

CALTRAIN ELECTRIFICATION

Impacts, Issues, Questions

Peninsula Cities Consortium

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BACKGROUND

- Initial Electrification Concept, 1998
- Draft EA/EIR, 2004. \$630million (2003\$)
- EA/EIR Delayed, Inadequate Funding
- HSR Bonds Approved, 2008 (Funding \$?)
- EA/EIR Updated as “Final” July, 2009
- FRA Approved EA/EIR, Dec. 2009
- JPB Proposed EA/EIR Certification April, 2010. Delayed: Public Concerns

EA/EIR HIGHLIGHTS

- Electrify 2 Tracks S F-San Jose, Diesel to Gilroy
- Traction Power Supply System (TPS)
- Overhead Contact System (OCS)
- Electric Multiple Units (EMU)
- Construction 2011 – 2013, Operate by 2015
- Initially 114 Trains per Weekday
- Compatible with HSR (Electrical Supply Only)
- Cost: \$1.225 Billion (2015 \$), Without HSR
- No Plans to Coordinate & Integrate with HSR

Would Be Covered in Future HSR Project EIR (2012?)

TRACTION POWER SUPPLY

- 2 Supply Sub Stations 36 Miles Apart
- 1 Switching Station Midway Between
- 7 Paralleling Stations 5 Miles Apart
- Many Within Current 2 Track r-o-w

HSR would require relocation and/or new land

- Cost: \$171 Million (2015 \$)

SUPPLY SUBSTATION



Figure 2.3-17
TYPICAL SUBSTATION COMPOUND
CALTRAIN ELECTRIFICATION PROGRAM

SWITCHING/PARALLELING STATION



AUTO-TRANSFORMERS WITH FIRE WALLS



OVERHEAD CONTACT SYSTEM (OCS)

SIDE POLES



PORTAL ARRANGEMENT



ELECTRIC MULTIPLE UNITS (EMU)



Cost: \$440 million (2015\$) for 112 Units

FACILITIES COST (2015\$)

COST CATEGORY	ELEC EMU (EA/EIR)	DIESEL (ESTIMATE)
Traction Power Supply	\$171 Million	0
Overhead Contact System (OCS)	\$358 Million	0
Signal System, Grade Crossings	\$93 Million	\$93 Million?
Communications	\$40 Million	\$40 Million?
Tunnel & Overcrossing Clearance	\$39 Million	0
Utilities, Landscape Improvements	\$27 Million	\$27 Million?
OCS Equipment, Materials Storage	\$22 Million	0
Retool Maintenance Yard & Training	\$11 Million	0
High Level Catenary Platfoems	\$2 Million	0
Liability Insurance, Finance, Other	\$9 Million	\$4 Million?
Real Estate Acquisition	\$12 Million	0
Total Infrastructure Cost	\$785 Million	\$164 Million?

TOTAL CAPITAL COST 2015\$

COST CATEGORY	ELEC EMU (EA/EIR)	DIESEL (ESTIMATE)
Infrastructure	\$785 Million	\$164 Million?
Rolling Stock	\$440 Million	\$250 to \$500 Million?
Total Capital Cost	\$1.225 Billion	\$414 to \$764 Million?

ELECTRIFICATION FUNDING

Table 2.3-7: Funding Sources for Caltrain Electrification Program with Preferred EMU Project (Millions of YOE Dollars)

Source	Amount
<i>Local Funds, including County Sales Tax</i>	<i>\$191</i>
<i>STIP/STP/CMAQ/Section 5307/9</i>	<i>\$16</i>
<i>Proposition 1B and HSR Connectivity Funds</i>	<i>\$62</i>
<i>Rolling Stock Replacement Project</i>	<i>\$440¹</i>
<i>Project funding shortfall, potentially to be made up for with funds from Project Financing, Federal American Recovery and Reinvestment Act High Speed Rail Program Funds, and/or State Proposition 1A funds.</i>	<i>\$516</i>
TOTAL	\$1,225

¹ \$440M includes \$352M in FTA Section 5307/9 funds for rolling-stock replacement and \$88M in matching funds from JPB Partners.

Source: MTC, *Regional Transit Expansion Policy: Program of Projects*, September 2008; and California High Speed Rail: *San Francisco/Silicon Valley Corridor Investment Strategy*, June 2009; JPB, 2009.

POSITIVE TRAIN CONTROL (PTC)

- Reduce Risks of Collision Between Trains
- Federal Mandate Requires by 2015
- Two Major Systems:
 - CBOSS – New, Caltrain Developing
 - European – Now in Use, HSR Might Adopt
- Estimated Caltrain Cost \$231 Million
 - Not Part of Electrification EA/EIR Cost
 - Caltrain Seeking Funding

EA/EIR ISSUES

- Visual Impacts
- Tree Impacts
- EMU Viability
- Caltrain Certification Urgency
- Integration with HSR
- Affordability

VISUAL IMPACTS

- Major Issue: Poles & Wires
- EA/EIR Claims No Significant Impacts
“OCS poles and wires within an existing rail corridor would not constitute a substantial visual change”

TREE IMPACTS

- Caltrain Tree Survey, 2002 - 2003,
- 19,250 Trees Within and Next To Caltrain R-O-W
 - Recommend Removal of Approx 1,727 Due to Project
 - Atherton: 110 Trees
 - Burlingame: 43 Trees
 - Menlo Park: 22 Trees (1/2 mile sample)
 - San Francisquito Creek: 6 Trees (1.8 mile sample)
- EA/EIR: “No removal of trees on private property is contemplated.” “No adverse impacts to heritage or significant trees are anticipated.”

TREE TRIMMING PHOTOS



Figure 3.1-1
TREE TRIMMING SIMULATION IN ATHERTON AREA
CALTRAIN ELECTRIFICATION PROGRAM



Figure 3.1-2
TREE TRIMMING SIMULATION IN BURLINGAME AREA
CALTRAIN ELECTRIFICATION PROGRAM

EMU VIABILITY

- EMUs allow variable train sizes to reduce costs in off-peak periods
- EA/EIR rolling stock requirements suggest little use of this capability
- Unless train sizes are varied to fit demand, high cost EMUs are a major waste compared to conventional locomotives (electric or diesel) and trailer cars

TRAIN SIZE REQUIREMENTS

CARS PER TRAIN	Trains/Day Feb 2010 130 Seats Per car	EMU Trains/Day 100 Seats/EMU
1 Car Train	5	2
2 Car Train	33	16
3 Car Train	22	29
4 Car Train	15	13
5 Car Train	9	11
6 Car Train	6	8
7 Car Train	0	9
8 Car train	0	2
Total Trains/Day	90	90
Avg Cars/Train	3.08	3.94

EA/EIR JPB CERTIFICATION

- Proposed at April 2010 JPB Meeting
 - Delayed Due to Public concerns
- Caltrain Now Meeting with Cities
 - Want MOU to address concerns, but certify EA/EIR
- Possibly on September JPB Agenda
- Caltrain Urgency Motivation:
 - State & Federal stimulus funds & deadlines

CALTRAIN EA/EIR CERTIFICATION URGENCY

- CPUC Exemption for 25kV Power
 - HSR Needs Similar Exemption
 - Why Caltrain Exemption Now?
- Federal Stimulus Funds
 - “Shovel Ready” (Requires Certified EIR)
 - Independent Utility

FEDERAL STIMULUS FUNDS

- HSR Stimulus Application:
 - “Overhead catenary and supports will be installed to allow the stringing of overhead wires over the Caltrain tracks, in accord with a design that will accommodate the additional two tracks for HST operations.”
- Caltrain/Pacheco Route Not Certified
- Caltrain Corridor Alignment Not Set
- No Integrated Design or Plan. Potential Waste
- Fuzzy “Independent Utility”
- “Hurry-Up” Electrification is Irresponsible

HSR INTEGRATION ISSUES

- Different Positive Train Control Systems
- Different Platform Height, Railcar Design
- Location of Power Traction Facilities
- PG&E Power Capacity for Peak Loads
- Scheduling, Dispatching on Shared Tracks
- UPRR Requirements
- Wasteful Construction Rebuilds

AFFORDABILITY

ITEM	ELECT EMU (EA/EIR COSTS)	DIESEL (ESTIMATED)
Total Cost Without PTC	\$1,225 Million	\$414 to \$764 Million?
Positive Train Control Cost	\$231 Million	\$231 Million?
Total Cost Without HSR	\$1.5 Billion	\$645 to \$895 Million?
Available Funding	\$707 Million	\$707 Million?
Caltrain Weekday Riders	37,500	37,500
Cost Per Rider	\$40,000	\$17,200 to \$23,900

CALTRAIN BASIC HANDICAPS

- Not frequent or near where people live or go
- Poor transit connections at stations
 - No transit service at some stations
 - Caltrain & transit schedules not linked
- Automobile's competitive advantages
 - Available 24-7
 - Flexible & convenient
 - Serves any destination
 - Cost not a major constraint
- No dedicated funding. \$35 million shortfall FY12
- Will electrification change anything?

WEST BAY TRIP DATA

CARRIER	Average Daily Trips	Percent of Population
San Francisco MUNI	654,000	79.3
Route 101 + 280 - SF/San Jose	650,000	19.1
Santa Clara VTA	124,000	6.7
BART Intra West Bay	108,000	6.9
Sam Trans	42,000	5.6
Caltrain (weekday)	37,500	1.1

MAJOR QUESTIONS

- Will HSR use Caltrain Corridor? When?
- Can Caltrain get dedicated funding?
- Can Caltrain survive?

Without HSR ??

With HSR, possibly with r-o-w user fee from HSR

- Can Caltrain fund electrification?

Without HSR

With HSR

- Can electrification cut deficit significantly?
- Are there more affordable alternatives?

CALTRAIN BENEFIT CLAIMS

CLAIM	RESPONSE
Improve train performance	More trains & 5 minutes less average trip time. How much ridership increase?
90% less train emissions	Possibly valid, offset by unknown emissions to produce power. Clean diesel could partially reduce. Noble goal, marginal benefit to Caltrain.
Reduce noise	Most noise is train horns. Electrification won't reduce horn noise without grade separations or quad gates.
Modernize Caltrain	Great! What does it mean?
Reduce deficit 50% by 2035	Most claimed from more riders at little increased cost. No supporting studies or analysis.

TWO MAJOR OPTIONS

1. Start 2 track electrification expecting HSR
2. Wait for HSR decisions
 - If Caltrain corridor is preferred & funded, develop HSR/Caltrain integrated plan.
 - If No HSR on corridor, Caltrain analyze alternatives & funding, update EA/EIR for Caltrain only, implement best affordable alternative.

WHY DELAY CERTIFICATION

- Obsolete, outdated EA/EIR (2004)
- 2 Track basis, vague HSR “Compatibility”
- Caltrain – HSR conflicts & issues
- No HSR integration plans
- EIR claims “No significant impact”
- Not affordable without HSR
- No analysis of non-electrified alternatives
- Unrealistic claims to reduce Caltrain deficit
- Stimulus deadlines override good planning
- Certification could invite litigation

CONCLUSION

Delay EA/EIR Certification

Without dedicated funding or HSR, should Caltrain risk \$1.5 billion of taxpayer money to electrify a system it can't afford to run and that may not survive?

EXTRA SLIDES

Comparative Performance On 15 Stop Run



With Systems Modifications & PTC

**Table 2.3-9: Incremental Operating and Maintenance Costs for Electrification
(Millions YOE \$)**

<i>Item</i>	<i>Increase (Decrease) in Annual O&M Relative to No-Project</i>	
	<i>Preferred Alternative: Electric Multiple Units (EMUs)</i>	
	<i>2015 (114 Trains/day)</i>	<i>2035² (114 Trains/day)</i>
<i>Train Operations (crew and admin.)</i>	<i>(\$0.94)</i>	<i>(\$1.87)</i>
<i>Traction Power (Fuel or Electricity)</i>	<i>(\$5.11)</i>	<i>(\$18.81)</i>
<i>Rolling Stock Maintenance¹</i>	<i>\$4.55</i>	<i>\$12.38</i>
<i>Traction Electrification/MOW</i>	<i>\$7.0</i>	<i>\$13.92</i>
<i>Maintenance Facilities</i>	<i>\$0.19</i>	<i>\$0.38</i>
<i>Total Change in Annual Costs</i>	<i>\$5.69</i>	<i>\$6.00</i>

¹ *The No-Project Alternative retains Caltrain's equipment and maintenance methods. The Electrification Program Alternative utilizes newer electric equipment and a new life cycle maintenance philosophy that increases annual cost, but improves service reliability and overall condition of the vehicle over its life. Thus, a direct comparison between maintenance costs between the No Project and the Project Alternative may be misleading.*

² *Cost assumes majority of vehicles would be replaced as they reach their nominal 30-year design life. 2035 O&M cost assumes additional diesel locomotive and coach replacement with EMUs in the 2030 timeframe, increasing electricity demand and decreasing diesel fuel consumption.*

Table 2.3-8: Caltrain Operating Parameters

	Existing Diesel Service	<i>Electrified Service (All Options)</i>	
	<i>2008</i>	<i>2015</i>	<i>2035</i>
<i>Number of Trains per Weekday</i>	98	114	114
Weekday Train Trips (San Francisco – San Jose Diridon)			
<i>A.M. Peak Period (6-9 a.m)</i>	27	38	38
<i>A.M. Peak Period Hour, one-way</i>	5	6	6
Weekday Train Trips (San Jose Diridon – Gilroy)			
<i>A.M. Peak Period (6-9 a.m.)</i>	3	3	3
<i>A.M. Peak Period Hour, one-way</i>	1	1	1
Cars/Train (Avg.)	4 to 5	6	6
Train Capacity (Seats)	580 to 725	600	600

Source: Caltrain Timetable, March 2008.

**Table 2.3-10: Caltrain Operating and Maintenance Costs with Electrification
(Millions of YOE Dollars)**

<i>Expense Category</i>	<i>Operating Year¹</i>		
	<i>2008</i>	<i>2015</i>	<i>2035³</i>
<i>Number of Trains per Day</i>	<i>98</i>	<i>114</i>	<i>114</i>
<i>Total O&M Expense</i>	<i>\$86.96</i>	<i>\$117.72</i>	<i>\$228.93</i>
<i>Estimated Potential Operating Revenues (Fare and Other)</i>	<i>\$47.48</i>	<i>\$73.45</i>	<i>\$206.18</i>
<i>Net O&M Expense/Subsidy²</i>	<i>\$39.48</i>	<i>\$44.27</i>	<i>\$22.75</i>

¹ Figures are for fiscal year, July 1- June 30, and provide a reasonable approximation of calendar year performance.

² The net O&M expense/subsidy is split between San Francisco, San Mateo, and Santa Clara counties in an approximate 18-42-40 ratio, respectively. In addition to net direct O&M costs, there are debt service, and capital contingency expenses that are paid for by the subsidy. These costs are estimated to total \$1.9 million in 2008 and \$2.1 million in 2015 and \$3.0 million in 2035.

³ Cost assumes majority of vehicles will be replaced as they reach their nominal 30-year design life. 2035 O&M cost assumes additional vehicle replacement in the 2030 timeframe.

Source: PCJPB, 2009.