



Deutsche Bahn Engineering & Consulting, USA Inc.

California High Speed Rail Side-By-Side Study

Preliminary Qualitative Analysis - Board Presentation

October 15, 2019

For the 2019 Project Update Report the ETO Completed Studies Investigating Early Service In the Peninsula and the Central Valley Corridors



Central Valley Corridor Study

- **Operating Expenses Versus Revenue**
- **Standalone operation Merced – Bakersfield**
 - Early High-Speed Rail services create significant value
 - Train miles offered more than double
 - Reduction of more than 90 minutes in travel time
 - More efficient cost per mile, improved cost recovery from fare revenues
 - Complemented by planned enhancements to ACE and San Joaquin Lines

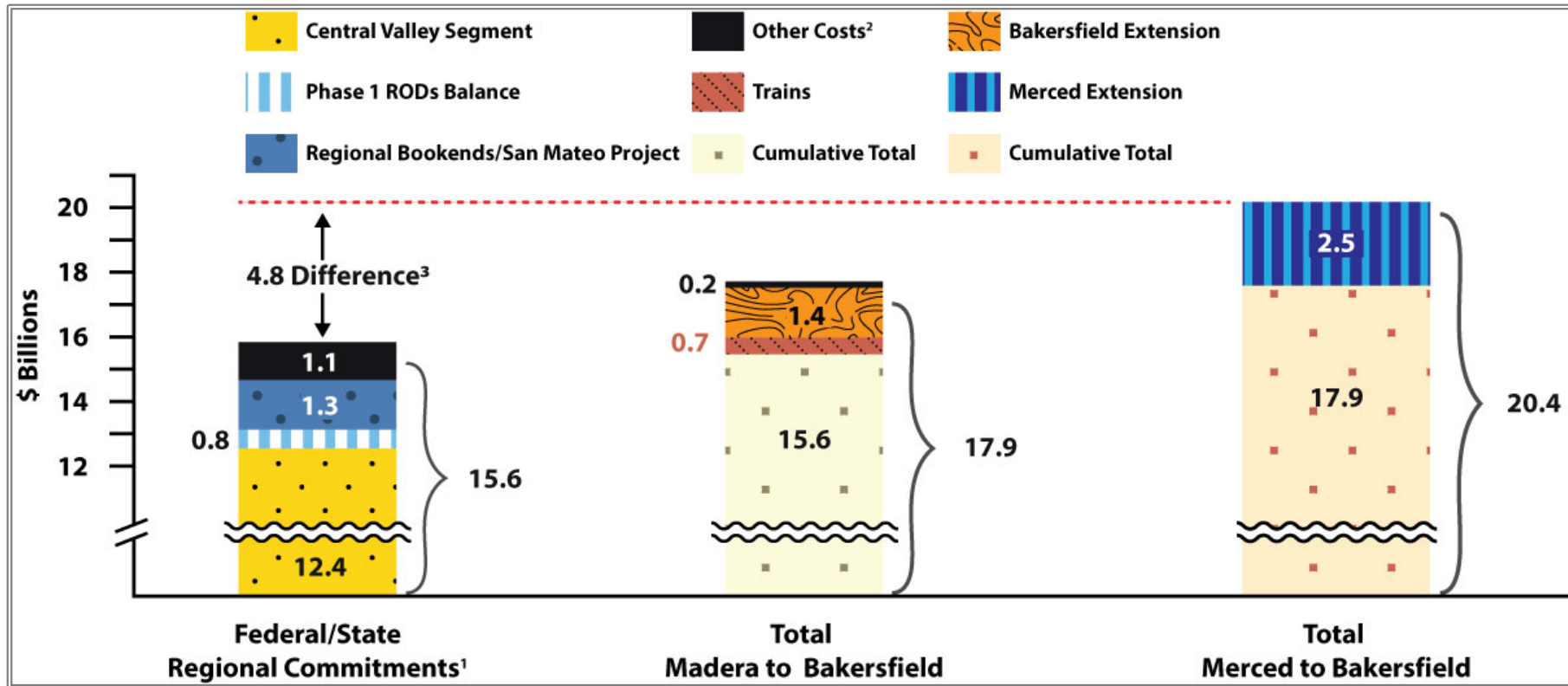
Peninsula Corridor Study

- **Operating Expenses Versus Revenue**
- **Standalone operation San Francisco – Gilroy**
 - No substantial ridership impact from incremental High-Speed Rail service
 - High-Speed Rail Operating Expenses significantly exceed fare revenues
 - Electrification Scenario with increased Caltrain service without High-Speed Rail captures most of the benefits
 - Significant benefit from High-Speed Rail investment does not materialize until connected to Central Valley via Pacheco Pass

Project Update Report Capital Cost (May 2019)



- Board approved funding of \$15.6 billion for Madera – Poplar Avenue section plus Bookends and RODs
- Project Update Report identified capital cost increment of \$4.8 billion for Merced and Bakersfield extensions and rolling stock (Total cost at \$20.4 billion)



NOTES:

1. Federal/State/Regional Commitments – These include completion of the Federal grant agreements to complete all Phase 1 Environmental Documents and 119 miles of civil and structural rail infrastructure from Madera to Poplar; completion of state and regional projects including SB 1029 Bookend projects (Caltrain Electrification Project, Rosecrans/ Marquardt Grade Separation and Link US) and the regional San Mateo Grade Crossing project.
 2. Other Costs – Other costs include program support costs and historical Phase 2 expenditures.
 3. Based on P70 estimates, potential for change with P100 estimates and due to FY 10 law suit (\$926 million)
- Source: California High-Speed Rail Authority, Delivering High-Speed Rail to Californians, Project Update Report to the California State Legislature, May 2019

Side-By-Side Study Purpose



- In May 2019 the High-Speed Rail Authority Board (Board) asked the ETO to compare options for potential early service investments in three High Speed Rail corridors:
 - San Francisco / Bay Area (NorCal): 4th & King Street Station – Gilroy
 - Central Valley Segment (CVS): Merced – Bakersfield
 - Los Angeles / Anaheim (SoCal): Burbank Airport – Anaheim
- Basis of the analysis is the understanding that High-Speed Rail funds can only be used for High-Speed Rail infrastructure and High-Speed Rail rolling stock within the Phase 1 project limits.
- The side-by-side study will draw from the ETO's prior Central Valley and Peninsula Corridor Financial Plan Study as well as additional analyses currently underway for completion of the side-by-side comparison.

Approach to Preliminary (Qualitative) Analysis



- Stakeholder Meetings
- Developed service concepts and infrastructure scenarios for Southern California corridor (Same methodology as in prior Peninsula Corridor Study and Central Valley Corridor Study)
- Review of information and data
- ETO has completed Phase 1 Qualitative Analysis of the study – to be released 10/31/19
- Reporting Preliminary Conclusions Today
- Second Quantitative Phase In Progress (Target early Q1 2020)

Investment Scenario Comparison: Cost versus Service Benefits



Summary of Trains per Hour per Direction during Peak

Investment Level:
Regional + State + Other + Authority



Project Corridor	Type	Scenario 1: Existing	Scenario 2: Regional Investment only (No CHSR Service)	Scenario 3: Partial High-Speed Rail Investment (No CHSR Service)	Scenario 4: Full High-Speed Rail Investment (With CHSR Service)
Peninsula Corridor (NorCal) San Francisco –Gilroy (North of San Jose)	Service	5 Caltrain 5 Total	4 <i>Electric Caltrain</i> * 2 Diesel Caltrain 6 Total	8 <i>Caltrain</i> * 8 Total	8 <i>Caltrain</i> * 2 <i>High Speed</i> * 10 Total
	Cost	(No Build)	(Regional \$)**	(+ \$4B HSR)	(+ \$3B HSR+ HSR Rolling Stock)
Central Valley Segment (CVC) Merced –Bakersfield (Entire Corridor)	Service	0.5 San Joaquins (7 Per Day)	N/A	N/A	1 <i>High Speed</i> * 1 Total (18 per Day)
	Cost	(No Build)			(+ \$4.8B HSR incl. HSR Rolling Stock)
Southern California Corridor (SoCal) Burbank –Anaheim (Section North of LAUS)	Service	0.5 Express 3 Regional 3.5 Total	2 Express 4 Regional 6 Total	2 Express 6 Regional 8 Total	2 Express 6 Regional 2 <i>High Speed</i> * 10 Total
	Cost	(No Build)	(Regional \$)**	(+ \$7B HSR)	(+ \$5B HSR+ HSR Rolling Stock)

* Indicates trains with electric catenary zero-emission propulsion. ** Scenario 2 includes High-Speed Rail bookend investments in NorCal and SoCal.

Preliminary Findings – Qualitative Comparison



Project Corridor	Length of Corridor	Improved Rail Service	Ridership and Revenue Increment	Increment GHG Benefits	Expected Congestion Relief	High-Speed Rail Capital Cost (YOES)	Prior Regional Investment Required?	High-Speed Rail operational within next 10 Years?
Peninsula Corridor (NorCal) San Francisco to Gilroy	77 Miles Shared	<ul style="list-style-type: none"> • Frequency • Slightly Increased Speed • All Electric 	Incremental	Auto and Diesel Trains to Electric Trains	Incremental	Range: \$4 to \$7 billion +HSR Rolling Stock TBD	Shared Corridor/ Caltrain Electrification complete	Maybe At 110 mph
Central Valley Segment (CVS) Merced to Bakersfield	171 Miles Dedicated	<ul style="list-style-type: none"> • Frequency • Full High Speed • 90 Minute Savings • All Electric 	Significant	Auto and Diesel Trains to Electric Trains	Significant	\$4.8 billion <u>including</u> Rolling Stock	Independent Corridor/ Can be developed in parallel	Yes At 220 mph
Southern California Corridor (SoCal) Burbank to Anaheim	44 Miles Shared	<ul style="list-style-type: none"> • Frequency • Slightly Increased Speed • Only High-Speed Rail Electric 	Incremental	Auto to Mainly Diesel Trains	Incremental	Range of \$7 to \$12 billion +HSR Rolling Stock TBD	Shared Corridor/ Regional Investment (Part of SCORE) complete	Unlikely At 110 to 125 mph

Peninsula Corridor San Francisco - Gilroy

- The NorCal corridor requires regional investment in addition to the High-Speed Rail investment (Additional fleet, capacity signal system)
- Caltrain Business Plan highlights these capital requirements (Non-High-Speed Rail rolling stock and rail systems)
- High-Speed Rail operating expenses would significantly exceed revenues
- Marginal benefits of standalone High-Speed Rail service (must connect to Central Valley)



Preliminary Findings – Southern California

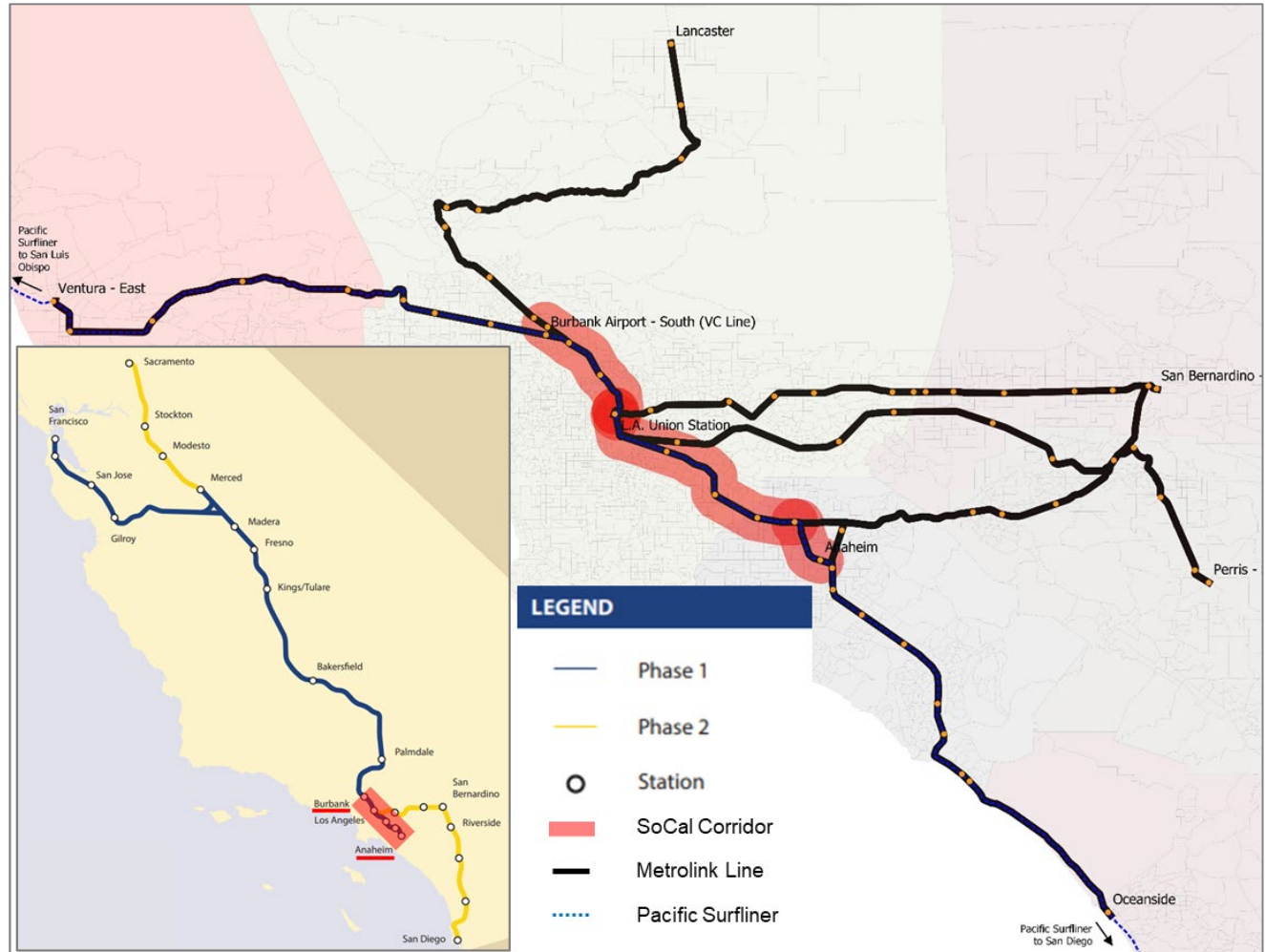


Southern California Corridor Burbank - Anaheim

■ The minimum High-Speed Rail infrastructure cost alone in the SoCal Corridor exceeds 1.5 times the remaining unallocated funding available (\$4.8 billion)

■ The full regional benefits of the High-Speed Rail investment can only be realized with concurrent new regional capital investment in network outside of the Burbank – Anaheim corridor

■ Incremental ridership benefits will be significantly higher if all connecting services are concurrently improved with the Burbank – Anaheim High-Speed Rail section

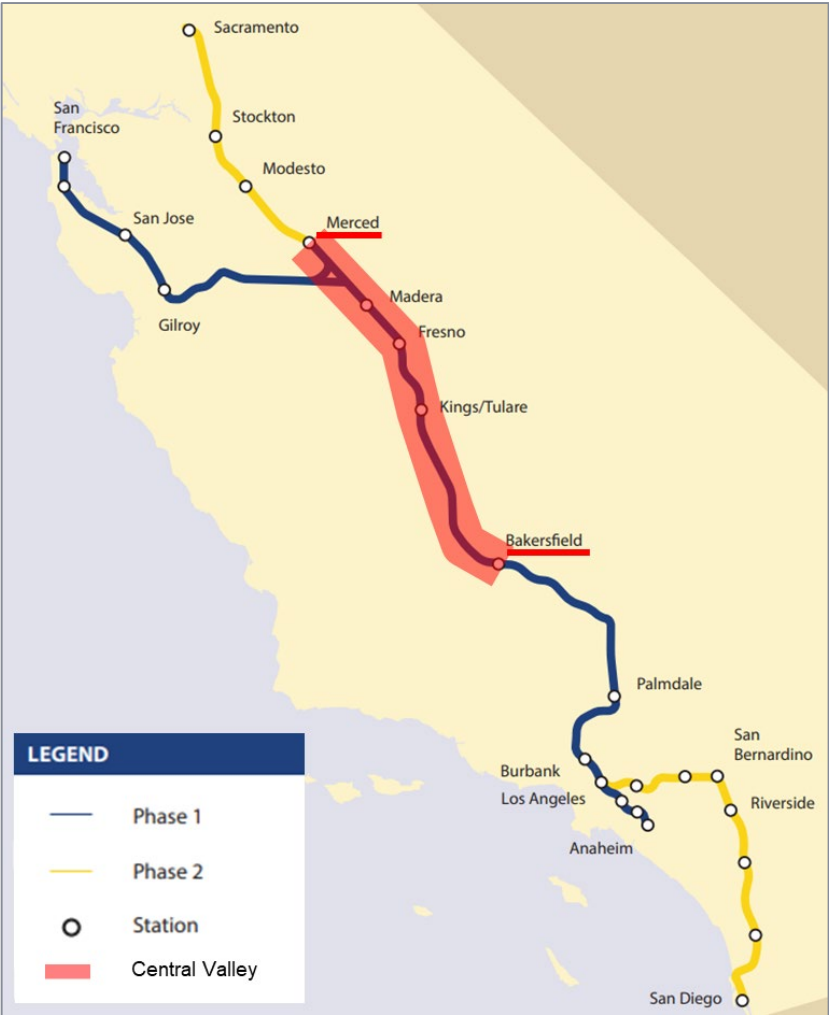


Preliminary Findings – Central Valley Full Build



Benefits if connections to Merced and Bakersfield are completed (\$4.8 billion to complete including High-Speed Rail rolling stock):

- Standalone High-Speed Rail operation
Merced – Bakersfield
- Early High-Speed Rail services create significant value
- Train miles offered more than double
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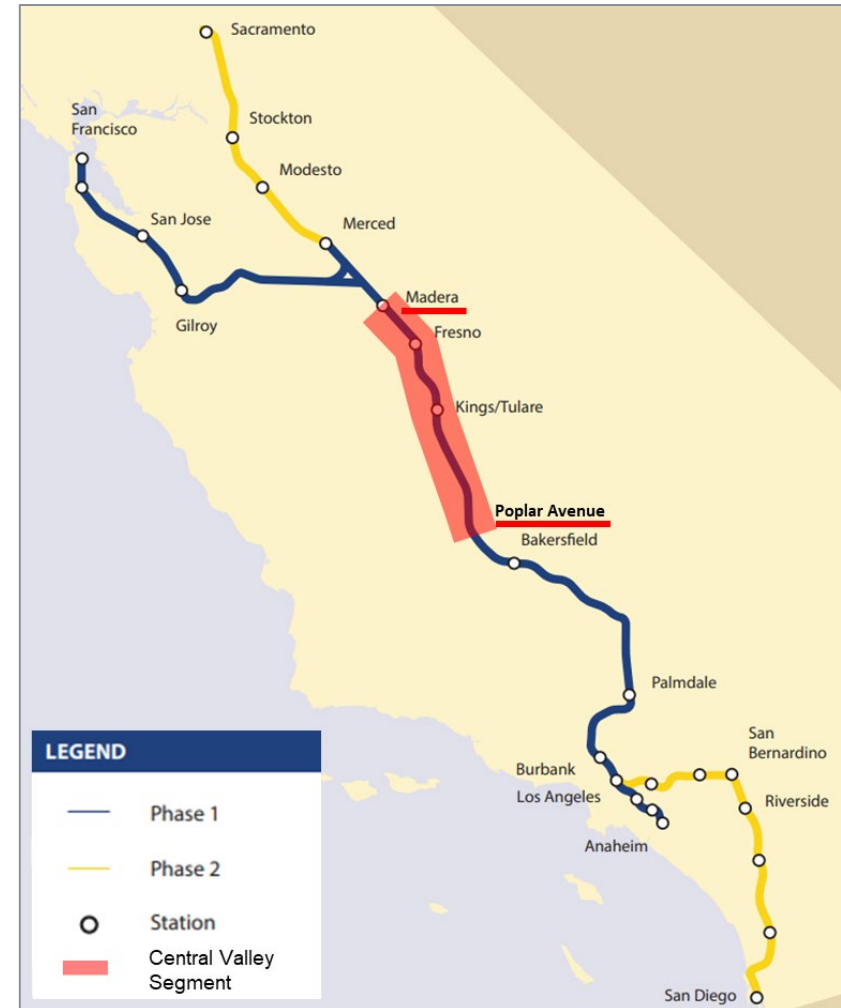


Preliminary Findings –Central Valley Partial Build



Consequences if connections to Merced and Bakersfield are not completed
(\$4.8 billion to complete including High-Speed Rail rolling stock):

- High-Speed Rail service in the Central Valley will be delayed until additional funding for Valley-to-Valley project is available
- Limited use of High-Speed Rail infrastructure in the Central Valley by San Joaquin trains will resemble current situation with only minor improvements
- Throw-away cost to build connections between the High-Speed Rail line and the BNSF line to make the section between Madera and Poplar Avenue fit for Diesel operation
- High operational expenses for a then underutilized infrastructure asset
- Limited or minimal environmental improvements



Proposed Next Steps

- Interim Qualitative Report available by 10/31 (In Review now)
- Continue Quantitative Phase:
 - Continue analysis of capital cost including cost for High-Speed Rail rolling stock
 - Work with stakeholders (Caltrain, Metrolink, LA Metro, LOSSAN, CalSTA, SJRRC, SJJPA) to provide insights on needed investment to incorporate into Final Report
 - Summarize High-Speed Rail capital costs and show regional benefits and needs
 - Estimate ridership and revenue impacts for SoCal scenarios
 - Identify GHG and congestion benefits for all three corridors
- Generate Quantitative Final Report in Early Q1 - 2020