



CALIFORNIA High-Speed Rail Authority

California High-Speed Rail System

**FISCAL YEAR 2017-2018 IMPACT ANALYSIS
TECHNICAL SUPPORTING DOCUMENT**

Economic Impact Methodology Documentation

JANUARY 2019



Prepared by

for the California High-Speed Rail Authority

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Acronyms & Terms

Analysis	Fiscal Year 2017-2018 Analysis
ARRA	American Recovery and Reinvestment Act
Authority	California High-Speed Rail Authority
Caltrain	Peninsula Corridor Electrification Project
Electrification	Construction manager / General contractor
CMGC	
CP	Construction package
DB	Design build
E&E	Environment and engineering
EIR/EIS	Environmental impact report/Environmental impact statement
FTE	Full time equivalent
FY	Fiscal year
Historical Analysis	July 2006 – June 2017 Economic Impact Analysis
PA	Program administration
PCM	Project and construction management
PM	Program management
PMT	Program management team
Program	California High-Speed Rail Program
RA	Resource agency
RC	Regional consultant
RDP	Rail delivery partner
ROW	Right of way
SBE	Small business enterprise
Study Team	Authority Team consisting of the Business and Economic Branch
TPA	Third party agreements



1 Executive Summary

As the California High-Speed Rail Authority (Authority) transitions from a planning organization to a project delivery organization, the benefits of the Program's increasing investment have continued to ripple through the California economy. Starting with just a few employees a decade ago, the Authority now supports thousands of jobs across all functions from planning and environmental clearance to engineering and construction. This sustained employment, along with substantial investments in construction and other activities across the state, have generated substantial economic benefits around California and across the country.

The discrete economic impacts associated with the Authority's investments were first documented in *High-Speed Rail: Investing in California's Economy*, which was published in September 2017. That report detailed benefits that resulted from the historical investment in high-speed rail from July 2006 through June 2016 (Historical Analysis), and was followed by an updated version published in December 2017 that documented the economic impacts associated with spending that occurred in Fiscal Year 2016-2017.^{1, 2}

This report, the Fiscal Year 2017-2018 ("FY 2017-2018") Analysis Technical Supporting Document, provides an updated snapshot of the economic impacts resulting from Authority spending that took place over FY 2017-2018, which corresponds to July 2017 through June 2018. The methodology used to estimate the magnitude of these impacts consists of two components, both of which use the IMPLAN input-output model: a "top-down" approach, and a "bottom-up" approach.

The top-down approach aggregates project costs and assigns the appropriate industry sectors to calculate the associated economic impacts at the statewide level. The bottom-up approach involves a more detailed review of contract-level costs, including invoice hours (which are converted to full-time equivalents), and produces estimates for economic impacts at the county and regional levels, in addition to statewide totals.

During FY 2017-2018, the Authority expended approximately \$1.18 billion in funds, comprising activity primarily related to construction, planning, and the Authority's operations. As shown in Table ES-1, these expenditures supported approximately 9,100-9,400 job years within the State of California; approximately \$652-\$664 million in labor income; and over \$1.6 billion in total economic output. Combined with the results from the previous analyses described earlier, the Authority's expenditures have, since 2006, supported approximately 40,000 job-years, nearly \$3 billion in labor income, and over \$7 billion in total economic output across the state.³

¹ www.buildhsr.com/hsrinvestment/pdf/California_Economy_2017.pdf

² www.buildhsr.com/hsrinvestment/pdf/FY1617_CHSRA_Economic_Impact_Technical_Memorandum_FINAL_01122018_v2.pdf

³ These terms are defined in Section 4.1 of this report.



Table ES-1. California Economic Impacts, FY 2017-2018 & Program Total⁴

	Employment (job years)	Labor Income	Economic Output
Direct Effects	4,100 - 4,200	\$348 M - \$353 M	\$806 M - \$815 M
Indirect Effects	2,200 - 2,300	\$151 M - \$155 M	\$413 M - \$417 M
Induced Effects	2,800 - 2,900	\$154 M - \$156 M	\$452 M - \$460 M
FY 2017-2018 Total	9,100 - 9,400	\$652 M - \$664 M	\$1,670 M - \$1,690 M
Program Total (July 2006 – June2018)	37,600 – 42,600	\$2,600 M – \$2,990 M	\$6,780 M – \$7,560 M

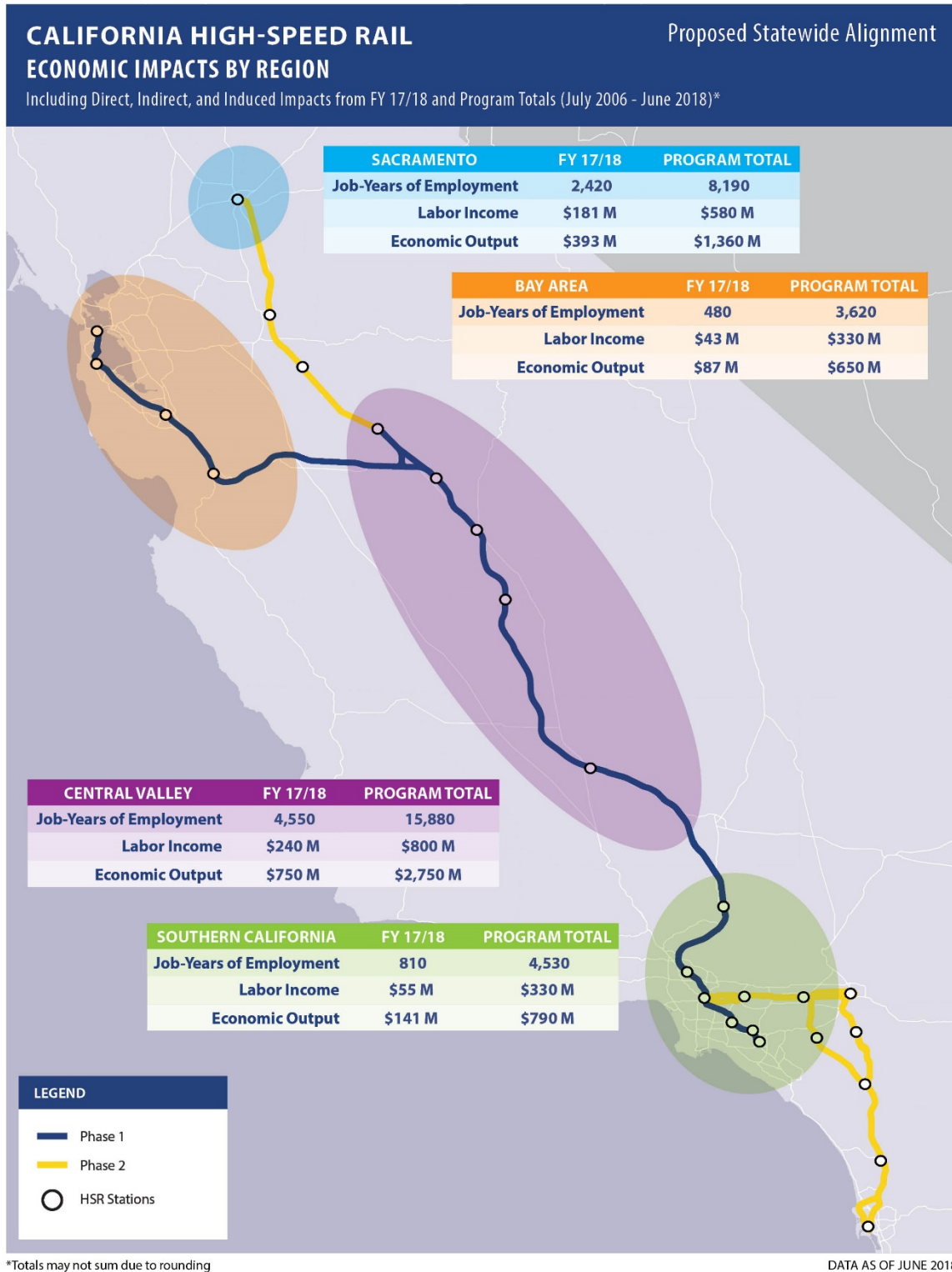
These economic impacts have been felt across the state, with the most sizable effects taking place in the Central Valley, where substantial construction activities are underway. These construction activities have supported over 4,550 job-years in the Central Valley region in FY 2017-2018, while over 2,400 job-years have been supported in the Sacramento region.

The economic impacts of Authority expenditures have been felt beyond the State of California, as well. Approximately \$26.6 million (3%) of the Authority's expenditures went to contractors outside the state, with approximately 94.5% of that out-of-state spending retained within the United States.

⁴ Note: totals may not sum due to rounding



Figure ES-1. Economic Impacts by Region, FY 2017-2018



2 Introduction

The California High-Speed Rail Authority (Authority) is responsible for planning, designing and building the first high-speed rail system in the nation. California's high-speed rail system will connect the mega-regions of the state, contribute to economic development and a cleaner environment, create jobs and preserve agricultural and protected lands. The system will run from San Francisco to the Los Angeles basin in under three hours at speeds capable of over 200 miles per hour. The system will eventually extend to Sacramento and San Diego, totaling 800 miles with up to 24 stations.

Construction is under way and the Authority has transitioned from a planning to a project delivery organization. As a result, the economic impact of its activities has grown substantially. Starting with just a few employees a decade ago, the project has now supported thousands of jobs across all functions from planning and environmental clearance to engineering and construction. The investment has generated substantial economic benefits and has spurred further economic impacts around California and across the country. To understand those economic impacts, the Authority developed the report **High-Speed Rail: Investing in California's Economy**, which was published in September 2017. This report detailed benefits that resulted from the historical investment in high-speed rail from July 2006 through June 2016 (Historical Analysis).⁵ To learn more about the methodology of the Historical Analysis, please review the Technical Supporting Document.⁶

Following this initial analysis, the Authority now updates and reports the Program's economic impact on a regular basis, beginning with the Fiscal Year 2016 – 2017 Analysis, which was published in December 2017.⁷

Figure 1. California High-Speed Rail System



⁵ www.buildhsr.com/hsrinvestment/pdf/California_Economy_2017.pdf

⁶ hsr.ca.gov/docs/brdmeetings/2017/brdmtg_071817_Item4_ATTACHMNT_Economic_Impact_Technical_Memorandum.pdf

⁷ www.buildhsr.com/hsrinvestment/pdf/FY1617_CHSRA_Economic_Impact_Technical_Memorandum_FINAL_01122018_v2.pdf



This FY 2017-2018 Analysis Technical Supporting Document outlines the methodology that was used in developing this Analysis, which covers the period of July 2017 to June 2018. This document serves as the methodological overview and provides the detailed data and assumptions supporting the results in the Analysis and other documents that may reference the results. In this FY 2017-2018 Technical Supporting Document, the previous analysis that focused on July 2006 through June 2016 will be referenced as the Historical Analysis, and the analysis that focused on July 2016 through June 2017 is referred to as the FY 2016-2017 analysis.



3 Context and Objective

3.1 Purpose of the Report

The FY 2017-2018 Analysis estimates the economic impact of the Authority's expenditure from July 2017 through June 2018 including job-years, labor income, and economic output.⁸ This analysis reports the economic impacts of the project on the State of California, as well as at regional, sub-regional, and national levels. A summary of the geographic breakdown of impacts can be found in *Section 4: Economic Impact Overview* and *Section 6: Results*.

The scope of this analysis is strictly limited to the economic impacts from historical project expenditures. It does not attempt to quantify the many long-term benefits and impacts associated with future rail operations, such as increased accessibility, reduced vehicle miles traveled and vehicular congestion, increased safety, greenhouse gas emission reductions, increased economies of agglomeration and other benefits. Additionally, this analysis does not consider the economic effects resulting from changes in consumption due to the collection of revenues. Lastly, the results of this analysis reflect the gross economic benefits of the project and do not consider the potential benefits of alternative uses of the state and federal funding sources used to pay for the project, including the potential benefit to other programs, services, or the State of California if funds had not been allocated to the Program.

3.2 Literature Review and Validation

Several studies have estimated the economic impacts and overall benefits of investment in transportation infrastructure in general, and of the Program specifically. A review of studies was conducted for the previous Historical Analysis Technical Supporting Document to provide analytical context, ensure a methodology consistent with industry standards, and benchmark results when applicable.⁹

For the Historical Analysis, the Authority requested review and validation from a number of industry experts both within and outside of government who reviewed inputs, assumptions, methodology, and outputs. Reviewers included the University of the Pacific, the California High-Speed Rail Peer Review Group, the State of California Department of Finance, and the California Department of Labor. All reviewers were positive in their review that the methodology used met industry standards. The FY 2017-2018 Analysis followed similar methods and approaches as the Historical Analysis so the review and validation conducted at that time remains relevant.

⁸ Technical definitions of these economic impact metrics are provided in *Section 3.1* of this report

⁹ hsr.ca.gov/docs/brdmeetings/2017/brdmtg_071817_Item4_ATTACHMENT_Economic_Impact_Technical_Memorandum.pdf



4 Economic Impact Overview

4.1 Types of Economic Impacts

The results of the Analysis are expressed in standard economic metrics including job-years, labor income, and value added. The following section provides definitions of these metrics.

4.1.1 Job-Years and Full-Time Equivalents

In the context of the Program's economic impacts, **job-years** are defined as the equivalent number of one-year-long, full-time jobs supported by the project. For example, if one full-time job is supported for two years, it therefore represents two job-years. In 2009, the White House Council of Economic Advisers (CEA) produced estimates of job creation that would result from ARRA; those estimates were expressed in job-years because, as the report describes, "for some purposes, looking at the effects at a single point in time is not the most useful approach."¹⁰ The FY 2017-2018 Analysis, the FY 2016-2017 Analysis, and the Historical Analysis considered historical, project-related spending over an 11-year period. Because the volume of spending was highly variable from year to year throughout the analysis period, and because the types of services procured with that spending changed substantially over the life of the project, reporting the results of this analysis as job-years is most appropriate.

Full-time equivalent (FTE) is a term frequently employed by agencies and other public employers. As described by the U.S. Government Accountability Office, an FTE is a measure of employment relative to the full-time hourly obligation for a given job.¹¹ That is, if a job entails a 35-hour workweek with 15 days of paid time off, the FTE for that role would be equal to 1,700 annual hours—therefore, an employee who worked 850 hours in that role in a given year would be described as 0.5 FTE. This allows for standardization between full-time and part-time positions to create one easy-to-understand estimate of the total amount of employment generated. As further described in section 4.3.2 *Bottom-Up Approach*, for certain contracts, FTEs directly supported by the project were estimated based on a detailed review of historical invoices detailing employee hours worked. For the purposes of this analysis, FTEs calculated from this data review represent the equivalent of job-years as defined above. In other words, one FTE supported on a contract is equal to one direct job-year supported.

4.1.2 Labor Income/Earnings

In addition to jobs supported, input-output models also report the labor income generated by the project.¹² This figure includes all forms of employment income, including compensation (wages, benefits, and payroll taxes) firms paid to employees, and income earned by self-employed workers or unincorporated sole proprietorships.

4.1.3 Output

The final economic-impact metric reported in this analysis is output, which represents the total value of industry production associated with the Authority's expenditures. For service-industry

¹⁰ <https://obamawhitehouse.archives.gov/administration/eop/cea/Estimate-of-Job-Creation/>

¹¹ https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/memoranda_2010/m10-08.pdf

¹² See Section 4.2.1 *RIMS & IMPLAN Methodology* for more information on input-output models



sectors, this value is equal to total sales, while for retail sectors, output is equal to businesses' gross margin. For manufacturing sectors, output is equal to sales, less any change in inventory.

4.1.4 Direct, Indirect, and Induced Economic Impacts

Direct impacts are the economic effects generated by direct spending on a project. In the case of California high-speed rail, these impacts result from the Authority's spending on Authority employees as well as its contractors (including both construction contractors and professional services).

Indirect impacts are the economic effects that occur in the next step in the supply chain. These impacts are dispersed among the industries that supply intermediate goods and services to firms with direct impacts. For California high-speed rail, these impacts can be observed in a diverse range of industries across the state—including, for example, the materials producers who supply the construction firms, as well as the technology vendors who service the professional service firms.

Induced impacts are the economic effects that result when income earned by direct and indirect employees gets spent elsewhere in the economy. For example, both the civil engineer working full-time on California high-speed rail and the software engineer who codes a new version of AutoCAD spend their household income on housing, groceries, and other expenses in California.

4.2 Program Expenditure

From July 2006 through June 2016 (Historical Analysis), the Authority invested \$2.3 billion in planning and constructing the nation's first high-speed rail system. In FY 2016-2017, the Authority invested \$1.28 billion. In the period covered in this FY 2017-2018 report, \$1.18 billion in expenditure took place, for a total program investment of nearly \$4.77 billion from July 2006 to June 2018. Funding for these contracts has been provided by a mix of federal and state sources.

4.2.1 Program Expenditure by Category

Program investments can be broken down into five general expenditure categories:

Construction – expenditure in this category includes the Design-Build (DB) contractors, California State Route 99 Relocation project being undertaken by Caltrans (through a contractor) and Project and Construction Management (PCM) contracts. Tasks under the construction category include final design, construction administration, utility relocation, site clearing and civil works construction.¹³

Planning/Environmental – expenditure in this category includes Regional Consultant (RC) and Environmental and Engineering (E&E) contract costs. Tasks under the planning/environmental category cover the preparation of project site-specific Environmental Impact Report/Environmental Impact Statement (EIR/EIS) documents and preliminary engineering for

¹³ The categories used in this analysis and described in this section are meant to be a summary for purposes of this analysis. The Authority's financial reporting may provide different breakdowns to manage and report on the program.



all the project sections.¹⁴ Although other parts of the organization also perform duties related to the planning and environmental clearance processes, this simplification of the variety of services provided is appropriate for the purposes of this type of economic analysis.

The project has been divided into ten separate sections along the alignment. Each of the sections will go through the EIR/EIS process before permitting, right-of-way (ROW) acquisition, and construction can begin in the area. The project sections (shown in Figure 2) include:

1. San Francisco to San Jose
2. San Jose to Merced
3. Merced to Sacramento
4. Merced to Fresno (Central Valley Wye Supplemental Analysis)
5. Fresno to Bakersfield (Locally Generated Alternative Supplemental Analysis)
6. Bakersfield to Palmdale
7. Palmdale to Burbank
8. Burbank to Los Angeles
9. Los Angeles to Anaheim
10. Los Angeles to San Diego

Figure 2. High-Speed Rail by Project Section



Program Administration – expenditure in this category includes Authority expenses and the Rail Delivery Partner (RDP)/Program Management Team (PMT) contracts costs. Tasks under the program administration category cover program management, program integration and coordination, and overall program delivery tasks. Although the Authority and RDP perform work across the other categories, for this analysis they are included separately in this summary category.

¹⁴ The environmental review process must comply with the standards set forth in both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) review process. As such, both EIR and EIS documents are required.



Real Property Acquisition – expenditure in this category includes right-of-way (ROW) support services (mapping, surveying, appraisal, negotiation and acquisition) contracts costs, relocation expenses, and land acquisition purchase payments.

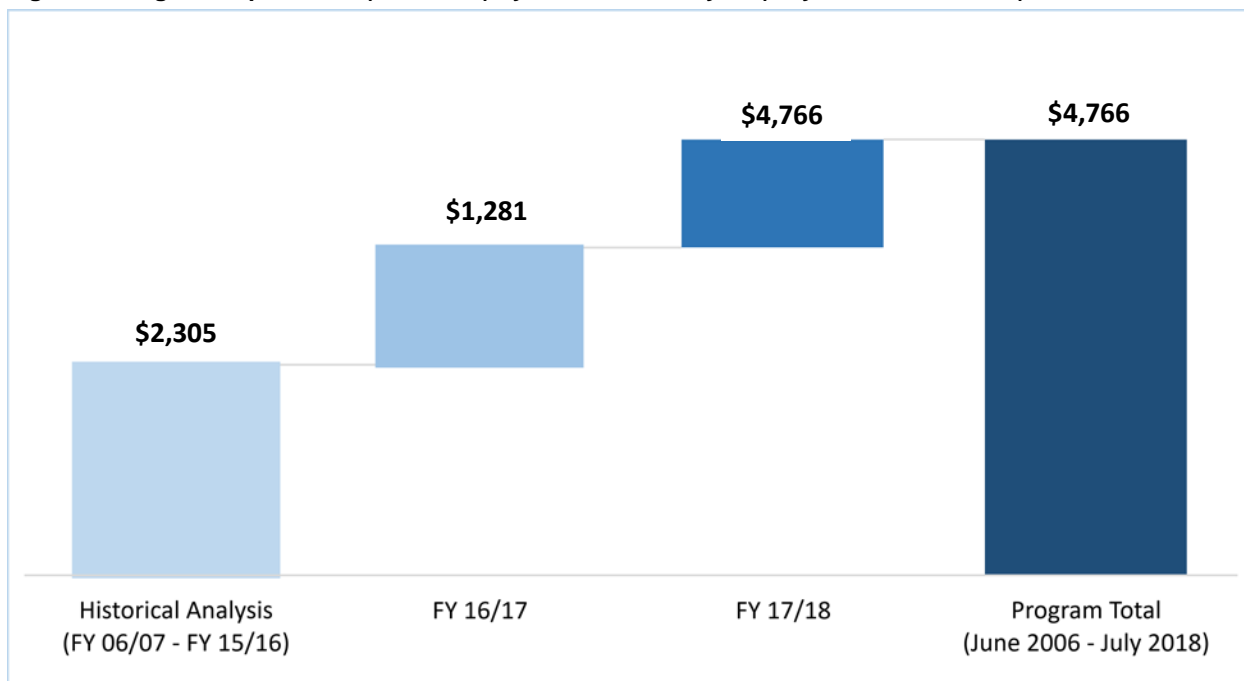
Other – expenditure in this category includes Resource Agencies (RA), Third-Party Agreements (TPA), legal, financial services, and other miscellaneous contracts costs.

- RA contracts are agreements with local, state and federal government agencies for station design, permits, review fees, etc.
- TPA contracts are agreements with utilities, railroads and other stakeholders for utility relocation work along the alignment.
- Legal contracts are for various legal advisory services for the Program.
- Financial services contracts are for accounting and financial advisory services for the Program.

Bookend Projects – expenditure in this category reflects projects that are defined under SB 1029 (Item 2665-104-6043 as added to Section 2.00 of the Budget Act of 2012) to receive specific project investments from Prop 1A and other commitments that the Authority has made through agreements with local agencies. As of FY 2016 – 2017, the only Authority expenditure for these projects was for Peninsula Corridor Electrification Project (Caltrain Electrification). Moving forward, additional funds may be allocated to additional bookend projects.

The total expenditure by economic analysis timeframe is shown in Figure 3.

Figure 2. Program Expenditure (\$ millions) by Economic Analysis (July 2006 – June 2018)^{15,16}



¹⁵ Source: Total Project Expenditures with Forecasts Reports, August 2018

¹⁶ Totals may not sum because of rounding.



Out of the approximately \$1.18 billion of total program investments in FY 2017-2018 , \$841 million was used as an input to the economic impact input-output modeling described in this report, with \$815 million of that spending taking place in California. The economic impact calculations in this study exclude expenditure spent on ROW land acquisition payments. Payment to property owners for land acquisition is considered an economic transfer and is excluded from the economic impact analysis. However, support activities for land acquisition, such as appraisal, surveying and geotechnical services, do generate economic impacts and are included in the analysis.

4.3 Geographies Analyzed

The report analyzes the impact of program investments over a number of different geographies – ranging from statewide to specific regions and counties within California. See *Section 5: Results* for detailed analysis.

4.4 Analysis Horizons

This study analyzes economic impacts of expenditure during Fiscal Year 2017-2018, from July 2017 through June 2018. Additionally, the results will include the total impacts supported by the program by adding the Historical Analysis and the FY 2016 - 2017 Analysis to the FY 2017-2018 results. New analysis was only undertaken for spending that occurred from July 2017 through June 2018.



5 Methodology

The impacts presented in this report were estimated using an industry-standard approach. To estimate a range for the statewide results, both a top-down and a bottom analysis were used. The top-down approach applies IMPLAN model multipliers to total project costs, allocated by industry sector. The bottom-up approach incorporates a review of contract-level costs, translating the labor-hours expended by Authority staff and external parties into FTEs; these FTEs were then used as an input to the IMPLAN model to estimate economic impacts at the county, regional, and state levels. This process involved rigorous internal and external research on detailed project expenditures, and customized geographic economic impact modeling using IMPLAN software.

The combination of the top-down and bottom-up approaches provide a reasonable range of outputs that can be used as benchmarks against other economic impact studies, and as estimates for the spatial distribution of economic impacts resulting from project investments.

This study captured expenditures that were incurred between July 2017 and June 2018, hereafter referred to as the 'study period'.

5.1 Data Collection

As discussed above, expenditure and labor hours data were collected as inputs to the IMPLAN input-output model. These inputs were categorized by industry sector and location at the zip code level. The following sections detail the data collection process used to develop these inputs.

5.1.1 Data Collection Strategy

An inventory of all existing data sources on expenditure, labor hours, and work locations between July 2017 to June 2018 was completed. Please see the 2016 Technical Supporting Document for more information.¹⁷

The bottom-up approach was based on a review of invoices that have been approved and paid by the Authority, as recorded in its accounting systems. As with previous expenditures analyses, the data collection focused on the contracts with the highest expenditures. This approach

IMPLAN

IMPLAN is a widely-used, industry-standard input-output model that quantifies the aggregate economic impact of direct spending in a local economy. Economists use input-output models to assess and quantify the broader economic impacts, such as additional labor income and increased demand in intermediate goods and services, generated from an initial change in spending within a particular industry and in a given geography.

See Section 0: IMPLAN Methodology for a more in-depth discussion of IMPLAN models.

¹⁷http://hsr.ca.gov/docs/brdmeetings/2017/brdmtg_071817_Item4_ATTACHMENT_Economic_Impact_Technical_Memorandum.pdf



significantly reduced the number of invoices reviewed for employee-level data, while still capturing most of the applicable program costs.

Nineteen of the largest contracts in FY 2017-2018 – which together comprised the majority of total contract expenditure – were reviewed in detail, as were the Authority’s direct expenditures. These 19 major contracts are shown in Table 1. Each of these contracts include a prime contractor (which is sometimes a joint venture) and multiple subcontractors. The Authority’s Small Business Enterprise (SBE) goals apply to these contracts.

The study team worked with contract managers of the major Regional Consultant prime contractors to gather spreadsheet-based information on the hours, cost, and/or location of work performed during the study period. These were then cross-checked against the Authority financial office’s accounting records to ensure consistency. Where such information was not available, the study team mined data from copies of the detailed invoices that were submitted by each contractor. These invoices contain the labor hours and fully-burdened labor cost for each employee working on the contract for a given month, as well as the industry in which the contractor operates.¹⁸ Assumptions inherent to the data collection process are discussed further in Section 5.1.3.

Table 1. Major Contracts Reviewed

Contract Number	Prime Contractor	Contract Category
Construction		
HSR13-06	Tutor Perini Zachary Parsons Joint Venture	DB
HSR13-57	Dragados-Flatiron Joint Venture	DB
HSR12-06	Caltrans (SR-99)	CMGC
HSR14-32	California Rail Builders	DB
HSR11-20	Wong-Harris	PCM
HSR13-81	Arcadis	PCM
HSR 15-01	HNTB	PCM
Planning/Environmental		
HSR08-03	AECOM	RC
HSR15-34	HNTB	RC
HSR13-44	T.Y. Lin	RC
HSR14-39	STV	RC
HSR08-05	Parsons Transportation Group	RC

¹⁸ Labor burden is the actual cost of a company to have an employee, aside from the salary the employee earns. Labor burden costs include benefits that a company must, or chooses to, pay for employees included on their payroll (for example, the cost of health insurance coverage).



HSR14-42	SENER	RC
HSR 13-43	CH2MHill	RC
HSR 14-56	Westervelt	RC
HSR 15-172	Kleinfelder	RC
Program Administration		
HSR14-66	WSP	PM
Other		
HSR15-92	KPMG	Financial
HSR17-20	DB Engineering and Consulting	Early Train Operator

Expenditures from other, smaller contracts not listed in Table 1 were captured at the contract level using the Authority financial office's existing contract expenditure database.

5.1.2 Invoice Review

The invoice review process entailed extracting monthly expenditure and labor hours data from each of the major contracts stated above. Building off the previously established methodology, the study team worked with contract managers to receive a spreadsheet accounting for expenditures and work location by employee directly from the prime contractors, where possible. Where such data was not available, the study team referred to contractor-submitted invoices, copies of which are stored on FI\$Cal, the state of California's Financial Information System. These invoices typically contain labor hours, hourly rates, and direct costs by staff member for each firm. The study team received updated office locations for the majority of prime contractor employees, however when not available, prime contractor's employees were assumed to have completed their work in the same office to which they were assigned in the FY 2016-2017 geographic spending profile.¹⁹ A web search was used to determine office locations for staff who were not previously recorded in the database, as needed. Subcontractors were assumed to have completed all of their work within the same office, which was assigned as either the California office closest to the project site or the head office (for out-of-state firms). Additional assumptions inherent to the invoice review process are discussed further in Section 5.1.3.

Overall, the result of the invoice review process was a detailed database of information that provided information on when, what type, and how much expenditure and how many labor hours the Program's investments yielded.

¹⁹ As detailed in *Fiscal Year 2016-2017: Economic Impact Analysis Technical Supporting Document*
https://www.buildhsr.com/hsrinvestment/pdf/FY1617_CHSRA_Economic_Impact_Technical_Memorandum_FINAL_01122018_v2.pdf



5.1.3 Geographic Assumptions

As mentioned previously, the study team worked with contract managers of the major contracts to receive as much expenditure information as possible, including a focus on the specific geographic detail on where work was completed. This geographic information allows the Authority to describe where exactly the economic impacts of its spending are felt, particularly within the State of California. The contractor outreach process varied slightly depending on the contract category.

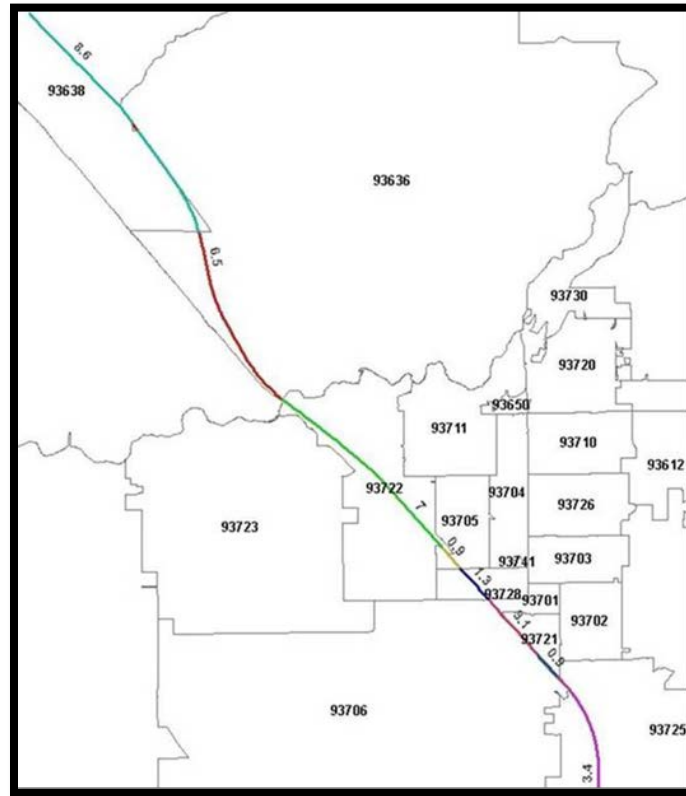
For professional service contracts, the goal was to match staff members with an office location where the work was performed. Many prime contractors provided a list of employee names and office locations for their direct employees. As described in the previous section, where this was not available, prime contractor's employees were assumed to have completed their work in the same office where they were employed in FY 2016-2017 geographic spending profile, or from a web search of employee or firm office addresses. For staff whose office addresses were not available, hours and expenditures were assigned to the most logical office location.²⁰ Subcontractors were assumed to have completed all their work within the same office, the location of which was assigned according to the same criteria.

For design-build contracts, subcontractor payments were allocated to the main regional office of that subcontractor. Prime contractor costs were first categorized as either professional services costs or construction costs. Next, professional services costs were assigned to the project office of each construction package (CP): CP1's project office is in Fresno, CP2-3's project office is in Selma and CP4's project office is in Wasco. Construction costs were allocated by linear miles per zip code along the alignment for each CP. This was done by plotting each of the CP alignments over a shapefile of zip codes, and then calculating the percentage of the total alignment length that falls within each zip code. Figure 4 shows an example of the CP1 alignment-zip code map overlay. This same process was undertaken for Caltrans' work on SR-99 realignment.

²⁰ Expenditures were assigned to the California office where available. For contractors with more than one office in California, expenditures were assigned to either the largest office in the state, or the office located closest to where the work was being performed. Expenditures by out-of-state subcontractors were assigned to the head office.



Figure 3. CP1 Alignment-Zip Code Map Overlay



The location of work for costs not included in the major contracts (such as Authority costs, ROW services, ROW relocation, Resource Agencies, or Third-party Agreements) were obtained through a variety of outreach and data gathering methods. Location of Authority costs were allocated based on the number of staff and their authorized salaries for each of the Authority's offices. ROW relocation costs were allocated to the recipient of the compensation. For other contracts such as ROW services firms, Resource Agencies, and Third-party Agreements, the study team determined the location of prime contractor offices based on either the FY 2016-2017 geographic spending profile, or a web search.

5.1.4 Data Quality Assurance / Quality Control

To ensure data reliability, the study team conducted thorough quality assurance / quality control procedures in every step of the data collection process including invoice review, contractor outreach, and data gap interpolation. Consultant costs submitted by prime contractors or tabulated from submitted invoices were validated against the payment logs of the Authority's financial office. This was especially important when considering the many ways in which data were formatted. Employee office locations submitted by contractors were validated through web searches to confirm that companies do have offices in the locations that they provided.



5.2 Analysis Approach

As described previously, the Analysis was performed using both a top-down and bottom-up approach, providing a range of impacts and allowing for internal quality checks. The input-output modeling software IMPLAN was used to conduct both types of analysis. IMPLAN Methodology

Following the data-collection tasks detailed in *Section 4.1 Data Collection*, the expenditure database was analyzed using input-output modeling, a technique that quantifies the aggregate economic impact of direct spending in a local economy. Input-output models describe how relationships between different industries determine the total economic impact of a particular type of spending; for example, how new expenditures in the construction sector will cycle through the intermediate steps in the supply chain and generate increased demand for intermediate goods and services ranging from concrete to carpenters. In addition, input-output modeling considers how the additional labor income generated by spending in a particular industry—e.g., the salaries earned by carpenters employed by the Program’s contractors—will translate into increased consumer spending in the form of household expenditures.

For this analysis, IMPLAN was used to calculate economic impacts at the statewide level, at the regional level, and at the county level (for select counties). The analyses used pre-defined regional economies for states and counties embedded within IMPLAN. The expenditure data used for inputs were expressed in nominal dollars; IMPLAN is capable of interpreting inputs from different dollar-years and performing the conversion to constant dollar-years.²¹ Similarly, IMPLAN is able to generate outputs in any desired dollar-year. For this analysis, all inputs and outputs were expressed in 2017 dollars.

²¹ The base year for IMPLAN’s multipliers is 2014, meaning that the multipliers reflect industry relationships as observed in 2014. This is industry standard and has little effect on the results.



6 Results

This section details the results of the FY 2017-2018 as well as total impacts to date, including the Historical Analysis and the FY 2016-2017 analysis. Please see the Technical Supporting Documents for the Historical Analysis for details on the first 11 years studied.²² Impacts are shown over a variety of geographies and results detail specific impacts in more depth.

As discussed in the previous section, this analysis shows geographic outputs based on location of the work being performed or where companies are located, rather than where those doing the work live. In addition, all inputs and results are expressed in constant 2017 dollars.

6.1 California Economic Impacts

For Fiscal Year 2017-2018 the Authority invested about \$841 million in planning and construction of the high-speed rail system, of which approximately \$815 million was retained in the State of California.²³ This investment has supported 9,100 to 9,400 job-years of in-state employment (including direct, indirect, and induced impacts) and generated \$1,670 to \$1,690 million in total in-state economic activity. Over the life of the project, the Authority has invested nearly \$4.5 billion, has supported 37,600 to 42,600 job-years of employment, and generated \$6.8 billion to \$7.6 billion in total economic output.

As mentioned above, the vast majority of this economic activity has taken place in the State of California, with 97% of FY 2017-2018 spending expended going to companies and workers in the state. This estimate was developed using the data in the bottom-up analysis, from which spending taking place in non-California zip codes was filtered out.²⁴ From analysis inception (FY 2006-2007) until June 2018, about 95% of the project expenditure has taken place in the State of California.

What are Direct, Indirect, and Induced Impacts?

Direct impacts are the economic effects generated by direct spending on a project.

Indirect impacts are the economic effects that occur in the next step in the supply chain. These impacts are dispersed among the industries that supply intermediate goods and services to firms with direct impacts.

Induced impacts are the economic effects that result when income earned by direct and indirect employees gets spent elsewhere in the economy.

²³ \$841 million does not include ROW and other expenditure not captured in the economic impact analysis.

²³ \$841 million does not include ROW and other expenditure not captured in the economic impact analysis.

²⁴ This percentage of spending within the state was estimated using the total expenditure for FY 2016-2017 minus ROW acquisition and Bookend Project expenditure



Table 2. California Economic Impacts, FY 2017-2018 & Program Total²⁵

	Employment (job years)	Labor Income	Economic Output
Direct Effects	4,100 – 4,200	\$348 M - \$353 M	\$806 M - \$815 M
Indirect Effects	2,200 – 2,300	\$151 M - \$155 M	\$413 M - \$417 M
Induced Effects	2,800 – 2,900	\$154 M - \$156 M	\$452 M - \$460 M
FY 2017-2018 Total	9,100 – 9,400	\$652 M - \$664 M	\$1,670 M - \$1,691 M
Program Total (July 2006 – June 2018)	37,600 – 42,600	\$2,600 M – \$2,990 M	\$6,780M – \$7,560 M

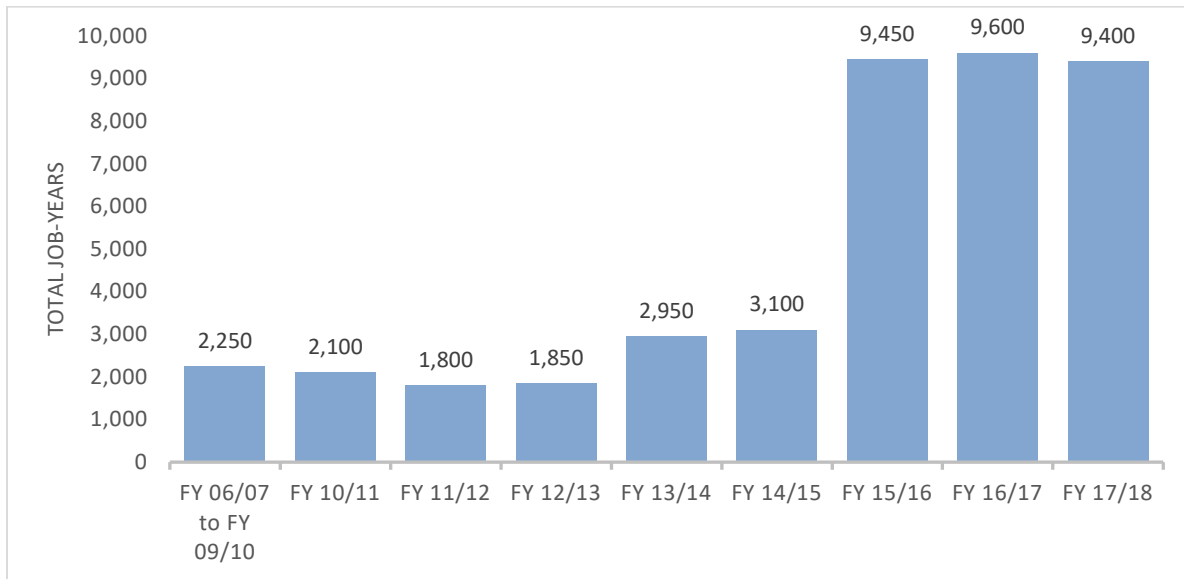
6.2 Employment Impact Overview

Job-years supported by the Authority's expenditures have grown significantly over the past several years as construction commenced and ramped up in the Central Valley. Figure 6 shows this growth in job-years from FY 2006-2007 to the current analysis, with a noticeable increase from FY 2014-2015 to FY 2016-2017, when construction in the Central Valley began. The historical jobs analysis took the results of the top-down statewide approach for the total impact shown in the Historical Analysis for statewide impacts and allocated them to each fiscal year based on the share of total expenditures that took place in that fiscal year.

²⁵ Note: totals may not sum due to rounding



Figure 4. Statewide Total Job-Years per Fiscal Year, July 2006 – June 2018²⁶



6.2.1 Job-Years by Industry Sector

As construction has ramped up, it has increased as a share of overall project expenditures and industry impacts and has surpassed architectural, engineering and other services as the largest category of direct employment on the program. This is consistent with the Authority’s transition from a historically planning organization to a project delivery organization, with active, large-scale construction contracts in the field.

Table 3 shows the split of direct employment impacts by economic sector in FY 2017-2018 and since July 2006. The table does not include indirect and induced effects that would add additional support services beyond engineering, planning, construction and management related activities. As shown in Table 2 earlier in this section, direct job-years over FY 2017-2018 range from 4,100 to 4,200. The split of public versus private job-years over this time period is about 88% in the private sector and 12% in the public sector. Public job-years include the Authority and Resource Agencies, while private ranges from construction and engineering to legal services, etc.

²⁶ Includes direct, indirect, and induced job-years.



Table 3. Largest Direct Job-Years per IMPLAN Sector, FY 2017-2018 & Program Totals ²⁷

IMPLAN Sector	FY 2017 2018 Job Years	Program Total Job Years		
		(FY 2006	2007	FY 2017 2018)
Construction of new highways and streets (Sector 56)	2,000	7,500		
Architectural, engineering, and related services (Sector 449)	1,160 – 1,530	5,860 – 8,460		
Other state government enterprises (Sector 523)	360 - 680	1,700 – 2,380		
Real estate (Sector 440)	170	250 – 400		
Accounting, tax preparation, bookkeeping, and payroll services (Sector 448)	40 – 110	710 – 1,140		
Rail transportation (Sector 409)	60	110 – 210		

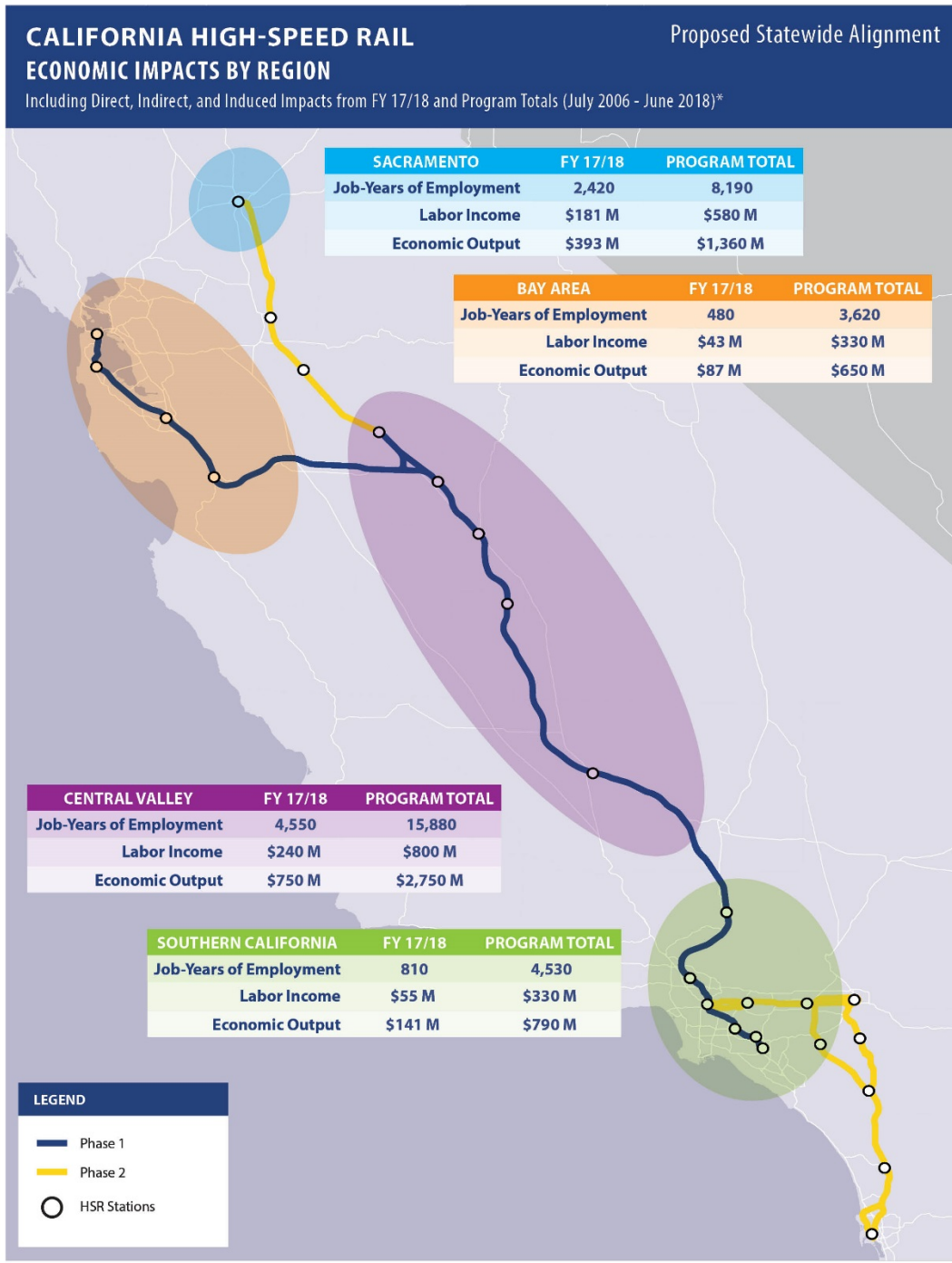
²⁷ The range of job-years is from the bottom-up and top-down analysis.



6.3 Breakdown by Region

The analysis breaks down the total expenditure by region to show the detailed impact throughout California. These regions include the Central Valley, Sacramento, Bay Area and Southern California.

Figure 5. Economic Impacts by California Region, FY 2017-2018 and Program Totals

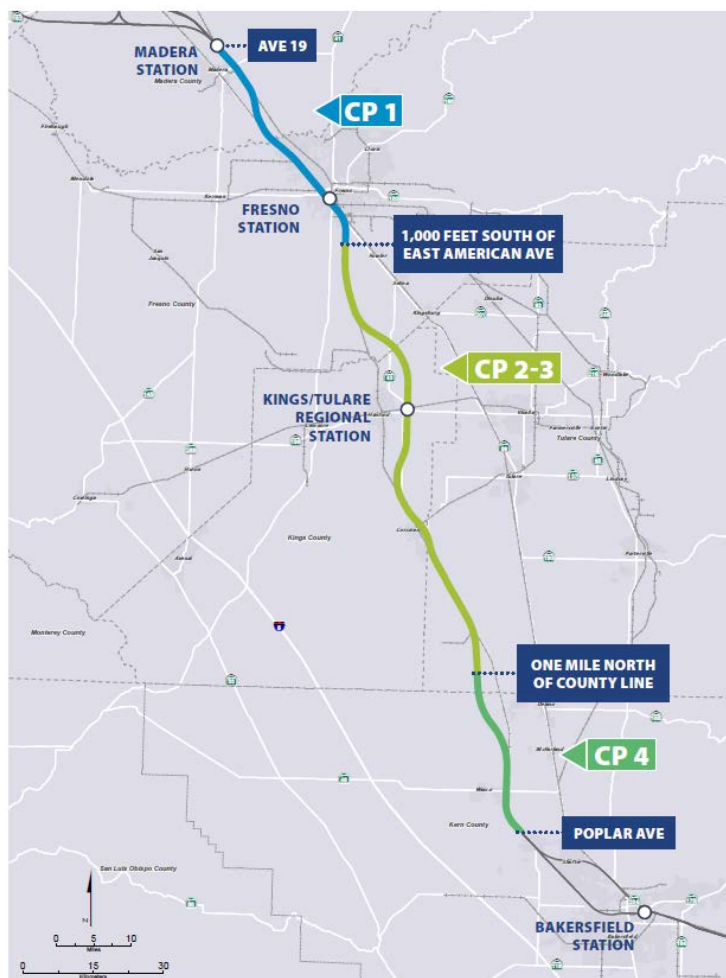


The Central Valley has seen the largest overall impact in job-years of employment, labor income and economic output because of increased construction investment over the past three years in the region. However, as construction spending continues to ramp up, its effects are beginning to be seen in the Sacramento, Bay Area, and Southern California regions as local firms from those areas join construction teams in the Central Valley.

6.3.1 Central Valley Region

For this analysis (and as commonly defined), the Central Valley region includes the following counties: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern— running through the center of California. The Central Valley section of the system is considered the “back bone” of the project with its connections to the Bay Area and the Los Angeles Basin being critical to improving accessibility and the mobility options of the region’s population.

Figure 6. Central Valley Construction Contracts as of November, 2017



Many communities in the Central Valley have been designated as disadvantaged based on a combination of economic and environmental conditions analyzed by the California Environmental Protection Agency.

Civil works construction for the first 119 miles of the system is ongoing through the CP1, CP2-3 and CP4 design-build contracts. Figure 7 shows each of the construction package segments along the project alignment. Each team has set up a local project and construction management office in the Central Valley and is doing the majority of their work locally and on the construction sites.²⁸

Program investments have had significant impact on the Central Valley economy, generating an estimated 4,600 job-years of employment and about \$749 million in total economic activity from July 2017

to June 2018. Table 4 shows direct, indirect, and induced economic impacts of program

²⁸ The CP1 project office is in Fresno, the CP2-3 project office is in Selma and the CP4 project office is in Shafter.



investments in the Central Valley in terms of job-years of employment, labor income, and economic output generated during the analysis period for both FY 2017-2018 and since 2006.

Table 4. Central Valley Economic Impacts, FY 2017-2018 & Program Total²⁹

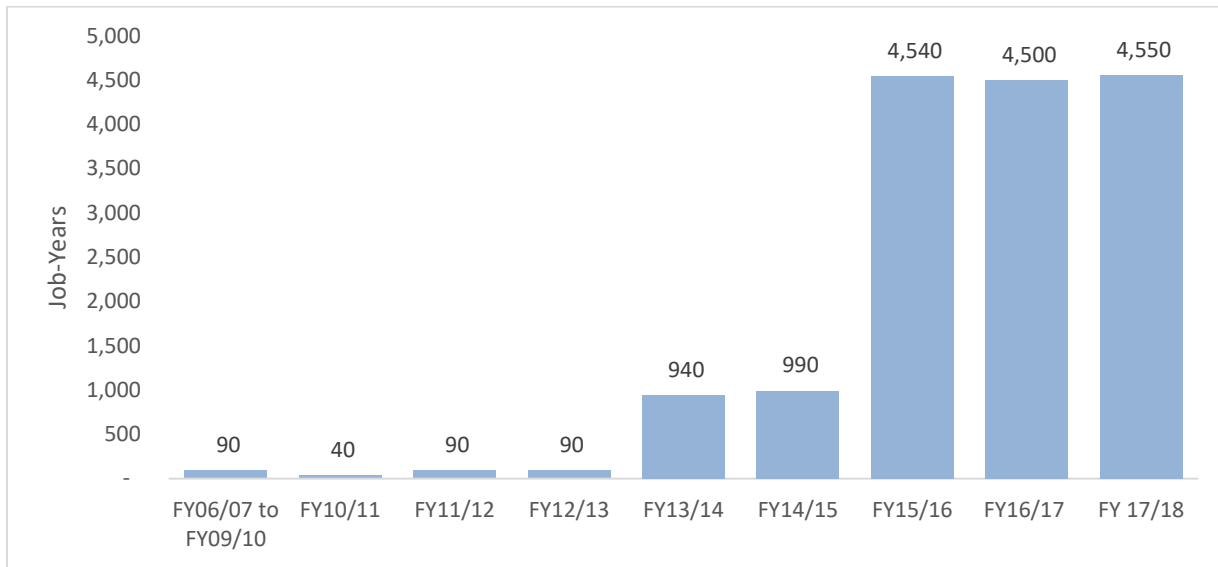
	Employment (job years)	Labor Income	Economic Output
Direct Effects	2,600	\$150 M	\$460 M
Indirect Effects	990	\$50 M	\$162 M
Induced Effects	950	\$40 M	\$127 M
FY 2017-2018 Total	4,550	\$240 M	\$749 M
Program Total (July 2006 – June 2018)	15,780	\$800 M	\$2,750 M

The Central Valley has seen the most benefit from the Program investments in the last several years. According to a recent report by the University of the Pacific's Center for Business and Policy Research, most Central Valley metro areas experienced job growth either at or exceeding the state average in 2016 and 2017. This trend is forecast to continue through 2020.³⁰ In recent years, the Central Valley economy has lagged behind the rest of the state, but now investment in high speed rail is helping to close the gap. Program investment in the Central Valley has surged in the past three years with the ramp up of right-of-way work and start of construction activities. Figure 9 shows the approximate job-years of employment generated in the Central Valley per fiscal year.

²⁹ Note: totals may not sum due to rounding

³⁰ <http://www.pacific.edu/Documents/school-business/BFC/Forecasts/CA%20Forecast%20October%202017Web.pdf>



Figure 7. Central Valley Region Total Job-Years per Fiscal Year, July 2006 – June 2018³¹

Of the nearly 2,600 direct job-years of employment supported in the Central Valley in FY 2017-2018, over 1,700 have been in the construction industry, representing over 65% of the direct job-years in the region. Architectural, engineering and related services, real estate, and rail transportation represent a smaller portion of the investment in that region, at around 521 (20%), 255 (10%), and 183 (7%) job-years respectively. Of the program total 10,600 direct job-years supported in the Central Valley from July 2006 – June 2018, around 7,800 were in the construction industry, making up the majority of direct employment impacts in the region. This is expected to continue as construction investment will continue to be focused in the Central Valley for a number of years.³²

6.3.2 Sacramento Region

For purposes of this analysis, the Sacramento region includes Sacramento, Yolo, Placer, El Dorado, Sutter, and Yuba counties all located north of the Central Valley. The Authority and RDP headquarters are co-located in downtown Sacramento comprising around 400 Authority and RDP staff members. Most of these staff have been in the government and professional services fields providing overall guidance and oversight for the program.

³¹ Note: includes direct, indirect, and induced

³² According to IMPLAN sector

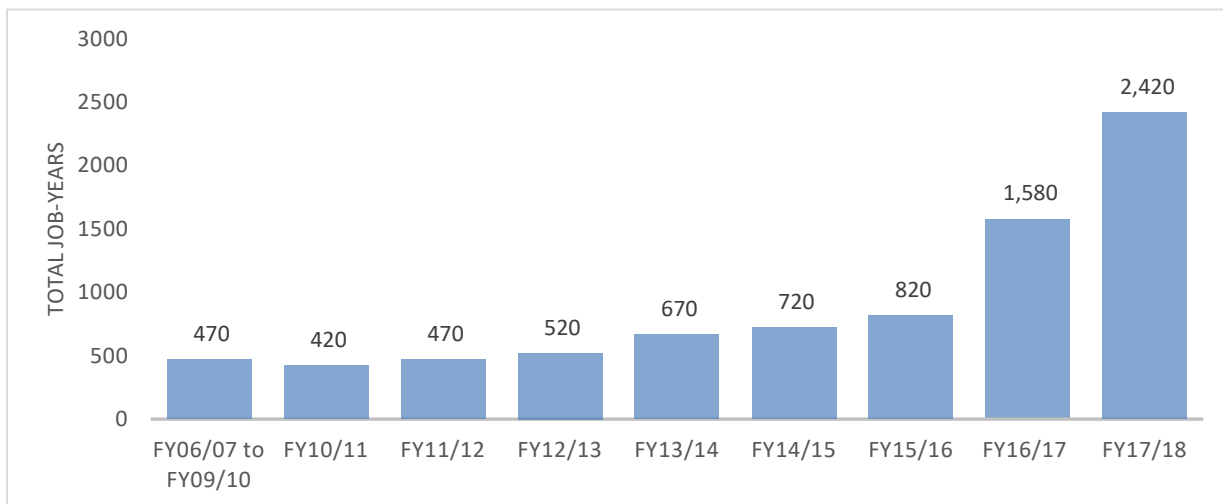


Table 5. Sacramento Region Economic Impacts, FY 2017-2018 & Program Total³³

	Employment (job years)	Labor Income	Economic Output
Direct Effects	1,010	\$112 M	\$199 M
Indirect Effects	580	\$32 M	\$82 M
Induced Effects	790	\$37 M	\$111 M
FY 2017-2018 Total	2,420	\$181 M	\$393 M
Program Total (July 2006 – June 2018)	8,190	\$577 M	\$1,360 M

Of the approximately 1,000 direct job-years of employment supported in the Sacramento region in FY 2017-2018, over 600 have been in state government enterprises, representing 60% of the direct job-years in the region.³⁴ Architectural, engineering and related services and construction represent a smaller portion of the investment in that region, at around 390 (39%) and 24 (2%) job-years respectively. The recent increase in job-years in the Sacramento region is due to the increase in construction spending in the region, mainly from many construction sub-contractors being located in the region.

Figure 8. Sacramento Region Total Job-Years per Fiscal Year, July 2006 – June 2018



³³ Note: totals may not sum due to rounding

³⁴ According to IMPLAN sector



6.3.3 Bay Area Region

The Bay Area region includes the following counties: Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, Sonoma, Napa, and Solano. These nine counties are part of the Metropolitan Transportation Commission region. The Bay Area has seen mostly planning, engineering, and environmental work with only a limited number of Bay Area firms working on the construction in the Central Valley.

Table 6. Bay Area Region Economic Impacts, FY 2017-2018 & Program Total³⁵

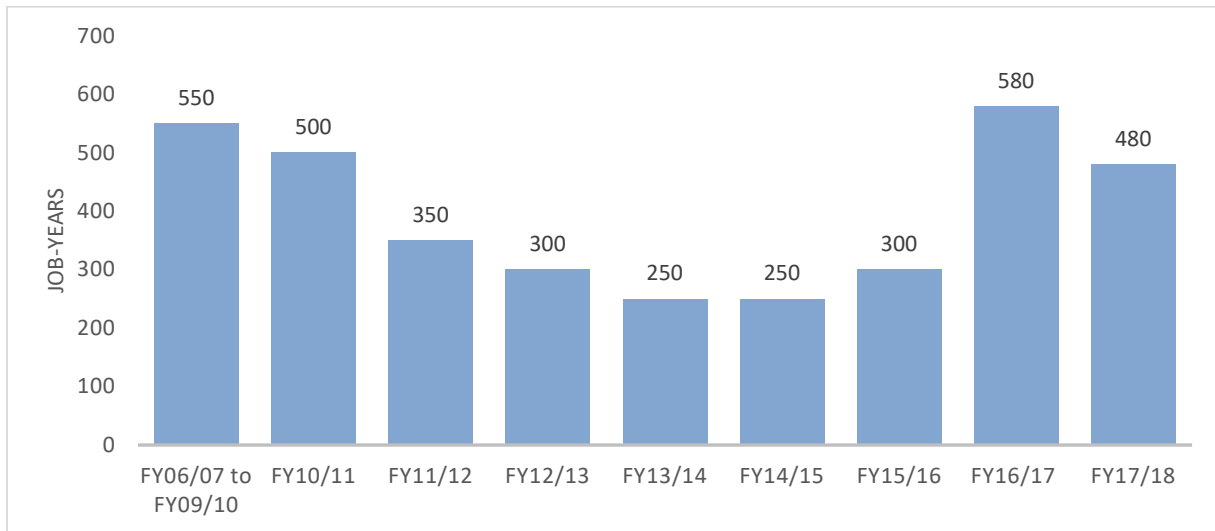
	Employment (job years)	Labor Income	Economic Output
Direct Effects	240	\$26 M	\$46 M
Indirect Effects	110	\$9 M	\$18 M
Induced Effects	130	\$8 M	\$12 M
FY 2017-2018 Total	479	\$43 M	\$87 M
Program Totals Program Totals (July 2006 – June 2018)	3,620	\$330 M	\$650 M

Of the approximately 240 direct job-years of employment supported in the Bay Area in FY 2017-2018, over 170 have been in architectural, engineering and related services, representing over 70% of the direct job-years in the region.³⁶ Construction and accounting, tax preparation, bookkeeping, and payroll services represent a smaller portion of the investment in that region, at around 30 (13%) and 21 (9%) job-years respectively. Indirect and induced impacts have been spread throughout a variety of other different sectors.

³⁵ Note: totals may not sum due to rounding

³⁶ According to IMPLAN sector



Figure 9. Bay Area Region Total Job-Years per Fiscal Year, July 2006 – June 2018³⁷

6.3.4 Southern California Region

For purposes of this analysis, Southern California includes Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. These six counties are either in the Southern California Area Governments or San Diego Area Governments regions.

The Southern California region has seen mostly planning, engineering, and environmental work with a growing number of Southern California firms working on the construction in the Central Valley. Additionally economic benefits have begun to accrue before high-speed rail construction starts in the region as connectivity and bookend projects in the region go through construction.

Table 7. Southern California Region Economic Impacts, FY 2017-2018 & Program Total³⁸

	Employment (job years)	Labor Income	Economic Output
Direct Effects	380	\$29 M	\$69 M
Indirect Effects	190	\$13 M	\$34 M
Induced Effects	240	\$13 M	\$37 M
FY 2017-2018 Total	820	\$55 M	\$141 M
Program Totals (July 2006 – June 2018)	4,530	\$330 M	\$790 M

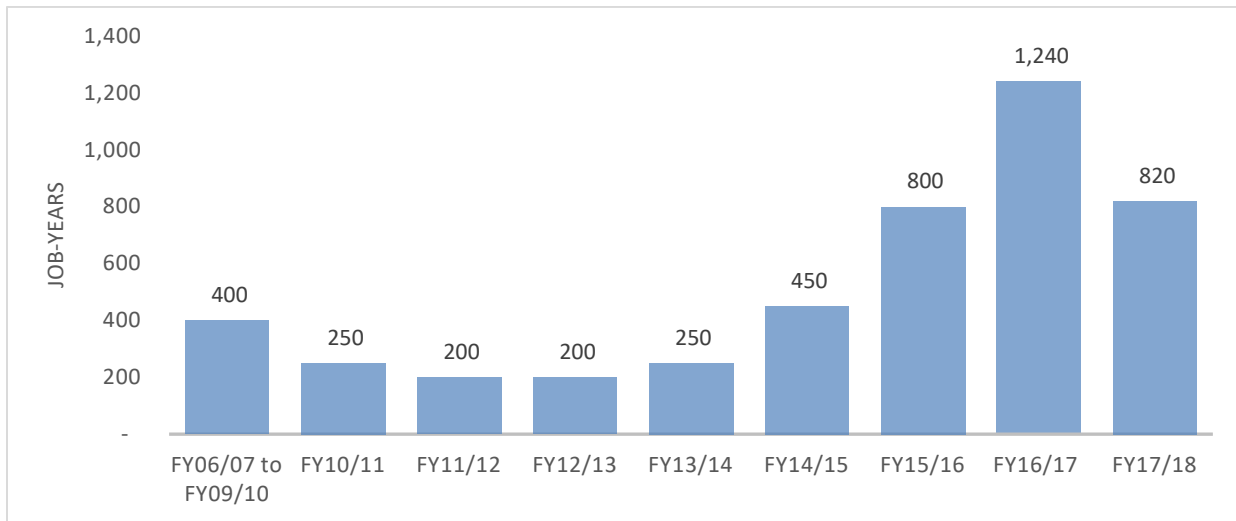
³⁷ Note: includes direct, indirect, and induced

³⁸ Note: totals may not sum due to rounding



Historically, the Southern California region had been very similar in industry breakdown as the Bay Area. However, over the past two fiscal years, the Southern California region has had a significant uptick in construction job-years. Of the approximately 380 direct job-years of employment supported in Southern California in FY 2017-2018, over 200 have been in the construction industry, representing 54% of the direct job-years in the region.³⁹ Architectural, engineering and related services represent a smaller portion of the investment in that region, at around 157 (41%) job-years. The increase in construction jobs in the Southern California region is due to firms from that region working on the construction teams in the Central Valley.

Figure 10. Southern California Region Total Job-Years per Fiscal Year, July 2006 – June 2018⁴⁰



6.4 California County Impacts

The California counties that show the largest impacts in FY 2017-2018 include Fresno County, Sacramento County, Madera County, Los Angeles County, and Kern County. As the region in which the bulk of ongoing construction activity is taking place, these counties include a large percentage of the direct and total job-years.

Fresno County has seen the biggest impacts with about 37% of total direct job-years supported as a proportion of the statewide analysis (bottom-up results). Sacramento County accounts for 24% of total direct job-years, with Madera County accounting for 11%, Los Angeles County accounting for 7%, and Kern County accounting for 5%.

Similar to the regions they fall within, Table 8 shows the breakdown of major employment sectors for direct job-years attributed to the highest impact counties.

³⁹ According to IMPLAN sector

⁴⁰ Note: includes direct, indirect, and induced



Table 8. Major Employment Sectors for Select California Counties⁴¹

County	FY 2017 2018 Direct Job Years	Architectural engineering and related services	Construc tion	Other governmenta l enterprises	Real estate (ROW services)
Fresno	1,530	22%	66%		9%
Sacramento	1,010	91%		5%	
Madera	450		91%		9%
Los Angeles	290	28%	66%		2%
		64%	27%		9%

6.4.1 Key County – Fresno County

Fresno was the site of the system's groundbreaking in 2015 and has seen significant construction and economic benefits from the project thus far. About one-half of CP1 and one-fourth of CP2-3 is in the County. Further, the Authority's Central Valley regional office is in the City of Fresno.

Work in the Central Valley and Fresno has included planning, engineering and site-work preparation, including right-of-way acquisition, in preparation for construction as well as major construction itself. In FY 2017-2018, Fresno County accounted for an estimated 1,530 direct-job years in the Central Valley region, or 59% of total direct job-years generated in the region. As construction continues to expand across the Central Valley, this share is expected to decrease as new opportunities are created outside of Fresno County.

Table 9. Fresno County Economic Impacts, FY 2017-2018 and Program Total⁴²

	Employment (job years)	Labor Income	Economic Output
Direct Effects	1,530	\$89 M	\$265 M
Indirect Effects	610	\$30 M	\$85 M
Induced Effects	610	\$26 M	\$79 M
FY 2017-2018 Total	2,750	\$145 M	\$429 M
Program Totals Program Totals (July 2006 – June 2018)	11,750	\$600 M	\$1,930 M

⁴¹ Note: analysis of regions and counties does not capture spill-over effects from surrounding regions/counties that would be captured in the statewide analysis.

⁴² Note: totals may not sum due to rounding



6.4.2 Key County - Madera County

Madera County is also located in the Central Valley Region and has similarly seen significant program investment as the other half of CP1 falls in Madera County. Like Fresno County, Madera County has seen planning, environmental and construction program activities occurring within its boundaries.

In FY 2017-2018, the program generated around 610 total job-years, \$28 million in total labor income, and \$97 million in total economic output in Madera County.

Table 10. Madera County Economic Impacts, FY 2017-2018 and Program Total⁴³

	Employment (job years)	Labor Income	Economic Output
Direct Effects	450	\$21 M	\$75 M
Indirect Effects	80	\$4 M	\$11 M
Induced Effects	80	\$3 M	\$11 M
FY 2017-2018 Total	610	\$28 M	\$97 M
Program Total (July 2006 – June 2018)	1,620	\$80 M	\$270 M

⁴³ Note: totals may not sum due to rounding



Figure 11. Total Job-Years by California Counties



6.5 Disadvantaged Communities and Small Business

The Authority is committed to ensuring small businesses and disadvantaged communities throughout California benefit and play an active role in building the Program. Investments made by the Program have promoted employment and business opportunities for small and disadvantaged businesses and workers.

California recognizes specific areas as disadvantaged communities based on a combination of environmental and socioeconomic factors. This analysis is conducted by the California Environmental Protection Agency (CalEPA) using a tool called CalEnviroScreen. Disadvantaged communities are defined as those that score in the top 25% of the most impacted communities based on an index made up of four components in two broad groups. Exposure and Environmental Effects components comprise a Pollution Burden group, and the Sensitive Populations and Socioeconomic Factors components comprise a Population Characteristics group.

Figure 12. CalEnviroScreen 2.0 Indicator and Component Scoring

Pollution Burden		Population Characteristics	
Exposure Indicators Ozone Concentrations PM2.5 Concentrations Diesel PM Emissions Drinking Water Contaminants Pesticide Use Toxic Release from Facilities Traffic Density	X	Sensitive Populations Indicators Children and Elderly Low Birth-Weight Births Asthma Emergency Departmental Visits	= CalEnviroScreen Score
Environmental Effects Indicators Cleanup Sites (1/2) Groundwater Threats (1/2) Hazardous Waste (1/2) Impaired Water Bodies (1/2) Solid Waste Sites and Facilities (1/2)		Socioeconomic Factors Indicators Educational Attainment Linguistic Isolation Poverty Unemployment	

One of the advantages to starting construction on the high-speed rail system in the Central Valley is the opportunity that construction has generated for residents of disadvantaged communities that are disproportionately (though not exclusively) located in the Central Valley. Under the guidelines of the ARRA grant, one of the priorities to be considered for project selection was whether the project was in an Economically Distressed Area. Project investments in the Central Valley have positively affected the local economy, stimulating economic activities and generating employment. Figure 14 shows the locations of disadvantaged communities in the state.

About 54% of the investment in the system in FY 2017-2018 occurred in designated disadvantaged communities throughout California, spurring economic activity in these areas. Additionally, over half (54%) of the total program investment from July 2006 – June 2018 occurred in designated disadvantaged communities.



Figure 13. Disadvantaged Communities in California and Project Alignment



From the implementation of the Authority’s Small and Disadvantaged Business Enterprise Program in 2012, professional services contractors have collectively met the 30% small business utilization target, while design-build contractors are working to attain their utilization target as construction activities ramp-up. As of September 2018, 474 small businesses were either committed, utilized, or actively working on the project.



Figure 14. Small Business Participation in the California High-Speed Rail Program

Further, the Authority Board of Directors approved a Community Benefits Policy in 2012 to ensure that jobs created through program investments benefit disadvantaged communities. The Authority's Community Benefits Agreement contains a Targeted Worker Program which ensures that 30% of all project work hours are performed by National Targeted Workers, and at least 10% of those work hours shall be performed by Disadvantaged Workers, including veterans.^{44,45} As of November 2018, 2,466 construction workers have been dispatched to the three high-speed rail construction packages in the Central Valley. Design-build teams are also meeting or exceeding goals for providing 30 percent of all project work hours to National Targeted Workers. They've hired 1,696 National Targeted workers, individuals whose primary place of residence is in an economically disadvantaged area.⁴⁶

6.6 National Impacts

Despite the majority of expenditure taking place in California, Program expenditure has also impacted the economies of other states through material purchases, companies based in other

⁴⁴ A Targeted Worker is an individual whose primary place of residence is within an Economically Disadvantaged Area or an Extremely Economically Disadvantaged Area in the United States.

⁴⁵ A Disadvantaged Worker is an individual who meets the income requirements of a Targeted Worker, and faces other barriers to employment (e.g. being a veteran, lacking a GED or high school diploma, being homeless, etc.)

⁴⁶ https://www.buildhsr.com/flipbook/vol_06_issue_03/#page=14



states working on the program, and other spillover effects. Over the lifetime of the program, companies from at least 36 different states have worked directly on the program, contributing to everything from planning and engineering to construction.

Table 11. US States with Highest Program Expenditure⁴⁷

State	FY 2017 2018		Total Program Expenditures
	FY 2017 2018 Expenditures	Percent of Non California Expenditure within US (excludes international)	
Colorado	\$5.1 M	20%	\$26 M
Massachusetts	\$3.8 M	15%	\$4 M
Virginia	\$2.2 M	9%	\$2 M
Texas	\$2.2 M	9%	\$15 M
Washington, D.C.	\$1.7 M	7%	\$11 M
New York	\$1.6 M	6%	\$19 M
Oregon	\$1.4 M	6%	\$12 M
Washington (state)	\$1.3 M	5%	\$15 M
All other states	\$5.5 M	22%	\$59 M
Total	\$25.2 M	100%	\$163 M

In FY 2017-2018 specifically, out-of-state spending accounted for about 3% (about \$26.6 million) of total fiscal year expenditures and includes spending across the United States (at least 30 states) as well as some expenditures for specialized services that could only be provided from experts abroad (since certain high-speed rail expertise is lacking in the United States). Of this out-of-state spending, nearly 94.5% of it stayed within the US (\$25.2 million). About 5.5% of out-of-state spending was international (\$1.5 million). The states with the highest program investment outside of California include Colorado, Massachusetts, Virginia, Texas, Washington D.C., Washington State and New York.

⁴⁷ Totals may not sum due to rounding.



7 Future Analyses

The Authority undertakes an update the economic impact analysis on a bi-annual basis. A fully-updated technical supporting document is completed once per year, including the total FY spending and results. Future analyses are expected to follow the same methodology discussed in this and previous technical supporting documents, though some changes may be included to show new data, types of expenditure, or more streamlined approaches to data gathering and/or modeling methodology.

