report.pdf

[525] See: p. A-3, [PDF 161] of HSIPR Best Practices: Operating Costs Estimation, prepared for:

maintenance cost per seat is $75,000 . .” [526]

Under Europe’s rail accounting system (Directive 91/440), 58%-121% of the overall maintenance costs for fixed infrastructure go into a different account than the costs of operating and maintaining the rolling stock. Since the Authority has adopted a EU-based accounting system, it’s fair to assume that at least 58% of its O&M costs do not appear on the Authority’s operating accounts.

The 2013 UIC review of the Authority’s O&M cost model was *“preliminary”* [527] and only used aggregated, not detailed, cost level data,[528] only compared the Authority’s O&M model with worldwide best practices because it found no US comparisons,[529] and admitted its report did not estimate all O&M costs, specifically excluding any US costs including personnel benefits. In mid-2013

Office of Inspector General US Department of Transportation, prepared by: Steer Davies Gleave, June 2011. Also, for the San Francisco-Los Angeles corridor, the OIG said, *“Infrastructure maintenance – this is proportional to the number of trains running and is labor intensive, with 45% of track maintenance, 55% of electric traction installations and 50% of equipment comprising of staff costs”* Attached as Pet No. 421, OIG-HSR-Best-Practice-Operating-Cost-Report June 2011.PDF or see https://www.oig.dot.gov/sites/default/files/files/OIG-HSR-Best-Practice-Operating-Cost-Report.pdf

[526] The full quote is*, “Rolling stock operating and maintenance costs are presented for four European countries in terms of per train, per seat and per seat-km for the life of the train . . . The average operating and maintenance cost per seat is $75,000 . .”* See: p. A-1, [PDF 161] of HSIPR Best Practices: Operating Costs Estimation, prepared for: Office of Inspector General US Department of Transportation, prepared by: Steer Davies Gleave, June 2011. Attached as Pet No. 421, OIG-HSR-Best-Practice-Operating-Cost-Report June 2011.PDF or see https://www.oig.dot.gov/sites/default/files/files/OIG-HSR-Best-Practice-Operating-Cost-Report.pdf

[527] See UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013, P.4 [PDF 9] says *“The ridership forecasts and project cost estimates were studied for years and the O&M cost analysis is preliminary.”* Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf
” See International Union of Railways; UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013. Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf

[528] See Pg.4 [PDF 9] in UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013. Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf

[529] Page 3 [PDF 8] of UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013 says *“Other costs regarding the maintenance activities of the HSR system were compared to the worldwide best current practices because there was no close analogy with the U.S HSR project.”* Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf

the Authority presented the PRG with O&M costs from the UIC.[530] This prompted the PRG to discount UIC's accounting methods, findings [531] and the relevance of UIC's work to GAAP-based accounting used in the U.S. [532] The UIC policy statement also says,

> " . .*the profitability of high speed is not assessed by adding infrastructure costs to operational costs . . but from the perspective of a high speed rail system serving both the passenger transportation market and society – the citizens – as a whole."*[533]

This admits that governments pay at least part of the O&M costs, clearly different from GAAP rules accounting.[534] Agreeing with the PRG's criticism, UIC admitted its 2012/13 O&M study was not an apples-to-apples comparison because:

> *"Other costs regarding the maintenance activities of the HSR system were compared to the worldwide best current practices because there was no close analogy with the U.S HSR project."*[535]

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[530] See Authority, Update to PRG of Work in Progress on O&M Modeling and Projections (July 2013). This shows 2014 projection of O & M costs were in the range of 8 cents PSM (Per Seat Mile), as compared to the 2012 projection of 7 cents PSM.

[531] Contrary to Generally Accepted Accounting Principles (GAAP) used in the United States, the Authority's costs of replacing train sets is deferred far into the future, and supposedly paid for by the cash flow in future years. Second, EU Directive 91/440 separates rail's operating costs into two accounts; that related to the rolling stock and that related to the fixed infrastructure. This method is not available to the Authority because DOT requires private operators to use GAAP. The GAAP-based accounting system does not account for "social profitability" which makes it different from accounting for profitability in European HSR and passenger rail systems. Third, the official policy statement by the Union International des Chemins des Fer (UIC/IUR) on profitability included "social profitability" a concept unknown to US accounting practices: *". . , the profitability of high speed is not assessed by adding infrastructure costs to operational costs, line section by line section, but from the perspective of a high speed rail system serving both the passenger transportation market and society – the citizens – as a whole."* See pages 3-5 of UIC policy accompanying a letter to Mr. Roelof van Ark from Jean-Pierre Loubinoux, Director General of the UIC, Paris, dated 8 February 2011. Found at http://www.calhsr.com/wp- content/uploads/2010/02/IUR- Officials-Letter-to-The Authority-CEO.pdf

[532] In 2013 the Peer Review Group (PRG) noted that, *". . while the UIC analysis is quite useful, it is not fully based on methods, practices and cost levels typical of railways in the U.S."* From: PRG comments of August 14, 2013 on the forthcoming 2014 Business Plan. This appears on PDF 93-99 of the California High-Speed Rail Authority, Final 2014 Business Plan

[533] See pages 3-5 of UIC policy accompanying a letter to Mr. Roelof van Ark from Jean-Pierre Loubinoux, Director General of the UIC, Paris, dated 8 February 2011

[534] See pages 3-5 of UIC policy accompanying a letter to Mr. Roelof van Ark from Jean-Pierre Loubinoux, Director General of the UIC, Paris, dated 8 February 2011.p. ii

[535] See International Union of Railways; UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013 Pg.3 [PDF 8]. Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf

UIC told the Authority to increase its O&M estimates**.** UIC argued that the Authority train's increased average speed will cost exponentially more (i.e. operating costs increase at a faster pace than the increases in speed) both for powering above 186 mile per hour (mph)[536] and maintenance costs for increased wear and tear on the fixed infrastructure and the rolling stock's equipment maintenance.[537] UIC also told the Authority it should increase its maintenance estimate on the electricity-carrying overhead catenary system by 20%[538] and its track maintenance by at least 40%.[539] With continued denial of access to the Authority's detailed O&M data,[540] there is no way to verify the Authority's claim that any or all of UIC or others' observations were used in the 2014 Plan.[541]

5.6 Conclusions On The Authority's O&M Forecasts – No "outsiders" are allowed full access to the Authority's detailed information on

[536] See International Union of Railways; UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013. Page 7 [PDF 12] Finding #13 *"The electricity consumption for trains running at 220 mph (350 km/h) has to be increased by 10 to 30 percent (depending on the topography of the HSR line) in comparison with trains running at 186 mph (300 km/h)."* Operating & Maintenance Costs - UIC Peer Review, January 31, 2013, UIC (International Union of Railways) Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf

[537] See p.8 of International Union of Railways; UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013 Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf *"The experts also recommend making a significant cost provision for speeds up to 220 mph (350 km/h)) as preliminary findings show that the increase in equipment maintenance costs is above linearity when speed increases.*

[538] International Union of Railways; UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013, Appendix 2-14 [PDF 30] *"The impact assessment of speed on catenary and overhead line is a simple forecast of friction consumption which is in direct proportion with speed level; the —theoricall [sic] increase of maintenance corrective actions should be at least 20% (based on extrapolation from available information)."* Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf

[539] International Union of Railways; UIC PEER REVIEW OF OPERATING & MAINTENANCE COSTS OF THE CALIFORNIA HIGH-SPEED RAIL PROJECT, FINAL REPORT, JANUARY 2013, Appendix 2-14 says *"theoricall [sic] increase of the maintenance activity on the geometry of the track should be at least 40% (based on extrapolation from available information)."* Found at: http://www.hsr.ca.gov/docs/about/ridership/ridership_PR_O_M_Costs_UIC_final.pdf

[540] The last response to a PRA request for O&M information records was an email to Mr. Robert Prantis from Ms. Anne Parker of the Public Records Act Staff of the CA High-Speed Rail Authority, December 27, 2013.

[541] California High-Speed Rail 2014 Business Plan pg. 11 [PDF 11] *"The updated* [O&M] *estimates for the 2022 through 2060 analysis period show an approximately 14 percent increase from the cost estimates shown in the 2012 Business Plan"*

the data, assumptions and calculations of its Operations & Maintenance (O&M) costs, but have shown that the Authority's O&M forecasts are a fraction of worldwide experience,[542] and that its accounting for O&M is selective, biased and ultimately far below empirical evidence.

Even if outside access to inputs were available, by adopting EU rules instead of GAAP rules, the Authority's costs accounting is much like Volkswagen's accounting for carbon emissions versus US Government standards – what counts is what goes into the formula, not what comes out. That won't work beyond the first operating year; but by then it will be too late,

[542] See Figure 5, page 7 of To Repeat, The Authority's Train Will Need A Subsidy Forever, July 2012

SECTION 6

THIRTEEN MORE HURDLES

TO THE AUTHORITY'S HSR SYSTEM'S FINANCIAL VIABILITY

The following observations note challenges to the notion that the Authority's HSR project will be completed as the Authority says, and that it is competitive in terms of cost or passengers' door-to-door convenience.

6.1 Surveyed Travelers Are Less Interested In A High-Speed Rail Ride Even If Auto Travel Takes Longer – The Authority's paid Ridership Technical Advisory Panel (RTAP) thought the 2013/2014 RP/SP survey's findings powerfully demonstrated the decreased interest in changing from autos and airplanes to high-speed rail.

> *"Travelers appeared to be slightly less sensitive to differences in travel time and cost in 2013-14 than in 2005. Thus, mode changes are less likely to occur based only on those considerations."* [543]

The RTAP agreed that both time was less important and there was more than expected recreation travel the earlier RP/SP survey.

> *"Two issues of concern existed with respect to the results presented at the meeting: (1) lower than expected values of time, and (2) unexpected, significant increases in predicted recreational/other HSR ridership and revenue compared to previous V2 forecasts."* [544]

These empirical findings, reinforced by the Authority's commissioned RP/SP surveys, should be a 'red flag' against optimistic changes out of personal vehicles to high-speed rail travel.

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[543] See p. 2 [PDF 3] of the Ridership Technical Advisory Panel Review of the California High-Speed Rail Ridership and Revenue Forecasting Process, Findings and Recommendations from the May-June 2014 Review Period, September 17, 2014

[544] See p. 3 [PDF 4] of the Ridership Technical Advisory Panel Review of the California High-Speed Rail Ridership and Revenue Forecasting Process, Findings and Recommendations from the May-June 2014 Review Period, September 17, 2014

6.2 HSR Is Not A 'Disruptive' Technology: It's Just A Faster Rail Ride – High-speed rail may be new to California, but it is not a 'disruptive' transport alternative that changes users' experiences like Surf Air[545], Uber and Lyft are, or self-drive vehicles and Hyperloop be. There is no personalized service for HSR users; passengers would be using a mass transport mode, like rail for 150 years and airlines more than 70 years.

When HSR was introduced more than 50 years ago, it was 'disruptive' because it offered travelers[546] between densely crowded cities a faster rail ride. Today and in 2025 when IOS North supposedly opens, there is and will be nothing new about a faster rail ride that *ipso facto* will enthuse potential riders to switch from their present long distance (>100miles) travel modes.

6.3 CA High-Speed Rail Faces The Rigors of All Start Ups: It Must Differentiate Itself From Other Travel Modes While Making A Profit – HSR in California is a start-up corporation. That's because of the requirement to not require and operating subsidy from 2025 onwards. Start-ups are risky: consider Coca-Cola's New Coke, Ford's Edsel and Apple's Newton, all from well-established and leading companies in their markets. But all failed. The Authority has leaped into a highly competitive market without experience in managing either the construction or operation of a high-speed rail system.

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[545] Membership-based Surf Air (http://www.surfair.com/) provides 90 daily intra-California flights, serving Burbank and Hawthorne in the LA Basin, San Carlos and Oakland in the SF Bay, as well as Sacramento. The company was founded to provide members with rapid, no-wait time transport to close-to-CBD airports with frequent flights.(http://www.surfair.com/how-it-works.html). The monthly cost looks attractive when compared to the costs of twelve or more LA-SF round-trips on HSR. Twelve RTs on HSR would cost $$2,136. As of March 2016, Surf Air membership starts at $1,950/month, and Surf Air's offerings allow members flights that also quickly reach vacation spots such as Monterey, Napa, Palm Springs Santa Barbara and Lake Tahoe at any point in a business day or week. (http://www.surfair.com/destinations.html)

[546] The Tōkaidō Shinkansen began service on 1 October 1964. See: https://en.wikipedia.org/wiki/Shinkansen#Initial_success

The Peer Review Group drew the right conclusion for this start-up two years ago: *"HSR in California will be a "greenfield" system: that is, neither HSR nor adequate intercity rail service on any significant scale exists in California today.*[547] But unlike Global Star, Webvan or other unknown-then, unknown-now brands offering "greenfield" services, the Authority has a surrogate. The Authority recognizes Acela as a profitable high-speed rail service.[548] But although the statutorily required Peer Review Group (PRG) said Acela was the HSR system most like the Authority's,[549] Acela's per mile fares and operating costs being multiples of the Authority's [550] that analogy was spurned by the Authority.

The operator, whether private or the Authority, must make a profit and differentiate itself to consumers in California's auto-dominated market. Put another way, the Authority's train service must show it is the *". . . safe, convenient, affordable, and reliable alternative . . "* [551] it was billed to be in 2008. As an unknown start-up, HSR services must be considerably more convenient and affordable in order to take market share from present day air or auto travel as its plans claim it will. At present it's neither.

6.4 California HSR Has An Inherent Cost Disadvantage For Pragmatic Travelers – The Authority can't charge the 40¢-50¢ per passenger mile (PPM) fares as European HSR operators do[552] largely to

[547] Connecting California, 2014 Business Plan, April 30, 2014, p.7 [PDF 87] letter from the California High-Speed Rail Peer Review Group, Will Kempton, Chairman; May 18, 2012 Found at: www.cahsrprg.com.
[548] HSRA Report to the Legislature, December 2009 p. 2-15 [PDF 59] *"High-speed train services, on the other hand, generate positive cash flows around the world, including the Northeast Corridor"*
[549] Connecting California, 2014 Business Plan, April 30, 2014 says, *". . overall results of the model appear optimistic by comparison with readily available data on the closest comparable U.S. HSR operations (Amtrak's operations in the Northeast Corridor)."*
[550] See Figure 5, p. 7 [PDF 7] of To Repeat – The Authority's Train Will Need A Subsidy Forever, August 22nd 2012. Found at: www.sites.google.com/site/hsrcaliffr
[551] See: Section 1.6 p.6 [PDF 1] of Prop1A arguments – Voter Information Guide. Found at http://vigarchive.sos.ca.gov/2008/general/argu-rebut/argu-rebutt1a.htm
[552] Figure 5 pg.7 [PDF 7] of To Repeat – The Authority's Train Will Need A Subsidy Forever, August 22nd 2012. Found at: www.sites.google.com/site/hsrcaliffr

business passengers[553] in California's relatively cheap fuel market.[554] The Authority recognized that seven years ago when it said,

> *"Train fares were assumed to be somewhere between the cost of driving and of taking an airplane or train"*[555]

The Authority set its fare to compete for airline travelers, not to compete against auto travel costs. It has also never proven, as required by AB3034, that HSR's capital cost is one-third or less than the cost of expanding the highway and air travel system to carry equal numbers of passengers.[556] That requirement was ignored in the 2014 and 2016 Business Plans.

Having it maximum fare metro-center-to-metro-center fare at $83 or $89 (20¢-24¢ PPM) perpetuated auto travel's advantage because a single person's driving costs between LA and SF's downtowns is less than $50,[557] while the Authority's 2016 fare ($89) is 70% more. Door-to-door driving time is 5hrs. 33min,[558] while an HSR-using traveler during the VtoV Ext. period – making all connections on time, and no delays in the bus service – arrives at LA Union about six and a half hours after leaving his/her home or business in SF.[559] Advantage driving!

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[553] *"Business trips usually take up a significant proportion of HSR trips (Chang & Lee, 2008; Levinson, 2004)"* quoted in Chuyuan Zhong, Germà Bel, and Mildred Warner: High-Speed Rail Accessibility: What Can California Learn From Spain? 2013. Found at: http://mildredwarner.org.s3.amazonaws.com/2012/09/20/Zhong_Bel_Warner_HighSpeedRail_201 2-b19b0817.pdf

[554] See: http://www.nationmaster.com/graph/ene_gas_pri-energy-gasoline-prices The main operating cost of an auto is gasoline, and California's gasoline is relatively very cheap. Gas in the UK is about 92% more expensive than the US, Japan's 74% higher, France's 62% higher, Germany's 49% and Spain's 20% higher.

[555] HSRA Report to the Legislature, December 2009 p. 64 [PDF 66] *"Train fares were assumed to be somewhere between the cost of driving and of taking an airplane or train"*

[556] AB3034, Section 8 *(c) says, "The high-speed train system proposed by the Authority will cost about one-third of what it would cost to provide the same level of mobility and service with highway and airport improvements"* A feeble attempt was done in 2012 to prove this demand, but used ridership figures about four times as high as Phase 1 ridership, and even then did not meet the one-third cost requirement. See: pp.60-61, [PDF 60-61] of California High-Speed Rail Authority's 2012 Draft Business Plan, Assessment: Still Not Investment Grade, January 27, 2012. Found at www.sites.google.com/site/hsrcaliffr

[557] The cost of driving between LA and SF on April 1st 2016 was $42.58. Found at: http://www.travelmath.com/cost-of-driving/from/San+Francisco,+CA/to/Los+Angeles,+CA

[558] The driving time on April 1st 2016 between SF and LA was found at http://www.travelmath.com/driving-time/from/San+Francisco,+CA/to/Los+Angeles,+CA

[559] Using the elapsed times in Appendix A.2 of the Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document, the travel time using the Authority's

The Authority recognizes that capturing any of that metro center-to-metro center market depends on getting a larger and larger share of the almost stagnant air travel market:

"In longer-distance markets, high-speed rail diverts a smaller share from autos and a greater share from air travel." [560]

While the Authority's current fare tables are calculated to **ALWAYS** give the HSR train a cost advantage, if the Authority is to be profitable it will loose that advantage at the same time intra-CA air passenger ridership has stagnated. This is a dead end for gaining customers.

To pry any Californians from their autos, the Authority must offer a clear convenience differential, because the HSR train cannot compete with the costs of auto travel, particularly for recreation/other travel where the likelihood of multiple travelers per auto is high. the Authority's research into the impact of the introduction of HSR on auto travel should have been instructive; showing only a 6%-8% decrease of auto travelers occurred since the introduction France's Paris-Lyon TGV route (1981) and only an 8% decrease since Spain's Madrid-Seville AVE route was introduced in 1992.[561] In addition to its consultant's findings on the increased preference for driving, the Authority should be under no illusion that the introduction of HSR in California will get travelers out of their cars.

6.5 Traveling Via HSR During IOS North Is Long, Complex, Riddled With Potentially Missed Connections – Trips to LA Union, starting in SF or Oakland and choosing a HSR-included trips' during VtoV Ext. include:

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offerings is 5hrs. 42mins. However another 25 minutes for both access and wait time in SFTBT and an equal amount to egress from LA Union to the destination must be added; bringing the door-to-door travel time during IOS to 393minutes or 6hours 33minutes.

[560] See: Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document, p. 6-4 [PDF 40]

[561] See: p. ES-12 [PDF 20] of the California High-Speed Rail Program, Revised 2012 Business Plan, April 2012, Building California's Future

1) access via public or private transport ride to a regional rail (more frequent and HSR will only stop at Millbrae in VtoV Ext.) or Authority train station, and wait to connect, a total of at least 25minutes[562]

2) then a regional rail or Authority train (that does not travel at 200mph), of 52-63 minutes[563] then a wait

3) then a 2hour 11minute HSR ride,[564] plus at least five more minutes for three intermediate followed by another wait

4) then an Authority bus ride, of 2hours 40minutes hours[565], and

5) finally station egress, then public or private transport to the traveler's destination (another 25 minutes).

That's three-four connections. Assuming inter-modal connections of no more than 5minutes, at best one hour is added to a 'perfect' IOS journey. Given that there are only two HSR trains or busses/hour and one HSR train or bus/hour during peak and non-peak travel times, waits are likely to be longer. Also, any evening time interruption of HSR service could leave LA-SF travelers stranded in the San Joaquin Valley.

Even in the best of conditions, each of those SF -LA Union journeys will be at least 5-8hours. To enjoy HSR's benefits during IOS, every SF/Oakland-LA Union traveler must spend 40% of that travel time (2-5hrs) on regional rail or busses.

Then there is the Travel-in-the-Southland-Penalty. To go onward from LA Union to Anaheim via Metrolink,[566] the extra 45minutes makes a SF/Oakland to Anaheim trip total about 6-9hours; to Riverside 6.5-9.5 hours, and to San

[562] See: 'Most Likely Case' at Table 7.2 Year 2025 Silicon Valley to Central Valley Risk Variable Ranges and Distributions, p. 7-8 in the California High-Speed Rail Authority Draft 2016 Business Plan
[563] See: p. A-2 [PDF 60] of the California High-Speed Rail Draft 2016 Business Plan. Time between SF TransBay Terminal and San Jose connection to HSR is 52minutes.
[564] See: p. A-2 [PDF 60] of the California High-Speed Rail Draft 2016 Business Plan. San Jose to Bakersfield is scheduled at 131 minutes (2hrs 31min)
[565] See: p. A-2 [PDF 60] of the California High-Speed Rail Draft 2016 Business Plan. Time between SF TransBay Terminal and San Jose connection to HSR is 52minutes. The Dedicated Bus Connection between Bakersfield and LA Union is 160minutes
[566] Metrolink schedules at http://www.metrolinktrains.com/schedules/

Bernardino, total trip time is 7-10hours. Travelers can drive from SF/Oakland to Anaheim in 6hours 17minutes, and to Riverside or San Bernardino in 6hrs. 45min.[567]

Worse, to get to SANDAG, a HSR journey originating in SF/Oakland will be another 2hrs. 45min.[568] – making the total SF/Oakland to San Diego journey 7hrs. 45min-10hrs. 45minutes. Driving time is nearly three hours faster.[569]

6.6 The Inconvenience of Longer HSR Travel Times During IOS Succumbs To The Convenience of Auto or Flight Times – In 2007, the Director of High-Speed for the Paris-based Union International des Chemins Des Fer (UIC/IUR) presented the US House of Representatives evidence that around two and a half hours of HSR travel, high-speed rail begins to lose long haul market share to air travel.[570] In 2008 the Authority recognized that door-to-door travel times[571] are highly influential when travelers choose their mode of intercity travel.[572] But during IOS, high-speed rail (HSR) service does not reach the centers of SF and LA's metropolises. The Authority also recognized that half or more of the reasons to travel are business

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[567] Driving times are from http://www.travelmath.com/driving-time/from/Oakland,+CA/to/Anaheim,+CA and http://www.travelmath.com/driving-time/from/Oakland,+CA/to/Riverside,+CA and http://www.travelmath.com/driving-time/from/Oakland,+CA/to/San+Bernardino,+CA

[568] Amtrak schedule at https://tickets.amtrak.com/itd/amtrak

[569] Driving times are from http://www.travelmath.com/driving-time

[570] On PDF 64, Iñaki Barron de Angoiti, Director Of High-Speed Rail for the UIC/IUR, presents a table that shows that after 2.5 hours of transport time - or about 300 miles – HSR's share of riders versus airlines' drops off precipitously. See: Pet No. 198, or International High-Speed Rail Systems: a Hearing before the Subcommittee on Railroads, Pipelines and Hazardous Materials of the Committee on Transportation and Infrastructure, House of Representatives; April 19, 2007. Attached as Pet No. 198, House RR Sub hearing CHRG-110hhrg34799 Apr 18 2007.PDF, also see: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_house_hearings&docid=f:34799.pdf

[571] See Kings County Board of Supervisors Coordination with High-Speed Rail Authority - transcript, June 4, 2013. Authority Chairman Dan Richard states, *"Frankly, if we get longer than the three hours we start to lose some of the advantages we have in terms of competition with airlines in that corridor. So we have reasons to want to keep the times down."* Attached as Pet No 038, Kings County-HSR coordination transcript 06-04-2013.PDF, Also see p. 31, line 12 to 17, [PDF 31] of the transcript

[572] Page. 25 [PDF 29] Californian High-Speed Train Business Plan, November 2008, says *"Locating well-placed stations in large urban centers, with adequate connections to the existing and planned transit, air, and road networks."*

related.[573] Europe's existing HSR systems' serve mostly (70%) [574] reimbursed [575] business passengers traveling to and from employment-concentrated urban cores.[576] Air travel is the quickest way for the business traveler to

[573] The 2012 Plan's technical memorandum says, "*Based on the 2,820 interregional trips captured in the* [2001 California statewide household activity/travel survey] *survey, business travelers and commuters comprised more than 50 percent of the interregional travel market*." See: California High-Speed Rail 2012 Business Plan Draft Technical Memorandum – Ridership and Revenue Forecasting, October 19, 2011, page 1-4 [PDF 14]

[574] See: Accessibility Analysis of Korean High-speed Rail: A Case Study of the Seoul Metropolitan Area; Transport Reviews, Vol. 28, No.1, 87-103; Chang, J., & Lee, J.-H; January 2008, Page 9 [PDF 10 *". . 70.8% of all HSR passengers travel for business reasons during a weekday."*]. Attached as "Pet No. 087, Accessibility, Analysis of Korean HSR.PDF", also found at http://www.tandfonline.com/doi/pdf/10.1080/01441640701421495#.VGfmF_mjOm4. Also see: *"Business trips usually take up a significant proportion of HSR trips (Chang & Lee, 2008; Levinson, 2004)"* quoted in Chuyuan Zhong, Germà Bel, and Mildred Warner: High-Speed Rail Accessibility: What Can California Learn From Spain? 2013, found at: http://mildredwarner.org.s3.amazonaws.com/2012/09/20/Zhong_Bel_Warner_HighSpeedRail_201 2-b19b0817.pdf or Zhong, Chuyuan; Bel, Germà; Warner, Mildred: High-speed rail accessibility: a comparative analysis of urban access in Los Angeles, San Francisco, Madrid, and Barcelona. Attached as "EJTIR Urban Access in CA and Soain, Zhong and Bel 2014, replaces Pet 102 –AR394.PDF", also see EJTIR, Issue 14(4), 2014 pp. 468-488 ISSN: 1567-7141. Found at tlo.tbm.tudelft.nl/ejtir. Or http://www.tandfonline.com/doi/pdf/10.1080/01441640701421495#.VGfmF_mjOm4

[575] See The Economics and Politics of High-Speed Rail; Lessons From Experiences Abroad; Daniel Albalate and Germa Bel; Lexington Books, copyright 2014 (paperback); Hand delivered to California High-Speed Rail Headquarters, 770 L Street, Sacramento, CA on 29 March 2016 and time stamped at 9:07am. Page xiii says: *". . taxpayers are subsidizing journeys realized above all by users belonging to the upper-middle and upper income brackets, who usually travel for business reasons and whose ticket (the amount of which is far from covering the total cost of the service) is paid for by their employers."* Page xii shows that despite enthusiastic promotions of HSR*: ". . . the widely recognized fact that only two lines in the world, the Tokyo-Osaka and the Paris-Lyon, have been able to fully recover the costs of both their construction and operation, as even the president of the International Union of Railways has pointed out."* Page xiii says not only are HSR riders in Spain mainly reimbursed through their businesses, but also that high-speed rail's operations' costs exceed the revenue from tickets: *". . if we keep in mind that the public resources used in high-speed rail imply a regressive transfer of income, in that taxpayers are subsidizing journeys realized above all by users belonging to the upper-middle and upper income brackets, who usually travel for business reasons and whose ticket (the amount of which is far from covering the total cost of the service) is paid for by their employers."* On page 17, *"In conclusion the projected costs of the California HSR have risen continuously, and ridership forecasts have decreased. Given these figures, it is doubtful that a high-speed rail link could be constructed in California without considerable subsidy and that profitability is out of the question."* Page 104: *"The fact that it is difficult for fees to recover even the variable costs of Spanish high-speed rail sheds light on the importance of the public subsidies granted to the high-speed train in Spain . . . has sparked significant criticism, as well as an important sanction for Spain from the European Union for illegal competition."*

[576] Chuyuan Zhong, Germà Bel, and Mildred Warner, High-Speed Rail Accessibility; PDF 18 says, *"Many business trips originate or terminate at office district destinations where employment concentrates. Hence a major employment center is also a major area of potential HSR riders."* and PDF 20 says, *"In Barcelona and Madrid, the employment centers coincide with the population centers in the downtown areas. . . However, in Los Angeles and the Bay Area, employment centers do not coincide with population centers."* Found at: http://mildredwarner.org.s3.amazonaws.com/2012/09/20/Zhong_Bel_Warner_HighSpeedRail_2012-b19b0817.pdf or Zhong, Chuyuan; Bel, Germà; Warner, Mildred: High-speed rail

productively get between the state's largest cities. Even counting a half hour transit time to a LA Metro Area or SF Bay Area regional airport, plus a 45 minute check in and security wait, plus another three-quarters of an hour via public transit to a Bay or Basin destination, the business traveler can make that one-way trip in just under or over 3 hours, or the round trip between California's mega-cities (about 6 hours) allows the business traveler to be home or back to the office or factory by the evening.[577]

Capturing business riders is one of the Authority's Achilles Heels, as business travelers' basic motive is to get to and from their appointments or jobs as quickly as possible, creating productivity – less time doing the same work – and therefore maintaining jobs and profits. Using the Authority's offerings is not only an inconvenient and inefficient use of the business travelers' time; it's also a waste of human resources.

The 2012 and 2014 IOS only had HSR service between the agricultural San Joaquin Valley (Merced-to-Bakersfield) with low population density, low incomes and high unemployment; and lightly populated northern Los Angeles County (Palmdale-to-San Fernando).[578] Unlike Europe, [579] after a HSR ride, passengers would have travel one-to-three more hours by the Authority's

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accessibility: a comparative analysis of urban access in Los Angeles, San Francisco, Madrid, and Barcelona. Attached as EJTIR Urban Access in CA and Spain, Zhong and Bel 2014, replaces Pet 102 –AR394.PDF: see also EJTIR, Issue 14(4), 2014 pp. 468-488 ISSN: 1567-7141 tlo.tbm.tudelft.nl/ejtir.

[577] See: Figure 4, pg. 7 [PDF 7] of 'If You Build It They Will Not Come' prepared by William Grindley and William Warren, found at https://www.sites.google.com/site/hsrcaliffr/home

[578] Merced to San Fernando is about three-fifths the 500-mile distance between California's two major cities' downtowns.

[579] Chuyuan Zhong, Germà Bel, and Mildred Warner: High-Speed Rail Accessibility: What Can California Learn From Spain? 2013, Found at: http://mildredwarner.org.s3.amazonaws.com/2012/09/20/Zhong_Bel_Warner_HighSpeedRail_2012-b19b0817.pdf. PDF 18 says, *"Many business trips originate or terminate at office district destinations where employment concentrates. Hence a major employment center is also a major area of potential HSR riders."* and PDF 20 says, "In Barcelona and Madrid, the employment centers coincide with the population centers in the downtown areas. . . *However, in Los Angeles and the Bay Area, employment centers do not coincide with population centers."* Also see the attached as EJTIR Urban Access in CA and Spain, Zhong and Bel 2014, replaces Pet 102 –AR394.PDF

feeder bus, rail and/or auto; to reach either Los Angeles'[580] or San Francisco's centers; and more to reach each of the respective regions' forty to twenty employment centers.[581]

The Authority's 2012 and 2014 IOS South offering was for a journey between SF and LA Union station of 6hrs 3min.[582] In 2016, the VtoV HSR train starts near one of the polycentric SF Bay Area's business centers and zooms over to near Bakersfield with three intermediate stops[583] where passengers then take a three-hour bus ride to LA Union. Without substantial evidence to support the assertion, that route's VtoV Ext. journey supposedly takes 5hrs 43minutes. [584]

The 2016 VtoV journey takes eight minutes more (371min vs 363min) than that route's 2012/2014 journey – not counting access/egress or wait times at stations, for busses or any 'pad' for traffic congestion on three hour bus rides. VtoV Ext.'s elapsed time is 20minutes (343-363minutes) faster than the 2012/2014 IOS journey. Driving time (333minutes)[585] is quicker than either the 2012/2014 Plan's 363minutes or VtoV (371minutes) or VtoV Ext. (343minutes).

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[580] Including connections, the bus trip, San Fernando-LA Union will require an hour – to go onward to San Diego, another three hours via Amtrak. Arriving at Merced, the HSR passenger will take 2 hour 15 minute trip to San Jose or a 2hour 45minute trip to San Francisco. See: www.travelmath.com/

[581] Chuyuan Zhong, Germà Bel, and Mildred Warner: High-Speed Rail Accessibility: What Can California Learn From Spain? 2013, found at: http://mildredwarner.org.s3.amazonaws.com/2012/09/20/Zhong_Bel_Warner_HighSpeedRail_201 2-b19b0817.pdf. On PDF 8, the authors say, *"Los Angeles is the prime example of a polycentric city . . 7 employment centers in Los Angeles Metro area in 1970 . . 36 employment centers in 1990 and 48 in 2000. The SF Bay Area is only slightly less polycentric; 22 employment centers in the San Francisco Bay Area in 1990."*

[582] See Appendix A. p. A-1, [PDF 68] of California High-Speed Rail Draft 2014 Business Plan Appendix A. The total elapsed time between SF and LA Union was 363minutes.

[583] See Appendix A, A-1, p. A-1 [PDF 59] of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.

[584] See Appendix A, A-2, p. A-2 [PDF 60] of the Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.

[585] For driving time between LA and SF, see http://www.travelmath.com/driving-time/from/San+Francisco,+CA/to/Los+Angeles,+CA

If a traveler wants to experience HSR and is genuinely concerned about a 5% difference on a partial HSR journey during IOS of nearly six hours, he/she is most probably a business traveler (likely reimbursed for costs) and will most probably choose to fly and be in LAX or SFO in less than an hour (57min).[586] During either rendition of IOS North, driving is both cheaper and faster than the Authority's partial-HSR ride, and flying takes about one-sixth time.

6.7 Door-to-Door Times Are What Counts – But HSR travel or flying times don't show the real picture. Door-to-door travel requires access/egress times and wait times. These 'frictions' add time to air and Authority travel.

Uncounted in the Authority's claim of a 2hour 40minute trip between LA and SF during Phase 1 are the 'last mile' details of door-to-door travel.[587] During IOS, access and egress times count disproportionately compared with the Authority's later phases. Going northward, a partial-HSR passenger must first use private or public transit to connect with the Authority's feeder buses to next go to an HSR station, then take a HSR ride, and egress by connecting to at least one other private or public transport mode to arrive at their destination. That's a minimum of three connections. For example, after getting to LA's Union Station, northbound Authority travelers arrive at the Bakersfield HSR station in three and a half hours:[588] they could drive that route in less than two hours.[589]

The Authority's feeder bus connections must synchronize with four HSR trains/hour during peak times but only two/hour during off-peak hours.[590] In

[586] http://www.travelmath.com/flying-time/from/San+Francisco,+CA/to/Los+Angeles,+CA
[587] 2012 and 2014's door-to-door travel times were also analyzed in If You Build It, They Will Not Come, March 11, 2014, found at www.sites.google.com/site/hsrcaliffr
[588] Assume 10 minutes from the front door-to-LA Union, a five minute wait; the LA Union-Bakersfield, the Authority's bus requires at least10 minutes more than driving 28 minutes to exit I5, stop and load in Burbank, then re-enter I5: with a 5 minute connection the door-to-Bakersfield HSR station is at least 205minutes,
[589] See: http://www.travelmath.com/driving-time/from/Bakersfield,+CA/to/Los+Angeles,+CA
[590] See Table 3.2, pg. 3-6 [PDF 29] of Draft 2014 Business Plan: Ridership and Revenue Forecasting, draft technical memorandum

real life, connections get missed. Seamless auto travel also eliminates the time to rent and return a rental car at an HSR-friendly station to complete the door-to-door trip in relatively low population density California. Analysis shows that with some exceptions, the travel time on an IOS high-speed train is less time[591] than getting to the HSR station and from it to a final destination. The consequences of these inherent 'frictions of time' on the Authority during IOS travel undermine HSR's rationale, and make auto travel almost always quicker and although more expensive flight times are always quicker.

6.7.1 But The Authority Makes The Importance Of Its Model's Access and Egress Times' Perform A Disappearing Act –

The Authority's Draft 2016 Plan says it will make passengers' journey's safe.[592] In theory, it complies with AB3034's demands for passenger security.[593]

But its model doesn't seem to count times for passenger security checks like at airports, and the Authority received criticism that its ridership model did not adequately account for access times from a journey's starting point to a high-speed rail ride or egress times from the HSR station to a selected destination. The Authority's third version of the Business Plan Model's ridership model (BPM-V3) supposedly recognized this problem.[594]

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[591] " *. . . the HSR Phase 1 system average speed between San Francisco and Los Angeles is planned to be approximately 140 miles per hour."* See: [PDF 84] of Analysis of an "Equivalent" Northeast Corridor (NEC) of the California High-Speed Rail Draft 2014 Business Plan: Ridership and Revenue Forecasting, draft technical memorandum

[592] The California High-Speed Rail Draft 2016 Business Plan P. 30 [PDF 30] says, *"We will implement the highest levels of safety and security measures to ensure the protection of passengers, employees, emergency responders and the public including: A comprehensive safety and security program*." and p.76 [PDF 76] says, "*Stations – station managers, ticket agents, passenger assistance representatives, facility maintenance managers, station cleaners, train cleaning staff, police and security."*

[593] AB3034, Section 2704.08 (C) says, *All known or foreseeable risks associated with the construction and operation of high-speed passenger train service along the corridor or usable segment thereof and the process and actions the Authority will undertake to manage those risks."*

[594] *"Additionally, the BPM-V3 addresses a tendency of the Version 2 Model to forecast some trips with long access and/or egress times, coupled with relatively short trips on the main mode."* See p. 2-1 [PDF 21] of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting document

Then the Authority's consultants 'calibrated' the model to discount much if not all the trips where access/egress times as a percent of travel times were significant.[595]

> *"Although these trips did not constitute a substantial share of either ridership or revenue, CS* [Cambridge Systematics] *added specific variables to the model to discourage these types of trips."*

The net effect of this calibrating – a word used over 100 times in the Authority's risk analysis report[596] – is that access/egress times which impinged on ridership, particularly for shorter HSR trips, get discounted heavily or completely. This makes HSR travel times for both long and short haul trips appear to be more competitive against auto and air travel since the shorter trips become a smaller percent of the total.

This is just one method of changing a model's variables to fit the Authority's needed outcome. By 2009, the compiled data from several studies allowed Flyvbjerg and his colleagues to conclude:

> *" . . . perverse incentives that encourage promoters to underestimate costs and overestimate benefits . . . the projects that are made to look best on paper are the projects that amass the highest cost overruns and benefit shortfalls in reality."* [597]

The Authority's consultants consistently produced outcomes that are not supported by empirical evidence, rather appear to make the train financially viable.

6.8 HSR Travelers Can't 'By Pass' Other Travel Inconveniences –

Even in the Age of Mobile Communications, HSR and air passengers' experiences of getting from an origin to a destination (O-D) are similar. First, they must take the time to buy tickets. Then both must somehow

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[595] See p. 2-1 [PDF 21] of Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting document

[596] See: California High-Speed Rail Draft 2016 Business Plan Ridership and Revenue Risk Analysis, draft technical report, Cambridge Systematics, Inc. February 17, 2016.

[597] Bent Flyvbjerg, Survival of the unfittest: why the worst infrastructure gets built—and what we can do about it; Oxford Review of Economic Policy, Volume 25, Number 3, 2009, pp.344–367. Found at: http://oxrep.oxfordjournals.org/content/25/3/344

arrive at a city center station (be it Fresno or LA or SF) or air terminal and wait: then ride or fly, only to arrive at another city center station and find transport to their desired destinations. 'Getting there' requires 2-3 different types of transport: an access mode, HSR/air and finally an egress mode. But unlike metro-to-metro California air travel, HSR travel can require eight stops en route for other passengers even in Phase1 between San Francisco's TransBay Terminal (SFTBT) and LA Union Station (LA Union).[598]

If not before, certainly by 2025, high-speed rail operators are likely to require airline-similar security screening to thwart domestic terrorist attacks; they already do in Madrid, on the Eurostar system, and likely to do after the March 2016 Brussels' attacks. So, the access times to and through HSR rail terminals and airports will be similar. Egress time – the time from the station or terminal to the final destination – is calculated as equal by the Authority, no matter the travelers' final destination. But that's unrealistic, and another Achilles' Heel of the high-speed rail scheme.

6.9 Regional Airports Are Today and Tomorrow's Gateways To The SF Bay Area and LA Metropolitan Area – A goal of Phase1 is to connect the downtowns of San Francisco and Los Angeles with high-speed rail in 2hours, 40minutes. But today, flights between LAX and SFO take about a third (35%) of the time of the estimated LA Union-SFTBT ride on HSR,[599] with seven, price competitive airlines serving those two airports.[600] That gives air passengers lots of fare options, and leaves them at least an hour and a half to compensate for delays in scheduled arrival times, which planners being realistic must assume will also happen to HSR travel.

[598] See Figure 3.2, p. 3-2 [PDF 24] of the Ridership and Revenue Forecasting; Draft 2016 Business Plan: Technical Supporting Document.
[599] Flight time SFO-LAX is 56minutes. See: http://www.travelmath.com/flying-time/from/LAX/to/SFO The legal maximum HSR travel time between SF's TransBay Terminal and LA Union Station is 160minutes (2hrs. 40min.)
[600] Seven airlines serve the LAX-SFO route: Spirit, JetBlue, Virgin America, United, Southwest, American and Delta For daily one-way service from SFO or LAX to the other, see https://www.orbitz.com/lp/flights/178305/178280/san-francisco-to-los-angeles

But airlines' unassailable time-as-convenience advantage for metro area-to-metro area travel is the dispersed regional airports serving different clusters of metro populations: versus a fixed rail system operating on one route. There are three major regional airports in three Bay Area (MTC) counties (SJC, OAK, and SFO).[601] Together, the three have more than 400 departures and arrivals (408) from the seven LA metro area airports (including Palm Springs and San Diego[602]). SFO alone has nearly as many (183) daily connections[603] to/from Southern California as the 199 in the HSR train's forecasts; and this doesn't count either the 121 connections from Oakland, or the 100 daily connections between San Jose (SJC) and the Southland. During the same 16hour day, HSR is forecasted to connect SFTBT with LA Union with only half the number (199) of trains as the three Bay Area airports.[604]

If you wish to go between the state's metropolitan centers, and value the convenience of more options to decrease door-to-door times, the solution exists: seven dispersed airports in the Los Angeles metropolitan area (SCAG), and three in the San Francisco Bay Area (MTC). San Diegans (SAN) can find four airlines[605] that will fly them to/from Oakland (OAK) in half the time they to get the LA Union;[606] likewise to/from San Francisco (SFO) or San Jose (SJC). Orange County residents can avoid more than an hour traveling to LA Union by choosing one of five airlines serving the SNA-SJC

[601] The fourth, STS in Sonoma Count has infrequent flights to/from LAX.
[602] Both PSP and SAN are included in this paper because Palm Springs is in Riverside County, which is part of the SCAG area, and the Authority includes San Diego travelers in its 'pool' of potential HSR riders.
[603] See: Table 1, p. 10 [PDF 116] Appendix B, Potential Airline Response to High-Speed Rail Service in California, prepared by Aviation System Consulting LLC, for Cambridge Systematics, Inc. Found in California High-Speed 2012 Business Plan, Ridership and Revenue Forecasting, final technical memorandum, April 12, 2012.
[604] See Appendix A.2 of the Ridership and Revenue Forecasting, Draft 2016 Business Plan: Technical Supporting Document.
[605] The airlines are Delta, Alaska, American and Spirit. Found at: https://www.orbitz.com/lp/flights/601762/178304/oakland-to-san-diego
[606] Flight time SAN-OAK is 70minutes. Found at: http://www.travelmath.com/flying-time/from/San+Francisco,+CA/to/San+Diego,+CA. The Amtrak ride from San Diego to LA Union takes at least 166minutes (longer than the forecasted LA Union-SFTBT travel time). Found at: https://tickets.amtrak.com/itd/amtrak

route[607] or five airlines serving SNA-SFO,[608] or SNA-OAK with three competing airlines.[609]

6.10 Urban Geography Defeats The Rationale For HSR Journeys Between SFTBT and LA Union Station – Business travel usually makes up a significant proportion of the total number of passengers traveling on HSR.

> *In South Korea . . 70.8% of all HSR passengers travel for business reasons during a weekday.*[610]

The Authority's assumption of capturing airline passengers is affirmation of that finding since many, if not most business travelers are reimbursed.

In a 'benchmark' study comparing Spain's AVE Barcelona-Madrid route with SFTBT-LA Union, the authors stressed the similarities of the two HSR routes.[611] But they also pointed out:

> *"Among the aspects not adequately assessed in demand forecasts is the role of urban structure, especially as regards accessibility of HSR."* [612]
>
> *"HSR has proved to work best in corridors with populous and dense urban centres, such as Paris and Tokyo . . Polycentric cities with low population density will not reap the benefits of city centre connection that HSR offers. For polycentric cities, HSR presents a difficult trade-off: build several stations to attract suburban riders or limit stations to*

[607] The airlines are Alaska, American, Delta, Southwest and United. Found at: https://www.orbitz.com/lp/flights/603224/6023769/orange-county-to-san-jose-silicon-valley
[608] The airlines are Alaska, American, Delta, Southwest and United. Found at: https://www.orbitz.com/lp/flights/603224/178305/orange-county-to-san-francisco
[609] The airlines are Alaska, American, and Southwest. Found at: https://www.orbitz.com/lp/flights/601762/603224/oakland-to-orange-county
[610] See Chuyuan (Viktor) Zhong, Suitability Analysis of Proposed High-Speed Rail Stations in Los Angeles Metropolitan Area, PET #087. Or see: Lee and Chang, 2008, found at: http://www.tandfonline.com/doi/abs/10.1080/01441640701421495
[611] See p. 470, of Zhong, Chuyuan; Bel, Germà; Warner, Mildred: High-speed rail accessibility: a comparative analysis of urban access in Los Angeles, San Francisco, Madrid, and Barcelona. EJTIR, Issue 14(4), 2014 pp. 468-488 ISSN: 1567-7141 tlo.tbm.tudelft.nl/ejtir. *"California and Spain have similar surface areas (423,970 and 505,645 Square Km), relatively similar population (38 and 47 million), and population densities (92 and 93 inhabitants per Square km), and the same distance (430 miles) between their main metropolitan areas: Los Angeles and San Francisco in California, and Barcelona and Madrid in Spain. Projected travel times in the two HSR corridors are also similar: 150 minutes for Barcelona-Madrid and 166 minutes for LA-San Francisco."*
[612] See p. 469 of Zhong, Chuyuan; Bel, Germà; Warner, Mildred: High-speed rail accessibility: a comparative analysis of urban access in Los Angeles, San Francisco, Madrid, and Barcelona. EJTIR, Issue 14(4), 2014 pp. 468-488 ISSN: 1567-7141 tlo.tbm.tudelft.nl/ejtir.

maintain the high speed advantage." [613]

Then the authors 'drill down' to the differences between Spain and California cities' urban geographies. Two quotes suffice:[614]

> *"Los Angeles is the prime example of a polycentric city . . . identified seven employment centres in the Los Angeles Metro area in 1970 and later . . . identified 36 employment centres in 1990 and 48 in 2000. The San Francisco Bay Area is only slightly less polycentric . . . 22 employment centres in the Bay Area in 1990."*
>
> *"However, employment concentration in the two Spanish cities is much higher. Data for 2009 in the metropolitan area of Barcelona show that the three districts in the central city surrounding the HSR station . . . concentrate more than 17% of total employment . . . In 2009, concentration of employment in the metro area of Madrid is still higher: the four districts in the central city surrounding the HSR station . . . concentrate more than 20% of total employment in the metro area . . ."*

This tale of two city pairs is crucial. In simple terms a HSR passenger going to Barcelona from Madrid (or vice versa) is likely to only be destined to one of three or four employment centers. By stark contrast, a HSR passenger going to Los Angeles Union Station from SFTBT (or vice versa) faces the question of how to get to between twenty and forty employment centers.

Complementing the inconvenience of finding their way to and from the HSR station, the traveler finds California's employment centers scattered far beyond the two HSR stations, particularly for Los Angeles. The travelers' solution all to often involves renting an auto, which not only adds time to a business trip, but defeats the Authority's goal of decreasing greenhouse gases. It's a lose-lose proposition that few, if any business travelers will find more convenient than the regional airport solutions.

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[613] See p. 471 of Zhong, Chuyuan; Bel, Germà; Warner, Mildred: High-speed rail accessibility: a comparative analysis of urban access in Los Angeles, San Francisco, Madrid, and Barcelona. EJTIR, Issue 14(4), 2014 pp. 468-488 ISSN: 1567-7141 tlo.tbm.tudelft.nl/ejtir.

[614] See p. 472 of Zhong, Chuyuan; Bel, Germà; Warner, Mildred: High-speed rail accessibility: a comparative analysis of urban access in Los Angeles, San Francisco, Madrid, and Barcelona. EJTIR, Issue 14(4), 2014 pp. 468-488 ISSN: 1567-7141 tlo.tbm.tudelft.nl/ejtir

6.11 The HSR Train Will Never Succeed Financially If It Only Relies On Central City Residents – LA and SF residents who don't reside in the city center are assumed to use the high-speed train services. The Authority recognized this in detailed assumptions of riders' origins in 2014.[615] But travel times and the door-to-door costs of HSR trip still assume travelers live on top of the HSR stations.

The City-County of San Francisco and the City of San Jose together represent only a quarter of the 7.15Million residents of the SF Bay Area.[616] The 3.86Million residents of the City of Los Angeles represent only a third of the 12.8Million population of Los Angeles' metropolitan area.[617] An effective transport system must serve the other 67%-75% of an area's population. HSR in a dispersed, polycentric urban geography is not a solution.

The non-central city dwellers will need substantial cost, time-savings or other advantages to select the Authority's HSR offerings over auto or air transport. Assuming an Anaheim station ever gets built and a passenger wishes to go to Berkeley, north of downtown San Francisco, during the IOS period, the best the Authority can offer is a 7hour journey, versus 6hours driving and under two hours by flying.[618]

Even for the longer trips, access to a HSR station is a large portion of the travel equation. In 2001 the now-Chair of the Peer Review Group said:

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[615] For examples of the markets for all phases, including IOS, see Table 7.4 Page 7-7 [PDF 64] of the California High-Speed Rail Draft 2014 Business Plan: Ridership and Revenue Forecasting, draft technical memorandum; prepared for Parsons Brinckerhoff for the California High-Speed Rail Authority; prepared by Cambridge Systematics, February 6, 2014.
[616] The SF Bay Area population comes from Bay Area Census, found at http://www.bayareacensus.ca.gov/bayarea.htm The population of San Francisco, 805,235 and the San Jose population of 1,000,000 come from http://worldpopulationreview.com/us-cities/san-francisco-population/ and http://worldpopulationreview.com/us-cities/san-jose-population/
[617] Found at http://worldpopulationreview.com/us-cities/los-angeles-population/
[618] See Figure 4, page 7 [PDF 7] and Figure 5 [PDF 9] of If You Build It, They Will Not Come. Found at www.sites.google.com/site/hsrcaliffr

". . .the eventual success of HSR in the U.S. will have to be based . . . on much better systems of urban access to HSR stations. While these do exist in some cities in the Northeast U.S., they are very sparse elsewhere." [619]

The HSR system is being built to serve those beyond the central cities. While it's arguable whether San Francisco may have a decent 'feeder' bus and light rail system to/from SFTBT, all other HSR stops are either in polycentric urban areas or 'cities' with low or very low population densities.

Neither central city nor suburban dwellers gain a time advantage during the IOS, and the only cost advantage of HSR is versus air travel, which is only true for all phases if the Authority's fares don't rise to exceed the train's operating costs. At least two-thirds of the potential market, suburban dwellers, have autos and the underlying reasons they will choose to drive during the IOS and afterwards should be fairly clear.

6.12 Induced By Construction, Valley Fever Will Hinder Construction Progress –

The Act's (AB3034) title, the *"Safe, Reliable High-Speed Train Bond Act"* says the high-speed rail project "Reduces air pollution and global warming greenhouse gases" [620] Section 14 of the Act, says "*This act is an urgency statute necessary for the immediate preservation of the public peace, **health**, or safety within the meaning of Article IV of the Constitution and shall go into immediate effect."* [Emphasis added]

Perhaps no one at the Authority thought of Valley Fever as a impediment to building the HSR system, but the disease is omnipresent throughout the Central Valley and triggered by construction activities that disturb the soils. Igniting the fungal infection[621] called Valley Fever will not only affect

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[619] Thompson, Louis and Tanaka, Yuki: High Speed Rail Passenger Services: World Experience and U.S. Applications; Prepared with the support of the Institution for Transport Policy Studies (a non-profit organization fully supported by the Nippon Foundation), September 20, 2011, page 18 [PDF 21].
[620] See AB3034, p. 92 [PDF 16]
[621] *"Valley fever is a fungal infection caused by coccidioides . . .organisms. . ."* See: http://www.mayoclinic.org/diseases-conditions/valley-fever/basics/definition/con-20027390

construction workers, it will infect anyone within proximity of the high-speed rail project, including school children.[622]

The Corps of Engineers' mitigation measures include washing hands, respiratory protection and providing information to local health officials.[623] This may be well meaning, but having wide spread tests for Valley Fever prior to the start of construction,[624] while time consuming and expensive, may be the only way to identify existing Valley Fever cases and narrow the probable litigation expenses, since those who already have the disease are likely immune.

If a recent Central Valley correction facility test is indicative,[625] 8% of those tested had been exposed to Valley Fever and are likely immune the Authority still has a big problem. During the construction of IOS, the Authority claims it will create over half a million (510,000) construction and construction related jobs.[626] If only half are construction site jobs, that means 92% of that work force, or 230,000 IOS workers should be inoculated. Even assuming all those inoculated construction workers stay on-the-job when Phase 1 direct and indirect employment is to rise to over a million (1,010,000)[627] – not counting nearby residents, school children and business employees – at least 500,000 workers will need inoculations. That is not a risk: it's a reality. But it isn't accounted for in the 2016 Business Plan or its predecessors.

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[622] See Table 2 Fresno to Bakersfield Avoidance and Minimization Measures, p. 344 [PDF 344] of the HSR FEIR ROD Appendices & errata AIR.pdf
[623] See Table 2 Fresno to Bakersfield Avoidance and Minimization Measures, p. 344 [PDF 344] of the HSR FEIR ROD Appendices & errata AIR.pdf
[624] Such tests already exists, as reported in http://www.news-medical.net/news/20150409/Nielsen-BioSciences-launches-skin-test-that-helps-physicians-manage-Valley-Fever-infections.aspx
[625] Joyce Hayhoe, a spokeswoman for the medical receiver's office, said skin tests were offered to more than 94,500 inmates at the Pleasant Valley and Avenal correctional facilities in mid-January: 36,600 agreed to be tested and more than 3,000 (8%) tested positive, suggesting they had previously been exposed and unlikely to become ill from the fungus. See: http://www.latimes.com/local/political/la-me-ff-skin-tests-identify-inmates-for-valley-fever-stricken-prisons-20150129-story.html
[626] See Exhibit 7.3, p. 59 [PDF 59] of the California High-Speed Rail Program; Revised 2012 Business Plan, April, 2012,
[627] See Exhibit 7.3, p. 59 [PDF 59] of the California High-Speed Rail Program; Revised 2012 Business Plan, April, 2012,

6.13 The Authority Does Not Control Its IOS Timetable, Highway Traffic Flows Do – In 2012, 2014 and 2016 the Authority expanded its IOS mission to be a multi-modal transport corporation using feeder busses to complement HSR service with all the attendant problems of management as well as the logistics and operations of each mode. It not only must have enough spare capacity in its bus fleet to compensate for delays; but also between modes such as coordinating its own HSR fleet with not only its feeder bus schedules, which it doesn't seem to have,[628] but also coordinate with Metrolink, Amtrak and Caltrain's schedules.

The Authority biases travel times by assuming its feeder bus fleets' point-to-point times equal to auto travel times[629] discounting the time its busses require to detour, stop to pick up passengers then return to a main highway. Each dedicated bus journey is also at the mercy of highway traffic. While auto travelers are also captive to that, they don't have to meet a high-speed train's schedule. The southern HSR terminus, Bakersfield in VtoV Ext., requires only one stop (BUR in 2014 and Burbank in 2016) after leaving LA Union: the northern terminus required five stops to/from Sacramento in 2014 [630] and eight stops in 2016.[631]

[628] Analysis of the number of arrivals in feeder buses during peak HSR operating hours shows too few HSR riders to sustain the claimed 85% Load Factor. See California High-Speed Rail Draft 2014 Business Plan, Appendix A, page A-1 [PDF 68]
[629] See Section 5.2.3, page 14 [PDF 18] of the Draft 2014 Business Plan, Technical Supporting Document 2014 Service Planning Methodology of February 2012. *"Run times for each feeder bus connection were based on auto travel times between each consecutive bus stop."*
[630] AG000336 See Figure 3.1, page 3-2 [PDF 25] of the California High-Speed Rail Draft 2014 Business Plan Ridership and Revenue Forecasting—Draft Technical Memorandum and
[631] See Figure 3.1, p. 3-1 [PDF 23] of Ridership and Revenue Forecasting; Draft 2016 Business Plan: Technical Supporting Document

SECTION 7

THE AUTHORITY'S HIGH-SPEED RAIL SYSTEM LACKS FINANCIAL VIABILITY DURING IOS AND BEYOND

For the Authority, *"Revenue and ridership were closely correlated with a R^2 of more than 0.999 for each year."* [632] meaning that a rise of fall in ridership was reflected nearly exactly in revenues. Prior sections showed how the Authority's fares were 'outliers'; another addressed inflated ridership – and therefore revenue – was when compared with empirical evidence about the lack of the HSR train's competitiveness with auto travel, and airfares if the Authority's fares are raised to reflect real world conditions. Another section The preceding section showed some problems a real world HSR system in California has to face. This section brings together all the variables of the formula, Revenues (= Fares x Ridership), when greater than (>) Total[633] Operations and Maintenance (O&M) Costs equates to Positive Operational Cash Flow (Profitability or Financial Viability) [634] and shows that through its dismissal of critics' fact-based analyses, its self-inflicted, mortal wound from its '83% fare ceiling' and its attempt to use a non-compliant accounting system, public support for the HSR system has dwindled. Today, the Authority faces an existential crisis.

7.1 Whatever Stance The Authority Takes About Financial Viability, IOS North Isn't Profitable – And The Authority Admits It –

[632] See: page B-9 [PDF 80] of California High-Speed Rail Draft 2014 Business Plan: Ridership and Revenue Forecasting, draft technical memorandum
[633] The word 'Total' is used here because the US DOT, uses Generally Agreed Accounting Principles (GAAP) guidance, and requires all revenues and costs be in a single account.
[634] See: To Repeat – The Authority's Train Will Need A Subsidy Forever, August 22nd 2012. Found at: www.sites.google.com/site/hsrcaliffr Page. 35 [PDF 35] refers to France's and EU's rail accounting under Directive 91/440 that separates fixed infrastructure O&M accounts from rolling stock O&M accounts, as well as attributing at least part of health, pension and other benefits' costs to non-rail accounts. See: Réseau Ferré de France (RFF) History at http://www.fundinguniverse.com/company- histories/Reacute;seau-Ferreacute;-de-France-company-History.html

In 2008's hubris, apparently no legislator sought the give the Authority the right to 'ramp up' its ridership and revenue to be profitable after its first initial operating years. Nowhere is AB3034 is there provision for operating with a financial loss for several years, as new companies often do. But the Authority assumes it can ignore AB3034, and operate at a loss through IOS North and into Phase 1.

> *"Analysis shows that five years after opening (after ramp-up) there is a 97% chance of breaking even and the cumulative chance of breaking even over the first five years is 89%. . . Analysis focuses on opening year of the Silicon Valley to Central Valley line in 2025 (38% chance of breaking even), the ramp-up period between 2025 and 2029 (75% chance of breaking even)."* [635]

The first IOS year's 38% chance of breaking even – while excluding *inter alia*, operator's profit, state and federal taxes, fees to terminal operators and while using an European Union (EU) accounting system prohibited in the US – is not breaking even. The first Phase 1 operating year's chance of breaking even (87%) is also not what is required by AB3034. To allow the Authority to ignore AB3034 is to succumb to arbitrary and unlawful decisions taken without Legislative or Ballot approval.

7.2 The Authority Ignored "Outsiders" Analyses And Suggestions –

Like its behavior towards HSR's history and "outsiders" expertise on other portions of the financial viability equation, the Authority ignored its statutorily required Peer Review Group's (PRG) suggestions for early-on private operators and investors' planning input, [636] and early warnings from PRG's now-chairman that private investors do not see that the

[635] See p. 99 [PDF 99] of Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan

[636] *"Without input from the final private sector participant regarding route alignment and station location, the future value of the HSR concession/franchise may be greatly diminished and less attractive to potential private sector participants."* See: Letter, dated January 3, 2012 to Legislators from The Authority Chairman Tom Umberg, critiquing the letter from the California High-Speed Rail Peer Review Group, Will Kempton, Chairman, January 3, 2012. Found at: www.cahsrprg.com. See Page 5 [PDF 5]

benefits of an HSR investment outweigh the risks of financing such projects without a subsidy.[637]

This was not the first or only bad news. In US Congressional testimony, the High-Speed Rail Director at the Union International des Chemins des Fer (UIC), presented a graphic showing that after about 250 miles of travel, HSR's share of riders versus airlines' drops off precipitously.[638] In that same hearing, RENFE, Spain's HSR (AVE) operator, showed that government O&M subsidies amounted to $1.8Billion.

A 2013 Congressional Research Service (CRS) report on HSR in the US said,

> *"The organizational structure of passenger rail is not conducive to a market environment in which competition among carriers exerts downward pressure on operating costs."* [639]

The Authority is 'swimming against the tide' or more accurately, against a riptide. In 2011, the Lincoln Institute, a professional group focused on land use, concluded:

> *"Like other modes of transportation and public goods, high-speed rail generally does not pay for itself through ticket fares and other operating revenues."* [640]

Because every phase of the project must produce a profit, listening to what outsiders say and do about the "opportunity" was crucial. Didn't happen.

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[637] "*There is little question that, for most potential U.S. HSR systems, private financial net benefits alone will not support the system.* Thompson, Louis and Tanaka, Yuki: High Speed Rail Passenger Services: World Experience and U.S. Applications; Prepared with the support of the Institution for Transport Policy Studies (a non-profit organization fully supported by the Nippon Foundation), September 20, 2011, page 27 [PDF 31].

[638] AG131 PET #198 [PDF 64] http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_house_hearings&docid=f:34799.pdf

[639] See p. 18 [PDF 22] of the Congressional Research Service (CRS) Report R42584 - The Development of High Speed Rail in the United States: Issues and Recent Events; Peterman, Frittelli, and Mallett; December 20, 2013

[640] See p. 46 [PDF 48] of Petra Todorovich, Daniel Schned and Robert Lane; Policy Focus Report, Lincoln Institute of Land Policy: High-Speed Rail, International Lessons for U.S. Policy Makers, 2011. Found at: https://www.lincolninst.edu/pubs/dl/1948_1268_High-Speed%20Rail%20PFR_Webster.pdf

The 2009 Business Plan stated, *"The private sector will expect to be compensated for any risks that it assumes."*[641] clarifying that the project's basic purpose is commercial. Again in 2012 the Authority seemed implacable on the point of IOS' financial viability,

> *"Under all forecasted scenarios, each operating section of the California high-speed rail system is projected to operate without a subsidy. This is not only important in terms of achieving the Proposition 1A criteria, but it supports investment of private capital for construction."* [642]

But empirical evidence shows that headline to be a *chimera*. The ability to make IOS operational is even harder. The Authority has no substantial evidence of a commitment from state[643] or federal sources[644] to complete constructing and equipping IOS to make it operational, and supposedly profitable. In 2011[645] and 2012, [646] The Authority said that over $10Billion of private sector investment would emerge, the latter claim because IOS operations produce a positive cash flow. [647] In 2012 the Authority offered more detail, saying that *". . initial operating contracts will be structured to support the Authority's plan for granting a long-term operating concession*

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[641] See p. 102, California High-Speed Rail Authority: Report to the Legislature; December 2009.
[642] Pg. ES-17 of the California High-Speed Rail Authority, Revised 2012 Business Plan,
[643] Although the 2012 Business Plan, pg. 8-21 [PDF 189] claimed a state commitment, before April 10, 2014, there was no commitment to use 25% of Cap & Trade funds for the HSR project. The quote is, *"Notably, the Authority has secured a backup funding commitment from the state for funding the full IOS should the estimated amount of federal funding not materialize."*
[644] 2012 DRAFT Plan Figure 5-2 pg. 5-5 [PDF 85] shows that private sector operations, maintenance and investment come after IOS is operational; the last role only when B2B is under construction
[645] 2012 DRAFT Plan (November 2011) ES-6 [PDF 12] "*Importantly, the state has authorized $9 billion in Proposition 1A bonds, and projections illustrate that an additional $11 billion should be available in private capital when the IOS is completed."*
[646] 2012 DRAFT Plan (November 2011) pg. 2-7 [PDF 39] *Introduce the state's (and nation's) first fully operational high-speed service with the Initial Operating Section. This service can be operated by a private entity without subsidy, will have the potential to attract private investment in expansion to Bay to* Basin . ."
[647] 2012 Plan, pg. ES-12 [PDF 20] says, *"Based on projected cash flows from operations, over $10 billion in potential private-sector capital is anticipated once the IOS is in operation. These funds can provide a significant contribution toward completion of the Bay-to-Basin system."*

after the IOS is in operation and early ridership is proven."[648] This is a clear statement that the project's future depends on private capital input.

But the Authority seems to have missed private investors' paramount message of 2008 and 2009, as shown in the Introduction to this paper. Given what the Authority has known since then about the unwillingness of private parties to invest in its project, the Authority's claim of private capital's interest to invest without any form of operating subsidy at best seems highly speculative.

7.3 The Authority's Policy Towards Private Operators and Investors Is Now Both Irrational And Unreasonable – The lifeline to continuing to build the IOS is solely private investment. Prior to 2014, asset investment was dependent on private capital input after IOS was proven profitable.[649]

> *"These initial operating contracts will be structured to support the Authority's plan for granting a long-term operating concession* ***after the IOS is in operation and early ridership is proven****."* [650]
> [Emphasis Added]

At first, the 2014 Plan seemed to maintain the 2012 and earlier policy[651] to sell a long-term operating concession to finance building the Bay-to-Basin

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[648] In the 2012 Plan the private sector enters the picture after the IOS ridership has been proven: *"These initial operating contracts will be structured to support the Authority's plan for granting a long-term operating concession after the IOS is in operation and early ridership is proven."* See: Final 2012 Business Plan, Page 4-6 [PDF 102]*."* No mention is made of the need for private sector investment prior-to-IOS operations until the 2014 Plan, which requires at least several $Billion of private investments in IOS infrastructure to overlay the basic rail bed the Authority plans; *"The Authority will also rely on the private sector for the delivery and maintenance of the remaining elements of the infrastructure (i.e., track, systems, and power)."* See: Connecting California, 2014 Business Plan, April 30, 2014 p. 30 [PDF 30].
[649] *"These initial operating contracts will be structured to support the Authority's plan for granting a long-term operating concession after the IOS is in operation and early ridership is proven."* See: 2012 Business Plan, Page 4-6 [PDF 102].
[650] See: California High-Speed Rail Authority, Revised 2012 Business Plan, Page 4-6 [PDF 102]
[651] The Connecting California, 2014 Business Plan, April 30, 2014, pg. 55 [PDF 55] says *"Once the IOS is in operation, cash flows will be available from the project that can be used to support capital from government, private-sector debt programs and private-sector equity investments."*

after the Authority has proven the IOS is profitable.[652] Then the Authority's policy towards private investment did an about face, became unreasonable and even less likely to be taken up. Instead of the Authority alone financing the fixed infrastructure and rolling stock, the Authority's IOS formula became:

> *"The Authority will also rely on the private sector for the delivery and maintenance of the remaining elements of the infrastructure (i.e., track, systems, and power)."* [653]

The 2014 Plan admits that $8.5 Billion of private capital is now needed to supplement the Authority's rail bed with investment in tracks, control systems and electrification[654] before IOS is operational, much less proven able to produce a positive operating cash flow (profit). [655] Since private investors have shown no commitment or interest in the nearly seven years after AB3034, the Authority admits that sum

> *" . . is very large in current private-sector investment terms . ."* [656]

The Authority then falls back on its old canard,

> *" . . the transaction would likely need to encompass low-cost federal debt programs . . ."*[657]

This ignores that there is no ARRA federal commitment past September 30, 2017 although about $1Billion of FY10 FRA funds can be spent after that

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[652] The California High-Speed Rail Authority, Revised 2012 Business Plan, pp. 7-18 [PDF 160] explains the $10.1Billion concession will be negotiated in 2023 the second year of IOS operations – but in 2011 terms is $7.3Billion.
[653] See: Connecting California, 2014 Business Plan, April 30, 2014page 30 [PDF 30]
[654] By inference, since IOS must show a profit, it will also need rolling stock, a maintenance facility, ticketing and IT centers, etc. suggesting $8.5Billion is likely a low estimate.
[655] *"The Authority is exploring procuring a high-speed rail operator, even before the construction of the IOS is complete . . The Authority will also rely on the private sector for the delivery and maintenance of the remaining elements of the infrastructure (i.e., track, systems, and power)."* See: Connecting California, 2014 Business Plan, April 30, 2014, p. 30
[656] See: Connecting California, 2014 Business Plan, April 30, 2014 Plan p.56 [PDF 56] The full text is *"For the purpose of planning the sources of funds for the Bay to Basin phase . . . resulted in an estimated $8.5 billion of private sector capital that could be used to augment government funding contributions . .This plan recognizes that the amount to be financed is very large in current private-sector investment terms and the transaction would likely need to encompass low-cost federal debt programs and be staged to allow for market capacity and competition."*
[657] See: Connecting California, 2014 Business Plan, April 30, 2014, pg.56 [PDF 56] The full text is *" . . the transaction would likely need to encompass low-cost federal debt programs and be staged to allow for market capacity and competition."*

date; and that legally AB3034 requires all needed capital needed to make IOS operational be committed **before** using Pro1A funds for IOS construction[658] a part of AB3034 upheld by the Appellate Court.

Simultaneous with stating the need for a-pre-financially-proven-IOS investment, the 2014 Plan went on to say the Authority will own those privately financed infrastructure investments and exercise governance over them.[659] The *sine qua non* of private investment is clear ownership, control over assets and high quality due diligence proof of financial viability prior to investing; therefore a private, at-risk asset investment, owned and governed by the Authority is an oxymoron. The extraordinary the Authority statement both admits that while it has insufficient federal and state funds to make the IOS operational, it will attempt to attract private investment under onerous rules after learning in 2008 and 2009 the highly qualified interest private sector investors might have in the project. It is unreasonable to assume private investors IOS will appear under the proposed terms and conditions.

Yet the Authority continues to claim, ". . *that the private sector will regard this as an attractive investment opportunity."*[660] The Authority cannot see that its only way to complete IOS is to find private capital, but that its new terms and conditions are anathema to private investors. With no private investment commitment seven years after Prop1A, it is unreasonable to assume operators/investors will change their 2008/2009 or 2015 stance and raise private funds to complete IOS's infrastructure based the risks inherent in the Authority's ridership, revenue and O&M forecasts and on it 2014 Plan's contradictory statements.

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[658] The Appellate Court upheld that part of the Superior Court's ruling,

[659] See: See: Connecting California, 2014 Business Plan, April 30, 2014, pg. 31 [PDF 31] that says *"While the Authority will rely heavily on the private sector to bring innovation and investment into the project, the state will maintain its lead organizational role, retaining ownership and governance functions."*

[660] See: Connecting California, 2014 Business Plan, April 30, 2014 pg. 9 [PDF 9] "T*hese new forecasts serve as the basis for the updated financial analysis—which continues to show that the program is financially viable and which, in turn, confirms that the private sector will regard this as an attractive investment opportunity."*

The plan to have private investment prior to the opening of at-the-time IOS South is also described in its 2015 requests for expressions of private sector interest.

> *"Between Madera and the southern terminus of CP4, the Developer would not be required to provide civil infrastructure **but the other components would be required to be delivered sooner so that this section can serve as a test track** to commission trains before being put into revenue service."* [661] [Emphasis added]

Despite what they were told in 2008 by IMG, and in 2009 by IMG and Goldman Sachs and in 2015,[662] the Authority still thought it would have private, at-risk capital to complete IOS before operations began.[663] It's unclear whether the thirty-six companies that responded to the 2015 request understood they were being asked to risk many billions of dollars on a poorly conceived, planned and managed project. But none responded that they were interested in committing capital to the project.

7.3.1 More Private Sector Financing Fantasies In The 2016 Draft Plan –

The Authority continued its fantasy that private capital will finance and build much of the IOS infrastructure prior to its being ready for operations: this time for the IOS North.

> *"The business model will transition over time from government funding and government decisions to a commercially run enterprise managed by **a private sector operator and infrastructure provider** responsible for service, safety and commercial risks and success."* [664] [Emphasis added]
>
> *The specific high-speed rail components that will be delivered under a*

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[661] See p. 5 [PDF 12] of Request for Expressions of Interest for the Delivery of an Initial Operating Segment, RFEI HSR#15-02, Release date, June 22, 2015. Found at: http://www.hsr.ca.gov/docs/about/doing_business/HSR15_02_RFEI.pdf

[662] Thirty-six firms responded to the 2015 request for expressions of interest from the Authority.

[663] More details on the Authority's assumptions about having private investment prior to IOS being completed by public funds are described in Section 7.2 of the Request for Expressions of Interest for the Delivery of an Initial Operating Segment, pp. 5-7 [PDFs 12-14]. These include the need for private capital to build civil works, tunneling, track, traction power, communications, signaling and an Operations Control Center OCC)

[664] See p. 35 [PDF 35] of Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan

> *potential* **[Design, Build, Finance and Maintain] *DBFM*** [665] *or other contract are described in detail below.* [666] [Emphasis added]

and later in the 2015 RFEI document:

> *"The Authority is contemplating a single DBFM or similar contract with a Developer to deliver the IOS-South project scope and a single DBFM or similar contract with a Developer (could be the same or different Developer) to deliver the IOS-North project scope."* [667]

It's hard to know whether any the Authority staff or board member understands that private capital is NOT going to come to a project where the Authority's ridership, revenue and O&M cost claims are so arbitrarily derived; and that once the investment is made, the state of California owns those assets. But it's not reflected in the 2014 or 2016 plans.

The 2016 Plan (again) parses the truth, suggesting Cap & Trade funds are a certified, permanent funding source.

> *". . . with the passage of Senate Bill 862, the Legislature and Governor approved an annual appropriation of 25% of the annual Cap and Trade proceeds on a continuous basis to fund high-speed rail. "* [668]

No mention is made of two lawsuits outstanding against Cap & Trade funds, nor is there mention that that appropriation is only through 2020, five years before IOS North (VtoV Ext.) is supposedly operational. The choice to not face facts is the hallmark of the Authority's work.

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[665] "For example, with a Design-Build-Finance-Operate-Maintain (DBFOM) contract, the private sector entity is responsible for the design, building, financing, operation, and maintenance of an infrastructure under a very long period of time, usually 20-30 years, after which the facility is transferred to the public entity." See p. 24 [PDF 24] of Flyvbjerg, Bent; Garbuio, Massimo and Lavallo, Dan: Delusion and Deception in Large Infrastructure Projects Two Models for Explaining and Preventing Executive Disaster. Found at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2229781 or at https://arxiv.org/ftp/arxiv/papers/1303/1303.7403.pdf

[666] See pp. 8-12 [PDFs 16-18] of the Request for Expressions of Interest for the Delivery of an Initial Operating Segment, RFEI HSR#15-02, Release date June 22, 2015. Found at: http://www.hsr.ca.gov/docs/about/doing_business/HSR15_02_RFEI.pdf

[667] See p. 11 [PDF 18] of Request for Expressions of Interest for the Delivery of an Initial Operating Segment, RFEI HSR#15-02, Release date, June 22, 2015. Found at: http://www.hsr.ca.gov/docs/about/doing_business/HSR15_02_RFEI.pdf

[668] See p. 10 [PDF 10] of Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan

After the analyses of the lack of competitiveness of HSR fares against auto transport, the lack of competitiveness against regional airports in the vast tracks of Los Angeles, and the lack of interest from private funding sources, the following 2016 Plan statement rings hollow.

> *Given the opportunity to leverage more ridership, revenue and private sector participation, we will seek federal funds to help complete the full San Francisco to Bakersfield line. If those additional funds are not forthcoming, we can and will still construct the Silicon Valley to Central Valley line described above*. [669]

The decision to switch the timing of the entry of private at-risk capital is not insignificant. First, it recognizes that the funds available to the Authority can only pay for the IOS' substrate, not its rails, electrification, and signaling systems. These items – and perhaps the rolling stock, IT systems, stations, etc. – are perhaps as expensive as building the dirt mound that will become a 'stranded asset' in the San Joaquin Valley.

Second, to ask a private company or companies to put such serious funds at risk without having had input a decade (or more) of prior, key decisions such as planning, design, engineering, or routing – or having very early-on validated the Authority's detailed financial data, algorithms and assumptions on demand (ridership) revenues and O&M – is unrealistic and likely to fail. But the Authority continues to spend public funds with impunity.

For seven years the Authority has claimed, but not produced, evidence of private sector interest to invest in the project. Of the more than twenty HSR operators worldwide, not one has offered as much as a letter of commitment to the Authority's plans. And while private funds such as Goldman Sachs[670] have assembled investment packages of far more than $68Billion, not one

[669] See p. 12 [PDF 12] of Connecting and Transforming California, the California High-Speed Rail Authority's Draft 2016 Business Plan

[670] Sixteen years ago, in 2000, Goldman Sachs – an advisor to the Authority in 2009 – led Vodafone's $183 billion purchase of Mannesmann. Vodafone AirTouch took control of Mannesman in February 2000. The £112bn ($183bn) all-share deal is still the largest corporate merger in history. See: http://news.bbc.co.uk/2/hi/business/630293.stm

has expressed the willingness to invest, to lead an investment group for the project, or to co-invest as an operator.

To date 'outsiders' are bereft of evidence that the Authority's claims about profitability are supported by independently verified data, assumptions and calculations.[671] The Authority's claim of private capital's interest seems a mirage. That evidence would be the *sine qua non* of financial viability.

7.4 Tracing The Zigzags Of The Project's Profit Equation Shows Its Lack Of Financial Viability – The 2008 Authority Business Plan's profits were clearly a sign of self-confidence*, ". . . an annual operating surplus of more than $1.1 billion*".[672] The 2009 Business Plan downgraded that assertion but promised an operating surplus of $370 million in 2020, the first operating year of the voter-approved Phase 1.[673] Then the Blended system was introduced in the Draft 2012 Plan (November 2011) and the Authority claimed

> *"Private-sector involvement is feasible because each of the operating sections generates a net operating profit."*[674]

That Draft Plan claimed the IOS (South) produced an annual profit of $464Million, and would attract private capital to purchase a concession to run the system. [675] After the first year, profits were projected to explode.

According to the 2012 Draft Plan, by 2030, a year after the Blended system started operations, the Medium case in the Draft Plan showed $1,246Million in net operating profits – 3.4 times the profits from the fully mature, voter-

[671] Public Records requests concerning access to the actually used data and assumptions on ridership, revenues, O&M costs and profits, and the algorithms used for their computation, have been met with responses that, for example, say: *"This is trade secret information pursuant to Evidence Code section 1060, incorporated into the California Public Records Act through Government Code section 6254(k) and, therefore, will not be provided."* See: email to Mr. Robert Prantis from Ms. Anne Parker of the Public Records Act Staff of the CA High-Speed Rail Authority, December 27,2013.
[672] 2008 California High-Speed Train BUSINESS PLAN November; pg. 12
[673] California High-Speed Rail Authority, Report to the Legislature; December 2009; pg. 81
[674] California High-Speed Rail Program, Draft 2012 Business Plan; November 1, 2012; pg. ES-8 [PDF 14]
[675] California High-Speed Rail Program, Draft 2012 Business Plan; November 1, 2011; Exhibit ES-3, pg. ES-9 [PDF 15]

approved Phase 1 offered in 2009.[676] Five months later (April 2012) the Authority's supposed Phase 1 Blended system produces three times the net cash flow from operations in its first operating year (2029) – $1,144Million vs $370Million – that the voter-approved Phase 1 purported to promise in 2009.[677] Both these plans achieved of soaring profits despite not supplying the voter-approved, full HSR passage between SF's Transbay terminal and LA Union Station.

Then the *deus ex machina's* miraculous intervention reversed outcomes. In 2014's technical supporting document, the net cash flow from operations shrinks 55% below the 2012 claim. Instead of the $1.14Billion in the 2012 Plan, by 2029 the Blended System, now called Phase 1, only produced $519Million of net cash flow from operations – aka profits.[678] When the Authority (finally) admits there are capital replacement costs, the cumulative net project cash flow is negative – $65Million negative in 2029.

From *"an annual operating surplus of more than $1.1 billion"* to half that ($519Million); to a $65Million deficit in cash flow in six years is a rollercoaster ride of claims. That inconsistency is likely born of continual struggles to get the ridership, revenue and operating cost data and computer models to produce profits. Instead of a continued refinement around a norm of the same time period's forecasts, the opposite of expected refinement happens, making all the Authority's financial forecasts appear unreasonable.

7.5 The Authority Set Sail Into The Shoals Of Bankruptcy With Impunity – The Authority's 2014 Ridership and Revenue memo opened by saying that its forecasts were; *". . predicated on the following concepts"* –

[676] California High-Speed Rail Program, Draft 2012 Business Plan; November 1, 2011; Exhibit 8-12, pg. 8-20 [PDF 148]
[677] California High-Speed Rail Program, Revised 2012 Business Plan; April 2012. The first operating year of the Phase 1 Blended system is 2029, as stated in Exhibit ES-3, pg/ ES-13 [PDF 21]. According to the Medium Scenario in Exhibit 7-2, pg. 7-3 [PDF 145], in 2029 the net cash flow from operations in 2029 is $1.144Billion.
[678] California High-Speed Rail Authority, 2014 Business Plan, Section 6, Financial Analysis and Funding, High, Medium, Low Cash Flows; February 2014; Medium Case pg. 8, Exhibit 2, [PDF 10].

the first of which was that the *". . model produces reasonable forecasts . . ."* [679]

The main body of the 2014 Plan warned that its ridership and revenue forecasts for a 'Greenfield' HSR project could be far from accurate,

> *"Given that the program is entirely new, and no high-speed rail currently operates in the U.S., a risk exists that the actual ridership demand and revenue will differ from the projections currently being used. The impact to the program could be wide ranging and include the following: Decreased commercial and financial viability: Lower-than-expected project revenue: Increase in the public funding required: Loss of stakeholder support."* [680]

But instead of being cautious, as its Plan's remarks warned, the Authority chose to use ridership forecasts that 'push the envelope' far past credibility. This may have been the result of their self-laid fare trap that disallows fares greater than '83% of airfares' or unknown reasons, but the net results are risible revenue forecasts without substantial supporting evidence.

According to both the 2014 and 2016 plan's technical memos on ridership and revenue, the Authority selected ridership and revenue forecasts even they recognize could be as much as 50% less than forecasted to compute financial viability.[681] While the Authority had full (100%) confidence in 2014 that annual riders during IOS will not be less than 2.27Million, it 'cherry-picked' and 11.3Million riders instead.[682] The choice of ridership five times more than its, model that "*produces reasonable forecasts . . ."* assured manipulated result existing only on paper.

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[679] See Cambridge Systematics (CS) final technical memorandum on Ridership and Revenue Forecasting of February 6, 2014; page ES-1 [PDF 12]

[680] See: California High-Speed Rail Draft 2014 Business Plan, page 71 [PDF 71].

[681] For examples of how the Authority used ridership and revenue forecasts with a possible 50% failure rate, first see Table 7.2 and 7.3 on page 7-3 [PDF 60] of Cambridge Systematics (CS) final technical memorandum on Ridership and Revenue Forecasting of February 6, 2014. Those forecasts are then used in Table 7.4 [PDF 64] to compute Total ridership and revenues at the 'mature' case – when ridership has grown to its maximum such as 11.3 (or 11.4) million during the IOS period.

[682] The 100% confidence level would be 45% of CS' 95% confidence level – stated inversely in the CS report. If the average ticket during IOS is $55.57 for the 95% confidence interval, dividing the Figure 7.1 revenues ($126.61Million/yr.) by $55.57 yields 2.28Million annual riders during IOS.

Likewise, in 2016 the Authority chose to risk public funds by selecting the 'Median' (50%) ridership forecast of either 7.6Million or 7.3Million VtoV riders [683] when there was 100% confidence that 1.7Million riders would take the VtoV train annually.[684] The 7.6Million IOS forecast is 4.5 times the assured 1.7Million riders, but increases the risk that nearly 6Million (5.9M) of those riders will not show up.

The 2016 Plan gives no range of confidence in the chosen VtoV Ext. ridership forecast, but the 12.8Million riders for the VtoV Ext.[685] is labeled the Year 2025 Medium Level forecast.

Since Flyvbjerg's 2003 study's database included both conventional and Greenfield rail technologies, it would have been reasonable for the Authority to understand that, when choosing ridership and revenue forecasts for a first-of-its-kind project, requiring solid proof of profitability to potential private operators, its planners should err or the side of financial caution – choosing forecasts with a higher probability of becoming reality. Otherwise, the eventual operating income portion of the profitability equation is compromised, the HSR train has little or no chance to meet the strictures of AB3034 and no private operator will step forward.

The PRG took notice of this late-in-the game risky choice. In their April 2014 comments on the Draft 2014 Plan, the PRG noted the risk inherent in using the chosen mid-range of ridership and revenue figures in forecasting and said,

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[683] Table ES.1, p. ES-2 [PDF 14] of Ridership and Revenue Forecasting; Draft 2016 Business Plan, Technical Supporting Document says the Median for VtoV is 7.6Million riders, while Table 6.2, p. 6-3 [PDF 39] says 7.3Million riders. While the difference is 4%, the expectation after at least five years of forecasting is that ridership forecasts in the same document should be the same.
[684] See Table ES.1, p. ES-2 [PDF 14] of Ridership and Revenue Forecasting; Draft 2016 Business Plan, Technical Supporting Document
[685] See Table 6.2, p. 6-3 [PDF 39] of Ridership and Revenue Forecasting; Draft 2016 Business Plan, Technical Supporting Document

> *"We have added the 15%* [i.e. PRG lowered the risk of having fewer riders than the medium forecast] *. . to give an indication of greater caution on the low side. The* ***critical point is that the program must be assessed not just on the medium forecast*** [50% confidence that ridership not be what the Authority's forecast] *. . ."* [686] (Emphasis added)

The PRG made no comment on the riskiness of choosing the medium forecast in its letter on the 2016 Plan .[687]

The choice to use more risky figures stands in contrast to the Plan's statement about their ridership and revenue model's reasonableness. These risky ridership choices exhibit politically useful behavior, with paper consequences today, but disastrous, future financial consequences.

Nowhere is there a description of why the Authority chose to use a risky ridership and revenue forecast in this first-of-a-kind project. Private investor/operators performing independent due diligence have not and will not be tantalized by theoretical numbers based on a 50:50 chance of failure in a Greenfields project.

7.6 Conclusions On The Chances To Complete IOS North (VtoV Ext.) Or Any Other Phase And Prove Financial Viability – One of the existential problems that the Authority's IOS faces is that in late 2015 and early 2016, the Authority had no recourse to private, state or federal monies other than what it has had for nearly three years, federal grants equaling about 10% ($3Billion) of the then-estimated $30.5Billion to build IOS South – or 15% of its unsubstantiated capital investment claim to build IOS North for $20Billion.

[686] See: PDF 9 of California High-Speed Rail Group, Letter to Legislative Leadership, April 6, 2014.
[687] Louis S. Thompson, Chairman, California High-Speed Rail Peer Review Group, to Legislative Leadership, dated March 25, 2016.

The Authority "burned its bridges" to private sector capital by requiring Billions of dollars be invested under unacceptable terms and conditions before IOS is completed and proven profitable. In 2016 it's assertions of available capital, be it private, at risk or non-existing federal funds, are premised on either very shaky of false assumptions.

There is no public access nor ever has been to the underlying data, assumptions and calculations, nor an independently verifiable analysis on whether the IOS can be an operationally profitable business, which AB3034 requires California's *sui generis* HSR project to be. But there is a great deal of evidence in the public domain to conclude that its ridership, revenue and O&M forecasts are indemonstrable or false. The Authority's IOS is not financially viable and will require a government's operating subsidy; so will succeeding phases.

In seventeen months, the Authority will have only FY'10 funds and at best a relatively small amount of Cap & Trade funds to continue property acquisitions, infrastructure relocation and rail bed earthworks. The project's status is rapidly approaching that of a 'stranded' asset. To continue to allow state and federal funds to be spent without assurance of enough funds to complete this 'greenfield' concept is reckless.

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April 12, 2016