



ON THE MOVE

SOUTHERN CALIFORNIA DELIVERS THE GOODS

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Comprehensive Regional Goods Movement Plan and Implementation Strategy

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Comprehensive Regional Goods Movement Plan
and Implementation Strategy

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Goods Movement Has Significant Economic Benefits

Chapter 2 of this report provides a discussion of the role that goods movement plays in Southern California’s economy and Chapter 6 describes the mobility, safety, and environmental benefits of the goods movement strategies that are proposed in the Comprehensive Regional Goods Movement Plan and Implementation Strategy. This chapter examines how these mobility, safety, and environmental benefits translate into economic impacts in the region, contributing to growth in GRP and employment, and how these impacts are distributed across the economy. This chapter also presents analysis of the benefits of goods movement investments for the national economy as a whole.

For this Plan, economic impact analysis was conducted for two packages of regionally significant projects.¹ These packages are:

1. The EWFC and
2. The complete rail improvements package, including the mainline capacity projects and the railroad crossing grade separation projects.

Economic impact is measured as changes in economic activity in a given region arising from a project or a change in policy. It can be expressed in terms of various economic variables, including Gross Regional Product, sales (output), employment, and personal income (earnings). Reduction in transportation cost and improved connectivity to domestic and international markets arising from transportation system capacity expansion or elimination of choke points increases output of firms (especially manufacturing and distribution industries that ship to markets outside of the region) and increases demand for key factors of production, including labor, materials, equipment, and supporting downstream activities which are supplied by other local and nonlocal firms. This chain of activities leads to local economic expansion through increased employment, personal income, and business profits. Generally, a total assessment of economic impacts includes three different impact types: direct, indirect, and induced.

1. **Direct Impacts.** Direct impacts associated with transportation system improvements are the direct effects of changes in output (sales) or production cost and spending in key economic industries, including wholesale and retail trade, manufacturing, and transportation and logistics. For instance, the direct effect of improved roadways to a manufacturing firm is the reduced cost of transportation and inventory.

¹ The economic impact analysis was conducted using an economic modeling tool developed by Regional Economic Models, Inc. (REMI). The modeling tool, PI+, is often referred to generically in this report as “REMI” or “the REMI model.” PI+ is a modeling tool that allows the user to analyze how investments or policies that change business costs create changes in demand for different industries’ products and how these changes trickle through the rest of the economy.



2. **Indirect Impacts.** As business sales increase, demand for key input materials also increases. Therefore, the indirect impact associated with increased business sales by those industries directly affected by a transportation improvement (output) is estimated or referred to as increase in demand (purchases) for key input materials by firms that are the direct suppliers to the directly affected businesses. For example, increased construction activities increase the demand (purchases) for steel, concrete, timber, fuel, etc. Consequently, spending on factors of production stimulates expansion of businesses downstream in the production chain. This expansion of downstream businesses is considered to be the indirect impacts.
3. **Induced Impacts.** Direct and indirect impacts are the sources of induced impacts, which normally constitute the largest portion of total impacts. As businesses expand through direct and indirect impacts, wages and salaries, and other forms of business income also are increased. This increase in personal income leads to increased purchases by households. Changes in output, employment, and income stemming from household consumption of goods and services are induced impacts. Similar to indirect impacts, increases or decreases in personal consumption also lead to increases or decreases in business sales (output). This chain of activities also translates into changes in employment and income.

If the region fails to make appropriate investments in the goods movement system, it will miss out on economic growth opportunities. Reducing roadway congestion for trucks will help keep the costs of goods and services down and allow for growth of local businesses and personal consumption. It also will make the region more competitive in national and global markets. Likewise, investment in the regional rail system will allow continued growth in the marine ports and associated logistics businesses.

The remaining sections of this chapter present the results of the analysis of each of the two regionally significant goods movement project packages.

7.1 Economic Impacts of the EWFC

In order to evaluate the economic impacts of the EWFC, it was necessary to determine how the project would directly affect users and nonusers of the freight corridor and how these effects would translate into decreases or increases in out-of-pocket costs. The direct economic effects of the EWFC that were estimated include:²

- Travel time reductions for trucks and autos and associated reductions in business costs for users of trucking and commuters using autos;
- Improvements in reliability that reduce the needs of businesses to carry safety stocks of inventory;
- Reduced operating costs for trucks and autos associated with reduced fuel and maintenance costs; and
- Reduced emissions and associated economic benefits from improved health and the general attractiveness of the region as a place to live.

There also are likely to be significant safety benefits associated with separating trucks and autos. However, these might be offset to some extent by increased overall VMT and higher speeds. For this analysis, we assumed no safety benefits. The present value of these direct benefits over the first 32 years after the initial operating segment (IOS) of the corridor is completed are presented in Table 7.1.

² A more complete description of the methodology and data inputs used to estimate the economic impacts of the EWFC is presented in a technical memorandum prepared for the Comprehensive Regional Goods Movement Plan and Implementation Strategy, *Economic Analysis of Proposed Investments*, Cambridge Systematics, Inc., December 2012.

Table 7.1 Present Value of Benefits Related to EWFC, 2025-2057
Dollars in Billions, 2012

Region	Travel Time and Reliability	Vehicle Operating Costs	Emission	Toll Revenue
SCAG	40.88	(0.04)	1.3	7.62

Source: Cambridge Systematics Analysis.

Estimation of Economic Impacts

The direct benefits described above were allocated to their various beneficiaries using data from the travel demand models and several other sources³ and the REMI model was used to simulate the total direct, indirect, and induced economic impacts of the project. These economic impacts are of the types described previously. The results of the REMI simulation are summarized in Table 7.2. The proposed EWFC is expected to stimulate economic expansion of \$134.5 billion (GDP) and create about 818,000 job-years in the United States as a whole over the 32-year study horizon.

Table 7.2 Total Economic Impact of EWFC
2025-2057

Economic Variable	SCAG Region	Total U.S.
<i>Job-Years (Thousand)</i>		
Private Non-Farm	524.8	731.4
Government	69.1	86.6
Subtotal	593.8	818.0
<i>Gross Regional/Domestic Product (Dollars in Billions, 2012)</i>		
Private Non-Farm	90.5	126.2
Government	6.9	8.3
Subtotal	97.4	134.5

Source: REMI, Cambridge Systematics Analysis.

³ Ibid.

Economic Impact of EWFC on SCAG Region

From Table 7.2 and Figure 7.1, the SCAG region’s economy is the largest beneficiary of the East-West Freight Corridor (EWFC). The EWFC is expected to stimulate economic expansion of \$97.4 billion dollars in the SCAG region, representing 72 percent of total economic expansion in the United States.

Figure 7.1 **Distribution of Economic Expansion Due to EWFC**
2025-2057

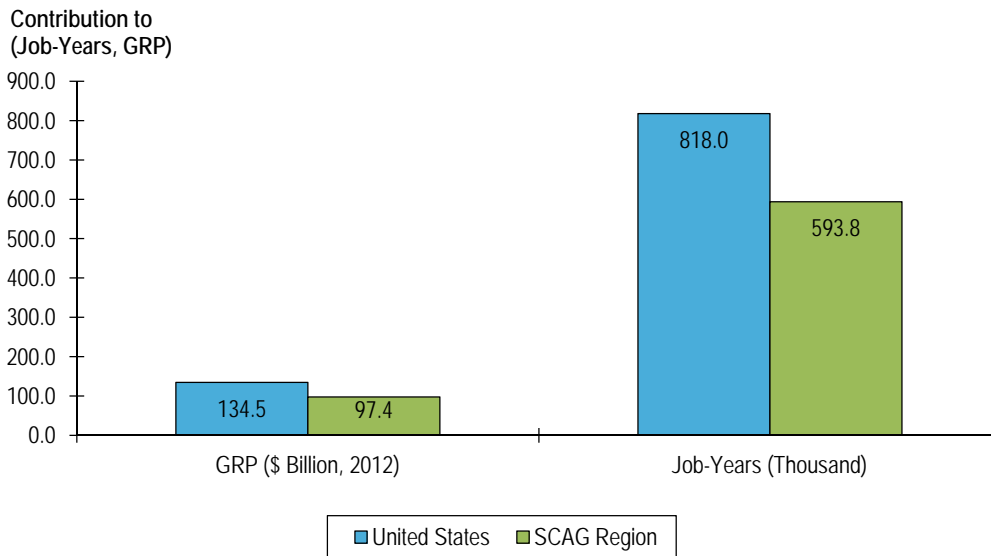
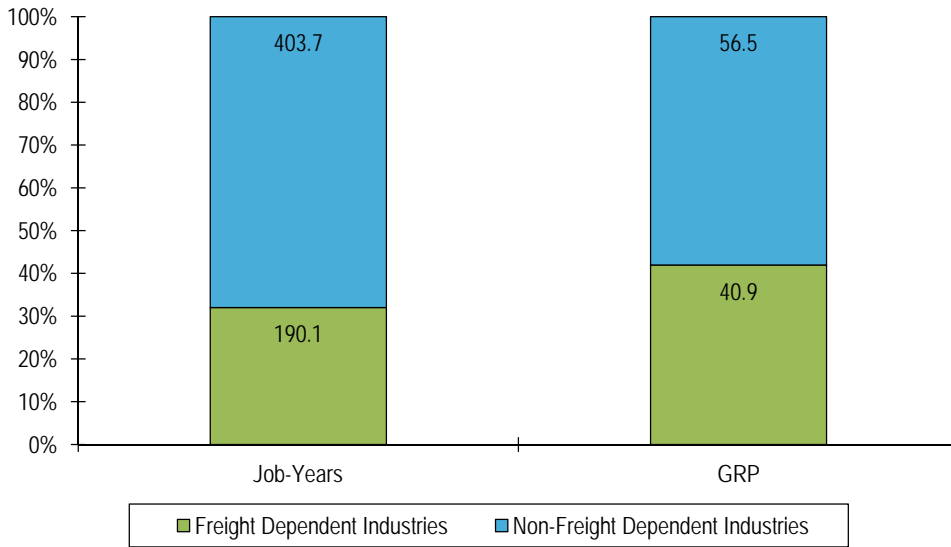


Figure 7.2 and Table 7.3 show the distribution of economic impacts that result from the EWFC project by industry sector. About 39 percent of the economic expansion and 32 percent of total jobs generated are in the freight-dependent industries. This is roughly equivalent to the share of total regional economic activity that these industries represent. This may seem counterintuitive for a goods movement project but there are several explanations that illustrate how widespread the economic impacts of goods movement projects are.

- The EWFC creates significant benefits for the trucks using the corridor and the businesses they serve. But it also benefits other trucks in the influence area due to reduced congestion and delays on parallel highways, arterials, and local roads. The trucks operating in the influence area (not direct users of the freight corridor) serve all kinds of businesses. While many of the non-freight-dependent businesses spend less on transportation as a fraction of their total business costs relative to freight-dependent businesses, they represent over 65 percent of the SCAG region’s economy. So reduced costs to these non-freight-dependent businesses and the associated indirect benefits represent a significant majority of the economic benefits of the EWFC.
- The EWFC also generates benefits for autos in the influence area due to reduced general congestion as trucks shift to the freight corridor. This reduces out-of-pocket expenses for commuters and increases disposable income. This increase in income is spent on consumer products and services and generates economic benefits in the non-freight-dependent businesses that provide these products and services.
- All of the direct and indirect benefits of the EWFC create induced spending by consumers. The products and services they consume are provided mostly by the non-freight-dependent industry sectors.

Figure 7.2 Employment Impact Distribution between Freight-Dependent and Non-Freight-Dependent Industries Due to EWFC 2025-2057



Source: REMI, Cambridge Systematics Analysis.

The EWFC is expected to generate and support a total of 593,860 job-years in the SCAG region over the project horizon. From Table 7.3, professional and technical services (67,100 job-years), retail trade (65,900 job-years), and construction (52,400 job-years) industries are the three top industries where most jobs are generated and supported. This distribution reflects the patterns described above with respect to how benefits are distributed among freight-dependent and non-freight-dependent sectors.

**Table 7.3 SCAG Region’s Employment Impact Distribution Due to EWFC
2025-2057**

Industry	Job-Years (Thousand)	Percent Change Relative to Baseline Forecast
Forestry, Fishing, Related Activities, and Other	3.3	0.28%
Mining	0.5	0.14%
Utilities	0.8	0.12%
Construction	52.4	0.20%
Manufacturing	35.1	0.18%
Wholesale Trade	19.6	0.14%
Retail Trade	65.9	0.20%
Transportation and Warehousing	12.6	0.08%
Information	6.4	0.07%
Finance and Insurance	26.2	0.13%
Real Estate and Rental and Leasing	30.6	0.15%
Professional and Technical Services	67.1	0.15%
Management of Companies and Enterprises	6.0	0.18%
Administrative and Waste Services	40.8	0.14%
Educational Services	10.6	0.11%
Health Care and Social Assistance	57.4	0.11%
Arts, Entertainment, and Recreation	10.9	0.09%
Accommodation and Food Services	38.2	0.13%
Other Services, ^a except Public Administration	40.4	0.14%
Government	69.1	0.14
Total	593.8	0.14%

Source: REMI, Cambridge Systematics Analysis.

^a Other services include repair and maintenance, personal and laundry services, membership associations and organizations, and private households.

7.2 Economic Impacts of the Rail Grade Separation Projects and Rail Mainline Capacity Improvements

The estimation of economic impacts resulting from the complete package of rail grade separation projects and rail mainline capacity improvements involved a number of different methodologies. As in the case of the EWFC, the first step involved estimation of the direct economic effects of the investments. In the case of the grade separation projects, the following direct benefits were estimated:⁴

- Travel time savings for autos and trucks that would otherwise be delayed at crossings. It was assumed that there are much higher auto delay reductions than truck delay reductions based on the average vehicle mix on the types of roads that cross railroad mainlines.
- Reduced fuel costs from idling vehicles.
- Safety benefits due to reduced crashes of vehicles and trains. The benefit of reducing crashes is valued based on the severity of the types of crashes that would be eliminated (using historical data on crash severity).
- Emission benefits from reduced vehicle idling at crossings.

The calculation of direct economic benefits of improving rail mainline capacity involved more complex procedures and assumptions. Based on projected freight movements in the SCAG region, inadequate investment in the rail network would lead to severe congestion on the network, thus causing delay and unreliability in freight delivery as well as increasing shipper cost. In fact, at a certain level of rail traffic, current capacity would be insufficient to handle the traffic and the region's rail-related goods movement and commuter rail would not be able to expand further. Thus, the economic impacts of investment in additional rail capacity focuses on estimating the amount of additional economic activity that would occur in the SCAG region as a result of being able to accommodate additional rail traffic. These benefits are increased economic activity at the ports and rail yards, increased logistics activity associated with transload cargo, and reduced costs to domestic rail shippers who might otherwise have to use higher cost trucking.

For the purposes of this analysis, it is assumed that users of the rail system would share the benefits of expanded capacity in proportion to their contribution to overall demand for that capacity. The direct economic impacts were estimated for each of the freight rail market segments in the region:

- Direct benefits from increased IPI traffic are associated with the increased activity at the Ports (increased marine terminal operations) and rail yards that handle this traffic. The increased employment in these activities associated with expanded cargo volumes at the ports (the increased number of IPI containers that would be handled) was estimated based on the increase in rail capacity and the IPI share of demand that was presented in Chapter 4.
- Direct benefits from increased transload traffic also are associated with increased activity at the Ports and rail yards but also include increased demand for logistics service providers offering transloading services and drayage trucking to and from the transload sites. On a per TEU basis, the local transload activities (and therefore the direct economic benefits) are greater than those of the IPI traffic.
- Direct benefits from increases in true domestic traffic are associated with reduced costs to shippers who would otherwise have to use more expensive trucking. It is assumed that unlike IPI and transload traffic, which could be diverted to other ports if capacity were not available at the San Pedro Bay Ports, true domestic rail is serving local

⁴ As noted for the EWFC, a more detailed discussion of the methodology, data inputs, and assumptions for the rail impact analysis are provided in the Economic Analysis tech memo already cited.

consumers and businesses that would have to find another way to transport their goods. Trucking (the likely alternative mode) is more expensive on a per ton-mile basis than rail.

Estimation of Economic Impacts

From Table 7.4, improvement in the SCAG rail network will result in an overall economic expansion of \$64.0 billion (GDP) in the United States over the study period. About 94 percent (\$60.4 billion) of this expansion is due to private sector activities, while the remaining 6 percent is attributed to the public sector activities. The overall U.S. economic gain from the rail investment program is less than that of the EWFC but the costs of the program also are lower (with differences in economic impacts being similar on a percentage basis to the difference in costs).

There are two other important considerations to keep in mind when comparing the economic impacts of the EWFC and the rail capacity improvements:

1. In the case of the rail capacity improvements, the assumption is that the demand for the cargo movements on Southern California's rail system could be satisfied by diverting the cargo to another port(s) and using rail capacity available at other port (s). Thus from a national perspective, that diversion represents a transfer of economic activity from one region to another so the net economic effect is generated only by considering the cost differential to shippers of moving good through another more expensive distribution gateway. Of course, if diversion is substantial (as it would be under these scenarios), it would be likely to require significant investments in new port and rail infrastructure that could add new costs to moving goods through these other port regions. This is not taken into account in the modeling because other port regions' costs and investments are not included (only direct changes in the SCAG region are modeled). The analysis does not address landside constraints at other ports to determine if there would be severe obstacles to accommodating the diverted demand.
2. A substantial fraction (over 67 percent) of the cost of the rail improvement package is associated with the grade separation investments. These projects generate relatively small, but important, direct benefits as compared with their costs. The benefits they do create in terms of improved safety and reduced community impacts of large increases in rail traffic are critical mitigations. The analysis assumes that there are no operational benefits to the railroads from the grade separations and thus, no impacts on delay that would constitute direct benefits to railroads and their customers. More detailed simulation modeling of rail operations might identify at least some operational benefit that is not being taken into account. However, because of the impact mitigation (non-economic) benefits of the grade separation projects, they are included as an integral component of the overall rail improvement program.

It also is noteworthy that the economic benefits of the rail improvement program to the SCAG region are larger than the benefits to the nation as a whole. This may seem counterintuitive at first but can be explained when considering the economic transfer effects just described. The SCAG region benefits substantially (in relative terms) because the investments attract economic activity at the Ports, rail yards, and in local logistics businesses. But since most of this direct economic activity could go elsewhere in the United States, these direct gains for the SCAG region are really not a direct gain for the U.S. economy. It is only the incremental benefit of moving through a lower cost logistics system in Southern California that creates benefits for the national economy. The correct way of viewing the economic impacts of the rail improvement package is to consider that SCAG regional benefits are roughly equivalent to national benefits – not that the SCAG regional benefits are all the benefits that the nation receives. The expected economic expansion nationally is expected to generate and support 399,300 job-years, 90 percent of which is attributed to private sector activities.

**Table 7.4 Economic Impact of Grade Separation, Rail, and Intermodal Improvements
2021-2045**

Economic Variables	SCAG Region	United States
<i>Job-Years (Thousands)</i>	<i>768.8</i>	<i>399.3</i>
Private Non-Farm	720.1	359.3
Government	48.6	40.0
<i>Gross Regional Product (Dollars in Billions)</i>	<i>67.0</i>	<i>64.0</i>
Private Non-Farm	64.2	60.5
Government	2.9	3.5

Source: REMI, Cambridge Systematics Analysis.

Economic Impact of Grade Separation, Rail, and Intermodal Improvement on SCAG Region

Over the study period, the gross regional product or economic expansion of the SCAG region is estimated to be \$67.0 billion (Table 7.4). About \$65 billion (97 percent) of SCAG economic expansion is due to private sector activities, while the remaining accounts for public sector activities in the SCAG region. The economic expansion translates into 768,800 job-years over the study horizon (see Figure 7.3).

Unlike EWFC, the combined investment in grade separations and rail capacity generates 60 percent of total jobs and 58 percent of economic expansion in the freight-dependent industries of SCAG (see Figure 7.4). The relatively high impact on the freight-dependent industries is mainly attributed to the indirect (services to the productive and nonproductive sectors) and induced impacts associated with the transportation industry. These indirect impacts flow from the fact that almost all of the direct economic impacts are experienced by the port, rail, trucking, and logistics service providers. In the case of the EWFC, there were substantial direct benefits that are experienced by non-freight users of the highway system (as a result of reduced general congestion in the influence area).

Figure 7.3 Distribution of Economic Expansion Due to Grade Separation, Rail, and Intermodal Improvements

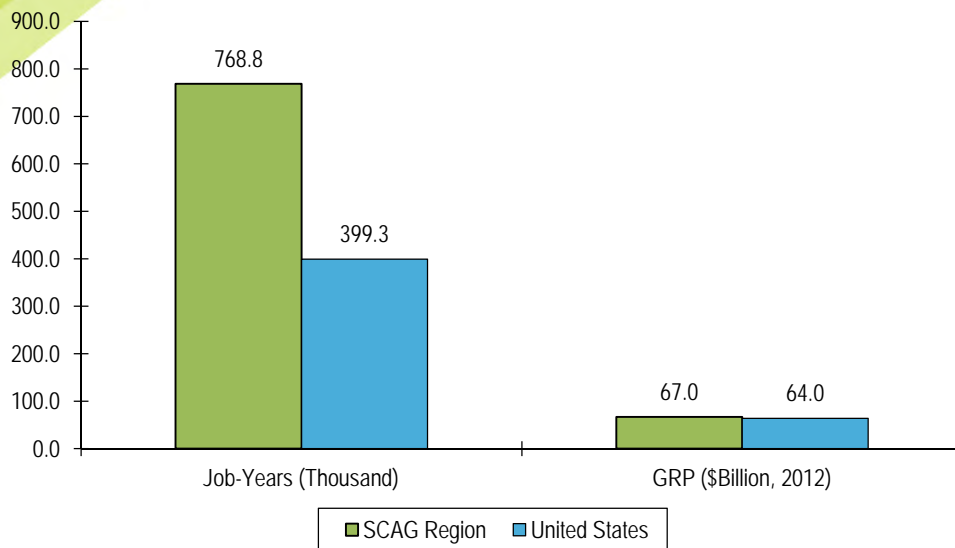
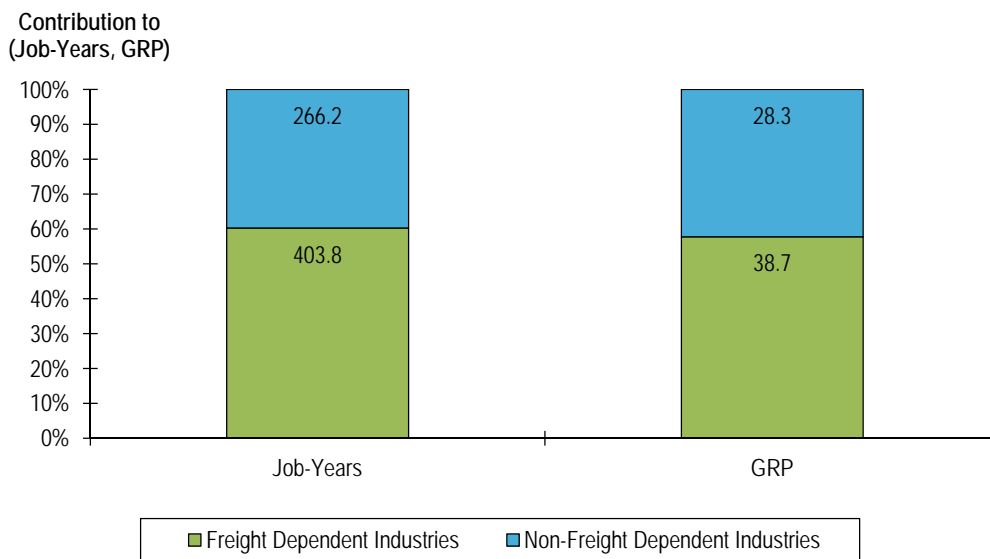


Figure 7.4 Employment Impact Distribution between Freight-Dependent and Non-Freight-Dependent Industries Due to Grade Separation Project, Rail, and Intermodal Improvement 2021-2045



A total of 768,800 job-years, comprising 720,100 and 48,600 private and public sector jobs respectively are generated and supported to accommodate economic expansion in the SCAG region. As shown in Table 7.5, Transportation and Warehousing accounts for 247,280 job-years, while Construction, and Administrative and Waste Services account for 80,260 and 59,700 job-years, respectively. Industry variations in transport spending and productive change account for varied impacts across industry.

Table 7.5 Total Job Distribution Due to Grade Separation, Rail, and Intermodal Improvement in the SCAG Region 2021-2045

Industry	Job-Years (Thousand)	Percent Change Relative to Baseline Forecast
Forestry, Fishing, Related Activities, and Other	0.11	0.01%
Mining	0.50	0.19%
Utilities	0.89	0.16%
Construction	80.84	0.43%
Manufacturing	15.08	0.10%
Wholesale Trade	18.33	0.17%
Retail Trade	43.99	0.18%
Transportation and Warehousing	247.58	2.39%
Information	6.01	0.08%
Finance and Insurance	30.32	0.19%
Real Estate and Rental and Leasing	24.56	0.16%
Professional and Technical Services	52.76	0.17%
Management of Companies and Enterprises	2.39	0.10%
Administrative and Waste Services	60.19	0.28%
Educational Services	11.62	0.16%
Health Care and Social Assistance	56.18	0.15%
Arts, Entertainment, and Recreation	9.16	0.10%
Accommodation and Food Services	30.12	0.15%
Other Services, except Public Administration	39.84	0.19%
Government	50.15	0.14%
Total	780.62	0.29%

Source: REMI, Cambridge Systematics Analysis.

7.3 Conclusions about the Economic Impacts of Major Goods Movement Investments in the SCAG Region

The economic impact analysis of major goods movement investments conducted for the Comprehensive Regional Goods Movement Plan and Implementation Strategy leads to several key conclusions:

- Economic impacts of both highway and rail investments in the region will have significant economic benefits over the lives of the projects that will exceed costs. These benefits cut across all sectors of the economy and are both regional and national in scope.
- The nature of economic benefits and the industry sectors that are affected are different for the EWFC and the rail improvement package. The EWFC, by creating additional capacity for trucks in a highly congested roadway network, reduces congestion and improves safety for all highway users within a fairly large influence area. This distribution of economic benefits looks very similar to the distribution of total economic activity across industry sectors in the region. The direct benefits of rail capacity improvements are almost entirely focused in the goods movement sectors and this pattern holds true for indirect benefits.
- The share of benefits that are experienced locally versus those that are more national in scope also differ between the two projects. National shares of the benefits are greater in the case of the rail improvement project as compared to the EWFC improvements. However, in both cases, these national benefits are primarily to businesses located outside of the region. Various approaches to capture this value in project financing will be challenging but important.

Overall, this analysis of economic impacts provides important information about the benefits that will need to be considered in assigning cost responsibility when paying for the projects. This is the subject of the next chapter of the report which describes funding and financing strategies and associated issues for the Comprehensive Regional Goods Movement Plan and Implementation Strategy.