Statement of the
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Before the
Committee on Transportation and Infrastructure
United States House of Representatives

California High-Speed Rail Plan: Skyrocketing Costs and Project Concerns

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Chairman Mica, Ranking Member Rahall and members of the Committee: It is my honor to represent President Obama and Secretary of Transportation Ray LaHood before you today to discuss the California high-speed rail (HSR) project. This testimony will first explain why we believe high-speed rail is critical to the State of California's future, and then discuss the key risk factors that my agency is carefully assessing as we move forward, concluding with a description of next steps.

Why are we doing this?

Throughout this nation's history, transportation infrastructure has been a key driver of our economic growth and competitiveness. The canals and waterway systems in the 18th century, the transcontinental railroad in the 19th century, and the interstate highway and aviation systems in the 20th century all transformed the American economy and way of life, helping the United States become the global leader that it is today.

This is clearly true in California as well. California alone is the world's 9th largest economy and is known across the globe for its innovative and entrepreneurial spirit, top-tier educational institutions, and thriving communities. California achieved this status because past generations recognized the importance of infrastructure and invested accordingly – in ports, electric power systems, highways, water systems, railways, airports, universities, and more.

Today, California (not unlike other regions of the U.S.) faces a series of related and complex challenges that must be addressed if the State is to maintain its global economic competitiveness and high quality-of-life – and with 12 percent of the nation's population and 13 percent of GDP, California's success is critical to the nation's economic vitality:

- **Population growth:**
  - *Statewide*: California's population will grow by 20 million people between 2010 and 2050, reaching 60 million.[1] That growth *alone* is larger than the current population of every State except Texas.
  - *Central Valley*: This fast-growing region stretching from Sacramento to Bakersfield is currently home to approximately 6.1 million people—more people than all but 17 States. The Central Valley is expected to more than double in size,

[1] California Department of Finance, "Population Projections for California and its Counties 2000-2050," July 2007. http://www.dof.ca.gov/research/demographic/reports/projections/p-1/.

to 13.2 million people by 2050[2]—equivalent to *adding* more people than the entire populations of Massachusetts or Washington to this relatively small region.

- **Mobility:**
  - *Air congestion*: Delayed flights at six of California's major airports had an economic impact of more than $1 billion in 2010.[3] Los Angeles-to-San Francisco is the busiest and most delay-prone short-haul air market in the U.S., with approximately one of every four flights late by at least an hour. According to FAA, California is home to 5 of the 14 U.S. airports that will require additional capacity by 2025 to accommodate projected increases in demand, even *after* planned improvements are made. In densely populated places like the Bay Area and the Los Angeles Basin, airport capacity is constrained by geography, airfield, and airspace, making expansions costly and challenging.[4]
  - *Road congestion*: California's highways are among the most congested in the nation, costing residents and businesses in Los Angeles and San Francisco alone nearly $13.5 billion dollars in 2010. Between 1982 and 2010, the average hours of delay experienced by commuters in the San Diego area increased 375 percent, from 8 to 38 hours each year.[5] Many fast-growing communities in the Central Valley now suffer from increasing congestion, as well.

- **Air quality:**
  - Air quality is a major challenge in California, in large part due to automobile and truck emissions, which are worsened by congestion.[6] According to the U.S. Environmental Protection Agency, four of the five metropolitan areas with the worst air quality are in California, with two Central Valley areas (Bakersfield and Fresno) ranking second and third.[7]
  - The American Lung Association's air quality report notes that California is home to 8 of the 10 metropolitan regions with the worst ozone pollution—six of which are in the Central Valley. Bakersfield ranks first or second in all three categories analyzed (ozone, year-round particle pollution, short-term particle pollution).[8]

California—and the nation—will suffer if these challenges are not addressed. The question we must answer is not *if* substantial investments need to be made in California, but *how* – what is the best mix of solutions, from transportation, cost-effectiveness, and public benefits perspectives? We agree with the State of California that high-speed rail must be a key part of the solution.

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[2] California Department of Finance, "Population Projections for California and its Counties 2000-2050," Table: Population Projections, July 2007. http://www.dof.ca.gov/research/demographic/reports/projections/p-1/.

[3] FRA analysis of passenger and flight totals and delay data from the Bureau of Transportation Statistics, applied to monetary impact values as developed by the Airlines for America (formerly Air Transport Association). The six airports analyzed are SFO, LAX, SAN, OAK, SNA and LGB.

[4] Federal Aviation Authority, "Capacity Needs in the National Airspace System," May 2007. http://www.faa.gov/airports/resources/publications/reports/media/fact_2.pdf.

[5] Texas Transportation Institute, "TTI's 2011 Urban Mobility Report," September 2011. http://mobility.tamu.edu.

[6] California Air Resources Board, "ARB Fact Sheet: Air Pollution and Health," 2009. http://www.arb.ca.gov/research/health/fs/fs1/fs1.htm.

[7] U.S. Environmental Protection Agency, "Number of Days with Air Quality Index Values Greater than 100 at Trend Sites, 1990-2010, 2010 Trend Sites," 2011. http://www.epa.gov/air/airtrends/aqi_info.html.

[8] American Lung Association, *Most Polluted Cities: State of the Air, 2011.* http://www.stateoftheair.org/

From a transportation perspective, HSR will provide substantial amounts of fast, frequent, and reliable travel capacity with a relatively limited environmental footprint, freeing up badly-needed capacity on California's runways and highways that can then be used to accommodate the travel needs of the state's growing population. Additionally, the airports in San Francisco and Los Angeles are among the most important international gateways in the nation—shifting valuable landing slots from short-haul flights to longer journeys will connect California and the nation to a larger number of international markets.

From a cost-effectiveness perspective, the California High-Speed Rail Authority (CHSRA or the Authority) estimates that without this HSR investment, the State would need to invest $171 billion to acquire the equivalent level of capacity—2,300 miles of new highways, 115 new airport gates, and 4 new airport runways. In addition to this high price tag, many of these expansion projects would conflict with various local, state, and federal transportation goals and policies, and in some cases may not even be possible due to geographic constraints. Operations and maintenance costs for these expansions would not be fully paid by users (whereas projections show the HSR project will recover these costs through ticket revenues), and thus would add substantial additional public costs in the future.

From a public benefits perspective, the HSR project addresses many economic growth, quality of life, and mobility challenges. Utilizing domestic and international best practices, the Federal Railroad Administration (FRA) has independently analyzed the expected public benefits that will be generated over a 40-year period, beginning with the commencement of operations on the Initial Operating Segment (described below).

Table 1
California HSR - Preliminary Benefits Estimates Over 40 Years*

Benefits	Annual Average	40-Year Totals (2022-2061)
Passenger Travel Time Savings	71– 87 million hours	2.8– 3.5 billion hours
Passenger Cost Savings	$190–$240 million	$7.6– $9.6 billion
Safety	18 – 23 fatalities, 3,200 – 4,100 injuries, and 7,100 – 8,800 accidents avoided	720 – 920 fatalities, 120,000 – 170,000 injuries, and 280,000 – 360,000 accidents avoided
Pollution Reduction Cost Savings	$280– $360 million	$11– $15 billion
Mobility / Congestion	Reduction of 3.3– 4.1 billion vehicle-miles traveled (VMT)	Reduction of 130– 170 billion VMT

*Undiscounted sum of benefits over this period.

In addition to the direct benefits highlighted in Table 1, economists generally agree that large-scale infrastructure investments invariably have wider—even transformational—economic benefits that can have important and long-lasting effects, such as spurring growth in regional

productivity and competitiveness.[9] The Authority also estimates that the initial construction work will directly generate over 30,000 job-years, with at least 400,000-450,000 job-years directly generated during full project build-out. Using typical multipliers for infrastructure investments, the project could also generate roughly double these figures in indirect job-years.[10]

What are the key issues?

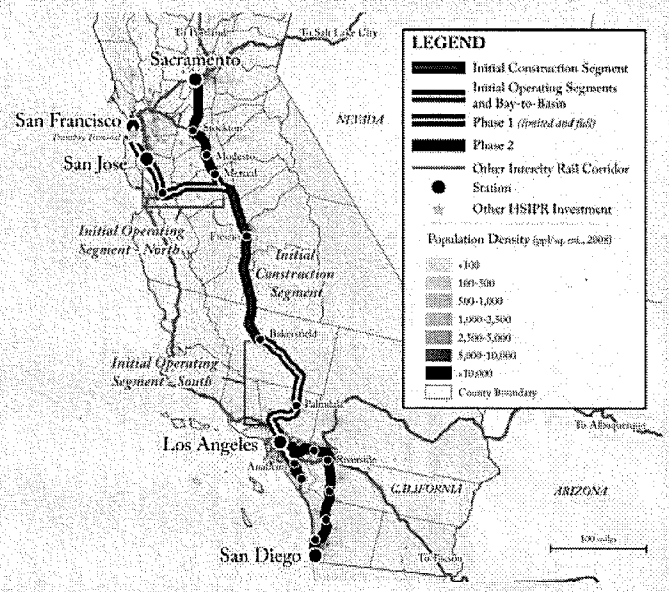
While the need for high-speed rail in California is clear, there are several areas that are critical to both short-term and long-term success of the project. FRA will continue working with the Authority and other stakeholders to provide effective technical assistance and oversight in these key areas:

- Phasing and implementation approach
- Capital costs
- Funding and finance
- Ridership and public benefits

Phasing and implementation approach

While the headlines are focused on the "Full Phase 1" costs and timeline, it is important to recognize that the Authority has laid out a clear, practical, and achievable phasing strategy in its Draft 2012 Business Plan, with several important interim stages coming on-line before full build-out (see sidebar).

California High-Speed Rail
Draft 2012 Business Plan – Phasing Strategy



- **Initial Construction Segment (ICS):** 130-mile, fully-funded segment from Merced-Bakersfield
- **Initial Operating Segment (IOS)**: beginning of high-speed operations will extend the ICS to either the north or south:
  - *IOS North*: San Jose to Bakersfield (290 miles).
  - *IOS South*: Merced to the San Fernando Valley (300 miles)
- **Bay-to-Basin**: After construction of the IOS, the system will then be extended to complete an operating high-speed line from the San Francisco Bay Area to the Los Angeles Basin, with connecting service to downtowns through local transit and commuter rail options.
- **Phase 1 (Blended)**: Incremental infrastructure investments on the final approaches into the downtowns of L.A. and San Francisco will allow for several high-speed trains per hour.
- **Phase 1 (Full)**: Completion of Phase 1, with frequent downtown-to-downtown connections.
- **Phase 2 – Extensions to Sacramento and San Diego**: 280 miles of high-speed extensions to California's two other major urban centers.

[9] See, e.g., Ahlfeldt, Gabriel M. and Arne Feddersen, "From Periphery to Core: Economic Adjustments to High-Speed Rail," London School of Economics and University of Hamburg, 2010. http://mpra.ub.uni-muenchen.de/25106/1/MPRA_paper_25106.pdf.

[10] U.S. Department of the Treasury and Council of Economic Advisors, "An Economic Analysis of Infrastructure Investment," October 11, 2010.

This approach is consistent with how other major infrastructure projects have been implemented, both in the U.S. and across the globe.

Each interim stage, starting with the Initial Operating Segment (IOS) in 2021, is projected to turn an operating profit and generate substantial public benefits, even using new, more conservative cost and ridership forecasts. This strategy will allow the appropriate level of flexibility for a project of this magnitude and complexity, enabling the Authority, the State, and other stakeholders to adapt to changing conditions and challenges during the course of implementing the project. FRA will continue to work closely with the Authority throughout the business planning, environmental analysis, and project development period to identify opportunities for operational and engineering efficiencies and additional interim phasing.

If necessary, CHSRA's Cooperative Agreement with FRA includes an interim use scenario that would make use of the Initial Construction Segment (ICS) before operations are ready to begin on the IOS. Under this scenario, the existing Sacramento-Bakersfield *San Joaquin* service could be routed over the ICS infrastructure, allowing for improved trip times and reliability on a corridor that is already the fifth busiest intercity passenger corridor in the nation, with over one million passengers annually. This approach would ensure that the ICS results in improved passenger rail service and public benefits even before the IOS is ready to begin operations.

Five key reasons the Authority is starting this project in the Central Valley:

1. *Backbone of the System*: The Central Valley segment will provide the core north-south infrastructure, allowing options for the next segment (either north to the Bay Area or south to the Los Angeles Basin) based on project readiness, funding availability, and other factors. Additionally, the connections into the urban cores of Los Angeles and San Francisco will rely primarily on existing rights-of-way and infrastructure; the Central Valley is where the most land needs to be acquired and entirely new infrastructure built. Doing this first makes sense—population growth will only drive these costs upward.

2. *Maximize Funding*: The land-use patterns and flat terrain found in California's Central Valley allow for lower acquisition costs, less complex system designs, and higher prospective speeds.

3. *Advanced Technology Demonstration*: The Authority has the opportunity to demonstrate America's capacity to design, build, and operate world-class high-speed rail service through the Central Valley. This segment will demonstrate the American rail industry's technological and operational capabilities.

4. *Project Readiness and Funding Availability*: The readiness of this segment to begin construction—as well as the statutory requirement for Recovery Act funding to be expended by the end of FY 2017—was a major factor in this decision. The environmental documents for the Central Valley segments will be complete in mid-2012, allowing construction to begin in late 2012.

5. *Growth and Environment*: By 2050, the Central Valley will have more than 13 million people; if it was its own state, it would rank 5th in the nation, more populous than the current populations of Illinois, Pennsylvania, or Ohio. The region is already showing signs of strain on area highways, and the existing airports are ill-equipped to deal with the surge in intercity travel demand that will be created by this growth. As mentioned, the Central Valley suffers from some of the worst air pollution in the nation—Bakersfield, Fresno, Hanford, and Visalia all rank within the top 10 worst metro areas for every pollutant category analyzed in a recent air quality report.[11]

Capital costs

There has been understandable attention on the Draft 2012 Business Plan's capital costs, which in year of expenditure (YOE) dollars increased from $43 to $98 billion for Full Phase 1 implementation. Why did the numbers increase?

- *Contingency and inflation*: $16 billion in contingencies have been included to account for inherent uncertainties in a long-term, complex project (these contingencies range from 15 to 25 percent allocated by cost category, with an additional unallocated contingency of 5 percent added on top). This is an increase from the $8.3 billion in contingencies in the previous plan. Additionally, given that this figure is expressed in "year of expenditure" dollars—which is less typical for multi-decade projects like this—approximately $27.5 billion is simply inflation. Of this inflation cost, $16 billion (or 59 percent) is due to the schedule extension in the Draft 2012 Business Plan. (The estimate conservatively assumes 3 percent annual inflation for the entire project implementation period. Lower inflation rates, as experienced in the past several years, would result in lower YOE costs).

- *Changes requested by local communities*: Local input, environmental necessity, and substantial population growth in the Central Valley have increased the need for viaducts, bridges, and tunnels. For instance, the length of elevated structures increased from 77 miles to 138-168 miles, and for tunnels from 32 miles to 51-52 miles (depending on alignment alternatives). The Authority estimates that 80 to 85 percent of the capital cost increase is due to "scope growth" factors such as these, while the remaining 15 to 20 percent is due to increases in component costs.

- *Refined engineering design and environmental studies*: The new estimates are based on more rigorous analyses, as the project has further advanced in the design and environmental review process. These estimates have been developed and examined by domestic and international experts in HSR design and construction.

These figures are in-line with international examples. A World Bank report found that HSR construction and equipment costs (excluding right-of-way acquisition and professional services) typically range from $56 to $112 million per mile.[12] The capital costs for the IOS and Bay-to-Basin phases are well within this range, especially when considering the difficult topographic and seismologic characteristics of California (see Table 2). The Full Phase 1 costs, while on the higher end of this range, are reasonable when considering the limited existing rail infrastructure

[11] American Lung Association, *Most Polluted Cities: State of the Air, 2011.* http://www.stateoftheair.org/

[12] World Bank, *High-Speed Rail: The Fast Track to Economic Development?*, July 2010.

into central Los Angeles and San Francisco (many international systems were able to build upon significant existing infrastructure for "last mile" connections into urban cores).

Table 2
California HSR Construction/Equipment Costs (from Draft 2012 Business Plan)
(excl. ROW and professional services)

Phase	Cost Per Mile (2010 $M)
Initial Operating Segment	$74-87
Bay-to-Basin	$84-100
Full Phase 1	$104-119

These costs should also be put into context. Assuming an annual GDP growth rate of 2.3 percent (the annual average growth rate experienced from 2000-2010), the total public *plus private* expenditures on this project in nominal dollars will be roughly 0.02 percent of U.S. GDP over the project's implementation period, and just 0.16 percent of California's GDP.

It is also useful to consider these costs in the context of other transportation projects in California. Replacing the east span of the Bay Bridge will cost $6.4 billion[13]; the 10-mile I-405 expansion in L.A. will cost $1 billion[14]; the planned 25-mile North County Corridor in the Central Valley is estimated to cost $1.2 billion[15]; and Los Angeles International Airport is undergoing a $4.1 billion modernization and expansion project[16]. Simply put—adding and maintaining transportation capacity in California, while vital, is expensive.

Funding and finance

The biggest question I hear is "how are we going to pay for all this, especially during difficult economic times?"

Nearly every large-scale infrastructure project—including our own interstate highway system as well as HSR systems across the globe—has gone through periods of uncertainty pertaining to long-term financing.[17] The important thing to recognize is that this project has realistic, achievable interim stages that allow for flexibility and innovation as the project is implemented, and the first stage is fully-funded. We do not need, and cannot expect, a multi-decade, set-in-concrete financial plan for Full Phase 1. What is needed at this stage is continued focus on a financial plan that bridges the gap between the initial work and the first stage of operations.

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[13] Bay Area Toll Authority. *San Francisco Bay Area Toll Bridge Seismic Retrofit and Regional Measure 1 Programs: Project Progress and Financial Update, February 2011.* http://bata.mtc.ca.gov/pdfs/monthly/February2011.pdf

[14] Los Angeles County Metropolitan Transportation Authority. *I-405 Sepulveda Pass Improvements Project: Project Benefits Fact Sheet.* http://www.metro.net/projects_studies/I405/images/I405-Project-Benefits-Fact-Sheet.pdf

[15] Caltrans. *North County Corridor Frequently Asked Questions.* http://www.dot.ca.gov/dist10/environmental/projects/ncc99to120/faq.html

[16] Los Angeles World Airports. *LA Next: Fun Facts About Modernizing LAX.* http://www.lawa.org/uploadedFiles/LAXDev/News_for_LAXDev/LANEXT%20Fun%20facts.pdf

[17] E.g. France, Germany, Spain, South Korea, and Japan all expanded their systems in a phased approach according to funding availability; the U.S. Interstate Highway system was jeopardized by major funding shortfalls in 1961, just a few years after the program began.

The Authority's Business Plan includes a mixture of secured and potential funding sources, including state bonds, operating profits from early segments, and federal grants, loans, and other finance tools. The private sector will also play a critical role in financing, building, and operating this system. However, given that there are no 220mph HSR corridors operating in the U.S. today, it is unrealistic to expect substantial private sector contributions until the project has advanced beyond initial construction. While some private investment is expected in early phases, once the initial segment is operating and generating a positive cash flow, the environment for attracting private capital will improve.

Skeptics have criticized the Authority's assumption that the federal government will play a major funding role in this project. To give a better sense of the scope of funding that the current draft business plan relies upon, in reality:

- The Authority's Draft 2012 Business Plan assumes no further federal grants until at least 2015.
- The level of unsecured federal grants assumed in the financial plan is not implausible. For the Initial Operating Segment and Bay-to-Basin phases, the plan assumes an average of about $1.42 billion per year (YOE) in federal grants from 2015-2026.[18]

While that level of support is certainly substantial, it is illustrative to think about it as compared to the total project cost and the other major infrastructure expenditures discussed above. A difficult economy is not an excuse to avoid or defer investments in our national infrastructure. Indeed, past generations of Americans built the infrastructure we rely on today during tough economic climates—the Hoover Dam, portions of California's water system, and the Brooklyn Bridge were all built in times of economic stress, and positioned the nation for success as we pulled out of those difficult periods.

Ridership and public benefits

Ridership levels are the key driver of public benefits, and thus FRA has analyzed the new ridership projections in the Draft 2012 Business Plan. We believe the new estimates make appropriately-conservative assumptions.

To develop the new ridership forecasts, CHSRA commissioned an independent Peer Review Panel composed of international experts in travel forecasting, who were responsible for reviewing methodologies and ensuring the model's functionality for business planning purposes. A number of adjustments to the previous approach were made by the Panel, which resulted in new forecasts that are more conservative than the previous figures. These new forecasts, in the range of 30 to 44 million annual passengers upon completion of Phase 1, are on the low side of the ridership experience on comparable international corridors (due to California's different population density, travel behaviors, and other factors):

[18] Assuming private sector contributions beginning in 2023 and the availability of a tax credit or similar program.

Table 3
HSR Ridership and Population Served

Corridor	Annual Ridership	Population Served	Ridership / Population Served
Los Angeles-San Francisco (Full Phase 1, 2035)	30,000,000	32,000,000	0.94
Taiwan (Taipei-Zuoying)	37,000,000	20,000,000	1.85
Tokyo-Osaka	151,300,000	75,000,000	2.01
France (TGV high-speed network)	98,000,000	25,000,000	3.92

As another point of comparison, Amtrak's "Next-Generation" plan for the Northeast Corridor (NEC) projects ridership between 38 and 52 million by 2050, after implementation of 220mph service comparable to that planned for California.

Some critics compare California's ridership projections to the 3.4 million people who currently use the NEC's Acela high-speed service, and suggest that this difference indicates California's estimates are inflated. This argument ignores several key facts, however:

- The Acela service is severely capacity-constrained—we simply cannot add enough seats to the trainsets or slots at Acela-served stations to accommodate the high demand (which is why an Acela ticket is relatively costly and trains are routinely sold-out).
- The Acela is not the only train running on the NEC—an additional 7.5 million people use the NEC's "regular" intercity service and 246 million riders use commuter services that operate over portions of the corridor (both of which are also capacity-constrained).
- The NEC faces a serious state-of-good repair (SGR) backlog than further hinders service quality and availability.[19]

Given that the California HSR system will also serve some commuter markets, will have lower ticket prices than the Acela, and will not have the same capacity or SGR constraints as the current Northeast Corridor, it is more appropriate to compare California's projections to HSR systems in other nations.

Even with higher capital costs and lower ridership projections, the project still has a strong business case. The Authority estimates that in the Bay-to-Basin stage, the benefit-cost ratio will be between 1.46 and 1.66; for Phase 1, between 1.57 and 1.78. FRA's internal analysis, which used the new, lower ridership figures, also shows robust benefits for the project (see Table 1.) Additionally, revenue projections based on these ridership estimates show the project generating

[19] Amtrak, "Northeast Corridor State of Good Repair Spend Plan – PRIIA Section 211", April 15, 2009. http://www.amtrak.com/servlet/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1249200493941&blobheader=application%2Fpdf&blobheadername1=Content-disposition&blobheadervalue1=attachment;filename=Amtrak_NEC_StateOfGoodRepair_PRIIA.pdf

an operating profit during each stage of service, beginning with the Initial Operating Segment (and even if ridership comes in at only 30 percent of projections in year five, the project *still* breaks even).

How do we move forward?

We have four immediate next steps:

- *Monitoring and oversight*: FRA's primary role is to ensure that the federal High-Speed Intercity Passenger Rail program grants result in projects delivered on-time and on-budget. We have a comprehensive grants monitoring plan in place, and are incorporating a strategy to use contractors for additional oversight and technical assistance, similar to the approach used by other DOT agencies.

- *Environmental studies*: Program-level environmental clearance was obtained in 2005, 2008, and 2010 for the HSR system. In fall 2011, FRA and the Authority issued Draft Environmental Impact Statements (EIS)/Environmental Impact Reports (EIR) for the Merced-Fresno and Fresno-Bakersfield segments. FRA is currently targeting spring 2012 for a record of decision (ROD) on the Merced-Fresno segment and the release of a Revised EIR/Supplemental EIS for the Fresno-Bakersfield segment. A ROD for the latter segment is targeted for late 2012.

- *Finalization of the 2012 Business Plan and strategy for reaching the next phase*: The Draft 2012 Business Plan was released in November 2011, and is currently going through a 60-day public comment period. The Authority will finalize the 2012 Business Plan in January.

- *Initial construction*: Construction is scheduled to begin in the Fresno area in late 2012. CHSRA will be utilizing a design/build project delivery approach to construction and contracting. In mid-November, the Authority issued an RFQ for the first $1.5 - 2 billion design/build construction contract.

Longer-term, there are a variety of efforts that will be ongoing in the years ahead. These include refining the delivery model and financing plan for future stages; negotiating with key stakeholders to define operating and engineering strategies for the Phase 1 Blended stage; and continuing environmental studies and analyses, as well as important outreach activities with affected communities, landowners, and other stakeholders.

Conclusion

In closing Mr. Chairman, the Administration agrees with the people of California that high-speed rail is vital to California's future. The business and public investment case for this project, even under the new cost projections, is strong. While this does not mean we ignore important questions related to phasing, costs, financing, or public benefits, it does mean that we must

continue to work with Congress and other stakeholders to develop creative and cost-effective approaches for moving forward. Secretary LaHood and I look forward to working with you to make this historic project another in a long line of proud examples of America's ingenuity and innovation. I would be happy to address any questions the Committee might have.

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