

## **APPENDIX 3.3-C: CHANGES TO PROJECT BENEFITS BASED ON 2018 BUSINESS PLAN**



## 1 INTRODUCTION

This appendix provides additional information regarding the benefits associated with the long-term operation of the high-speed rail (HSR) project. The document briefly summarizes assumptions about the HSR system and the corresponding key project benefit information presented in the *San Francisco to San Jose Project Section Final Environmental Impact Report (EIR)/Environmental Impact Summary (EIS)*. The benefits described in the Final EIR/EIS are based on the scenarios and assumptions contained in *Connecting and Transforming California: 2016 Business Plan* (2016 Business Plan) (California High-Speed Rail Authority [Authority] 2016), which was adopted by the Authority on May 1, 2016. This appendix provides information on how those benefits may change based on updated scenarios and assumptions contained in the *2018 Business Plan: Connecting California, Expanding Economy, Transforming Travel* (2018 Business Plan) (Authority 2018), which was adopted by the Authority on May 15, 2018. This information is intended to reflect the potential range of outcomes for HSR project benefits in the future and to inform the decision-making process.

The information contained in this appendix is part of the Final EIR/EIS. However, it does not constitute a change in the proposed HSR system and does not identify new or more severe adverse environmental impacts or changes to the discussion of adverse environmental impacts from the HSR system. The additional information does not change the feasibility of any project alternative or mitigation strategies considered infeasible or not reasonable for purposes of project-level analysis. This additional information is solely for comparing the analysis provided in the Final EIR/EIS to the 2018 Business Plan.

## 2 OVERVIEW OF KEY ASSUMPTIONS IN THE 2016 AND 2018 BUSINESS PLANS

### 2.1 2016 Business Plan

The Final EIR/EIS includes information on project benefits, including reduced vehicle miles traveled (VMT), energy use, and air pollution. These benefits were derived based on the assumptions in the 2016 Business Plan for the opening year for passenger service of the Silicon Valley to Central Valley Line (Valley-to-Valley Line) and Phase 1 of the HSR System (Phase 1). The Valley-to-Valley Line would connect San Jose to north of Bakersfield. Phase 1 would connect San Francisco and the Bay Area to Los Angeles and Anaheim.

Two primary forecasting scenarios were created: one assumes that the Valley-to-Valley Line would open in 2025 and the other assumes that Phase 1 would begin in 2029. Forecasts were also made for 2040, the planning horizon for the environmental analysis. A 5-year ramp-up assumption was made for growth in ridership after the opening of each section for revenue service. It was assumed that only 40 percent of the forecast ridership would materialize in the first year, 55 percent in the second, 70 percent in the third, 85 percent in the fourth, and 100 percent in the fifth.

Because the ultimate ridership of the HSR system would depend on many uncertain factors, such as the price of gasoline and population growth, the forecasts in the 2016 Business Plan and Final EIR/EIS consider medium and high ridership scenarios for each analysis year.

### 2.2 2018 Business Plan

The 2018 Business Plan builds on and updates the 2016 Business Plan. It summarizes progress since 2016, updates information and forecasts, and outlines a path for advancing the HSR system. The revised cost estimates and forecasts have been informed and improved by rigorous scrutiny and review by external experts and academics. The 2018 Business Plan also includes an updated analysis of the economic impacts of the system, which shows that the program is financially viable and a sound investment opportunity.

One of the key revisions to the 2018 Business Plan that could affect the benefits analysis presented in the Final EIR/EIS is the opening year assumption for the Valley-to-Valley Line and Phase 1. In its 2016 Business Plan, the Authority adopted the goal of connecting San Jose to

north of Bakersfield as part of the initial Valley-to-Valley Line. The 2018 Business Plan extends the Valley-to-Valley Line with service between San Francisco and Bakersfield. Extending the Silicon Valley to Central Valley Line to San Francisco and Bakersfield expands HSR to major urban centers at both ends of the line, which results in different ridership forecasts than the Valley-to-Valley Line as defined in the 2016 Business Plan. The extended Valley-to-Valley Line would not be complete until 2029. Accordingly, the opening year for Phase 1, which includes the sections from Bakersfield to Anaheim, from Madera to Merced, and final improvements between San Jose and San Francisco (Salesforce Transit Center), was updated in the 2018 Business Plan to 2033. As discussed, the Final EIR/EIS assumed that the Valley-to-Valley Line would begin operating and generating benefits in 2025 and Phase 1 would begin in 2029.

In addition to different opening years, the 2018 Business Plan presents different ridership forecasts for 2029 and 2040 than were assumed in the Final EIR/EIS. All forecasts presented in the 2018 Business Plan used the same models as the 2016 Business Plan. However, since the 2016 Business Plan, the ridership model has gone through additional internal and external reviews. In addition, key model inputs for all forecasting have been updated to reflect the latest available data, such as population forecasts and auto operating costs. Specifically, the following elements were updated:

- Socioeconomic forecasts
- Transit network plans
- Auto travel time
- Auto operating cost
- Parking costs
- Operations planning

Finally, the ridership forecast includes an enhanced risk analysis that considers new and additional risk variables. This enhanced risk analysis builds upon the risk analysis conducted in 2016 by including the following risk variables:

- **Reliability of HSR**—Captures uncertainty around on-time reliability.
- **Travel time in autonomous vehicles**—Measures the disutility of time spent in an automobile and considering how travel choices might change with autonomous vehicles.
- **Visitor travel**—Includes out-of-state trips from tourism, business, and other travel.
- **Induced travel**—Includes trips that would not have otherwise been made without the increased connections created by the HSR system.
- **Travel time**—Includes increased penalty applied to long-distance HSR trips that require long access/egress travel time.

## 2.3 Ridership Comparison

The 2016 Business Plan presents ridership forecasts for the initial segment of the Valley-to-Valley Line in 2025 under the medium and high ridership forecasts. The 2016 Business Plan also presents ridership forecasts for Phase 1 in 2029 and the 2040 planning horizon. Table 1 compares these ridership forecasts from the 2016 and 2018 Business Plans.

Based on the assumptions of the 2018 Business Plan, the extended Valley-to-Valley Line would open in 2029 and carry 71 percent fewer annual riders compared to the HSR system described in the 2016 Business Plan. The ridership comparison for 2029 is not exact given that the 2016 Business Plan assumes Phase 1 would be open by 2029 and the 2018 Business Plan assumes that only the extended Valley-to-Valley Line would be open by 2029. The most direct and applicable comparison is under 2040 conditions where both the 2016 and 2018 Business Plans assumed full build of the HSR system. As shown in Table 1, the 2018 Business Plan forecasts 9 to 18 percent fewer annual riders in 2040 than the 2016 Business Plan.

**Table 1 Comparison of High-Speed Rail System Ridership Forecasts Under the 2016 and 2018 Business Plans (millions of riders per year)**

| Forecasts               | 2025 <sup>1</sup> | 2029 <sup>2,3</sup> | 2033 <sup>4</sup> | 2040 <sup>5</sup> |
|-------------------------|-------------------|---------------------|-------------------|-------------------|
| <b>Medium Ridership</b> |                   |                     |                   |                   |
| 2016 Business Plan      | 3.0               | 19.3                | –                 | 42.8              |
| 2018 Business Plan      | –                 | 5.7                 | 23.6              | 40.1              |
| <i>Change</i>           | <i>NA</i>         | <i>-71%</i>         | <i>NA</i>         | <i>-18%</i>       |
| <b>High Ridership</b>   |                   |                     |                   |                   |
| 2016 Business Plan      | 4.2               | 26.0                | –                 | 56.8              |
| 2018 Business Plan      | –                 | 7.6                 | 30.8              | 51.6              |
| <i>Change</i>           | <i>NA</i>         | <i>-71%</i>         | <i>NA</i>         | <i>-9%</i>        |

Sources: Authority 2016, 2018

– = data not available

NA = comparison not available

<sup>1</sup> 2016 Business Plan assumes Valley-to-Valley Line will be open by 2025.

<sup>2</sup> 2016 Business Plan assumes Phase 1 will be open by 2029.

<sup>3</sup> 2018 Business Plan assumes extended Valley-to-Valley Line will be open by 2029.

<sup>4</sup> 2018 Business Plan assumes Phase 1 will be open by 2033.

<sup>5</sup> Both the 2016 and 2018 Business Plans use 2040 as the environmental analysis planning horizon

### 3 COMPARISON OF KEY PROJECT BENEFITS UNDER THE 2016 AND 2018 BUSINESS PLANS

Ridership estimates from the 2016 Business Plan (Table 2-1) were used in the Final EIR/EIS to assess project benefits under the medium and high ridership forecasts for 2040 in terms of reduced VMT, air pollutant emissions, and energy consumption, as compared to the No Project condition. Table 2 presents a summary of these key benefits. Note that criteria pollutant reductions are not shown as all pollutants would be reduced for all years and under all ridership forecasts. Refer to Tables 3.3-12 through 3.3-19 in Section 3.3, Air Quality and Greenhouse Gases, for estimated criteria pollutant reductions.

**Table 2 Key Annual Statewide Benefits Compared to the No Project Condition**

| Forecast         | VMT (million miles) | Diverted Aircraft Flights | GHG Emissions (million metric tons CO <sub>2</sub> e) | Energy Use (million BTUs) |
|------------------|---------------------|---------------------------|---|---------------------------|
| <b>2040</b>      |                     |                           |   |                           |
| Medium Ridership | 4,800               | 111,000                   | 1.0   | 19.3                      |
| High Ridership   | 6,600               | 107,000                   | 1.5   | 28.1                      |

BTU = British thermal unit

CO<sub>2</sub>e = carbon dioxide equivalent

GHG = greenhouse gas

VMT = vehicle miles traveled

The HSR system would provide a new travel mode and divert automobile trips and aircraft flights to the HSR. The reduction in both automobile and air travel VMT would provide benefits in the form of reduced congestion on both the state's highway system as well as at airports. Shifting passenger trips to HSR would also achieve substantial criteria pollutant and greenhouse gas (GHG) emissions reductions, as well as energy savings. Under the 2018 Business Plan ridership forecasts, the HSR system would achieve these benefits, but they would occur at different times and may be less than described in the Final EIR/EIS under Phase 1 in 2040.

Under Phase 1 in 2040, the 2018 Business Plan estimates that the HSR system would achieve 9 to 18 percent fewer annual riders than expected under the 2016 Business Plan. Because project benefits in the form of reduced VMT, air pollution, GHG emissions, and energy use are based on public use of the HSR system, it is reasonable to expect that the lower ridership forecasts of the 2018 Business Plan scenarios (Table 2-1) would lead to benefits in these areas accruing more slowly than anticipated in the Final EIR/EIS (Table 3-1). Accordingly, benefits achieved under the 2018 Business Plan may be 9 to 18 percent less than those presented in the Final EIR/EIS, depending on the ridership scenario.

#### **4 OTHER POTENTIAL BENEFITS**

The following additional benefits of the HSR project are described in the Final EIR/EIS and 2018 Business Plan:

- Travel time savings for HSR riders
- Travel time savings for highway users
- Travel time savings for airline passengers
- Reliability in travel times
- Reductions in vehicle operating costs
- Increased productivity for HSR riders
- Reduction in parking infrastructure needs
- Airline operator savings
- Improved transportation safety and reduced costs from accidents
- Jobs to operate and maintain the HSR system

In the *Connecting California: 2014 Business Plan* (Authority 2014), a benefit-cost analysis concluded that the anticipated quantifiable benefits from the HSR system exceed anticipated costs, regardless of buildout phasing or scenarios. This is true for assumptions in both the 2016 and 2018 Business Plans. However, the quantifiable benefits achieved under the 2018 Business Plan may follow the same trend of ridership and be 71 percent less in 2029 and 9 to 18 percent less in 2040 than the quantifiable benefits presented in the 2016 Business Plan.

#### **5 CONCLUSION**

Although the 2018 Business Plan assumes fewer annual riders in 2029 and 2040 and therefore reduced benefits when compared to the 2016 Business Plan, in both business plans the HSR system ultimately provides a more energy-efficient choice for personal travel that would help alleviate highway congestion and provide greater capacity for goods movement. Benefits would be achieved in terms of reduced VMT, air pollutant emissions, and energy consumption. With the HSR system as a backbone for the state's transportation infrastructure, there would also be new opportunities for transit connectivity and refocusing land use patterns that can take advantage of mass transit investment and other alternatives to automobile travel, reducing GHG emissions and moving the state closer to the "sustainable community" goals laid out in Senate Bill 375 (see Chapter 1, Project Purpose, Need, and Objectives, of the Final EIR/EIS).

## 6 REFERENCES

- California High-Speed Rail Authority (Authority). 2014. *Connecting California: 2014 Business Plan*. April 30, 2014.  
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