REGIONAL TRANSPORTATION PLAN 2012–2035 RTP

SUSTAINABLE COMMUNITIES STRATEGY

Towards a Sustainable Future

Southern California Association of Governments

DRAFT DECEMBER 2011

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REGIONAL TRANSPORTATION PLAN 2012–2035

RTP

SUSTAINABLE COMMUNITIES STRATEGY

Towards a Sustainable Future

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Transit Report
Transportation Conformity Report
Transportation Demand Management
Transportation Finance
Transportation Safety
Transportation Security
Vehicle Technology

MISSION STATEMENT

Leadership | Vision | Progress

Leadership, vision and progress which promote economic growth, personal well-being, and livable communities for all Southern Californians.

THE ASSOCIATION WILL ACCOMPLISH THIS MISSION BY:

- Developing long-range regional plans and strategies that provide for efficient movement of people, goods and information; enhance economic growth and international trade; and improve the environment and quality of life.
- Providing quality information services and analysis for the region.
- Using an inclusive decision-making process that resolves conflicts and encourages trust.
- Creating an educational and work environment that cultivates creativity, initiative, and opportunity.

Funding: The preparation of this document was financed in part through funds from the Federal Highway Administration and Federal Transit Administration. Additional financial assistance was provided by the California Department of Transportation.

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EXECUTIVE SUMMARY

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Our Vision

Towards a Sustainable Future

For the past three decades, the Southern California Association of Governments (SCAG) has prepared Regional Transportation Plans (RTPs) with the primary goal of increasing mobility for the region's residents and visitors. While mobility is a vital component of the quality of life that this region deserves, it is by no means the only component. SCAG has placed a greater emphasis than ever before on sustainability and integrated planning in the 2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), whose vision encompasses three principles that collectively work as the key to our region's future: mobility, economy, and sustainability.

The 2012 RTP/SCS includes a strong commitment to reduce emissions from transportation sources to both improve public health and meet the National Ambient Air Quality Standards as set forth by the federal Clean Air Act. As such, the 2012 RTP contains a regional commitment for the broad deployment of zero and near-zero emission transportation technologies in the 2023-2035 timeframe and clear steps to move towards this objective. This is especially critical for our goods movement system. The development of a world class zero emission freight transportation system is necessary to maintain economic growth in the region, to sustain quality of life and to meet federal air quality requirements. The 2012 RTP puts forth an aggressive strategy for technology development and deployment to achieve this objective. This strategy will have may co-benefits, including energy security, cost certainty, increased public support for infrastructure, GHG reduction and economic development.

Never before have the crucial linkages and interrelationships between the economy, the regional transportation system, and land use been as important as now. For the first time, the 2012 RTP includes a significant consideration of the economic impacts and opportunities provided by the transportation infrastructure plan set forth in the 2012 RTP, considering not only the economic and job creation impacts of the direct investment in transportation infrastructure, but also the efficiency gains in terms of worker and business economic productivity and goods movement. The 2012 RTP outlines a transportation infrastructure investment strategy that will beneficially impact Southern California, the state, and the nation in terms of economic development, competitive advantage, and overall competitiveness in the global economy in terms of attracting and retaining employers in the Southern California region.

The 2012 RTP/SCS will transform the region, serving as a blueprint for improving quality of life for our residents by providing more choices for where they will live, work, and play, and how they will move around. Its safe, secure, and efficient transportation systems will provide improved access to opportunities, such as jobs, education, and healthcare. Its emphasis on transit and active transportation will allow our residents to lead a healthier, active lifestyle. It will create jobs, ensure our region's economic competitiveness through strategic investments in our goods movement system, and improve environmental and health outcomes for 22 million residents by 2035. More importantly, the RTP/SCS will also preserve what makes the region special, including our stable and successful neighborhoods and our array of open spaces for future generations to enjoy.

The Setting

In order to successfully overcome the challenges that lie before us, this RTP/SCS first recognizes the impacts that recent events and long-term trends will have on how people choose to live and move around.

ECONOMIC RECESSION

[800,000] jobs have been lost in the region due to the Great Recession

The economic turmoil faced by many of the region's residents is likely to impact their housing choices and travel behavior, including their transportation mode choice and day-to-day travel patterns. This will potentially require different types of transportation solutions.

POPULATION GROWTH

The region will add [**4 million**] people by 2035

This growth in population will only exacerbate our region's existing mobility challenges. The SCAG region is already home to 18 million people, or 49 percent of California's population. If it were its own state, the SCAG region would be the fifth most populous in the nation. Furthermore, this expected growth will occur mainly in the suburban inland counties of Riverside and San Bernardino, adding to the existing imbalance of jobs and housing in the region, and requiring people to travel which contributes to transportation and air quality challenge. In addition, with the aging of the Baby Boomer generation (the share of the population 65 years or older will increase from 11 percent in 2010 to 18 percent in 2035), the region will soon have a greater need for efficient modes of transportation for those who can no longer drive as their main form of transportation.

MULTIMODAL TRANSPORTATION SYSTEM

Over the past few decades, the region has invested heavily in a multimodal transportation system that serves as the backbone of the region's economic well-being.

THE SYSTEM AT A GLANCE

[**21,630**] miles of highways and arterials

[**470**] miles of passenger rail

[**6**] air carrier airports

Nine out of ten trips in the region utilize our extensive highway and arterial network, which supports a host of modes, including the automobile, transit, and active transportation. The region is also home to a growing number of passenger rail lines, none of which existed 20 years ago. Our regional aviation system is the nation's largest and most complex in terms of number of airports and aircraft, and our goods movement industry plays a critical role in sustaining the economy of our region. The importance of this system to our region cannot be understated.

THE REGION IN MOTION

[**446 million**] miles driven each day

[**81 million**] air passengers each year

[**45%**] more urban rail riders between 2000 and 2006

[**34%**] of our jobs depend on the goods movement industry

Challenges

The challenges facing the region are daunting. When combined, our mobility, air quality, and funding challenges present an imposing threat to the quality of life for both current and future residents.

MOBILITY CHALLENGES

The region wastes over [**3 million**] hours each year sitting in traffic

The region's roadways are the most congested in the nation, and traffic relief is critical, even more so in our current economic situation. By failing to address our congestion, we have foregone jobs—every 10 percent decrease in congestion can bring an employment increase of about 132,000 jobs.

SAFETY CHALLENGES

On the brighter side, our roadways are among the nation's safest, with rate of fatal and injury collisions declining dramatically since the 1930's. But as we continue to successfully improve safety for our motorists, we cannot neglect the alarming fatality rates of those traveling on other modes of transportation.

[**21%**] of all traffic-related fatalities involve pedestrians

This fatality rate is unacceptable, and if we plan to successfully move towards a more sustainable future that includes plenty of active transportation, we must address the safety deficiencies in all modes of transportation.

AIR QUALITY CHALLENGES

In addition, while Southern California is a leader in reducing emissions and ambient levels of air pollutants are improving, the SCAG region continues to have the worst air quality in the nation and air pollution still causes thousands of premature deaths every year, as well as other serious adverse health effects. The South Coast Air Quality Management District (AQMD) estimates the monetary cost of air pollution in Southern California to be at least $14.6 billion annually.

Even with on-going aggressive control strategies, ever more stringent national ozone standards require further oxide of nitrogen (NO_X) emission reductions in the SCAG region. In the South Coast Air Basin, for example, it is estimated that NO_X emissions will need to be reduced by approximately two-thirds in 2023 and three-quarters in 2030. This is a daunting challenge. The level of emission reduction required is so significant that 2030 emissions forecasted from just three sources—ships, trains, and aircraft—would lead to ozone levels near the federal standard. Because most sources, including cars and factories, are already controlled by over 90 percent, attainment of ozone standards will require broad deployment of zero and near-zero emission technologies in the 2023-2035 timeframe.

Senate Bill 375

New to this RTP, California's Sustainable Communities and Climate Protection Act, or Senate Bill (SB) 375, calls for this RTP to include an SCS that reduces greenhouse gas (GHG) emissions from passenger vehicles by 8 percent per capita by 2020 and 13 percent per capita by 2035 compared to 2005, as set by the California Air Resources Board (ARB). SB 375 enhances the State's goals of Assembly Bill 32, the Global Warming Solutions Act of 2006. Meeting the required targets will not be easy, but it must be done for the health and quality of life of current and future generations. Meeting these targets will point the region towards overall sustainability and will provide benefits beyond reducing carbon emissions.

FINANCIAL CHALLENGES

Of all the challenges facing us today, there is perhaps none more critical than funding. With the projected growth in population, employment, and demand for travel, the costs of our multimodal transportation needs surpass projected revenues available from our historic transportation funding source—the gas tax.

State and federal gas taxes have not changed in nearly **[20]** years

Yet, highway construction costs have grown by **[82%]**

As a result of years of underinvestment, a significant amount of our roadways and bridges have fallen into a state of disrepair. It is imperative that this situation be addressed. The rate of deterioration will only accelerate with continued deferral, significantly increasing the cost of bringing our assets back into a state of good repair.

Furthermore, with recent declines in transit funding, the region's transit operators continue to face major obstacles to providing frequent, attractive transit service.

Rail operating costs have increased by over **[40%]** in the past decade

Intercity transit operators have been forced to cut service by up to **[20%]**

The region must consider ways to stabilize existing revenue sources and supplement them with reasonably available new sources. This region needs a long-term, sustainable funding plan that supports an efficient and effective transportation system that grows the economy, provides mobility choices, and improves our quality of life.

Our Approach

To address these challenges, SCAG performed a careful analysis of our transportation system, the future growth of our region, and potential new sources of revenue, and embarked on a massive outreach undertaking to hear what the region had to say. While SCAG continued to work closely through hundreds of meetings with stakeholder agencies that it has always collaborated with, it also conducted a series of planning sessions throughout the region to find out what Southern Californians want to see in their future. The result of this multi-year effort is the 2012 RTP/SCS, a shared vision for the region's sustainable future.

Transportation Investments

The RTP/SCS contains a host of improvements to our multimodal transportation system. These improvements include closures to critical gaps in the network that hinder access to certain parts of the region, as well as the strategic expansion of our transportation system where there is room to grow in order to provide the region with the mobility it needs. These improvements are outlined in **TABLE 1**.

TABLE 1 Transportation Investments

Component	Description	Cost
Transit		**$ 49.7 billion**
Bus Rapid Transit (BRT)	New BRT routes, extensions, and/or service enhancements in Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties	$ 4.6 billion
Light Rail Transit (LRT)	New Light Rail routes/extensions in Los Angeles and San Bernardino Counties	$ 13.1 billion
Heavy Rail Transit (HRT)	Heavy Rail extension in Los Angeles County	$ 11.1 billion
Bus	New and expanded bus service in Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties	$ 20.9 billion
Passenger and High-Speed Rail		**$ 51.6 billion**
Commuter Rail	Metrolink extensions in Riverside County and Metrolink systemwide improvements to provide higher speeds	$ 3.9 billion
High-Speed Rail	Improvements to the Los Angeles to San Diego (LOSSAN) Rail Corridor with an ultimate goal of providing San Diego-Los Angeles express service in under two hours Phase I of the California High-Speed Train (HST) project that would provide high-speed service from Los Angeles to the Antelope Valley	$ 47.7 billion
Active Transportation		**$ 6.0 billion**
Various Active Transportation Strategies	Increase our bikeways from 4,315 miles to 10,122 miles, bring 12,000 miles of deficient sidewalks into compliance with the Americans with Disabilities Act (ADA), safety improvements, and various other strategies	$ 6.0 billion
Transportation Demand Management (TDM)		**$ 4.0 billion**
Various TDM Strategies	Strategies to incentivize drivers to reduce solo driving: ▪ Increase carpooling and vanpooling ▪ Increase the use of transit, bicycling, and walking ▪ Redistribute vehicle trips from peak periods to non-peak periods by shifting work times/days/locations ▪ Encourage greater use of telecommuting ▪ Other "First Mile/Last Mile" strategies to allow travelers to easily connect to and from transit service at their origin and destination. These strategies include the development of mobility hubs around major transit stations, the integration of bicycling and transit through folding-bikes-on-buses programs, triple bike racks on buses, and dedicated racks on light and heavy rail vehicles	$ 4.0 billion

Component	Description	Cost
Transportation Systems Management (TSM) (includes Intelligent Transportation Systems (ITS))		**$ 6.8 billion**
Various TSM Strategies	Enhanced incident management, advanced ramp metering, traffic signal synchronization, advanced traveler information, improved data collection, universal transit fare cards (Smart Cards), and Transit Automatic Vehicle Location (AVL) to increase traffic flow and reduce congestion	$ 6.8 billion
Highways		**$ 72.3 billion**
Mixed Flow	Interchange improvements and closures to critical gaps in the highway network to provide access to all parts of the region	$ 18.4 billion
High-Occupancy Vehicle (HOV)/ High-Occupancy Toll (HOT)	Closures to gaps in the high-occupancy vehicle (HOV) lane network and the addition of freeway-to-freeway direct HOV connectors to complete Southern California's HOV network A connected network of Express/HOT lanes	$ 18.7 billion
Toll Facilities	Closures to critical gaps in the highway network to provide access to all parts of the region	$ 35.2 billion
Arterials		**$ 22.1 billion**
Various Arterial Improvements	Spot widenings, signal prioritization, driveway consolidations and relocations, grade separations at high-volume intersections, new bicycle lanes, and other design features such as lighting, landscaping, and modified roadway, parking, and sidewalk widths	$ 22.1 billion
Goods Movement (includes Grade Separations)		**$ 47.9 billion**
Various Goods Movement Strategies	Port access improvements, freight rail enhancements, grade separations, truck mobility improvements, intermodal facilities, and emission reduction strategies	$ 47.9 billion
Aviation and Airport Ground Access		**Included in modal investments**
Various Airport Ground Access Improvements	Rail extensions and improvements to provide easier access to airports, and new express bus service from remote terminals to airports	Included in modal investments
Operations and Maintenance		**$ 216.9 billion**
Transit	Operations and maintenance to preserve our multimodal system in a good state of repair	$ 139.3 billion
Highways		$ 56.7 billion
Arterials		$ 20.9 billion

Financial Plan

The 2012 RTP financial plan identifies how much money is available to support the region's transportation investments. The plan includes a core revenue forecast of existing local, state, and federal sources, along with reasonably available new revenues sources that are likely to materialize within the RTP time frame. These new sources include adjustments to state and federal gas tax rates based on historical trends and recommendations from two national commissions (N*ational Surface Transportation Policy and Revenue Study Commission* and *National Surface Transportation Infrastructure Financing Commission*) created by Congress, further leveraging of existing local sales tax measures, value capture strategies, potential national freight progam/freight fees, as well as passenger and commercial vehicle tolls for specific facilities. Reasonably available revenues also include innovative financing strategies, such as private equity participation.

TABLE 2 presents ten categories of new revenue sources and innovative financing techniques that are considered to be reasonably available and are included in the financially constrained plan. For each funding source, SCAG has examined the policy and legal context of implementation, prepared an estimate of the revenue potential, and identified action steps to ensure the funds are available to implement the region's transportation vision.

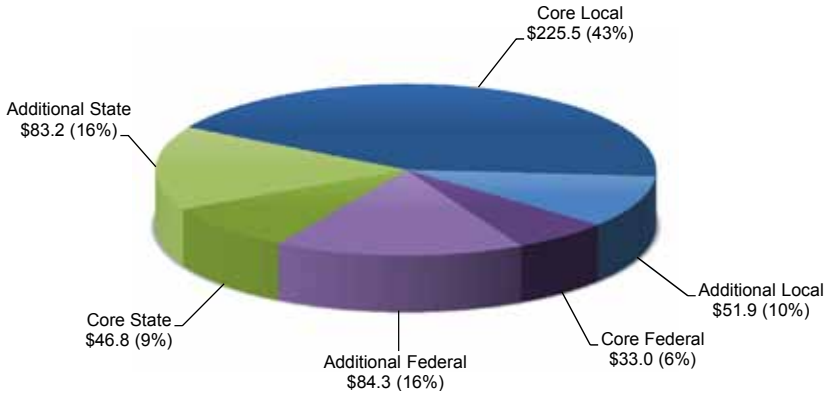
Revenue Sources and Expenditures

FIGURES 1 AND 2 provide a summary of the plan's forecasted revenues and expenditures. As shown in these figures, the region's budget over the next 25 years totals an estimated $524.7 billion.

TABLE 2 New Revenue Sources and Innovative Financing Strategies (Nominal Dollars, Billions)

Revenue Source	Description	Amount
Bond Proceeds from Local Sales Tax Measures	Issuance of debt against existing sales tax revenues: Los Angeles, Orange, Riverside, and San Bernardino Counties.	$25.6 bil
State and Federal Gas Excise Tax Adjustment to Maintain Historical Purchasing Power	Additional $0.15 per gallon gasoline tax imposed at the state and the federal levels starting in 2017 to 2024—to maintain purchasing power.	$16.9 bil
Mileage-Based User Fee (or equivalent fuel tax adjustment)	Mileage-based user fees would be implemented to replace gas tax and augment—estimated at about $0.05 (2011$) per mile and indexed to maintain purchasing power starting 2025.	$110.3 bil (est. increment only)
Highway Tolls (includes toll revenue bond proceeds)	Toll revenues generated from SR-710 Tunnel, I-710 South Freight Corridor, East-West Freight Corridor, segment of the High Desert Corridor, and Regional Express/HOT Lane Network.	$22.3 bil
Private Equity Participation	Private equity share as may be applicable for key initiatives: e.g., toll facilities; also, freight rail package assumes railroad share of costs for mainline capacity and intermodal facilities.	$2.7 bil
Freight Fee/National Freight Program	A national freight program is anticipated with the next federal reauthorization of the surface transportation act. The U.S. Senate's proposal would establish federal formula funding for the national freight network.	$4.2 bil
E-Commerce Tax	Although these are existing revenue sources, they generally have not been collected. Potentially, the revenue could be used for transportation purposes, given the relationship between E-commerce and the delivery of goods to California purchasers.	$3.1 bil
Interest Earnings	Interest earnings from toll bond proceeds.	$0.2 bil
State Bond Proceeds, Federal Grants & Other for California High Speed Rail Program	State general obligation bonds authorized under the Bond Act approved by California voters as Proposition 1A in 2008; federal grants authorized under American Recovery and Reinvestment Act and High-Speed Intercity Passenger Rail Program; potential use of qualified tax credit bonds; and private sources.	$33.0 bil
Value Capture Strategies	Assumes formation of special districts including use of tax increment financing for specific initiatives.	$1.2 bil

FIGURE 1 Revenue Sources
$524.7 Billion (Nominal Dollars) FY2011–FY2035



Source: SCAG Revenue Model 2011
Note: Numbers may not add due to rounding

FIGURE 2 Expenditure Summary
$524.7 Billion (Nominal Dollars) FY2011–FY2035

Source: SCAG Revenue Model 2011
Note: Numbers may not add due to rounding

Sustainable Communities Strategy

Within the RTP, the SCS demonstrates the region's ability to attain and exceed the GHG emission reduction targets set forth by the ARB. The SCS outlines our plan for integrating the transportation network and related strategies with an overall land use pattern that responds to projected growth, housing needs and changing demographics, and transportation demands. The regional vision of the SCS maximizes current local efforts that support the goals of SB 375, as evidenced by several Compass Blueprint Demonstration Projects and various county transportation improvements. The SCS focuses the majority of new housing and job growth in high-quality transit areas and other opportunity areas in existing main streets, downtowns, and commercial corridors, resulting in an improved jobs-housing balance and more opportunity for transit-oriented development. This overall land use development pattern supports and compliments the proposed transportation network that emphasizes system preservation, active transportation, and transportation demand management measures. Finally, the RTP/SCS fully integrates the two subregional SCSs prepared by the Gateway Cities and Orange County Council of Governments.

Measuring Up

The investments in this RTP/SCS are expected to result in significant benefits to the region with respect to transportation and mobility, as well as air quality, economic activity and job creation, sustainability, and environmental justice. They will result in better place-making, lower overall costs, advances in public health and the environment, responsiveness to a changing housing market, and improved accessibility and mobility.

Air Quality and GHG Targets

We will reduce greenhouse gas emissions by [**8%**] by 2020, [**16%**] by 2035

This RTP/SCS successfully achieves and exceeds our greenhouse gas emission reduction targets, set by ARB by achieving an 8 percent reduction by 2020 and 16 percent reduction by 2035 compared to the 2005 level on a per capita basis. This RTP/SCS also meets criteria pollutant emission budgets set by EPA. With each passing year, Southern Californians should expect to breathe cleaner air and live healthier lives.

This air quality benefit is made possible largely by more sustainable planning, integrating transportation and land use decisions to allow Southern Californians to live closer to where they work and play, and to high-quality transit service. As a result, more residents will be able to use transit and active transportation as a safe and attractive means of travel.

Location Efficiency

Over [**twice**] as many households will live near high-quality transit

Share of households living in the High Quality Transit Area will more than double over the plan period signaling a more efficient overall development pattern in the future.

Mobility

Delay on our roadway system will improve over today's condition

Our roadways will be less congested, allowing our region's residents to spend less time in traffic onboard a bus or behind the wheel and more time with their families.

Safety

Not only will residents be more mobile, they will also be safer. This RTP/SCS's emphasis on safety will result in significantly lower accident rates, giving our residents the peace of mind to travel freely throughout the day and come home to their loved ones every night.

Economy

We will generate [**4.2 million**] jobs

Not only will the region be more mobile, it will also be more prosperous. Implementation of the RTP/SCS will create or sustain jobs today to build transportation infrastructure projects for tomorrow. The 4.2 million total jobs over the life of the RTP/SCS equates to an annual average of 167,900 jobs, and is not limited to the construction industry, but will encompass a broad cross-section of industry clusters.

Investment Effectiveness

We will get [**$2.90**] back for every $1 spent

The RTP/SCS makes dollar sense. While its overall expenditures seem like a huge cost, the region will recover $2.90 for every $1 this RTP/SCS commits, which will only help propel the region to more prosperous days ahead.

Public Participation

The development of the Draft 2012 RTP/SCS involved implementation of one of the most comprehensive and coordinated public participation plan ever undertaken by SCAG. The public and stakeholder involvement program went over and beyond meeting the requirements of SB 375 and the SAFETEA-LU. SCAG engaged the widest range of stakeholder groups, elected officials, special interest groups as well as general public, through a series of workshops and public meetings, as well as SCAG's policy committees, task forces and subcommittee structure. The input received through this process has truly shaped the Draft 2012 RTP/SCS in a meaningful way. Furthermore, SCAG will continue to involve and engage the stakeholders and the public in the process of refining and finalizing the 2012 RTP/SCS over the next several months through the close of the formal comment period. SCAG has developed a state-of-the-art video and interactive RTP/SCS website called iRTP that will further enhance our capability to engage and involve the stakeholders and the public to continue shaping the 2012 RTP/SCS.

Strategic Plan – Looking Ahead – Beyond the Horizon

The 2012 RTP/SCS proposes investing over $500 billion over the next 25 years to improve the quality of life of the region's residents by enhancing our transportation system. However, additional strategies and projects are needed. The Strategic Plan identifies additional long-term initiatives such as zero emission transportation strategies; new operational improvements; expanded transit investments and high-speed rail system; as well as increased commitment to active transportation. Although elements of these strategies are included in the financially constrained plan, further work is needed to ensure there is regional consensus and commitment to fund the balance in subsequent RTPs.

01 VISION

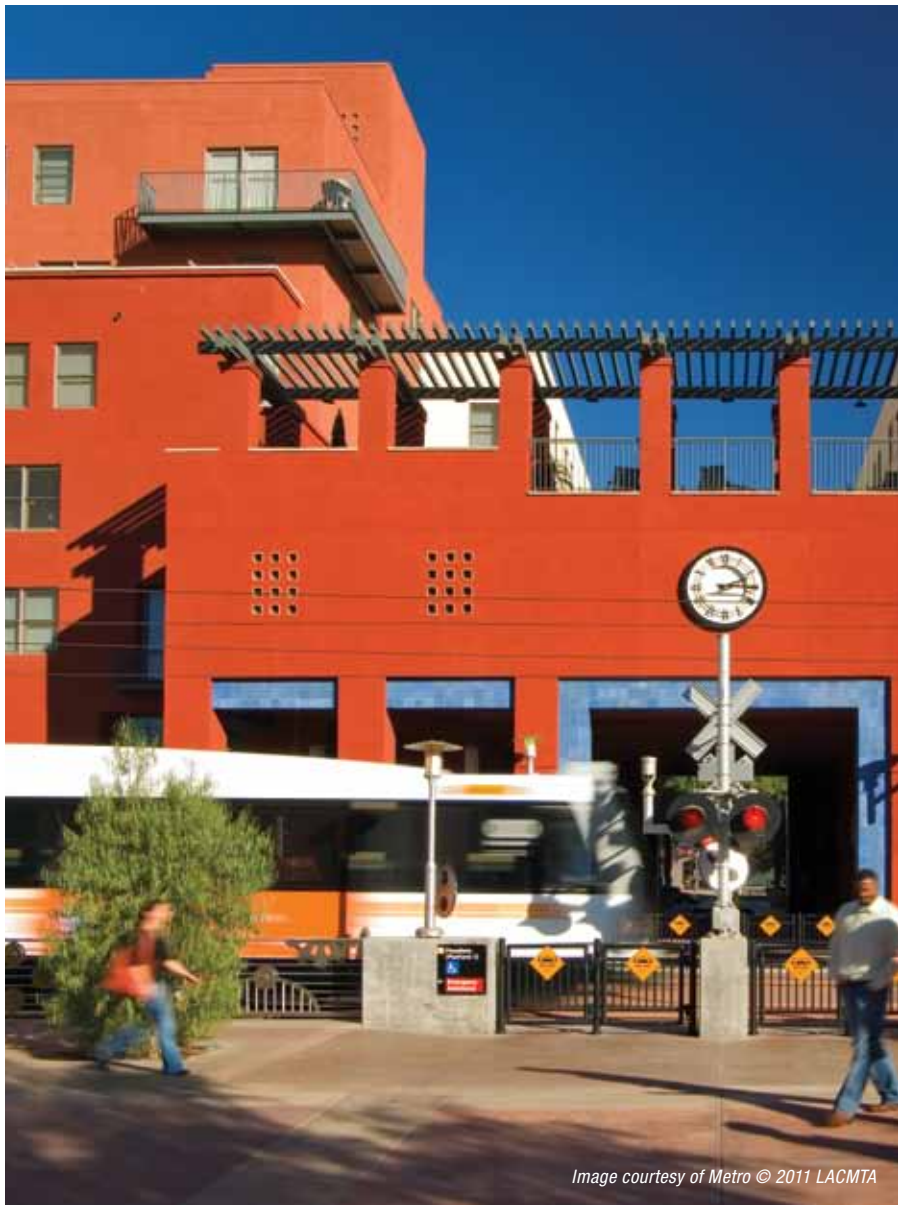


Image courtesy of Metro © 2011 LACMTA

Towards a Sustainable Future

SCAG has prepared and adopted Regional Transportation Plans (RTPs) since 1976. Throughout this history, SCAG has considered the RTP primarily as an investment in the six-county (Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura) region's mobility. The RTP identifies infrastructure projects and improvements in order to reduce traffic and generally make it easier to get around. As the process has evolved and RTPs have been updated, we have gradually broadened our viewpoint, particularly by elevating air quality considerations in the plan. This evolution has now culminated in the 2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which has mobility as an important component of a much larger picture that incorporates added emphasis on sustainability and integrated planning. The vision for the 2012 RTP/SCS encompasses three principles as the key to our region's future: mobility, economy, and sustainability.

The RTP/SCS is an investment in the region's future well-being through 2035. It contains projects, policies, and strategies that will achieve a range of positive outcomes when implemented. In one sense, the RTP is an accounting of revenues and expenditures. It identifies our available and reasonably foreseeable sources of funding, and directs that funding to multi-modal transportation projects that benefit our communities. The RTP/SCS strategies and policies are designed to assure that, to the greatest extent possible, the money we invest has the best chance of achieving our shared objectives.

In a broader sense, the RTP/SCS is a blueprint for improving the quality of life for our residents by making the best transportation and land-use choices for the future and supporting those choices with wise investments. The RTP/SCS will result in more and better travel choices as well as safe, secure, and efficient transportation systems that provide improved access to opportunities, such as jobs, education, and healthcare for our residents. Furthermore, the RTP/SCS will create jobs, ensure our region's economic competitiveness through strategic investments in our goods movement system, and improve environmental and health outcomes for 22 million residents by 2035.

Our Vision – Mobility, Economy, Sustainability

Our vision is built upon themes regional leaders discussed at the 2011 General Assembly. The vision has been further shaped by an unprecedented level of outreach and direct

engagement with stakeholders. For example, the public workshops held through the summer of 2011 gathered distinct feedback from a wide range of stakeholders on objectives for this plan. Taking all input into account, the 2012 RTP/SCS sets forth a vision to advance Southern California's mobility, economy and sustainability through 2035.

MOBILITY

A successful transportation plan allows the residents of the region to access daily needs, including work, school, shopping, and recreation, without undue burdens of cost, time, or physical danger. This includes the pressing need to preserve and maintain our infrastructure at adequate levels. Residents should be able to rely on their ability to get from one place in the region to another in a safe and timely manner. They should be able to choose from a variety of transportation modes that suit their preferences and needs, including active, non-motorized modes such as biking and walking that allow for physical activity and greater health.

ECONOMY

A successful RTP creates opportunities for business, investment, and employment in Southern California. This plan does so by proposing over $500 billion of investment in the next 25 years. This constitutes the largest regional-scale infrastructure jobs program in Southern California's history. This will put thousands of Southern Californians back to work in much needed jobs, not only in construction, but also in a broad cross-section of industry clusters. Over the twenty-five year period, the plan will generate 4.2 million jobs in the six county region. This represents the direct economic effect of designing, building and maintaining projects, as well as the indirect and induced benefits of the investments.

Moreover, the economic benefits of the RTP/SCS are likely far broader and greater. The recommended investments and strategies in the draft RTP/SCS set the conditions for economic activity in the region by improving mobility and reducing congestion and commute times, allowing businesses in the region to operate more efficiently and maintain their competitiveness. The plan does so by addressing the needs for logistics, shipping, distribution, and goods movement in the region—a key component of the Southern California Economic Recovery and Job Creation Strategy adopted by the Regional Council in June 2011. These investments not only serve local businesses, but allow the region to further capitalize on its unique position as a center for international trade. Also, through the integration of regional housing policy, residents will have better access to affordable housing in all communities, and residents will have lower overall combined costs for housing and transportation. In more subtle ways, the RTP/SCS encourages continued investment and job creation by ensuring a more livable, efficient, desirable, and competitive region where employers want and are able to do business over the long-term.

SUSTAINABILITY

The RTP/SCS is subject to specific requirements for environmental performance. The strategies and projects identified in the following chapters satisfy those requirements. However, this RTP will only be successful if we define sustainability in the broadest manner possible. A successful RTP/SCS allows future residents to enjoy a better quality of life than we do today, including the ability to lead a healthy lifestyle enjoying clean air and water and ample opportunities for recreation and physical activity. It will have direct and substantial benefits to public health by reducing pollutant emissions and expanding the opportunities for active transportation. It also demonstrates how we can transition from things we know to be unsustainable—such as reliance on fossil fuels—to new technologies for the future. Finally, a successful RTP establishes how we preserve what makes the region special, including our stable and successful neighborhoods and our array of open spaces for future generations to enjoy.

Realizing the Vision – Goals and Objectives

Developing the RTP/SCS is no simple task, particularly given the economic struggles we are facing today. Transportation funds are limited for sustaining our existing system and the regional initiatives that reduce pollution and congestion while increasing mobility and economic development require more money. Cities, businesses and taxpayers are coping with an acute economic struggle. We are also a large region with a diversity of views and a diffuse decision-making structure. Nevertheless, the RTP/SCS provides an opportunity to set a course for 2035 that not only accomplishes what we are required to do, but also delivers a future that benefits residents, cities, and businesses.

In crafting a plan to address these challenges, SCAG and the region have several advantages. These include our local commitments to dramatically increase the reach of transit, on-going progress in creating new voluntary templates for growth and development, and our existing rich and vibrant neighborhoods. Our ability to succeed will also be the result of layering projects, programs, and strategies that leverage each other to achieve better results.

To guide the development of these projects, programs, and strategies, the Regional Council adopted specific goals and objectives that help carry out the RTP/SCS vision for improved mobility, economy, and sustainability.

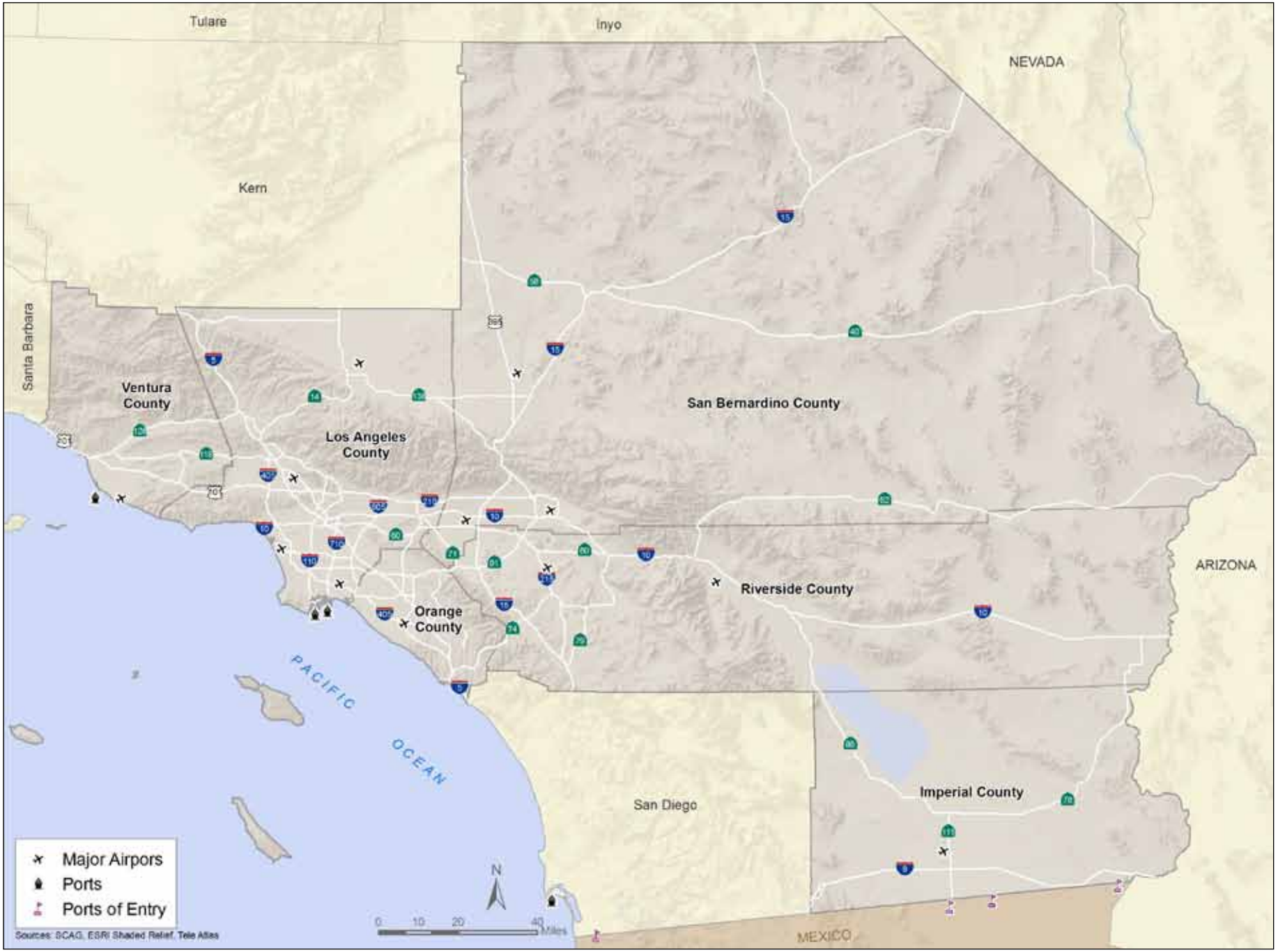
REGIONAL GOALS

The regional goals reflect the wide-ranging challenges facing transportation planners and decision-makers in achieving the RTP/SCS vision. The goals demonstrate the need to balance many priorities in the most cost-effective manner. These goals and over arching policies were discussed and approved by the RTP Subcommittee and the Transportation Committee. They will be adopted by the Regional Council as part of the 2012 RTP/SCS.

TABLE 1.1 RTP Goals

RTP Goals
▪ Align the plan investments and policies with improving regional economic development and competitiveness
▪ Maximize mobility and accessibility for all people and goods in the region
▪ Ensure travel safety and reliability for all people and goods in the region
▪ Preserve and ensure a sustainable regional transportation system
▪ Maximize the productivity of our transportation system
▪ Protect the environment and health for our residents by improving air quality and encouraging active transportation (non-motorized transportation, such as bicycling and walking)
▪ Actively encourage and create incentives for energy efficiency, where possible
▪ Encourage land use and growth patterns that facilitate transit and non-motorized transportation
▪ Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies

EXHIBIT 1.1 SCAG Region



RTP GUIDING POLICIES

The 2012 RTP/SCS guiding policies help to focus future investments on the best-performing projects and strategies that seek to preserve, maintain, and optimize the performance of the existing system (**TABLE 1.2**).

TABLE 1.2 RTP Policies

	RTP Policies
1	Transportation investments shall be based on SCAG's adopted regional Performance Indicators
2	Ensuring safety, adequate maintenance, and efficiency of operations on the existing multi-modal transportation system should be the highest RTP priorities for any incremental funding in the region
3	RTP land-use and growth strategies in the RTP will respect local input and advance smart growth initiatives
4	Transportation demand management (TDM) and non-motorized transportation will be focus areas, subject to Policy 1
5	HOV gap closures that significantly increase transit and rideshare usage will be supported and encouraged, subject to Policy 1
6	Monitoring progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies, will be an important and integral component of the Plan

PERFORMANCE MEASURES

In accordance with RTP Policy 1, the 2012 RTP/SCS is a performance-based plan. Performance measures allow us to quantify regional goals, estimate the impacts of proposed investments, and evaluate progress over time. The performance indicators for the RTP/SCS represent a continuing evolution that builds upon earlier successes and adds refinements to meet expanded policy objectives. **TABLE 1.3** describes the relationship between the RTP/SCS goals and performance measures.

TABLE 1.3 RTP Goals and Related Performance Outcomes

RTP Goals	Mobility/Accessibility	Reliability	Location Efficiency	Productivity	Safety and Health	Economic Well-Being	Cost Effectiveness	System Sustainability	Environmental Quality
Align the plan investments and policies with improving regional economic development and competitiveness						✓			
Maximize mobility and accessibility for all people and goods in the region	✓						✓		
Ensure travel safety and reliability for all people and goods in the region		✓			✓				
Preserve and ensure a sustainable regional transportation system								✓	✓
Maximize the productivity of our transportation system	✓			✓					
Protect the environment and health for our residents by improving air quality and encouraging active transportation					✓				✓
Actively encourage and create incentives for energy efficiency, where possible			✓						
Encourage land use and growth patterns that facilitate transit and non-motorized transportation			✓						
Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies*									

* SCAG does not yet have an agreed-upon security performance measure, therefore it is not included in the table.

The Setting

The 2012 RTP/SCS vision was developed by taking into account recent events and long-term trends. This includes the Great Recession and its aftermath, continuing growth in population and demand on the transportation system, and a growing expectation by planners, policy-makers, and the general public that a comprehensive and integrated approach to addressing the region's transportation issues is needed. This setting provides the backdrop for the challenges and opportunities facing the region.

Economic Recession

Approximately 800,000 jobs have been lost in the region due to the continuing economic downturn. This could have a long-term effect on where and how people choose to live, work, and play. It could also impact people's travel behavior, including mode choice and travel patterns, potentially requiring different types of transportation solutions. This downturn may also provide an opportunity to plan a more comprehensive approach for leveraging our infrastructure investments to improve the region's economic competitiveness and to create much-needed jobs by expediting project delivery through innovative financing. This is an opportunity to put more people to work sooner.

Without the projects and strategies in the RTP/SCS, the region would fail to meet critical investment needs, increasing congestion and travel time delay to the detriment of our economy. By doing nothing, the SCAG region would forego approximately $580 billion in Gross Regional Product (GRP) through 2035. To compete effectively in the global economy, we must invest strategically in our transportation infrastructure, while ensuring that we obtain the maximum return on investment. SCAG's analysis also indicates that every 10 percent decrease in congestion is associated with an employment increase of approximately 132,000 jobs. Congestion relief will be a major contributing factor to our future employment growth.

Population Growth

The region's mobility challenges are driven and exacerbated by the anticipated growth in population, households, and employment over the next 25 years. While this growth will increase the demand on the already-strained transportation system, there are also implications for land-use consumption. Furthermore, demographic changes such as the aging and diversity of the population will affect the future demand for certain types of housing and transportation services.

According to the 2010 Census, the SCAG region is now home to 18 million people, or approximately 5.8 percent of the U.S. population and 49 percent of California's population. The region includes the second largest metropolitan area in the country after New York City. If it were a state, the SCAG region would rank fifth in population, just behind Florida and ahead of Illinois.

After experiencing different growth stages with growth rates above the U.S. national average, the region entered a period of slow growth in 1990 (**TABLE 1.4**). The slow growth

period (1990–2010) represents the mature stage of regional growth and urbanization, during which the region added 3.4 million people and grew at a rate comparable to that for both the state and the nation. The growth was a result of natural increase (adding 3.56 million) and net migration (subtracting 130,000).

TABLE 1.4 Annual Average Growth Rate of the SCAG Region During Growth Periods (1850–2010)

	Very Rapid Growth 1850–1910	Rapid Growth 1910–1960	Average Growth 1960–1990	Slow Growth 1990–2010
SCAG region	311.0%	21.6%	2.9%	1.2%
California	41.1%	11.2%	3.0%	1.3%
United States	5.0%	1.9%	1.3%	1.2%

Source: U.S. Census, 1850–2010

Migration and population growth is affected by the economy. While economic growth is typically a major source of net domestic and international migration, in a similar fashion, economic downturns can also have a serious impact on the region's growth. Although the Great Recession officially ended in 2009, the region is still struggling to get back to pre-recession levels. The stability of future growth depends in part on how the region successfully addresses these economic challenges.

Although the rate of regional growth has stabilized in the last 20 years, urbanization and suburbanization of the region has continued (**TABLE 1.5**). The suburban inland counties of Riverside and San Bernardino together accounted for 23.4 percent of the region's population in 2010, up from 17.7 percent in 1990. Over this same period, Los Angeles County grew more slowly and its share of the region's population declined from 60.5 percent in 1990 to 54.4 percent in 2010. The fast growth of population relative to employment in Riverside and San Bernardino Counties highlights the imbalance of jobs and housing in the region. It also poses a serious transportation and air quality challenge to local and regional planners.

TABLE 1.5 County Share of Regional Population (1990–2010)

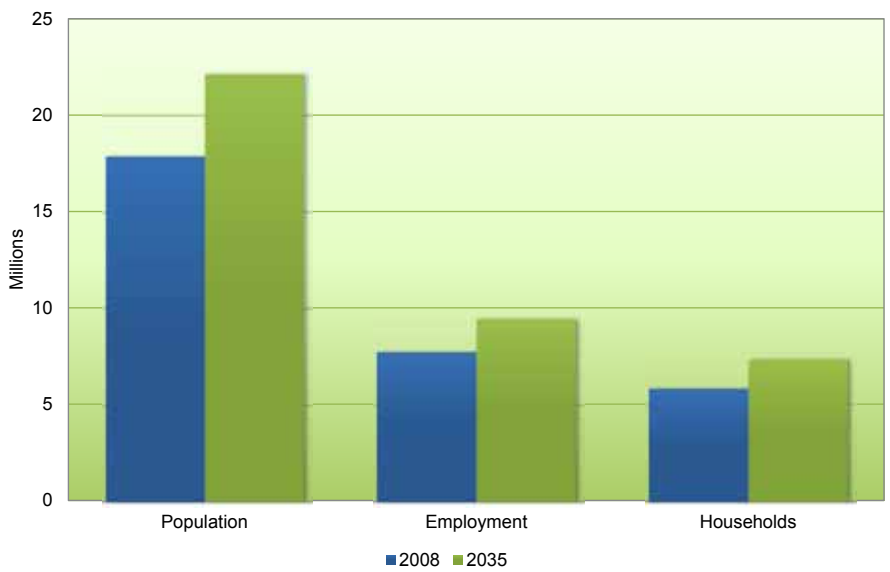
County	1990		2000		2010	
Imperial	109	0.7%	142	0.9%	175	1.0%
Los Angeles	8,863	60.5%	9,519	57.6%	9,819	54.4%
Orange	2,411	16.5%	2,846	17.2%	3,010	16.7%
Riverside	1,170	8.0%	1,545	9.4%	2,190	12.1%
San Bernardino	1,418	9.7%	1,709	10.4%	2,035	11.3%
Ventura	669	4.6%	753	4.6%	823	4.6%
SCAG Total	**14,641**	**100.0%**	**16,516**	**100.0%**	**18,052**	**100.0%**

Population in thousands; numbers may not add due to rounding.
Source: SCAG

Although the latest 2010 Census data indicates slower growth in population, households and employment than forecasted in the 2008 RTP, the region is still expected to grow over the RTP planning period—adding four million new residents by 2035 (**FIGURE 1.1**). The projected annual growth rate is only 0.9 percent, lower than the past 20-year growth rate. Most of this growth is through natural increase.

The aging of the population is one of the major demographic changes expected in the region. With the aging of the Baby Boomer generation (those born between 1946 and 1964), the median age of the population will increase from 34.2 years in 2010 to 36.6 years in 2035. The share of the population 65 years or older will increase from 11 percent in 2010 to 18 percent in 2035. Meanwhile, the working-age population (ages 16 to 64 years) will sharply decline, implying a future shortage in the regional labor force and a sharp increase in the old-age dependency ratio from 17 percent in 2010 to 30 percent in 2035.

FIGURE 1.1 Projection of Population, Household, and Employment Growth (2008–2035)



Source: SCAG

Another major demographic trend is the growing racial and ethnic diversity of the population. The region's diversity was already high in 2010, with 45 percent of the population Hispanic, 34 percent non-Hispanic White, 14 percent non-Hispanic Asian, and 7 percent non-Hispanic Black. By 2035, there will be a majority Hispanic population (56 percent) while the non-Hispanic White population will drop to 22 percent.

Economic recessions and globalization of the economy were major factors contributing to slow growth in the region over the past 20 years. However, employment in the region is still expected to increase over the RTP period from 7.2 million jobs in 2010 to 9.4 million in 2035. This is an annual rate of over 1 percent. From a longer term perspective, the region is expected to recover fully from the recession and return to reasonable labor force participation rates and unemployment levels. But, the region's industrial mix will experience continuous change over time due to globalization. The region will also transform its industrial structure from a manufacturing-oriented industry to a service-oriented industry.

Safety

The safety of people and goods is one of the most important considerations in developing, maintaining and operating our multi-modal transportation system. This section briefly describes the trends in accidents on our transportation system.

The rate of fatal and injury collisions on California's highways has declined dramatically since the California Highway Patrol began keeping such data in the 1930s (**FIGURE 1.2**). California has led the nation in roadway safety for much of the past 20 years. Only recently have roadways nationally become as safe as those in California. California's 2008 Mileage Death Rate (MDR) – fatalities per 100 million vehicle miles traveled (VMT) – is 1.05, much lower than the national MDR of 1.25.

The SCAG region has an extensive transportation system with about 67,000 freeway and arterial lane-miles. The region had 11.1 million licensed drivers and 13.4 million registered vehicles in 2008. The same year, over two million people rode public transit daily. Unfortunately, 1,533 people died and 124,975 were injured in traffic collisions in the SCAG region.

FIGURE 1.2 California Mileage Death Rate (1933–2009)

Source: California Highway Patrol Statewide Integrated Traffic Records System (SWITRS)

In 2005, Congress passed the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which required states to develop Strategic Highway Safety Plans (SHSPs). The California Department of Transportation (Caltrans) responded by developing its SHSP through a participatory process with over 300 stakeholders throughout California. The overarching goal was to reduce the California roadway fatality rate to less than 1.0 fatality per 100 million vehicle miles traveled (VMT) by 2010.

In 2006, the State of California initiated its SHSP to reduce transportation fatalities in the state in absolute numbers by 2010. Targets were set for strategies in 16 challenge areas (impaired driving, street crossing, bicycling, older drivers, etc). While the targets in most challenge areas were met by 2010, the SHSP Steering Committee is establishing new targets to reduce fatalities even further. The new targets will be finalized in 2012. While the California SHSP sets various actions that State agencies can perform to reduce fatalities, there are complementary strategies that can be performed by local governments.

As we continue to successfully improve the safety of our motorists, we cannot neglect the alarming fatality rates of those traveling on other modes of transportation. As safety is a multi-modal issue, walking and bicycling safety are included in the SHSP as challenge areas. Based on data from the Statewide Integrated Traffic Records System (SWITRS), in 2008, 21 percent of all traffic-related fatalities in the SCAG region involved pedestrians, and 5.7 percent of traffic-related injuries involved pedestrians. Additionally, 4 percent of all traffic-related fatalities in the SCAG region involved bicyclists, and 4.3 percent of all traffic-related injuries involved bicyclists.

Multi-Modal System

HIGHWAYS AND ARTERIALS

The region's highway and arterial system extends for 67,000 lane-miles and serves 53 million trips each weekday. It is the backbone of the region's economic well-being, and facilitates the movement of people and goods via multiple modes of transportation, including automobiles, public transit and active transportation. According to SCAG's Regional Travel Demand Model (RTDM), nine out of every ten trips rely either entirely or in part on the highway and arterial system. The RTDM also estimates the following:

- 3.3 million vehicle-hours of daily delay,
- 4.7 million person-hours of daily delay, and
- 15.8 minutes of daily delay per capita.

Despite the importance of the system, improvements have not kept pace with the region's increasing population and transportation demand. As a result, the region's traffic congestion has increased dramatically, leading to a less productive transportation system with negative consequences such as wasted time and fuel and poor air quality.

TRANSIT

Despite a common perception of an auto-oriented culture, the region's transit system includes an extensive network of services provided by dozens of operators that includes fixed-route local bus, community circulators, express bus, bus rapid transit (BRT), demand response, commuter rail, heavy rail, and light rail. Ridership in our region continues to grow, and significant progress is being made in making transit more available

and attractive by virtue of a burgeoning rail network, transit-oriented development (TOD), and other service improvements. Between 2000 and 2008, bus ridership increased by 17 percent, and urban rail ridership increased by 50 percent. Furthermore, there was an 81 percent growth in Metrolink ridership. **TABLE 1.6** depicts rail ridership by passenger boardings and passenger miles for 2000 and 2008.

TABLE 1.6 Urban Rail Ridership

Urban Rail Operators	2000	2008	Difference
	Metro Subway		
Passenger Boardings	27,957,650	43,584,566	56%
Passenger Miles	74,729,093	217,964,955	192%
	Metro Light Rail		
Passenger Boardings	29,859,558	43,122,565	44%
Passenger Miles	208,824,385	306,848,462	47%
	Metrolink		
Passenger Boardings	6,978,588	12,680,973	82%
Passenger Miles	256,386,730	436,565,493	70%

Source: 2000 & 2008 National Transit Database

The recent and future improvements to the region's transit system are accompanied by land-use developments around transit centers and stations and along transit corridors that encourage transit usage. Many residential and commercial developments have been built or are planned alongside transit facilities to offer residents and employees an opportunity to make a trip by transit, or bicycling or walking, instead of by car.

These developments have been significantly undermined by recent revenue declines and cutbacks in funding. Since Fiscal Year 2007–2008, transit providers within the SCAG region have seen a decrease in State Transit Account (STA) funds of approximately $759 million. By February of 2011, half of the agencies providing intercity service had cut service by anywhere from 2 percent to 20 percent. During this same period, 14 out of 25 of the intercity operators saw boardings fall between 2 percent and 27 percent. To offset this large revenue decline, almost all operators have raised fares, which reduces the incentive to ride transit.

In parallel with the revenue setbacks, costs for transit providers are rising faster than inflation. Every transit mode has experienced increases in cost per passenger mile traveled (PMT) over the past decade: bus service by 24 percent, Metro Rail by 41 percent, and Metrolink by 48 percent. Fare revenue, or "farebox recovery," has decreased from 32 percent of the cost of service to just 27 percent since 2000.

These cost and revenue trends weaken the long-term stability of transit services in the SCAG region. Unless transit operators in our region find ways to improve the ratio of fare revenue to costs, transit services will require much greater subsidies or cuts in services. This conflict will grow as new capital projects currently in development are ready for revenue service.

Image courtesy of the Southern California Regional Rail Authority (Metrolink)

PASSENGER AND HIGH SPEED RAIL

The SCAG region is served by a network of intercity passenger and commuter rail services which operate on the region's rail network, often sharing facilities with freight rail. They operate at higher speeds and have less frequent station stops than traditional transit services, and are more likely to serve intercity and interregional trips.

Amtrak operates interregional and intercity passenger rail service. Four of Amtrak's fifteen long distance routes serve our region, and of these, only two offer daily service. Amtrak provides much more frequent intercity passenger rail service via the Pacific Surfliner. This 351-mile-long service traverses the Los Angeles-San Diego-San Luis Obispo (LOSSAN) corridor. Amtrak's Pacific Surfliner is the second most-used service in Amtrak's national fleet, moving nearly 9 percent of the system's total national ridership. Pacific Surfliner ridership is growing at a rate over 8 percent a year.

The Southern California Regional Rail Authority (Metrolink) is the sole operator of the Metrolink system, which serves primarily as a commuter rail service in our region. Metrolink provides service on 512 track miles along seven routes in Ventura, Orange, Los Angeles, San Bernardino, Riverside and San Diego Counties. Four routes (i.e., the Ventura County Line, the Orange County Line, the Inland Empire/Orange County Line, and the SR-91 Line) share portions of the LOSSAN Corridor with the Pacific Surfliner.

Metrolink has recently been pursuing innovative marketing, ticket pricing and operations strategies to increase ridership and reduce costs. In May 2011, Metrolink started express service demonstration programs on its San Bernardino and Antelope Valley lines. This service shaves a large amount of time off conventional trips. By skipping most stops, travel time is reduced 33 percent to just one hour on the San Bernardino line, and 25 percent to an hour-and-a-half on the Antelope Valley line. Metrolink has also started specific trains for Dodgers' and Angels' games, as well as other special events.

Despite these services, fast and efficient interregional and intercity ground transportation remains an issue within our region. One potential solution is high-speed rail. In November of 2008, California voters passed Proposition 1A, authorizing nearly $9 billion in bonds to build a statewide High Speed Train (HST) system and additional $950 million to upgrade connectivity of current rail services to the proposed HST. Subsequently, the federal government committed $3.6 billion through the American Recovery and Reinvestment Act (ARRA) of 2009. Phase I of the HST program will connect San Francisco with Los Angeles and Anaheim and include several intermediate stops. Phase I is expected to be implemented during the RTP timeframe. Phase II will add connections to Sacramento, Ontario, Riverside, and San Diego.

The HST program presents an enormous opportunity for the state and the region, but faces significant challenges. The latest total costs for Phase I are estimated at $98.5 billion, and the State has secured only $12.6 billion in funds for Phase I to date. The California High-Speed Rail Authority, in partnership with the Federal Railroad Administration (FRA), has chosen to begin construction in the San Joaquin Valley, using federal High-Speed and Intercity Passenger Rail funds.

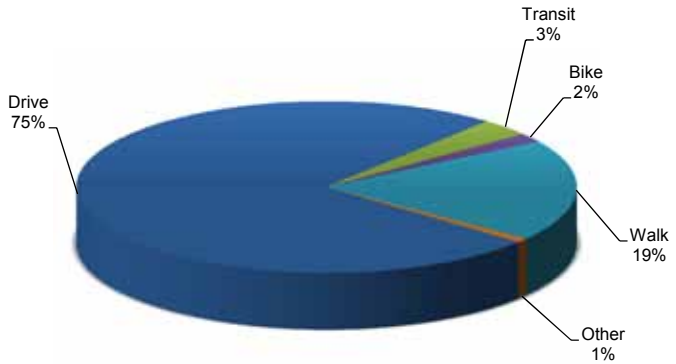
Due to the federal mandate of building the initial operating segment in the San Joaquin Valley, many local stakeholders are seeking to divert Proposition 1A revenues to fund and construct improvements to the LOSSAN and Metrolink corridors. This would provide faster speeds and better service to our region sooner, and act as a phased high-speed rail implementation. Once the high-speed train is built, three different rail passenger markets will be served through complementary systems.

ACTIVE TRANSPORTATION

Active transportation (e.g., bicycling and walking) are essential and increasingly important modes of transportation. These non-motorized modes are low-cost, do not emit greenhouse gases, help reduce roadway congestion, and increase health and the quality of life. As the region works towards reducing congestion and air pollution, walking and bicycling will become more essential to meet the future needs of our residents.

National Household Travel Survey (NHTS) data indicate that approximately 21 percent of all trips in the region in 2009 were conducted by walking (19 percent) or bicycling (2 percent), representing an approximately 75 percent increase from the 12 percent active transportation mode share in 2000 (**FIGURE 1.3**). The 2009 NHTS data also showed that there was an 11 percent decrease in driving from 84 percent to 75 percent. More active transportation has placed a greater focus on the preservation, maintenance and expansion of active transportation infrastructure. As the population in the SCAG region grows and matures, and as parts of the region move towards denser, mixed-use, and transit-oriented development, the demand and use of active transportation will increase.

FIGURE 1.3 Mode of Travel for Total Trips (2009)



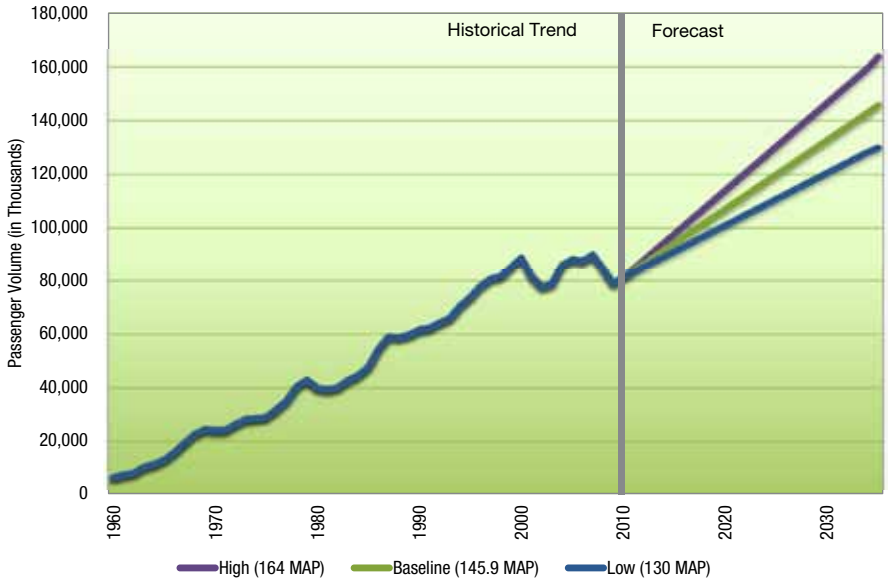
Source: National Household Travel Survey, 2009

Aviation and Ground Access

The SCAG region supports the nation's largest regional airport system with the most airports and aircraft operations, operating in a very complex airspace environment. The system has six air carrier airports, including Los Angeles International (LAX), Bob Hope (formerly Burbank), John Wayne, Long Beach, Ontario and Palm Springs. There are also four new and emerging air carrier airports in the Inland Empire and North Los Angeles County, as well as 44 general aviation airports and two commuter airports, for a total of 56 public-use airports.

The events of September 11, 2001 and the Great Recession have significantly impacted regional air passenger demand. **FIGURE 1.4** shows historical growth in regional air passenger activity since 1960, and the marked slowdown in regional air passenger demand growth over the last decade. The exhibit also illustrates three potential scenarios for growth: High Growth, Medium Growth/Baseline and Low Growth Scenarios. The Medium Growth/Baseline scenario is the aviation demand forecast adopted for this plan. At 145.9 million annual air passengers (MAP) in 2035, the adopted forecast is much more conservative than the 165.3 MAP 2035 forecast adopted for SCAG's last (2008) RTP, and the 170 MAP 2030 forecast adopted for SCAG's 2004 RTP. The adopted forecast reflects recent trends in the region and in the airline industry, and its 2.5 percent annual air passenger growth rate to 2035 is lower than growth rates in recent passenger forecasts published by the Federal Aviation Administration, Boeing and Airbus.

FIGURE 1.4 Historical Trend and Forecasts of Air Passenger Activity (1960–2035)



Source: SCAG

Despite the slowdown in aviation demand growth, meeting the future airport capacity needs of Southern California is still challenging. Even with a much more conservative regional air passenger forecast, an Aviation Decentralization Strategy is needed to meet forecasted air passenger demand. All four urban air carrier airports in Los Angeles and Orange Counties—LAX, Bob Hope, Long Beach and John Wayne—are highly constrained. Their collective acreage amounts to 5,540 acres, which is less than 17 percent of the 34,000 acres of Denver International, and less than the 7,700 acres of Chicago O'Hare. Despite being the third-busiest airport in the country and fifth-busiest in the world in terms of passengers served, LAX is a very small international airport with only 3,500 acres. The urban airports in the SCAG region have little room to expand because of severe encroachment by surrounding communities. In addition, two of these airports—Long Beach and John Wayne—have strict limits on allowable flights. These limits (one is a city ordinance and the other is a court settlement agreement) are legally enforceable because

they predate the Federal Airport Noise and Capacity Act of 1990 (ANCA). Air passenger growth at LAX is also limited by a settlement agreement constraint.

The challenge of meeting future aviation demand in the SCAG region is tied to improving regional airport ground access. To meet that demand, future air passengers from the urban areas of Los Angeles and Orange Counties need convenient access to available airport capacity at airports in the Inland Empire and North Los Angeles County. This challenge is complicated by the fact that the regional roadway system will become increasingly congested and unreliable unless we are successful in implementing improvements proposed in this plan. This will require air passengers to allow more time to get to the airport to meet flights in a timely fashion. An unreliable and unpredictable airport ground access system will make it difficult to accommodate future aviation demand by fully utilizing the region's airports with available capacity. They will have higher ground access time and costs associated with them. Until they fully mature, they will have few alternative flights to offer air travelers who miss their flights because of unreliable ground access.

Southern California airports play a crucial role in international trade, particularly with Pacific Rim countries, and to the regional economy. Unless the regional airport ground access system is substantially improved, many potential air passengers will choose not to fly at all. This will translate to substantial economic loss to the region and a threat to our regional economy and well-being. A regional airport ground access strategy is therefore needed to help address the challenges posed by a highly constrained regional aviation system.

The Great Recession has had a substantial impact on airports in the regional system. Ontario Airport, for example, lost about a third of its air passenger activity from 2007 to 2010. It is in the region's interest to help sustain and preserve airports like Ontario that have ample capacity to serve future aviation demand, until economic conditions improve and they can provide significant capacity relief to constrained urban airports in the region. The challenge is to identify how best to support the development of new air services at uncongested and unconstrained airports like Ontario, and to develop appropriate regional marketing strategies and economic incentives that can sustain these airports into the future.

Transportation Demand Management

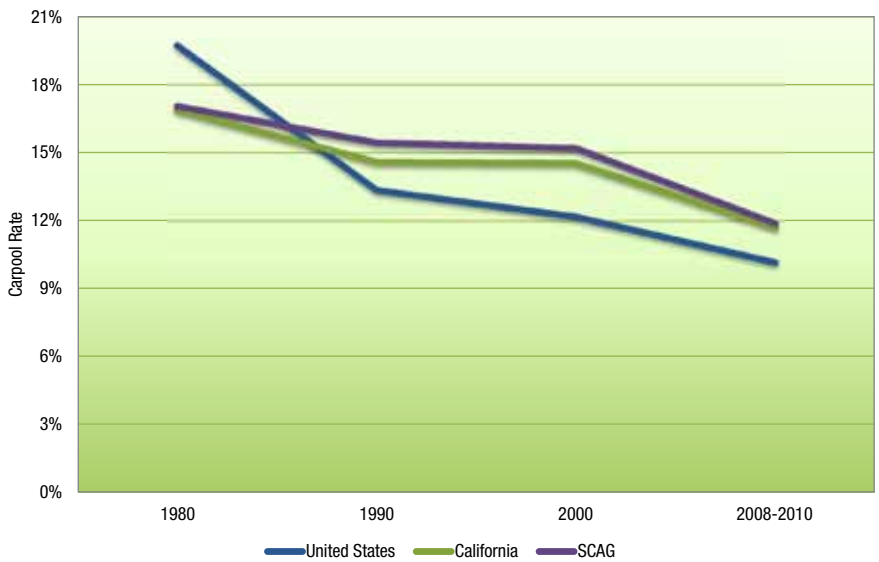
Transportation Demand Management (TDM) strategies are designed to reduce congestion, particularly during peak periods, by managing or reducing demand on the system. This can be accomplished by a variety of strategies including increasing carpooling, supporting active transportation modes, promoting telecommuting, and shifting demand to off-peak periods. TDM strategies help to make the most efficient use of our existing resources.

The SCAG region has a long history of investing in a comprehensive High Occupancy Vehicle (HOV) lane system to support and promote carpooling. Additionally, park-and-ride facilities, rideshare matching and vanpooling services, and Guaranteed Ride Home programs support carpooling as a viable travel alternative. However, a review of Census

journey-to-work data suggests that the carpool rate for commute trips has been on a downward trend for at least three decades (**FIGURE 1.5**).

While the national average of carpooling rates dropped from about 20 percent in 1980 to 10 percent in 2010, the regional carpooling rate remained above 15 percent through 2000. However, by 2010, it too had dropped to just under 12 percent. Over the same period, work trip drive-alone rates for the region increased from 70 percent to 74 percent, while at the national level they rose from 64 percent to 76 percent. The only other mode to see an increase in this period was work-at-home, or telecommuting, which increased dramatically over the past decade. Nearly 2.6 percent of all workers in the SCAG region telecommute. An even greater number telecommute at least one day per month. Investments in high-speed internet accessibility could increase full-time (equivalent) telecommuters to 5 percent in 2020 and 10 percent in 2035.

FIGURE 1.5 Commute Trip Carpool Rates (1980–2010)



Source: U.S. Census, 1980–2000; American Community Survey 3-Year Estimates (2008–2010)

Transportation System Management

Transportation System Management (TSM) strategies increase the efficiency of the existing transportation system, and reduce the need for costly system expansion. TSM strategies often use intelligent transportation system (ITS) technologies. These measures include signal synchronization, ramp metering, "at-speed" truck scales, and 5-1-1 traveler information systems. Strategic application of ITS technology on our transportation system can increase system productivity by as much as five percent.

Projects expected to significantly increase single-occupancy vehicle capacity are required to implement strategies (TDM and TSM) to mitigate the capacity increase. Key TSM strategies in the RTP/SCS include:

- Enhanced Incident Management
- Advanced Ramp Metering
- Traffic Signal Synchronization
- Advanced Traveler Information
- Improved Data Collection

The California Department of Transportation (Caltrans) recently implemented a statewide effort to develop Corridor System Management Plans (CSMPs) for corridors funded under the Corridor Mobility Improvement Account (CMIA). This integration of transportation planning and operations seeks to maintain over the long term, through identification of multi-modal, operational and minor capacity enhancements, the mobility benefits gained from major corridor projects.

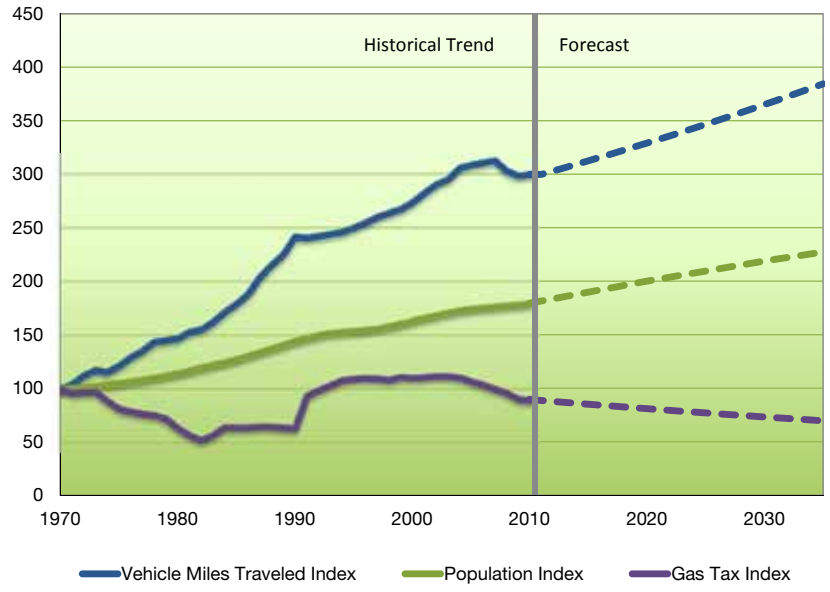
Challenges and Opportunities

Within the economic, demographic, and transportation setting described in the preceding section, SCAG developed the RTP/SCS vision in response to the challenges facing our region today. These challenges are a combination of recent events since the 2008 RTP and on-going long-term trends. Taken together, they present an imposing threat to the quality of life for both current and future residents. The RTP/SCS vision is linked to these challenges, but also seeks to build upon the strengths and opportunities that the region provides to address them.

Transportation Finance

Perhaps the most critical challenge is the need for sustainable transportation funding sources. With the projected growth in population, employment, and demand for travel, the costs of our multimodal transportation needs surpass projected revenues available from our historic transportation funding source—the gas tax. Improved fuel efficiency and the growth of alternative-fuel vehicles have reduced fuel consumption and eroded gas tax revenues. Additionally, state and federal gas taxes have not kept up with inflation—the latest adjustments occurred nearly two decades ago. **FIGURE 1.6** highlights the decline in the gas tax in relation to growing population and travel demand.

FIGURE 1.6 California Population, Travel, and Gas Tax Revenue Trends



Source: Caltrans, California Department of Finance, California State Board of Equalization, White House Office of Management and Budget

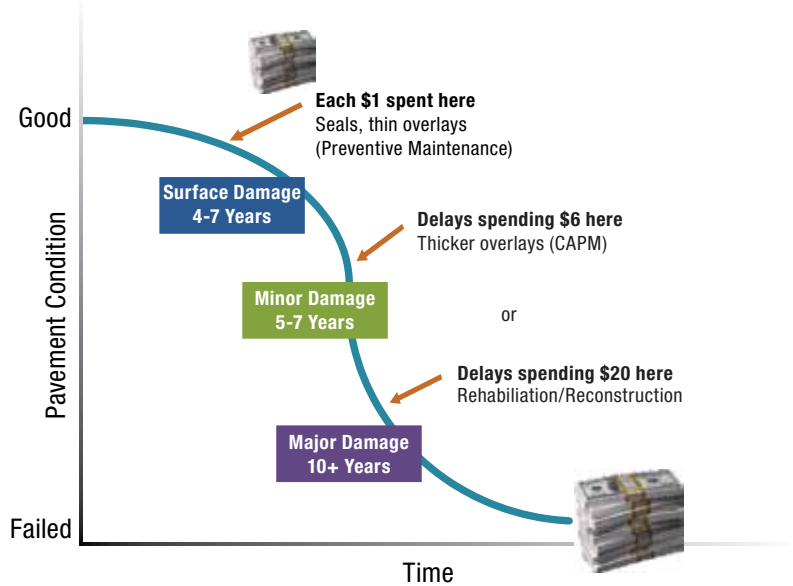
To backfill limited state and federal gas tax revenues, our region has continued to rely upon local initiatives (74 percent of core revenues) to meet transportation needs. With a total of seven sales tax measures throughout the region since the 1980s, we have shifted the burden to local agencies. However, the national purpose served by Southern California's transportation system—particularly in the movement of goods—points to the need for stronger state and federal commitment. Our transportation system is the responsibility of all levels of government.

System Preservation

The region's aging transportation system is facing increasing preservations costs in the face of diminishing revenues. These regional assets represent trillions of dollars of investments that must be protected in order to serve current and future generations. The loss of even a small fraction of these assets could significantly compromise the region's mobility.

Unfortunately, the region and the state have underinvested in system preservation and deferred critical maintenance of our multi-modal transportation system. The inevitable consequences of deferred maintenance include deficient road pavement conditions, particularly evident on our highways. The rate of deterioration is expected to accelerate significantly with continued deferral. In turn, the cost of bringing these assets back into a state of good repair is projected to grow exponentially (**FIGURE 1.7**). SCAG estimates the cost to maintain our transportation system at current conditions, which are far from the ideal, will be in the tens of billions of dollars beyond currently committed funds.

FIGURE 1.7 Preservation Cost-Effectiveness

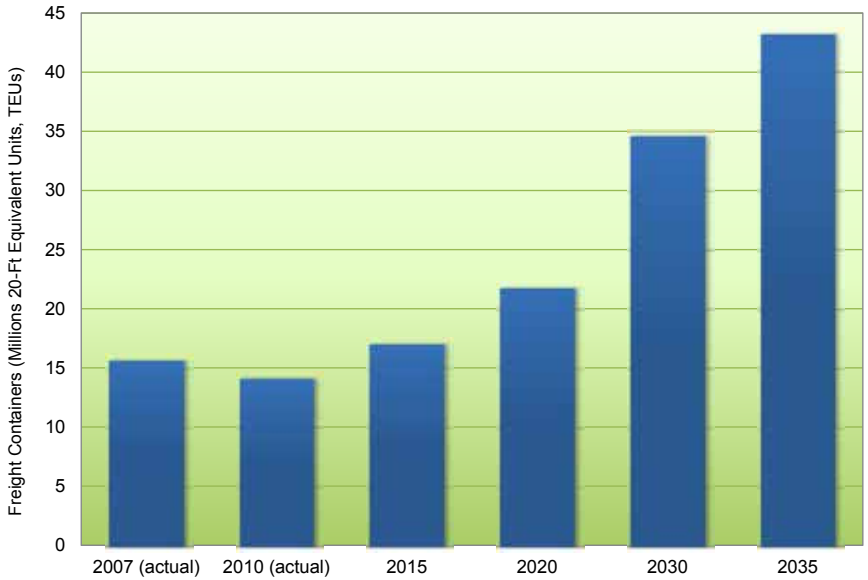


Goods Movement

The SCAG region is the largest international trade gateway in the U.S., supported by marine ports, air cargo facilities, railroads, regional highways and state routes. In 2010, the LA Customs District (Ports of Los Angeles, Long Beach and Hueneme and Los Angeles International Airport) handled $336 billion of maritime cargo and $78 billion in air cargo. In addition, $12 billion of trade passed through ports of entry in Imperial County in 2007.

In 2010, five major sectors contributed the majority of freight demand in the SCAG region: manufacturing, retail trade, wholesale trade, construction and transportation and warehousing. These sectors are dependent on goods movement and comprised $253 billion, or 34 percent of the regional Gross Domestic Products (GDP). These same sectors employed 2.9 million people, or 34 percent of the SCAG region's employment. With port traffic expected to triple during the timeframe of the RTP (**FIGURE 1.8**), the region's economic competitiveness depends upon a transportation system that facilitates the safe and reliable movement of goods.

FIGURE 1.8 San Pedro Bay Ports Container Volume Trend and Projections



Source: Port of Long Beach and Port of Los Angeles

To continue growing, the SCAG region's businesses must be cost-competitive in producing their goods and shipping them to market. The same is true for raw materials, components and other inputs transported to the region for manufacturing and processing. Reduced congestion and improved travel time reliability are critical.

However, the economic benefits of the industry must be balanced given significant mobility, community, and environmental costs associated with goods movement. Goods movement is a major source of emissions that contribute to the region's air pollution. An essential element to improving the region's goods movement system is to reduce its current and long-term impacts on public health and the environment. The RTP goods movement strategy ensures that investments in transportation infrastructure and associated transportation programs contribute to achievement of the region's air quality goals. Efforts are already underway, as the San Pedro Bay Ports have invested heavily in deploying clean trucks over the last several years. Additionally, planning efforts are underway to establish a regional zero emission freight system.

Integrated Land Use and Transportation

California's Sustainable Communities and Climate Protection Act, or Senate Bill (SB) 375, requires SCAG to develop a Sustainable Communities Strategy (SCS) to reduce greenhouse gas (GHG) emissions from automobiles and light trucks through integrated transportation, land use, housing and environmental planning. The SCS provides a plan for meeting the greenhouse gas emission reduction targets set by the California Air Resources Board (ARB) for the SCAG region. The 2012 RTP/SCS achieves an 8 percent per capita reduction for 2020 and 16 percent per capita reduction for 2035.

The SCS is envisioned to integrate transportation and land-use strategies to meet the GHG reduction targets and must:

- Identify existing land use,
- Identify areas to accommodate long-term housing needs,
- Identify areas to accommodate an eight-year projection of regional housing needs,
- Identify transportation needs and the planned transportation network,
- Consider resource areas and farmland,
- Consider state housing goals and objectives,
- Set forth a forecasted growth and development pattern, and
- Comply with federal law for developing an RTP.

The SCS requirements are meant to lay a regional policy foundation that local governments may build upon, and does not take away local land-use authority. The Gateway Cities COG and Orange County COG each developed a subregional SCS under SB 375 provisions. SCAG has incorporated these adopted subregional strategies into the regional SCS.

Based on SCAG's analysis of recent land-use trends in the region, it is clear that a significant trend of development policies supporting better integrated land use and transportation planning has emerged over time. Some of these recent trends include:

1. Changing demographics and housing market demand,
2. Redevelopment of main streets, downtowns and corridors to vibrant mixed use places,
3. Transit-oriented development adjacent to rail station areas and along major bus corridors, and
4. Protection of resource areas and farmland.

The RTP/SCS does not envision a wholesale redevelopment of the Southern California region. The vast majority of neighborhoods and business districts that will exist in 2035 are already on the ground and most of them—especially residential neighborhoods, which include large lot single-family homes—will be unchanged in the next 25 years. Rather, the RTP/SCS envisions a new development pattern for new neighborhoods and revitalized neighborhoods and business districts that build upon the current pattern to give residents more choices and more opportunities as they consider where to live and work in the future.

Air Quality

While Southern California is a leader in reducing emissions and ambient levels of air pollutants are improving, the SCAG region continues to have the worst air quality in the nation and air pollution still causes thousands of premature deaths every year, as well as other serious adverse health effects. The South Coast Air Quality Management District (AQMD) estimates the monetary cost of air pollution in Southern California to be at least $14.6 billion annually.

TRANSPORTATION CONFORMITY

The SCAG region contains 14 non-attainment and maintenance areas in parts of four air basins and administered by five air districts (**TABLE 1.7**). SCAG must demonstrate that the RTP complies with the Clean Air Act (CAA) for each of these areas pursuant to the U.S. Environmental Protection Agency's (EPA) Transportation Conformity Regulations, including demonstrating that emissions from on-road mobile sources stay within emission budgets set forth by local air districts and the ARB for each of the 14 federally designated non-attainment and maintenance areas. Without a conforming RTP, transportation projects can be delayed and federal funding interrupted or curtailed.

TABLE 1.7 SCAG Region Non-Attainment and Maintenance Areas

Criteria Pollutant	Air Basin
Ozone	SCCAB, Ventura County portion SCAB MDAB, Western portion SSAB, Coachella Valley portion SSAB, Imperial County portion
PM_{10}	SCAB SSAB, Coachella Valley portion MDAB, San Bernardino portion MDAB, Searles Valley portion SSAB, Imperial County portion
$PM_{2.5}$	SCAB SSAB, Imperial County portion
CO	SCAB
NO_2	SCAB

SCCAB: South Central Coast Air Basin, SCAB: South Coast Air Basin, SSAB: Salton Sea Air Basin, MDAB: Mojave Desert Air Basin

Complying with the Transportation Conformity Regulations is a complicated and increasingly challenging effort. As passenger vehicles have become cleaner, the positive air quality impacts of transportation strategies that reduce vehicle use or change congestion conditions (i.e., non-fuel or engine-based strategies) have been significantly diminished. Furthermore, the CAA process creates a confusing and uncertain regulatory environment due to the time it takes for federal action on air plans combined with the requirement to review and set national air quality standards (NAAQS) every five years. Addressing these transportation-related and other issues in implementing the CAA should be a high priority for all stakeholders and particularly for federal agencies.

EMISSION REDUCTION CHALLENGE

A key component of air pollution is nitrogen oxides (NO_X). NO_X is emitted whenever fuel is combusted and reacts in the air to form ozone (smog) and fine particulates. Cars, trucks, trains, power plants and refineries are examples of sources that generate NO_X. Even with on-going aggressive control strategies, ever more stringent national ozone standards require further reductions of NO_X emissions in the SCAG region. In the South Coast Air Basin, for example, it is estimated that NO_X emissions will need to be reduced by approximately two-thirds in 2023 and three-quarters in 2030. This is a daunting challenge. Emissions from most sources, including cars and factories, have already been reduced by over 90 percent. Emissions forecasted for 2030 from just three sources—ships, trains and aircraft—would lead to ozone levels near the federal standard.

OPPORTUNITIES

The air quality challenge also provides opportunities for the region. As an innovator and leader, Southern California can develop solutions to mobility and air quality problems that help set important national policies. To support a shared long-term vision for Southern California, decisions and actions should be part of an integrated strategy that addresses multiple needs with single investments, wherever possible. We can start by aligning our actions to improve mobility and air quality with efforts to reduce petroleum consumption. The 2012 RTP/SCS sets forth a roadmap to this end through the comprehensive set of transit, active transportation, TDM, pricing, goods movement, and land-use strategies.

The air quality challenge also creates an opportunity for economic leadership, since technologies for global climate protection, air quality improvement, and energy security are needed for Southern California to attain federal air quality standards. We should position Southern California industries and universities as technology innovators that serve emerging global needs. The region can give our industries and universities every opportunity to succeed by developing partnerships and accelerating demand for clean air and energy solutions.

The future belongs to those with the vision and commitment to act. SCAG and its partners can lead the way through the 2012 RTP/SCS.

Image courtesy of Metro © 2011 LACMTA

Energy

Gasoline is the most used transportation fuel in California. Within the transportation sector, gasoline is used primarily by light-duty vehicles. In 2009, 98 percent of the light-duty vehicle fleet was powered by gasoline, and 82 percent of the fleet was for personal trips. In 2010, California consumed gasoline at a rate of 40.7 million gallons per day, or 10.7 percent of the national demand of 379.4 million gallons per day.[1]

Environmental and geopolitical factors are causing energy and climate experts to question the long-term viability of continued reliance on fossil fuels. The RTP/SCS recognizes the uncertainty of a petroleum-based future and lays out the implications of future energy constraints. Travel demand forecasts generally assume that the future will include

[1] California Energy Commission. Transportation Energy Forecasts and Analyses for the 2011 Integrated Energy Policy Report, Draft Staff Report. CEC-600-2011-007-SD. August 2011. Last accessed September 30, 2011 from http://energy.ca.gov/2011publications/CEC-600-2011-007/CEC-600-2011-007-SD.pdf

an abundant and relatively inexpensive supply of transportation fuels. However, this assumption is in question based on the International Energy Agency's (IEA) 2010 World Energy Outlook.

The IEA forecasts that the emerging economies of India and China will drive global energy demand higher. The IEA further states that China overtook the United States in 2009 as the world's largest energy consumer and their consumption will continue to grow. If governments act more vigorously to increase fuel efficiency and promote demand for alternative fuels, the demand for oil will decrease, avoiding price increases and supply disruptions.[2]

However, if fuel prices continue to increase, it would have a ripple effect on numerous areas including construction costs, gas tax revenue, travel and aviation demand, air emissions, mode choice and growth patterns. In response, the 2012 RTP/SCS supports the increased adoption of near zero and zero emission technologies to lessen the region's exposure to fossil fuel price spikes resulting from an uncertain energy future and reduce GHGs and emissions of criteria pollutants.

In addition to reducing vehicle-miles traveled (VMT) through the integration of transportation and land use planning, building design can also affect energy use. Electricity generation, both in-state and out-of-state, and other residential and commercial energy use account for 32 percent of California's greenhouse gas (GHG) emissions. This contribution is second only to the transportation sector.[3] Energy efficiency reduces energy costs for owners, increases reliability and availability of electricity for the state, improves building occupant comfort, and reduces environmental impact. Furthermore, improving energy efficiency through both performance-based and prescriptive improvements could reduce emissions of pollutants for which federal and state standards exist.[4]

The RTP/SCS includes the following actions to address energy uncertainty and reduce the region's contribution to global climate change:

- Supporting new automobile technology to increase fuel efficiency
- Planning for the electrification of the vehicle fleet
- Adopting mitigation measures to reduce household energy consumption
- Testing an informal alternative that examines plan performance should the price of fuel double compared to what is assumed in other alternatives.

Public Health

The RTP/SCS recognizes the impact that transportation and land-use decisions have on the health of the region's residents. A substantial body of research shows that certain aspects of the transportation infrastructure, including public transit, sidewalks and safe street crossings near schools, and bicycle paths, are associated with more walking and bicycling, greater physical activity and lower obesity rates. A 2004 analysis of development patterns, travel behaviors, and health in the Atlanta region found that higher land-use densities and greater connectivity resulted in reduced rates of obesity. The study also found that each additional hour spent in a car per day was associated with a six percent increase in the likelihood of obesity.[5] A recent study of the health costs of transportation policies found that the health expenditure reductions from meeting federal air quality standards for NO_X and ozone could reach $22 billion per year within the South Coast Air Basin.[6]

The RTP/SCS supports the integration of transportation and land-use policies as well as initiatives to promote a cleaner fleet of vehicles to address a range of public health issues. The RTP allocates over $6 billion for active transportation projects, which is a 200-percent increase over expenditures in the 2008 RTP. It also seeks to promote active transportation options, increased funding and a decrease in bicycle and pedestrian fatalities and injuries. The 2012 RTP/SCS also sets forth a vision for a less carbon-intensive vehicle fleet. Through near zero and zero emission vehicle technologies, the RTP promotes a more sustainable future that creates an economic leadership opportunity for the region.

[2] International Energy Agency. World Energy Outlook 2010. November 2010. Last accessed October 6, 2011 from http://www.worldenergyoutlook.org/

[3] California Air Resources Board. Climate Change Proposed Scoping Plan: A Framework for Change. Sacramento: California Air Resources Board. October 2008. Last accessed October 11, 2011 from http://www.arb.ca.gov/cc/scopingplan/document/psp.pdf.

[4] California Energy Commission. Energy Aware Planning Guide. CEC– 600-200-013. February 2011. Last accessed October 5, 2011 from http://www.energy.ca.gov/energy_aware_guide/index.html

[5] Frank LD, Andresen MA, Schmid TL. Obesity relationships with community design, physical activity, and time spent in cars. American Journal of Preventive Medicine. 2004 Aug;27(2):87–96.

[6] American Public Health Association. The Hidden Health Costs of Transportation. February 2010. Last accessed October 6, 2011 from http://www.apha.org/NR/rdonlyres/E71B4070-9B9D-4EE1-8F43-349D21414962/0/FINALHiddenHealthCostsShortNewBackCover.pdf

Lastly, the 2012 RTP/SCS analyzes environmental justice (EJ) impacts to address equitability of the costs and benefits of the Plan are equitable.

The Environmental Justice appendix includes an analysis of pollution exposure within 500 feet of highly traveled corridors in the region, i.e. urban roads with more than 100,000 vehicles per day or rural roads with more than 50,000 vehicles per day. Additionally, SCAG conducted a Health Risk Assessment as part of the 2012 RTP/SCS Program Environmental Impact Report. This analysis evaluated emissions and cancer risk impacts resulting from transportation-related toxic emissions. The results are contained within the Program Environmental Impact Report. In partnership with our regional stakeholders, these actions will support a healthy future for Southern California.

Adaptation

Climate change mitigation means reducing or sequestering greenhouse gases, whereas adaptation is preparing for known impacts of climate change. Over the coming century, climate change studies project that Southern California will be expected to manage extremes of precipitation and temperature, increased storm frequency and intensity, and sea-level rise. These climate changes will impact streamflow, flooding, water supply, sea level and soil water content. These impacts will affect agriculture, stormwater, wastewater treatment, wildfire risk, roads, forest health, and biodiversity. These impacts will also have consequences for public health, economic livelihoods, the financial sector, the insurance industry, individual comfort and recreation. In practice, these impacts will mean coping with:

- Longer and hotter heat waves,
- Increased urban heat island impacts, such as heat-related illness and higher cooling demand and costs,
- More damaging storms and storm surges,
- Greater river flooding,
- Increased frequency and intensity of combined sewer overflows,
- More intense and extended duration of droughts,
- Longer water supply shortages, and
- Declines in local ecosystem services, such as species loss or the loss of specific ecosystem types (e.g., forests or coastal wetlands).

The associated impacts on buildings, water and transportation infrastructure, emergency preparedness, planning, and quality-of-life issues, have only now begun to be considered. Climate and impact modeling can offer a scientific basis for more informed planning, including improved data gathering. However, additional monitoring, development of improved management practices, and coordination among state and local agencies and the private sector are critical needs as well. Failure to anticipate and plan for climate variability and the prospect of extreme weather and related events could have serious impacts on the regional economy and quality of life. Starting now and continuing in the years and decades ahead, we can adapt to these new risks through resilient resource and land-use choices.

Plan Overview

The 2012 RTP/SCS is based on a careful analysis of our transportation system, the future growth of our region, and our vision for a sustainable future. The RTP/SCS is a living document that must be updated to reflect the most current information and conditions in order to remain relevant and useful. Updating the plan requires us to examine the progress we are making as a region, not just in terms of delivering projects, but also in terms of meeting our vision, goals and objectives.

Our Approach

SCAG is the federally designated MPO for the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. As the MPO, SCAG develops the RTP and updates it every four years through a bottom-up and comprehensive, cooperative and continuous ("3-C") process involving numerous stakeholders. Transportation investments in the SCAG region that receive state and federal funds or require federal approvals (such as environmental clearance) must be consistent with the RTP and must be included in SCAG's Federal Transportation Improvement Program (FTIP) when ready for funding. The FTIP is a four-year program and represents the immediate, near-term commitments of the RTP.

The development of the 2012 RTP/SCS has required a greater level of collaboration than in past plans. SCAG has worked together with stakeholders to develop a technically solid growth forecast, multi-modal transportation and land use strategies, economic impact analysis, and a realistically achievable financial plan.

The RTP/SCS has been developed using a 'bottom-up' approach respecting local communities' General Plans and growth input.

STAKEHOLDER INVOLVEMENT AND PUBLIC PARTICIPATION

SCAG develops the RTP/SCS in close coordination with stakeholder agencies such as the county transportation commissions (CTCs), subregional councils of governments (COGs), transit operators, Caltrans, local jurisdictions, port authorities, air quality management districts, state and federal resource agencies and other transportation stakeholders (**TABLE 1.8**). More stakeholder groups are identified and listed in Public Participation Chapter (Chapter 6) and the supporting technical report.

Each of the six counties in the SCAG region has a CTC responsible for countywide transportation planning and implementation, allocating locally generated transportation revenues and, in some cases, operating transit services. Additionally, the SCAG region includes 15 COGs, which are groups of neighboring cities and communities that work together to identify, prioritize and seek transportation funding for needed investments in their respective areas.

The SCAG region includes all or part of 14 air quality non-attainment or maintenance areas in five air basins. Federal law requires that transportation and air quality planning are coordinated in these non-attainment and maintenance areas. The SCAG region further includes the Caltrans Districts 7, 8 and 12, and the Imperial County portion of District 11.

TABLE 1.8 Stakeholders in the Development of the 2012 RTP/SCS

County Transportation Commissions (CTCs)	
Imperial County Transportation Commission (ICTC)	
Los Angeles County Metropolitan Transportation Authority (Metro)	
Orange County Transportation Authority (OCTA)	
Riverside County Transportation Commission (RCTC)	
San Bernardino Associated Governments (SANBAG)	
Ventura County Transportation Commission (VCTC)	
SubRegional Councils of Governments (COGs)	
Arroyo Verdugo Cities	SANBAG
Coachella Valley Association of Governments	San Fernando Valley COG
Gateway Cities COG	San Gabriel Valley COG
ICTC	South Bay Cities COG
Las Virgenes-Malibu-Conejo COG	Ventura County COG
City of Los Angeles	Western Riverside County COG
North Los Angeles County	Westside Cities COG
Orange County COG	
Local, County, and Tribal Governments	
Other Operators and Implementing Agencies	
Caltrans	Transportation Corridor Agencies (TCA)
Airport Authorities	Transit/Rail Operators
Port Authorities	
Resource/Regulating Agencies	
US Department of Transportation ▪ Federal Highway Administration (FHWA) ▪ Federal Transit Administration (FTA) ▪ Federal Aviation Administration (FAA) ▪ Federal Railroad Administration (FRA)	
US Environmental Protection Agency (EPA)	
CA Air Resources Board (ARB)	
CA Environmental Protection Agency (Cal/EPA)	
Air Districts	

In accordance with federal and state requirements, including new public participation requirements identified in SB 375, SCAG implements a public involvement process to provide complete information, timely public notice and full public access to key decisions, and to support early and continuing public involvement in developing its regional plans. Since its inception, SCAG has engaged in a public involvement process in developing its regional transportation plans and programs. The RTP is developed in consultation with all interested parties, and SCAG ensures that they have a reasonable opportunity to comment on the contents of the RTP. SCAG's broad-based participation activities are outlined in the adopted Public Participation Plan.

ALTERNATIVES DEVELOPMENT AND EVALUATION

Beginning in January 2011, SCAG conducted a series of 13 planning sessions to gather critical data from local jurisdictions on transportation and land use efforts to be used as the basis or starting point for the 2012 RTP/SCS. Planning sessions were conducted in each subregion, with a nearly 90 percent participation rate by jurisdictions. Prior to that, SCAG had been working with local jurisdictions since 2009 focusing on the local growth forecasts for 2020 and 2035.

Utilizing information from these planning sessions and additional survey responses, SCAG developed four preliminary RTP/SCS scenarios representing different conceptual futures of land use and transportation through 2035. SCAG modeled the impact of these scenarios using a set of high-level transportation, economic and environmental indicators. During July and August 2011, SCAG held a series of 18 public outreach workshops throughout the region to present the major components of the four scenarios and gather feedback from a wide range of stakeholders and the general public.

The interactive format of these public outreach workshops offered a variety of methods for input that included facilitating small group discussions, real-time polling and staffing information kiosks. In total, more than 700 individuals participated at these workshops.

The input gathered from these workshops along with continued extensive input from partner agencies and key stakeholders allowed for a further refinement and development of specific alternatives for more detailed evaluation and assessment. The guiding principles used to keep these alternatives realistic are:

- Alternatives should strongly consider regional economic competitiveness and overall economic development to help the region recover and prosper,

- Transportation investment commitments made by the CTCs through local sales tax expenditure plans, adopted long-range plans, and board-adopted resolutions will be fully respected,
- The subregional SCS submitted by the Gateway COG and the Orange County COG will be respected and integrated into the alternatives,
- New investment strategies proposed over and beyond the CTC commitments will be funded only through new funding sources identified and approved by the Regional Council,
- Ensuring an appropriate level of funding for system preservation will be given a priority, and
- Each of the alternatives will be evaluated using a set of accepted performance measures.

Based on these considerations, three alternatives were defined and compared against a "No Project Baseline" representing projects in the 2011 FTIP that have received full environmental clearance. Out of this evaluation, a preferred alternative was selected for the 2012 RTP/SCS. The preferred alternative builds on the region's success over the last four years in implementing the previous 2008 RTP and moves the region forward in meeting mobility, air quality, public health, integrated land use and transportation strategies and other regional goals. The components of the RTP/SCS are described briefly in the next section and in more detail in the succeeding chapters of this document.

Strategies and Investments

Given the setting and the challenges our region is facing, this Plan recognizes that our approach must be balanced, systematic, multimodal, and at the same time targeted to yield the best performance outcomes based on the established set of performance measures. Additionally, we recognize that much of the groundwork has already been laid out by our stakeholder agencies, particularly the CTCs in their countywide long-range transportation plans and local sales tax expenditure plans. The 2012 RTP supports and builds upon these local commitments.

We start first with the transportation investments, described in Chapter 2. This chapter proposes an integrated approach that would first make the most out of our existing transportation system by investing in system preservation and maintenance, transportation demand management, and transportation systems management, followed by completing the system and closing critical gaps, and finally, strategic system expansion. The investments in this chapter will provide more efficient and attractive travel choices for future generations on multiple modes of transportation.

In Chapter 3, we lay out a strategy to establish a long-term, sustainable funding plan. While recognizing financial constraints, the Plan sets forth funding strategies that are reasonably available within the time frame of the RTP. The financial plan ensures that the region can afford to implement the region's near-term commitments as identified in the FTIP, the county commitments as identified in countywide transportation plans and sales tax measures, and the regional investments which are the focus of Chapter 2.

In Chapter 4, the SCS identifies a future land use and development pattern, integrated with the future transportation network and other transportation strategies, to reduce greenhouse gas emissions.

The outcomes and benefits of the RTP/SCS are presented in Chapter 5 in the form of performance measures that attempt to quantify the mobility, economic, and environmental benefits of the plan investments. SCAG further recognizes that there are numerous co-benefits to implementing the SCS, not only in terms of transportation and the environment, but also public health and livable communities. Chapter 5 also addresses the statutory requirements of the RTP/SCS, including environmental justice outcomes, reduction in greenhouse gas emissions, and transportation conformity.

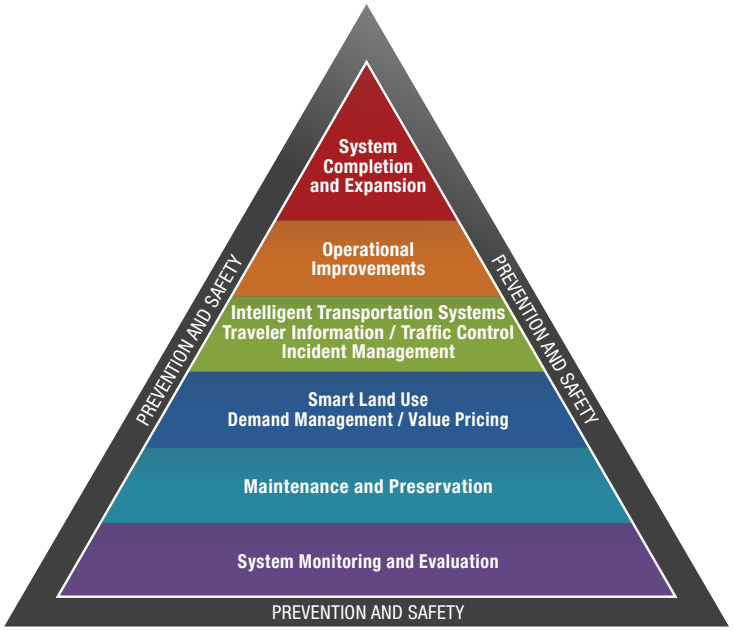
The public participation plan for developing the RTP/SCS is described in Chapter 6. Finally, recognizing that despite our best efforts, there simply may not be enough money to implement solutions to all of our transportation needs, the RTP/SCS includes a strategic component in Chapter 7. The Strategic Plan identifies projects that cannot be funded at this point, but merit further consideration in future plan updates based on additional studies, funding support, and stakeholder consensus.

02 TRANSPORTATION INVESTMENTS

Introduction

SCAG has consistently advocated a system management approach that aims to protect, maximize the productivity of, and strategically expand our region's transportation system. This approach recognizes that we can no longer afford to rely on system expansion alone to address our mobility needs. Rather, an integrated approach is needed, based upon comprehensive system monitoring and evaluation and the use of performance measures to ensure that the best-performing projects and strategies are included in the RTP. This approach is depicted as the mobility pyramid shown in **FIGURE 2.1**.

FIGURE 2.1 Mobility Pyramid



Over the course of developing the plan, we have heard from our stakeholders that we need to make sure we are investing our scarce transportation dollars more efficiently and effectively before we expect our taxpayers to pay more. Making sure that every dollar

available is spent wisely is at the heart of this philosophy. At the bottom of this pyramid is System Monitoring and Evaluation. In order to be effective system managers, we must have an in-depth understanding of how our system performs and why it performs the way it does. Only by understanding these causes can we identify the optimal mix of strategies and projects that yield the highest returns on our investments. Next, we must take care of what we have, and make sure that what we have is performing at the most efficient level possible. So, the basic idea as you move up the 'mobility pyramid' is to implement less capital intensive strategies or less invasive strategies before we consider implementing more drastic measures to deal with our challenges. At the same time, we must be realistic about our ability to address our challenges with 'soft solutions' alone in the face of tremendous growth that we anticipate over the next 25 years. Therefore, at the top of the pyramid are the capital improvement projects that will allow us to expand our system strategically to accommodate such future growth and maintain and improve our economic prosperity.

Following the system management philosophy, this chapter sets forth the investments and strategies that constitute the 2012 RTP/SCS. First, transportation investments should seek to optimize the performance of the existing system, and this includes system maintenance and preservation, integrated land use, operational improvements, transportation demand management, and transportation systems management strategies. Second, investments should seek to complete the system by addressing gaps. Finally, our investments should expand the system strategically. As a result, Southern Californians will enjoy more and better travel choices via an efficient multimodal transportation system with improved access to the vast opportunities this region has to offer.

Getting the Most Out of Our System

Over the past half-century, the SCAG region has invested billions of dollars into building and expanding the multi-modal transportation system that we have and rely on today. This investment must be protected. Under the system management approach, priority should be given to maintaining and preserving this system, as well as ensuring that it is being operated as safely, efficiently and effectively as possible. Protecting our previous investments in developing the region's transportation system and getting the most out of every one of its components is the highest priority for this RTP/SCS.

Safety and Security First

SCAG recognizes how important the safety and security of our transportation system is to our residents. The good news is we have made significant progress in improving safety, particularly highway safety, which accounts for the majority of transportation related accidents, around the State and in our region. But, we can do more. SCAG continues to support the implementation of the State Highway Safety Plan (SHSP) and work in partnership with Caltrans and the CTCs around the region to improve Safety and Security of our transportation system.

Safety improvements are intricately woven into the RTP/SCS at all levels. Many of the strategy and investment categories in this RTP/SCS aim to improve the safety of our multi-modal transportation system. For instance, enhancing maintenance and preservation of the region's buses, rail track, bridges, and roadway pavements will contribute towards reduced accidents and improved safety. Similarly, expanding the network of bike lanes and sidewalks, and bringing them into ADA (American with Disabilities Act) compliance will reduce accidents directly related to these modes. Furthermore, deploying technology such as advanced ramp metering to manage traffic flow also reduces collisions at on-ramps and critical freeway-to-freeway interchanges. In short, almost every category of investments discussed in this chapter leads to safety benefits.

SCAG has two main safety and security goals:

- Ensure transportation safety, security, and reliability for all people and goods in the region.
- Prevent, protect, respond to, and recover from major human-caused or natural events in order to minimize the threat and impact to lives, property, the transportation network, and the regional economy.

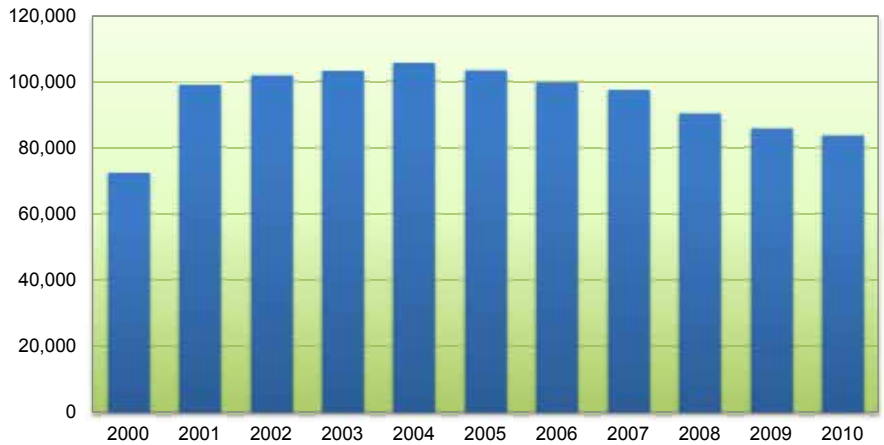
SAFETY

The rate of fatal and injury collisions on California's highways has declined dramatically since the California Highway patrol began keeping such data in the 1930's. California has led the nation in roadway safety for much of the past 20 years. Only recently have roadways nationally become as safe as those in California. **FIGURE 2.2** shows the improvement in roadway accidents in the SCAG region over the last 10 years.

While the trend indicates a long-term decline in fatalities compared to VMT, it remains an unacceptable personal burden to those involved. In 2008, over 1,500 people died on roadways in the SCAG region, and just under 125,000 were injured. The average costs for each traffic death, traffic injury, or property damage crash were (in 2005):

- Death – $1,150,000
- Nonfatal Disabling Injury – $52,900
- Property Damage, including non-disabling injuries – $7,500

FIGURE 2.2 Annual Collisions on the State Highway System in the SCAG Region



SAFETEA-LU required states to develop Strategic Highway Safety Plans (SHSPs). The California Department of Transportation (Caltrans) responded by developing its SHSP through a participatory process with over 300 stakeholders throughout California. The overarching goal was to reduce the California roadway fatality rate to less than 1.0 fatality per 100 million vehicle miles traveled (VMT) by 2010. The efforts culminated with 17 challenge areas and over 150 actions designed to reduce fatalities in each challenge area. The State achieved its goal in 2009, and is now focusing on reducing transportation fatalities further with a new SHSP in development.

SECURITY

Currently, there are numerous agencies that participate in the response to incidents and assist with hazard preparedness for individual jurisdictions. Collaboration occurs between many of these agencies. The Federal Emergency Management Agency (FEMA) oversees coordination. However, FEMA defines metropolitan areas and coordination differently than the U.S. Department of Transportation, limiting SCAG's ability to participate at an agency level. SCAG seeks to utilize its strengths and organization to assist planners, first responders and recovery teams in a supporting role.

There are three areas in which SCAG can assist both before a major emergency and during the recovery period:

- Provide a policy forum to help develop regional consensus and education on security policies and emergency response
- Assist in expediting the planning and programming of transportation infrastructure repairs from major disasters
- Encourage integration of transportation security measures into transportation projects early in the project development process by leveraging SCAG's relevant plans, programs and processes, including regional ITS architecture

Beginning in 2008, SCAG participated in the development of the draft Southern California Catastrophic Earthquake Preparedness Plan. The Plan was based on the 2007 Operation Golden Guardian scenario, which SCAG also assisted in developing, and envisioned a 7.8 earthquake starting in the Salton Sea area and travelling across the SCAG region to the Grapevine area where I-5 meets SR-138.

The Plan examines the initial impacts, inventory of resources, care for the wounded and homeless, and developed a long-term recovery process. The process of Long-Term Regional Recovery (LTRR) provides a mechanism for coordinating federal support to state, tribal, regional, and local governments, nongovernmental organizations (NGOs), and the private sector to enable recovery from the long-term consequences of extraordinary disasters. The LTRR process accomplishes this by identifying and facilitating availability and use of sources of recovery funding, and providing technical assistance (such as impact analyses) for recovery and recovery planning support. "Long-Term" refers to the need to re-establish a healthy, functioning region that will sustain itself over time.

Long-term recovery is NOT debris removal and restoration of utilities, which are considered immediate or short-term recovery actions.

Once a disaster has been proclaimed, the LTRR process may be activated for incidents that require a coordinated federal, state, tribal, regional, and local government response to address significant long-term impacts (e.g., impacts on housing, government operations, agriculture, businesses, employment, regional infrastructure, the environment, human health, and social services) to foster sustainable recovery. The three main focus areas of LTRR are:

- Housing,
- Infrastructure, and
- Economic Development.

When a disaster occurs, the initial operational focus is centered on response activities. This effort may last from a few hours to an extended period of time (several days or longer) depending on the situation. As response activities begin to taper off and non-life safety issues begin to be addressed, the operational focus begins to shift from response to recovery. Federal and state support will be heaviest during the beginning phase of the recovery effort when:

- Long-term impact analyses are performed,
- Necessary technical support to establish local long-term recovery strategies and/or plans is provided, and
- Coordination of long-term recovery resources needed by the region to launch its recovery efforts are complete.

Federal and state support lessens by the later stages of the LTRR process once the region has sufficient capacity to implement its long-term recovery plan.

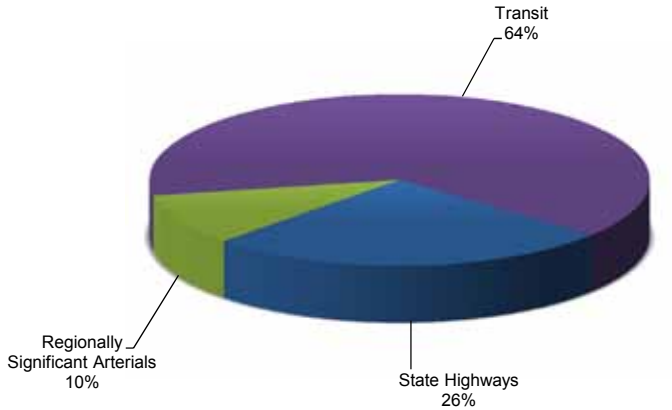
System Preservation

Recognizing that deferring the maintenance of our transportation system will only result in much costlier repairs in the future, preserving our assets now is a critical priority of this RTP/SCS. Approximately $217 billion, or almost half of all of its proposed expenditures through 2035, is allocated to system preservation and maintenance. As indicated in Chapter 1, to a great extent, this high cost is a result of three decades of preservation

underinvestment. Deficient road conditions are all too familiar to the region's drivers, and without a renewed commitment to improving the condition of our transportation infrastructure, costs will increase even more dramatically. Therefore, SCAG will continue to work with its stakeholders, particularly county transportation commissions and Caltrans, to prioritize funding for preservation and maintenance.

FIGURE 2.3 presents the allocation of these expenditures among the transit system, the state highway system, and arterials of regional significance within the 2012 RTP. Note that the allocation for the state highway system includes bridges and the allocation for transit includes funding to both preserve and operate the transit system.

FIGURE 2.3 Preservation and Operations Funding



Smart Land Use

Since initiating one of the nation's first large-scale regional growth visioning efforts in 2000, SCAG has sought to integrate land use and transportation by working with subregions and local communities to increase development densities and improve the jobs/housing balance. Implementing such smart land use strategies encourages walking, biking, and transit use, and therefore reduces vehicular demand. This saves travel time, reduces pollution, and leads to improved health. The SCS (in Chapter 2) describes the successes of the previous and smart land use efforts in the region, and lays the foundation for significant further improvements moving forward.

Transportation Demand Management

Transportation Demand Management (TDM) strategies reduce vehicular demand and thereby congestion, particularly during peak periods. Successful TDM combines two complementary strategies: "soft" or "pull" strategies—such as vanpool subsidies and preferential parking for carpools, with "hard" or "push" strategies—such as congestion pricing.

The first encourages or incentivizes travelers to reduce automobile use by making alternatives more desirable. The second discourages travelers from using automobiles by increasing out-of-pocket travel costs.

The RTP financial plan (Chapter 3) identifies reasonably available revenue sources that provide much needed funding for infrastructure preservation and critical regional projects. Increasing driving costs over the RTP time frame will also encourage some to look for more cost-effective travel options. In total, the RTP/SCS allocates $4 billion to TDM strategies to target such drivers and others and incentivize them in three ways:

- **Increase carpooling and vanpooling.**
  Carpooling is supported by a host of strategies. High Occupancy Vehicle (HOV) lanes and convenient Park-and-Ride Lots increase carpool usage. Other strategies include vanpool services for larger employers and rideshare matching services. Los Angeles, Orange, Riverside and San Bernardino Counties jointly sponsor a regional "Guaranteed Ride Home Program," which provides transportation for carpoolers and transit users in emergency situations.
- **Increase the use of transit, bicycling, and walking.**
  The RTP/SCS extends the reach of transit by focusing on "first mile/last mile" solutions. One of the biggest challenges in attracting new riders to transit is providing a reasonable and practical means of accessing transit at the origin and destination. "First mile/last mile" strategies are TDM strategies that offer reasonable and practical solutions to this problem, resulting in higher ridership for our transit services. Specific first mile/

Image courtesy of the Riverside Transit Agency

last mile strategies include development of mobility hubs around major transit stations to provide easier access to destinations. Other strategies include integrating bicycling and transit through folding bikes on buses programs, triple racks on buses, and dedicated racks on light and heavy rail vehicles. A study by the Los Angeles County Metropolitan Authority (Metro) indicates that 1.3 percent of all annual Metro Rail riders access transit stations via bicycle. The percentage of bicyclists accessing transit is likely to increase as investments are made.

The RTP/SCS also commits $6 billion to active transportation, which will expand bikeways, improve local streets, and address ADA requirements. Additional strategies include traffic calming and Complete Streets strategies, particularly near transit stations and schools, so as to further reduce vehicle trips by improving safety and desirability of active transportation.

- **Redistribute vehicle trips from peak demand periods to non-peak periods by shifting work times/days/locations.**
  The TDM investments also aim to reduce peak-hour congestion by promoting flexible work schedules and telecommuting, where applicable. Flexible work schedules allow employees to work fewer days in exchange for longer hours on the days they do work. For example, many employers offer a 9/80 schedule, where employees work 9 hours each day and have one day off every two weeks.

Telecommuting has increased dramatically over the past decade. Nearly 2.6 percent of all workers in the SCAG region telecommute most of the time, and an even greater number telecommute at least one day per month. Strategic investments that would remove barriers associated with telecommuting are expected to increase the number of full-time (equivalent) telecommuters to 5 percent in 2020, and 10 percent in 2035.

Congestion Management Process

The federal requirement for a Congestion Management Process (CMP) was initially enacted in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, and continued in the Transportation Equity Act for the 21st Century (TEA-21) in 1998 and subsequently in SAFETEA-LU. CMP requires monitoring, performance measures, and, in certain cases, mitigation measures. Above all, CMP requires and ensures that highway capacity projects that significantly increase the capacity for single occupancy vehicles (SOV) be developed in a comprehensive context that considers all possible alternatives, including transit, TDM and TSM strategies. Furthermore, if alternative strategies are demonstrably neither practical nor feasible, appropriate mitigation strategies must be considered in conjunction with significant roadway capacity improvement projects that would increase SOV capacity.

Each county transportation commission (CTC) in the SCAG region, with the exception of Imperial County, is also designated Congestion Management Agency (CMA) and are required to develop Congestion Management Plans (CMPs) pursuant to California Government Code Section 65089, and update it every two years. Imperial County, the least populated county in the region, has not reached the population threshold that would require them to opt in or out of the state CMP process at present. Nevertheless, Imperial County has embraced the spirit of CMP and is actively seeking to incorporate its key elements into their next long range transportation plan update. So, effectively SCAG's CMP is comprised of the CMPs developed by each of the CTCs integrated into the RTP and FTIP process as a unified response to reducing congestion in our region.

SCAG is proposing two critical improvements to our current CMP process, partly in response to the federal certification review that was concluded in the Spring of 2010. First, SCAG will incorporate a requirement in the FTIP Guidelines that calls for submittal of documentation by the sponsoring agencies associated with significant roadway capacity projects (greater than $50 million) to ensure documentation of all the alternatives considered in defining the project as well as identifying appropriate mitigations that would be implemented in conjunction with the project.

Second, this RTP/SCS recognizes the importance of addressing non-recurring congestion (collisions, stalled cars, severe weather). Non-recurring congestion accounts for almost 50 percent of all congestion on our roadway system. So, for the first time, this RTP identifies non-recurring congestion delay on the state highway system, both for general purpose lanes and carpool lanes, as a key performance metric that will be monitored and reported over time to ensure we are making progress towards addressing this critical issue.

A more complete discussion of our regional CMP is provided in a separate technical report.

Transportation Systems Management

Transportation Systems Management (TSM) increases the productivity of the existing multi-modal transportation system, thereby reducing the need for costly system expansion. TSM relies in part on intelligent transportation system (ITS) technologies to increase traffic flow and reduce congestion. This RTP/SCS dedicates up to $6.8 billion to TSM. Examples of TSM categories and their associated benefits are described in **TABLE 2.1**.

TABLE 2.1 TSM Categories and Benefits

Category	Benefit
Enhanced Incident Management	Reduces incident related congestion which is estimated to represent half of the total congestion in urban areas
Advanced Ramp Metering	Alleviates congestion and reduces accidents at on-ramps and freeway to freeway interchanges
Traffic Signal Synchronization	Minimizes wait times at traffic signals and therefore reduces travel time
Advanced Traveler Information	Provides real-time traffic conditions, alternative routing, and transportation choices to the public
Improved Data Collection	Allows agencies to monitor system performance and optimize the impact of transportation investments
Universal Transit Fare Cards (Smart Cards)	Reduces time required to purchase transit tickets and allows inter-operability among transit providers
Transit Automatic Vehicle Location (AVL)	Enables monitoring of transit vehicles and ensuring on-time performance

TSM will also play an increasingly larger role in regional goods movement improvements. The Ports of Los Angeles and Long Beach have identified ITS technologies, specifically automated vehicle location (AVL), as a major component in their proposed air quality mitigation strategies. Advanced monitoring will assist in achieving system efficiencies in ports and intermodal operations, reducing delays and wait times at gates and destinations, and allowing for more flexible dispatching, all of which reduce emissions. Weigh-in motion systems and enhanced detection will allow for better enforcement of commercial vehicles rules, reducing pavement damage, and identifying critical paths for goods movement planning in the future.

Corridor System Management Plans

With the passage of Proposition 1B by California voters in November 2006, a program of funding called the Corridor Mobility Improvement Account (CMIA) was created to improve mobility on the state highway system. The California Transportation Commission adopted guidelines for the CMIA program that required the development of Corridor System Management Plans (CSMPs) for those projects receiving CMIA funding, to ensure that mobility improvements would be maintained over time. In the SCAG region, CSMPs were developed by Caltrans for the following corridors:

- I-5 and I-405 in Los Angeles County;
- SR-57, SR-91, and SR-22/I-405/I-605 in Orange County;
- SR-91 and I-215 in Riverside County;
- I-10 and I-215 in San Bernardino County; and
- US-101 in Ventura County.

The CSMPs include several key components: a comprehensive corridor description and understanding; a performance assessment and bottleneck identification; identification of operational and minor infrastructure improvements to relieve congestion; and development of simulation models to estimate improvements from those projects and strategies. The recommended improvements include TSM investments such as ramp metering and enhanced incident management. The recommendations also include small infrastructure improvements such as auxiliary lanes and ramp and interchange improvements. The RTP/SCS includes $840 million of funding for the CSMP-recommended improvements.

Completing Our System

Southern California's highways and arterials extend for almost 22,000 center-line miles and 67,000 lane-miles and serve 53 million travelers each weekday. However, there are still critical gaps in the network that hinder access to certain parts of the region. Closing these gaps to complete the system will allow our residents to enjoy improved access to opportunities such as jobs, education, healthcare, and recreation.

Highways and Local Arterials

The expansion of highways and local arterials has slowed down over the last decade. This has occurred in part due to increasing costs and environmental concerns. However, there are still critical gaps in the network that hinder access to certain parts of the region. Locally-developed county transportation plans have identified projects to close these gaps and complete the system, and they are included in the RTP. **TABLE 2.2** highlights some of these highway completion projects. The full list of RTP projects is provided in the Project List technical appendix.

TABLE 2.2 Major Highway Completion Projects

County	Project	Completion Year*
Imperial	SR-115 Limited Access Expressway	2018
Los Angeles	SR-710 Gap Closure	2030
Los Angeles, San Bernardino	High Desert Corridor	2020
Orange	SR-241 Improvements	2020–2030
Orange, Riverside	CETAP Intercounty Corridor A	2035
Ventura	US-101 and SR-118 Improvements	2018

*Represents the Plan network year for which the project was analyzed for the RTP modeling and regional emissions analysis

Image courtesy of the Orange County Transportation Authority

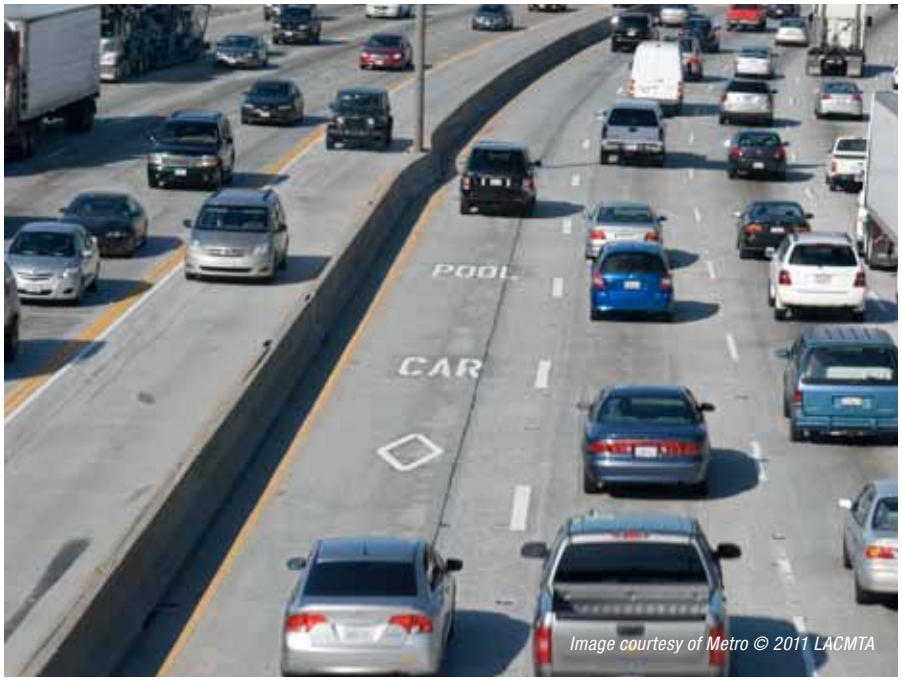


Image courtesy of Metro © 2011 LACMTA

Southern California's heavy investment in high-occupancy vehicle (HOV) lanes has given it one of the nation's most comprehensive HOV networks and highest rideshare rates. The Plan proposes strategic HOV gap closures and freeway-to-freeway direct HOV connectors to complete the system. The HOV lane network will serve as the backbone of the regional HOT lane system proposed in the "HOT Lanes Network" section later in this chapter. Another key HOV strategy in the Plan is the conversion of certain HOV lanes in the region to allow for continuous access. Orange County has taken a leadership role on this over the past few years, and their recent studies have concluded that continuous-access HOV lanes do not perform any worse than limited-access HOV lanes. At the same time, they provide carpoolers with greater freedom of movement in and out of HOV lanes. As a result, nearly every HOV lane in Orange County will be converted to allow for continuous access by the year 2013. **TABLE 2.3** highlights some of the Plan's major HOV projects and **EXHIBIT 2.1** provides a glance of major highway improvements proposed by the Plan.

TABLE 2.3 Major HOV Projects

County	Route	From	To	Completion Year*
HOV Lane Additions				
Los Angeles	I-10	I-605	Puente Ave	2014
Los Angeles	I-10	Puente Ave	SR-57/I-210	2018
Los Angeles	I-5	LA/OC County Line	I-605	2018
Los Angeles	I-5	Pico Canyon	Parker Rd	2030
Los Angeles	I-405	I-10	US-101	2018
Los Angeles	SR-14	Ave P-8	Ave L	2030
Orange	I-5	Avenida Pico	San Juan Creek Rd	2020
Orange	I-5	SR-55	SR-57	2035
Orange	SR-73	I-405	MacArthur	2035
Riverside	I-215	Nuevo Rd	Box Springs Rd	2030
Riverside	SR-91	Adams St	SR-60/I-215	2018
Riverside	I-15	Riv/SB County Line	I-15/I-215	2020
San Bernardino	I-10	Haven Ave	Ford St	2020
San Bernardino	I-10	Ford St	Riv/SB County Line	2030
San Bernardino	I-215	Spruce St	Orange Show Rd	2014
San Bernardino	I-215	SR-210	I-15	2030
San Bernardino	I-15	Riv/SB County Line	SR-18/Mojave River	2020
Freeway-to-Freeway HOV Connectors				
Los Angeles	I-5/SR-14	Connector		2014
Los Angeles	I-5/I-405	Connector (partial)		2030
Orange	I-405/SR-73	Connector		2035
San Bernardino	I-10/I-15	Connector (partial)		2020
San Bernardino	I-10/I-215	Connector		2030

*Represents the Plan network year for which the project was analyzed for the RTP modeling and regional emissions analysis

Our region's local streets and roads account for over 80 percent of the total road network and carry almost 50 percent of total traffic. They serve different purposes in different parts of the region, or even in different parts of the same city. Many streets serve as major thoroughfares or even alternate parallel routes to congested freeways. At the same time, within our urban areas, where a street right-of-way can account for as much as 40 percent of the total land area, streets shape the neighborhoods they pass through and often support different modes of transportation besides the automobile, including bicycles, pedestrians, and transit. The RTP contains a host of arterial projects and improvements to achieve different purposes in different areas. In all parts of the region, it includes operational and technological improvements to maximize system productivity in a more cost-effective way than simply adding capacity. Such strategic improvements include spot widening, signal prioritization, driveway consolidation and relocation, and grade separations at high-volume intersections. Finally, in a quickly growing number of areas, street improvement projects include new bicycle lanes and other design features such as lighting, landscaping, and modified roadway, parking, and sidewalk widths that work in concert to achieve both functional mobility for multiple modes of transportation, and a great sense of place.

TABLE 2.4 Arterial Investment Summary (in Nominal Dollars, Billions)

County	Investment*
Imperial	$ 1.6
Los Angeles	$ 6.7
Orange	$ 4.4
Riverside	$ 6.1
San Bernardino	$ 2.6
Ventura	$ 0.7
Total	**$ 22.1**

Strategically Expanding Our System

While the RTP/SCS's multimodal strategy aims to reduce per capita vehicle miles traveled (VMT) over the next 25 years, total demand to move people and goods will continue to grow due to the region's population increase. A strategic expansion of our transportation system is needed in order to provide the region with the mobility it needs. The RTP targets this expansion around transportation systems that have room to grow, including transit, high-speed rail, active transportation, Express/HOT lanes, and goods movement. Some of these systems, such as transit, active transportation, and Express/HOT lanes, have proven over the years to be a reliable and convenient form of transportation for those who are able to easily access it. However, these systems must be improved and expanded in order to provide the accessibility and connectivity needed to become a truly viable alternative for the region as a whole. Other systems, such as high-speed rail, are new to the region and are needed to expand the number of choices available to our residents for convenient longer-haul travel. In addition, to address both the need to move more goods throughout the region for our growing population and maintain regional economic benefits of our goods movement industry, we must strategically expand our goods movement system in a way that addresses the associated quality of life issues.

Transit

The Plan calls for an impressive expansion of transit facilities and service over the next 25 years. The local county sales tax programs, most recently Measure R in Los Angeles County, are providing for most of this expansion in facilities and services.

The region should be proud of what it has accomplished so far and what it plans to accomplish beyond that by 2035. **EXHIBITS 2.2, 2.3,** and **2.4** demonstrate this point. All three exhibits present passenger rail system in the region. In 1990, as shown in **EXHIBIT 2.2**, the region did not have any passenger rail service at all. **EXHIBIT 2.3** shows how successful the region has been in building an extensive passenger rail network by 2010, a mere 20 years later. This RTP/SCS builds upon this success and proposes to strategically expand our rail system over the next 25 years. A more robust network in 2035 is depicted in the **EXHIBIT 2.4**.

EXHIBIT 2.1 Major Highway Projects

EXHIBIT 2.2 Rail Transit System (1990)

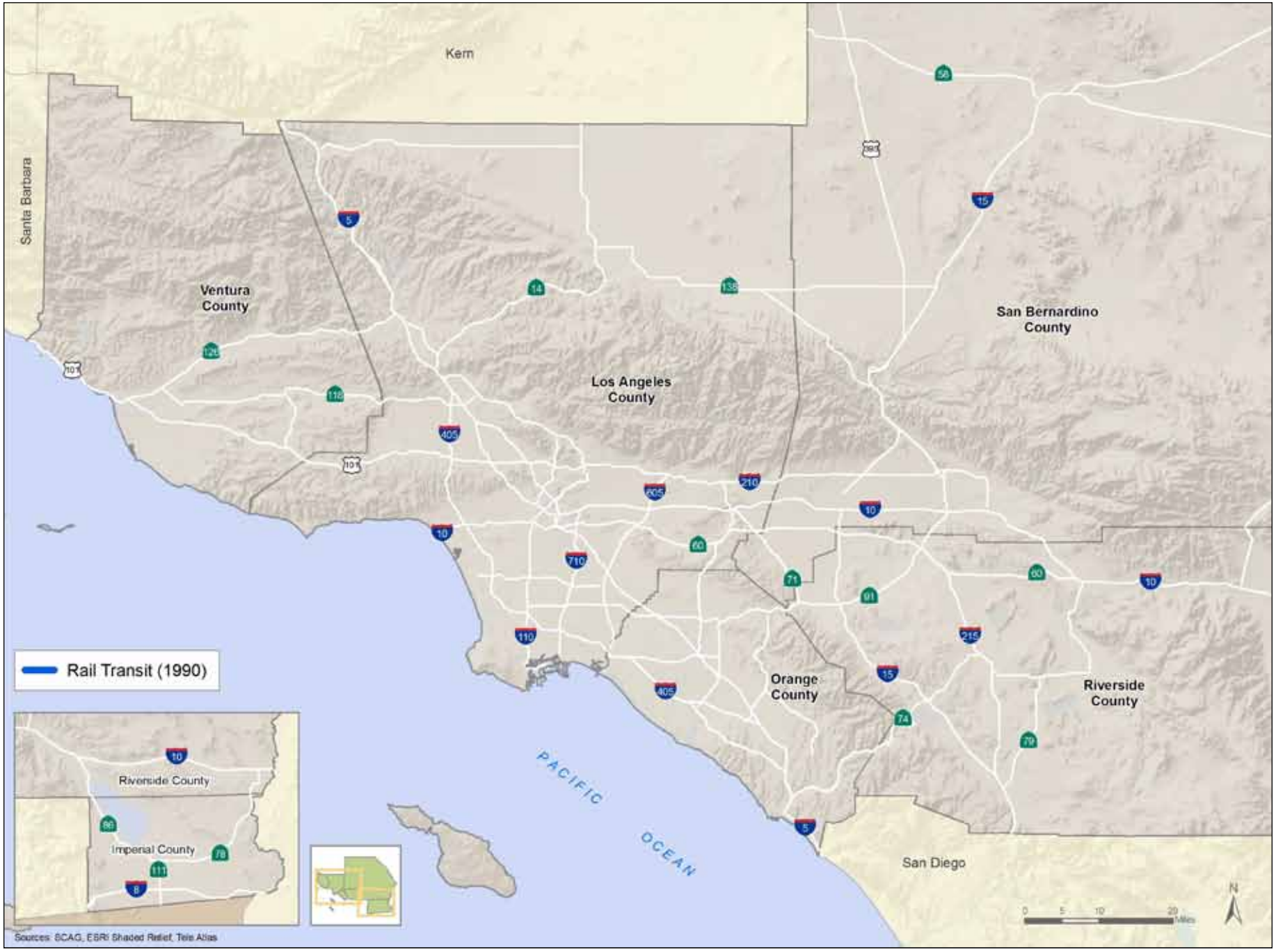


EXHIBIT 2.3 Rail Transit System (2010)

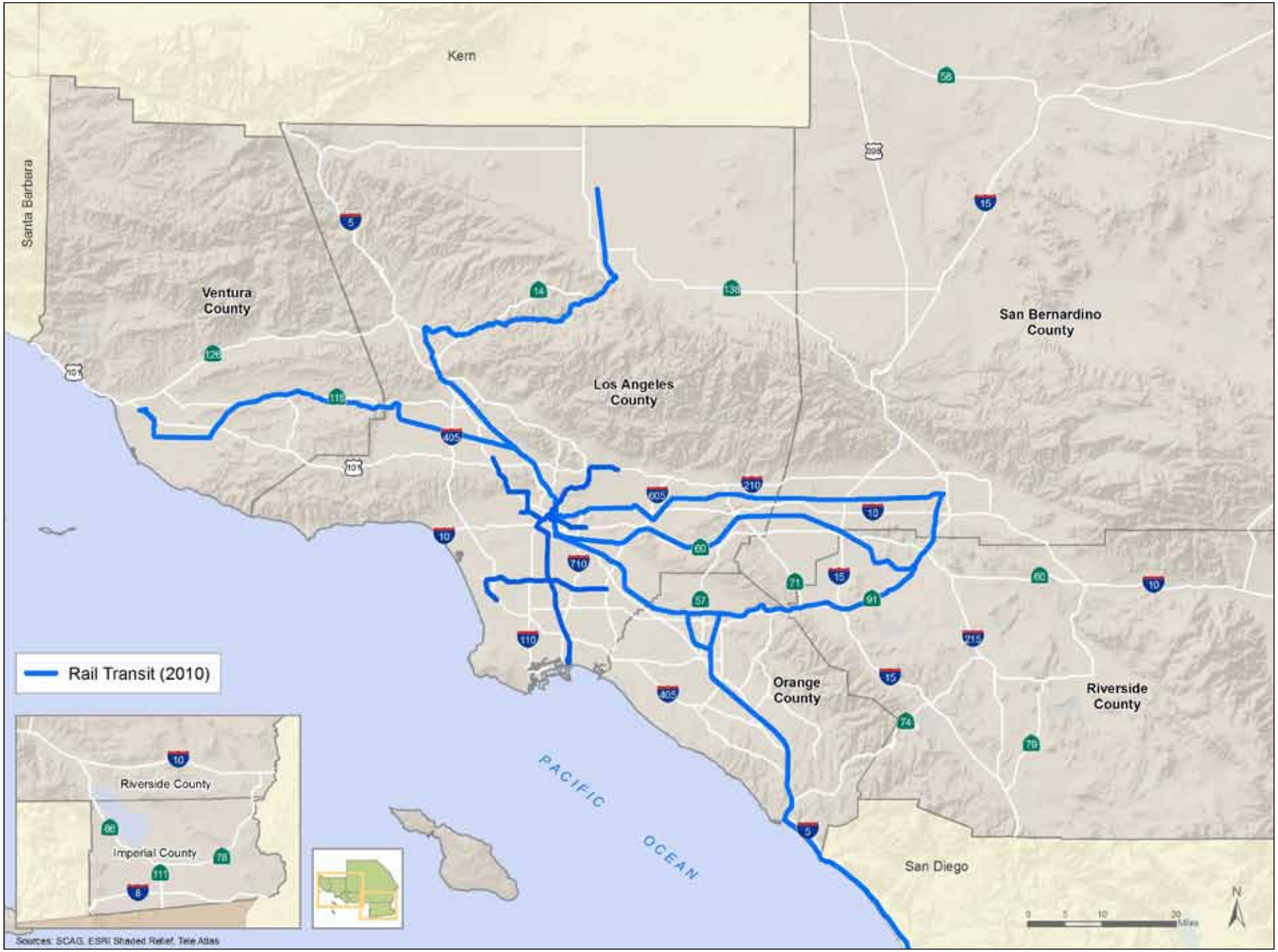
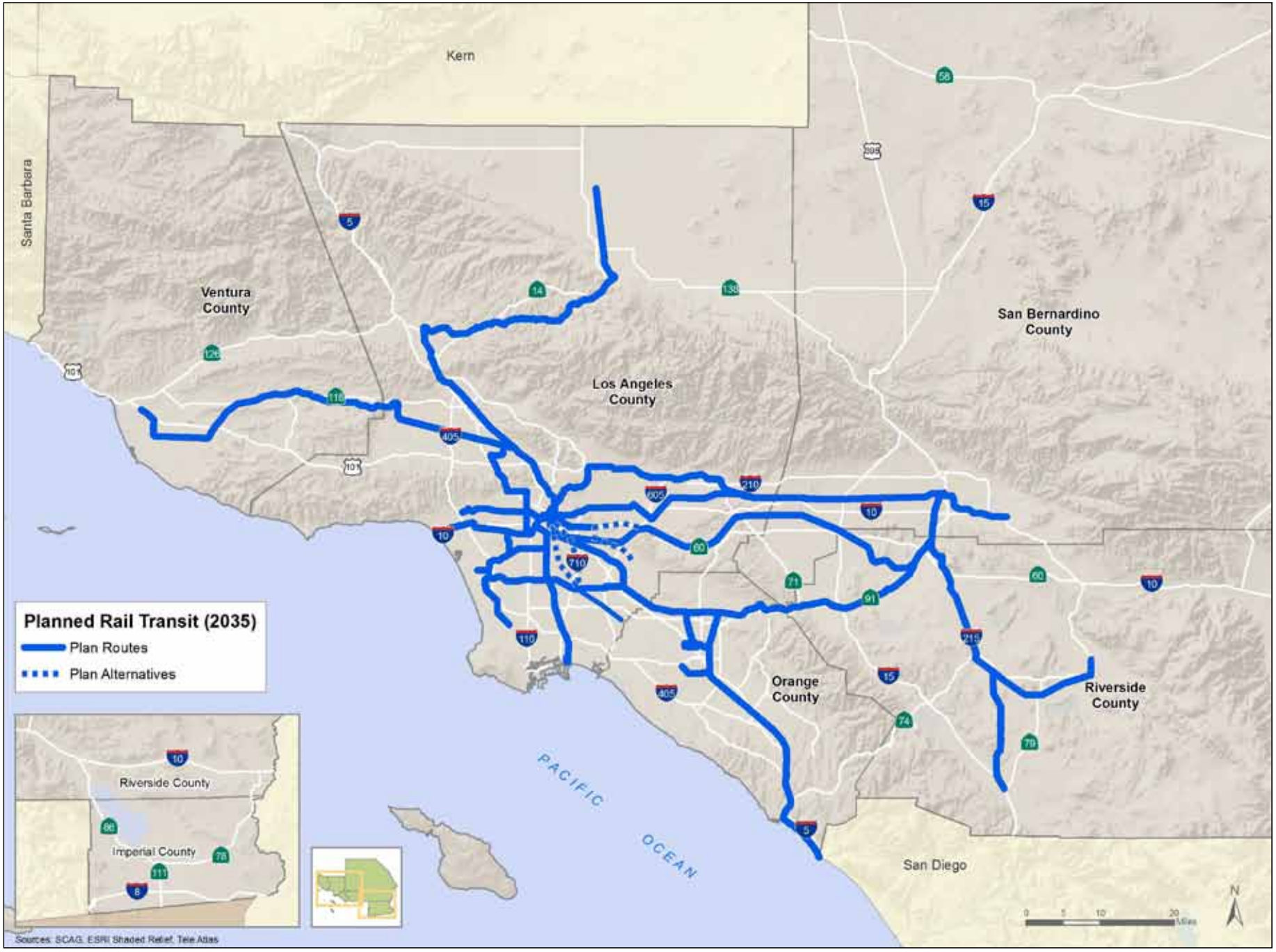


EXHIBIT 2.4 Rail Transit System (2035)



Once built out, Los Angeles County will have a greatly-expanded rail network, adding entire new corridors and lengthening existing ones. Orange County will greatly improve its Metrolink service and implement a slew of new bus rapid transit (BRT) routes, Riverside County will introduce various extensions to its Metrolink line, and San Bernardino County will introduce Redlands Rail.

TABLE 2.5 Major Transit Projects

County	Project	Completion Year*
Los Angeles	Crenshaw/LAX Transit Corridor	2018
Los Angeles	Gold Line Eastside Transit Corridor–Phase 2	2035
Los Angeles	Exposition Line–Phase 2 to Santa Monica	2018
Los Angeles	Gold Line Extension to Glendora	2018
Los Angeles	Gold Line Extension to Montclair	2035
Los Angeles	Green Line LAX Extension	2030
Los Angeles	South Bay Green Line Extension	2035
Los Angeles	Regional Connector	2020
Los Angeles	San Fernando Valley (East) North/South Rapidways	2018
Los Angeles	San Fernando Valley Orange Line Canoga Extension	2014
Los Angeles	West Santa Ana Branch Corridor	2030
Los Angeles	Westside Subway Extension to La Cienega	2023
Los Angeles	Westside Subway Extension to Century City	2030
Los Angeles	Westside Subway Extension to Westwood	2035
Orange	Anaheim Rapid Connection	2020
Orange	Bristol/State College, Harbor, and Westminster BRT	2030
Orange	Santa Ana/Garden Grove Fixed Guideway	2020
Riverside	Metrolink Perris Valley Line Extensions to San Jacinto and Temecula	2035
San Bernardino	E Street BRT (sbX)	2014
San Bernardino	Redlands Rail–Phase 1	2018
San Bernardino	Redlands Rail–Phase 2	2020

*Represents the Plan network year for which the project was analyzed for the RTP modeling and regional emissions analysis

While these capital projects will provide our region with a much more mature public transportation system, operational improvements and new transit programs and policies will also contribute greatly to attracting more trips to transit and away from single-occupant vehicle (SOV) travel. First, the expanding HOV and Express/HOT lane networks calls for the development of an extensive express bus point-to-point network. Second, transit oriented and land use developments call for increasing the frequency and quality of fixed-route bus service by virtue of adding new BRT service, limited-stop service, increased frequencies along targeted corridors, and the introduction of local community circulators to provide residents of smart growth developments with the option of taking transit over using a car to make short, local trips.

Another emphasis on transit network improvements includes transit priority facilities, such as bus lanes and traffic signal priority. Our region has virtually no bus lanes, especially compared to other major metropolitan areas. The Los Angeles County Metro Rapid Bus network employs bus signal priority that gives buses up to 10 percent more green light time from the normal green light phase. This should be expanded to other counties in our region.

Additional enhancements to our region's transit services include expanding bike-carrying capacity on transit vehicles, implementing regional and inter-county fare agreements and media, such as LA County's EZ Pass, and expanding and improving real-time passenger information systems.

TRANSIT POLICIES

In addition to the specific transit plans, projects and programs proposed, the 2012 RTP/SCS also supports the following policies and actions:

- Encourage the development of new transit modes in our subregions, such as BRT, rail, limited-stop service, and point-to-point express services utilizing the HOV and Express/HOT lane networks,
- Encourage transit providers to increase frequency and span-of-service in TOD and High Quality Transit Areas (HQTAs) and along targeted corridors where there is latent demand for transit service,
- Collaborate with local jurisdictions to provide a network of local community circulators that serve new TOD and HQTAs, providing an incentive for residents and employees to make trips on transit,

- Develop first mile/last mile strategies on a local level to facilitate access to the transit system via local circulators, active transport, scrip, or vehicle sharing. Continue partnering with member cities and subregions to do localized first mile/last mile planning,
- Encourage transit fare discounts and local vendor product and service discounts for residents and employees of TOD/HQTAs, or for a jurisdiction's local residents in general who have fare media,
- Advocate for increased operational funding for transit service from the state sources,
- Encourage transit properties to pursue cost containment strategies,
- Work with cities to identify and mitigate choke points in the regional transportation system that affect transit, and
- Work with county transportation commissions, municipalities, and transit operators to develop dedicated bus facilities.

Image courtesy of Metro © 2011 LACMTA

Passenger and High-Speed Rail

The Plan proposes three Passenger Rail strategies that will provide additional travel options for long-distance travel within our region and to neighboring regions. These are improvements to the LOSSAN Corridor, improvements to the existing Metrolink system, and the implementation of Phase I of the California High-Speed Train (HST) project.

The recent release of the draft CA HST Business Plan confirmed the funding and implementation challenges of the project. The plan now estimates a statewide Phase I cost of $98.5 billion (in year of expenditure dollars) with service extended to our region in 2033. Within the draft Business Plan, there are a variety of strategies to connect Northern and Southern California to the state network. This plan assumes that Southern California will be connected to the network in 2033, but that incremental improvements can be made in advance of and in preparation for that connection. Therefore, stakeholders throughout Southern California are seeking to implement a phased and blended implementation strategy for high-speed rail by employing state and federal high-speed rail funds to improve existing services, eventually meeting the Federal Rail Administration's (FRA) 110 MPH definition of high-speed service. These speed and service improvements to the existing LOSSAN and Metrolink corridors will deliver the California High-Speed Rail Authority's (Authority) new blended approach, and at the same time permanently improve our region's commuter and intercity rail services.

IMPLEMENTATION OF PHASE I OF THE CALIFORNIA HIGH-SPEED TRAIN (HST) PROJECT

The Authority has worked since 1996 to plan and build a HST system linking Northern and Southern California. In 2005, the Authority issued a Programmatic Environmental Impact Report (EIR) selecting a Phase I alignment that would travel from Anaheim to Los Angeles, on to the Antelope Valley via the San Fernando Valley, along SR-99 through the San Joaquin Valley, and into the Bay Area via San Jose and along the San Francisco Peninsula. Phase II would add connections to the Inland Empire, San Diego, Sacramento, and possibly the East Bay. In November of 2008, California voters approved Proposition 1A (Prop 1A), allocating $9 billion in bond funds for the project. In 2009 and 2010, the FRA awarded the Authority $3.6 billion in High-Speed and Intercity Passenger Rail discretionary grants, which will be used in the San Joaquin Valley as per FRA direction. As mentioned above, the new business plan has put total statewide Phase I construc-

tion costs at $98.5 billion (in nominal dollars). Prop 1A also included $950 million for upgrading and improving connectivity for current rail services that will connect with the HST project, so the need to make speed and service improvements for our current rail services, coupled with the CHSRA's new blended implementation approach, calls for the need to spend these funds in the next few years.

The primary benefits of Phase I will be realized on a statewide level; however, our region's interregional travel facilities will also benefit. If successful, the HST system will attract many interregional trips now made by car or airplane, providing an alternative to congested interregional highways and relieving ground congestion near local airports. The Los Angeles to the Bay Area travel market is currently the nation's seventh busiest aviation corridor, and our region's second busiest. Phase I has the potential to free up gate space at regional airports for more international and long haul routes, and relieve some airfield congestion. Similarly, when both Phase I and II are complete, the system will offer connectivity to Palmdale, Bob Hope (Burbank), Los Angeles, Ontario International and San Bernardino International Airports, helping to meet SCAG's long-term goal of regionalizing air travel in Southern California. Phase I will also provide excellent regional connectivity. The planned HSR stops at Sylmar, Burbank Airport, Los Angeles Union Station, Norwalk and Anaheim will readily connect with a robust network of inter-city and commuter rail, subway and light-rail, and fixed-route transit systems. All these connections will complement and feed each other, thereby boosting rail and transit ridership across our region.

IMPROVEMENTS TO THE LOS ANGELES TO SAN DIEGO (LOSSAN) RAIL CORRIDOR

Currently the SCAG region is served by a network of intercity passenger and commuter rail services. These services operate on the region's rail network, often sharing facilities with freight rail. They operate at higher speeds and have less frequent station stops than traditional transit services, and are more likely to serve intercity and interregional trips.

As discussed in Chapter 1, intercity passenger rail service is operated by Amtrak, and commuter services are operated by the Southern California Regional Rail Authority (Metrolink). Amtrak's Pacific Surfliner traverses the 351 mile long Los Angeles-San Diego-San Luis Obispo (LOSSAN) corridor. The Pacific Surfliner is the second most-used service in Amtrak's national fleet, moving nearly nine percent of the system's total national ridership. Surfliner ridership is growing over eight percent a year. While Amtrak service remains a small portion of all transit trips in the region, it does provide a significant option for travel between regions.

Since the 1990s, stakeholders along the LOSSAN corridor have been participating in the LOSSAN Rail Corridor Agency, a Joint Powers Authority (JPA) that coordinates planning along the corridor with the goal of increasing safety, ridership, revenue, and reliability. In early 2010, the agency released a Strategic Assessment, which found that capital investment in speed and capacity improvements could serve latent demand along the corridor.

As such, the LOSSAN JPA partners have begun work on a Strategic Implementation Plan, which will guide service and business planning and provide a corridor wide implementation plan for capital improvement projects. Strategies in the LOSSAN program will include grade closures, the installation of quad gates and raised medians, grade separations, the installation of sidings and double tracks, electronic and positive train control technologies, track straightening, and other speed capacity improvements. Ultimately, it is hoped that express services in the corridor will travel between San Diego and Los Angeles in under two hours.

Image courtesy of the Southern California regional Rail Authority (Metrolink)

IMPROVEMENTS TO THE EXISTING METROLINK SYSTEM

Similarly, the Southern California Regional Rail Authority is currently the sole operator of the Metrolink system, which serves primarily as a commuter rail service in our region. Metrolink operates 512 track miles of service along seven routes in Ventura, Orange, Los Angeles, San Bernardino, Riverside and San Diego Counties. Metrolink passengers travel much further than most transit passengers, having an average trip length of 36.9 miles. In Fiscal Year 2008–2009, Metrolink reported serving 12,241,830 passenger boardings. Four routes, the Ventura County Line, the Orange County Line, the Inland Empire/Orange County Line, and the SR-91 Line, share portions of the LOSSAN Corridor with the Pacific Surfliner.

Metrolink's service will also share a corridor with Phase I of the California High-Speed Train Project. By 2035, this project will provide a high-speed travel option to the Bay Area and the Central Valley via the existing valley subdivision, which is currently used by the Metrolink Antelope Valley Line (AVL). A recent express service demonstration project revealed the Metrolink AVL travel time between Palmdale and Los Angeles Union Station could be shortened by 33 percent simply by skipping less used station stops. An aggressive program of track straightening, grade separations, and track and siding expansion is expected to reduce express travel times to roughly one hour.

When Phase I of the State HST project is completed, Metrolink and Amtrak routes will serve as feeders, providing access to a new long distance travel mode. Travelers expected to access the State project at stations in the cities of Los Angeles, Burbank, San Fernando, Palmdale, Norwalk and Anaheim. The Authority's 2009 Business Plan posits that passengers will travel between Los Angeles and San Francisco in less than three hours, for about 80 percent of comparable airfare.

RAIL POLICIES

In addition to the specific plans, projects, and programs proposed, the 2012 RTP/SCS supports the following policies and actions related to our passenger and high-speed rail program:

- Implement cooperative fare agreements and media between Amtrak and LOSSAN, and CA HST when it begins revenue service,
- Implement cooperative marketing efforts between Amtrak and LOSSAN, and CA HST when it begins revenue service,
- Encourage regional and local transit providers to develop rail interface services at Metrolink, Amtrak and high-speed rail stations, and
- Work with the California High-Speed Rail Authority and local jurisdictions to plan and develop optimal levels of retail, residential and employment development that fully takes advantage of new travel markets and rail travelers.

Bus Transit

The RTP/SCS allocates additional funding to bus transit in the region. Fixed route bus lines in the region are continuously evaluated and adjusted. Los Angeles County also offers Rapid Bus Transit on many of its core corridors. In addition, new services are planned across the region, including:

- Orange County's first bus rapid transit (BRT) services and new trolley systems in Santa Ana, Anaheim, and Garden Grove,
- Riverside and San Bernardino Counties' first BRT services,
- Development of an extensive express bus point-to-point network based on the expanding HOV and Express/HOT lane networks,

Image courtesy of the Victor Valley Transit Authority

- Increasing the frequency and quality of fixed-route bus service and the introduction of local community circulators to provide residents of smart growth developments with the option of taking transit over using a car to make short, local trips, and
- The implementation of transit priority facilities, such as bus lanes and traffic signal priority.

Active Transportation

Active transportation refers to transportation such as walking or using a bicycle, tricycle, velomobile, wheelchair, scooter, skates, skateboard, push scooter, trailer, hand cart, shopping car, or similar electrical devices. For the purposes of the RTP, active transportation generally refers to bicycling and walking, the two most common methods. Walking and bicycling are essential parts of the SCAG transportation system, are low cost, do not emit greenhouse gases, can help reduce roadway congestion, and increase health and the quality of life of residents. As the region works towards reducing congestion and air pollution, walking and bicycling will become more essential to meet the future needs of Californians.

The majority of commuters within the SCAG region commute via car, truck, or van. According to the American Community Survey, in 2009, more than 85 percent of all commuters traveled to work by car, truck, or van; and less than 4 percent traveled to work via an active transportation mode (0.7 percent bicycled and 2.5 percent walked to work). In addition, the National Household Travel Survey (NHTS) data indicate that approximately 20.9 percent of all trips were conducted by walking (19.2 percent) or bicycling (1.7 percent). This represents an approximately 75 percent increase from the 11.9 percent active transportation mode share in 2000. In addition, NHTS data indicate that 75.0 percent of all trips in 2009 were conducted by driving, and this is an approximately 10.6 percent decrease from the 83.9 percent mode share in 2000.

Additional analysis regarding active transportation needs to be conducted in order to develop a better understanding of the users and their needs. The current level of data is extremely limited and does not provide a comprehensive overview of the current active transportation community. Active transportation users have differing levels of experience and confidence, which influences their decision to utilize active transportation. SCAG recognizes that there are a number of factors that motivate them to use active transportation. Increased data collection may provide a clearer understanding of the needs and deficiencies associated with active transportation.

Active transportation is not only a form of transportation in itself; it is also a means by which to access rail and bus service. Accessibility is one of the primary performance measures used to evaluate active transportation, by measuring how well the current infrastructure provides individuals with the opportunity to access destinations or facilities.

Using a two-mile buffer for bicyclists and a half-mile buffer for pedestrians, we found that our current transit infrastructures provides 97 percent of our residents access to transit via bicycle, and 86 percent access to transit by walking. While many individuals have access to transit stations by biking or walking, numerous other factors may influence an individual's decision to use active transportation.

Safety is an important factor that individuals consider when determining whether or not they should walk or bike to their destination. Based on data from the Statewide Integrated Traffic Records System (SWITRS), in 2008, 4.0 percent of all traffic-related fatalities in the SCAG region involved bicyclists, and 4.3 percent of all traffic-related injuries involved bicyclists. In addition, 20.9 percent of all traffic-related fatalities in the SCAG region involved a pedestrian, and 5.7 percent of traffic-related injuries involved pedestrians.

While each of the counties in the SCAG region currently have their own active transportation plan, the RTP/SCS aims at developing a regional active transportation system that closes the gap and provides connectivity between counties and local jurisdictions. While bicyclists are legally allowed to use any public roadway in California unless specifically prohibited, many bicyclists may be more inclined to utilize bikeways. Currently, 42.6 percent of the region's residents have easy access to 4,315 miles of bikeways. Local jurisdictions in the region have proposed an additional 4,980 miles of bikeways in this RTP/SCS that would increase this access to 62.4 percent of all residents. In order to close the remaining gaps in the bikeway network, this RTP/SCS goes a step further to include an additional 827 miles of bikeways to complete the SCAG Regional Bikeway Network.

In order to make active transportation a more attractive and feasible mode of travel for the different users in our region, additional infrastructure improvements need to be made. The 2012 RTP/SCS calls for improvements that would bring 12,000 miles of deficient sidewalks into compliance with the Americans with Disabilities Act (ADA). Given that all trips, including vehicular trips, start with walking, it is important to ensure that the sidewalks and streets are accommodating to all users. In all, the RTP's active transportation improvements exceed $6 billion.

COASTAL TRAILS

In addition to bikeways, local trails have played an important role to increase accessibility and provide opportunities for active transportation. Trails along the coast of California have been utilized as long as people have inhabited the region. In an effort to develop a "continuous public right-of-way along the California coastline; a trail designed to foster appreciation and stewardship of the scenic and natural resources of the coastal trekking through hiking and other complementary modes of non-motorized transportation," the California Coastal Trail (CCT) was established. SCAG proposes the completion of the CCT to increase active transportation access to the coast. Completion of the CCT would provide 183 miles of multi-purpose trails.

SAFE ROUTES TO SCHOOL

SAFETEA-LU established the Safe Routes to School (SRTS) program to "enable and encourage primary and secondary school children to walk and bicycle to school" and to support infrastructure-related and behavioral projects that are "geared toward providing a safe, appealing environment for walking and bicycling that will improve the quality of our children's lives and support national health objectives by reducing traffic, fuel consumption, and air pollution in the vicinity of schools." Safe Route to school programs can play a critical role in eliminating some of the vehicle trips that occur during peak periods to drop-off or pick up students by ensuring safe routes to bike or walk to school

COMPLETE STREETS

The Complete Streets Act of 2008 (AB 1358) requires cities and counties to incorporate the concept of Complete Streets in their general plan updates to ensure that transportation plans meet the needs of all users of our roadway system. SCAG supports and encourages implementation of Complete Street policies in the 2012 RTP. SCAG will work with the local jurisdictions as they implement Complete Streets strategies within their jurisdictions by providing information and resources to support local planning activities. SCAG also supports the following policies and actions related to active transportation:

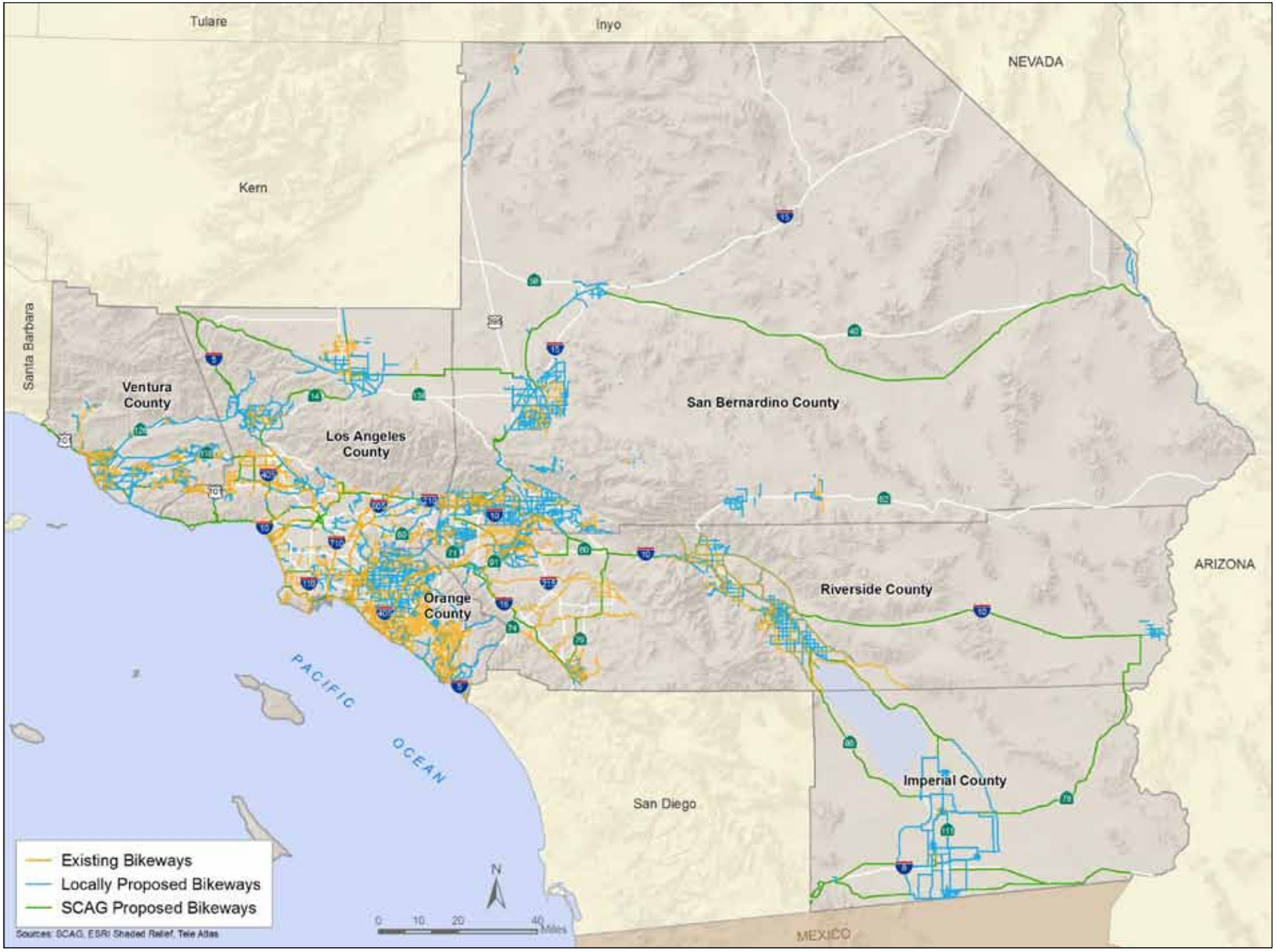
- Encourage and support local jurisdictions to develop 'Active Transportation Plans' for their jurisdictions if they do not already have one,
- Encourage and support local jurisdictions to develop comprehensive educational programs for all road users,
- Encourage local jurisdictions to direct enforcement agencies to focus on bicycling and walking safety to reduce multi-modal conflicts,
- Support local advocacy groups and bicycle related businesses to provide bicycle-safety curricula to the general public,
- Encourage children, including those with disabilities, to walk and bicycle to school,
- Encourage local jurisdictions to adopt and implement the proposed SCAG Regional Bikeway Network,
- Support local jurisdictions to connect all of the cities within the SCAG region via bicycle facilities,
- Encourage local jurisdictions to complete the California Coastal Trail,
- Encourage the use of Intelligent Traffic Signals and other technologies that detect slower pedestrians in signalized crosswalks and extend signal time as appropriate,
- Support the facilitation, planning, development and implementation of projects and activities that will improve safety, reduce traffic, and air pollution in the vicinity of primary and middle schools, and
- Encourage local jurisdictions to prioritize and implement projects/policies to comply with ADA requirements.

Express/HOT Lane Network

Despite our concerted effort to reduce traffic congestion through years of infrastructure investment, the region's system demands continue to exceed available capacity. Consistent with our regional emphasis on the mobility pyramid (**FIGURE 2.1**), recent planning efforts have focused on enhanced system management including integration of pricing to better utilize existing capacity and to offer users greater travel time reliability and choices. Express/HOT Lanes that are appropriately priced to reflect demand can outperform non-priced lanes in terms of throughput, especially during congested periods. Moreover, revenue generated from priced lanes can be used to deliver the needed capacity provided by the Express Lanes/HOT sooner and to support complementary transit investments.

Based on recent analysis of critical corridors performed for the CSMPs, inter-county trips comprise more than 50 percent—suggesting the value of a regional network of Express Lanes that would seamlessly connect multiple counties. As such, the 2012 RTP includes a regional Express/HOT Lane network that would build upon the success of the 91 Express

EXHIBIT 2.5 Regional Bicycle Network



Lanes in Orange County and two demonstration projects in Los Angeles County planned for operation in late 2012.

Image courtesy of the Orange County Transportation Authority

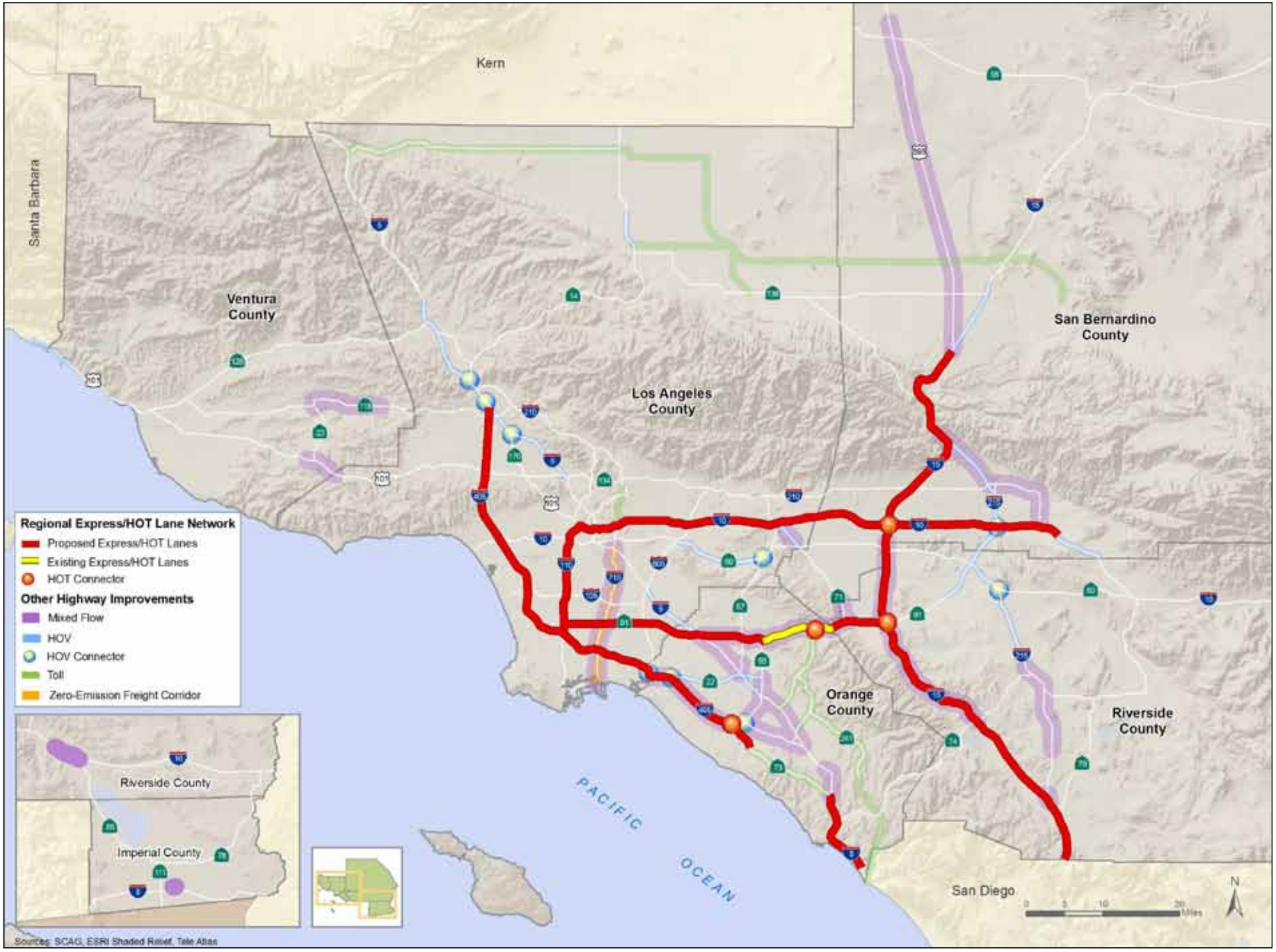
Additional efforts underway include the extension of the 91 Express Lanes to I-15 in Riverside County along with planned Express Lanes on the I-15. Also, traffic and revenue studies are proceeding for I-10 and I-15 in San Bernardino County.

TABLE 2.6 and **EXHIBIT 2.6** display the segments in the proposed Express Lane network.

TABLE 2.6 Express/HOT Lane Network

County	Route	From	To
Los Angeles	I-405	I-5 (North SF Valley)	LA/OC County Line
Los Angeles	I-110	Adams Blvd (s/o I-10)	I-405
Los Angeles	I and SR-110/	Adams Blvd	US-101
Los Angeles	US-101	SR-110	I-10
Los Angeles	I-10	US-101	I-710
Los Angeles	I-10	I-710	I-605
LA, Orange	SR-91	I-110	SR-55
LA, SB	I-10	I-605	I-15
Orange	I-405	LA/OC Line	SR-55
Orange	I-5	SR-73	OC/SD County Line
Orange	SR-73	I-405	MacArthur
Riverside	SR-91	OC/RV County Line	I-15
Riverside	I-15	Riv/SB County Line	SR-74
Riverside	I-15	SR-74	Riv/SD County Line
San Bernardino	I-10	I-15	SR-210
San Bernardino	I-10	SR-210	Ford St
San Bernardino	I-15	SR-395	Sierra Ave
San Bernardino	I-15	Sierra Ave	6th St
San Bernardino	I-15	6th St	Riv/SB County Line

EXHIBIT 2.6 Express/HOT Lane Network



Meeting Our Airport Demand

Although at a rate much slower than those seen in previous decades, air travel in the SCAG region continues to grow, and is expected to pick up the pace when the region economically recovers. This RTP's regional air passenger demand forecast of 145.9 million annual air passengers (MAP) in 2035 is a very conservative forecast compared to forecasts adopted by past SCAG RTPs, such as the 165.3 MAP 2035 forecast adopted by the 2008 RTP. However, like previous forecasts, this new long-range forecast is also based on interim forecasts that show the urban capacity-constrained airports of Los Angeles International (LAX), Bob Hope, Long Beach and John Wayne airports all reaching their defined legally allowable or physical capacity constraints well before 2035. The remaining air travel demand is served by the other, suburban airports with ample capacity to serve future demand, including Ontario International, San Bernardino International, March Inland Port, Palmdale Regional, Southern California Logistics, and Palm Springs airports. A small amount of future air passenger demand would also be served by the two commuter airports in the region, Oxnard and Imperial airports.

TABLE 2.7 displays Low Growth, Baseline/Medium Growth and High Growth air passenger forecast scenarios that were considered for inclusion in this RTP. At 164 MAP in 2035, the High Growth Scenario is only slightly less than the 165.3 MAP forecast adopted for the 2008 RTP in 2035, and its average annual growth rate is consistent with recent industry forecasts developed by the FAA, Boeing and Airbus. This Plan's aviation demand forecast is the Baseline/Medium Growth Forecast that is more conservative than the High Growth Scenario, and is consistent with recent passenger trends. At 145.9 MAP, it is virtually identical to the Constrained/No Project Scenario that was modeled for the 2008 RTP. **FIGURE 2.4** shows the airport allocations for this RTP's regional air passenger demand forecast.

At 5.61 million tons of cargo in 2035, this RTP's region air cargo demand forecast is also much more conservative than what was adopted by the 2008 RTP for 2035 (8.28 million tons). **FIGURE 2.5** shows the airport allocations for this RTP's regional air cargo demand forecast. A more complete discussion of the methodology use to develop these forecasts can be found in the Aviation technical appendix.

TABLE 2.7 2035 Airport Forecasts (Million Annual Air Passengers)

Airport	Low	Baseline	High
Bob Hope	9.4	9.4	9.4
John Wayne	10.8	10.8	10.8
LAX	78.9	78.9	78.9
Long Beach	4.2	4.2	4.2
March Inland Port	0.4	0.6	2.5
Ontario	19.2	30.7	31.6
Palmdale	1.6	2.6	6.1
Palm Springs	2.6	4.1	9.6
San Bernardino	1.8	2.8	6.7
SoCal Logistics	0.4	0.7	1.6
Imperial	0.6	0.9	2.1
Oxnard	0.1	0.2	0.5
Total	**130.0**	**145.9**	**164.0**

FIGURE 2.4 2035 Air Passenger Demand Airport Allocations

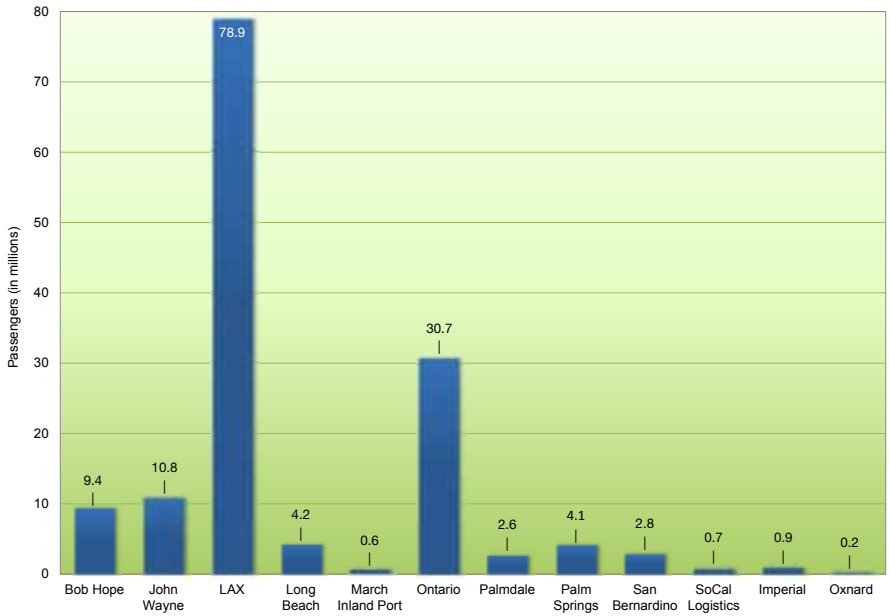
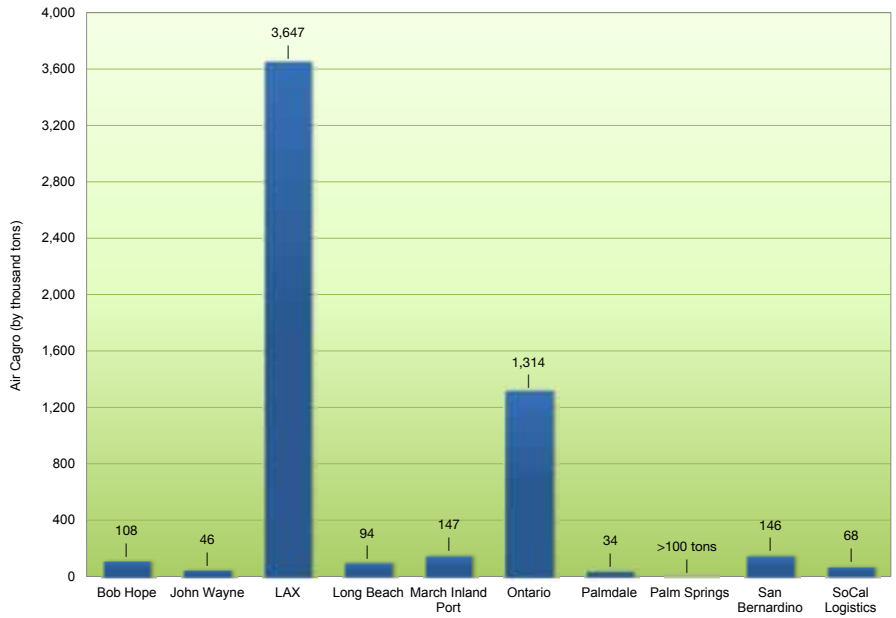


FIGURE 2.5 2035 Air Cargo Demand Airport Allocations



The past few years have seen deep cutbacks in flights by the airlines, particularly at mid-sized airports. There have also been several significant mergers in the U.S. airline industry. These mergers will likely lead to the elimination of duplicate service that may decrease airline competition, increase fares and reduce the number of flights in many markets. However, the merged carriers may find it advantageous to offer service at multiple airports in a given market, rather than add frequency at LAX. The other recent dynamic in the aviation industry has been the transition of the low-cost carriers, as they have gained market share, from primarily serving secondary airports in large metropolitan regions to competing directly with the legacy network carriers at the primary airport. A recent example is the decision by both Virgin America and Southwest to introduce or expand service at LAX, rather than primarily serve the region through the secondary airports. One consequence of this strategy has been a significant decline in passenger traffic at both Bob Hope Airport and Ontario International Airport.

These and other recent trends call into question the ability to shift air traffic from the existing constrained airports in the urban core to the outlying/suburban airports that have the capacity to accommodate the forecast growth, which is necessary to meet this RTP's 145.9 MAP forecast in 2035. In order to attract the number of passengers to the suburban airports envisaged in the 2035 regional air passenger demand forecast, some incentives are likely to be needed to encourage airlines to offer service at these airports. Potential incentives fall into three broad categories:

1. Improvements to the airport ground access system that would make the alternate airports more accessible to travelers from those parts of the region that currently find the core urban airports more convenient,
2. Measures that would reduce the cost to the airlines of offering service at the alternate airports, either through direct subsidy or by reducing airport fees and charges relative to the more congested airports, and
3. Marketing programs to encourage air travelers to consider using the air services at the alternate airports.

General Aviation

SCAG also updated regional general aviation demand forecasts for the 44 general aviation airports in the region, as well as for the 10 commercial airports in the region that support general aviation activity. Regional general aviation demand forecasts were last developed by SCAG in 2003. The new forecasts employed a sophisticated "cohort" methodology that considers the amount of flying done by pilots as they pass through different age groups, and the extent to which older pilots are replaced by new pilots. The forecast shows a decline in regional general aviation operations by about 32 percent from 2010 to 2035. The main reason for the anticipated decline is the fact that the aging pilot population is not expected to be adequately replenished by new student pilot starts. The regional general aviation demand forecast and methodology can be found in the Aviation technical appendix.

Airport Ground Access Strategy

Improvements to airport ground access (and egress) fall under SCAG's domain of responsibility. SCAG works closely with the airport authorities and county transportation commissions to identify and pursue implementation of specific projects. To be effective in attracting passengers to air service at the alternate airports, ground access improvements will need to significantly reduce the travel time and/or cost of accessing the alternate airports. This is likely to be a particular concern with airports such as Palmdale, which is almost 70 miles from downtown Los Angeles and around 50 miles from communities in the San Fernando Valley.

While the cost of significantly reducing freeway travel times beyond those improvements that will be implemented for other reasons would be prohibitive, particularly for the relatively small number of travelers likely to use the alternate airports, there may be opportunities to take advantage of improved transit and rail services that are being planned. These include the extension of the Metro Gold Line to Ontario and improvements to Metrolink service on the Antelope Valley and San Bernardino lines. While the

volume of airport passengers alone would not justify the cost of these projects, if they are being done anyway to address other travel needs, SCAG can work with the relevant agencies to make sure that the connections to the alternate airports are well planned and marketed. In the case of Ontario Airport, airport passenger volumes may be high enough to support express bus service from remote terminals at such locations as the Anaheim Regional Transportation Intermodal Center, Los Angeles Union Station, and the Van Nuys FlyAway terminal in the San Fernando Valley. These facilities all currently exist or will by 2035, so it would only be necessary to operate the bus service. These services may need to be subsidized until ridership reaches a level where the fare revenue can support the operation, and SCAG could work with the airport authorities and regional transportation agencies to identify funding to subsidize the operation. Potential sources of funding could include charging fees for private vehicles picking up and dropping off passengers at the congested airports. This would not adversely impact existing airport revenues and would have a number of advantages:

- It would encourage resident passengers to use airport parking instead of being dropped off and picked up, which would increase airport revenues,
- By discouraging pick-up and drop off trips it would reduce vehicle trips generated by the airport on surrounding streets, and
- It would encourage more passengers to use public transportation or express buses from remote terminals, which would reduce vehicle miles of travel (VMT) on the region's arterial and freeway system.

It is unlikely that the volumes of air passengers at the other three alternate airports would be high enough to support dedicated express bus service, but it might be possible to serve San Bernardino International Airport as an extension of express bus service to Ontario Airport from Union Station or Van Nuys.

A more thorough discussion and listing of recommended ground access projects for each airport, both roadway and public transit projects, can be found in the Airport Ground Access Element in the Aviation technical appendix.

AIRPORT FINANCIAL STRATEGY

SCAG currently does not have a source of funding to provide subsidies for air service or to reduce airport fees and charges to the airlines. However, it can work with the various airport authorities in the region to establish a regional funding mechanism to support the development of airport facilities and infrastructure at the alternate airports using revenues generated at the congested airports as part of efforts to limit traffic growth at those airports. This is currently prohibited by the U.S. Department of Transportation regulations on airport revenue diversion, except in cases where both airports are operated by the same airport authority. SCAG may need to work with the Congressional representatives from the region to obtain legislation that allows joint programs by congested and uncongested airports, even if they are operated by different agencies. This should not be a controversial issue as long as it is sufficiently targeted and narrowly scoped. Congested airports have an interest in shifting traffic to less congested airports. For airports like LAX, which has a significant component of international traffic that generates more revenue than domestic flights, it may be more efficient to limit domestic flights that could be accommodated at other airports in the region, thereby freeing up capacity for more lucrative international flights.

AIRPORT MARKETING STRATEGY

SCAG does not currently have a source of funding to support marketing efforts to encourage air travelers in the region to consider using air service at the alternate airports. However, there is potential for the various airport authorities and the region's business community to develop an effective region-wide marketing effort to promote alternatives to the use of congested airports. This program could be funded through a variety of sources, such as airport parking and rental car transactions. SCAG would need to work with the various stakeholders to identify the benefits of an effective marketing program to all the region's airports and develop a consensus on how to fund and implement such a program.

AIRPORT POLICIES AND ACTION STEPS

This section outlines the additional policies and action steps associated with the aviation program contained in this RTP/SCS.

Regional Aviation Demand, Airport Infrastructure and Airport Ground Access

The following outlines key policies:

- The capability of uncongested secondary airports in the region to accommodate future aviation demand, where such growth is desired, should be preserved during periods of declining or stagnant air traffic
- Uncongested secondary airports in the region, where additional activity is desired, should be supported through appropriate incentives, marketing, and projects that enhance their capacity and regional accessibility
- The factors that most influence the growth in demand for air travel and the composition of the market should be identified
- A regional consensus should be developed on how best to support the development of new air services at uncongested secondary airports, where such growth is desired
- State-of-the-art aviation demand forecast methodologies should be employed to accurately forecast future aviation demand in the region's complex multi-airport system, and regional aviation demand forecasts should be regularly updated to address changing conditions
- Existing and planned regional highway and high-occupancy transit improvements should be leveraged to the extent possible to increase the regional accessibility of uncongested secondary airports, where traffic is desired, while minimizing improvement needs

The following outlines additional action steps to improve aviation and airport ground access in the region:

- Work with the region's airport operators to conduct a region-wide air passenger survey on an ongoing basis, designed to enhance and inform regional aviation demand forecasting and airport marketing efforts
- Develop an in-house aviation demand forecasting model that can support the development of future forecasts and allocation of forecast demand to airports in a complex multi-airport regional system. The model should be fully integrated with SCAG's regional transportation model, and should have airport ground access modeling capabilities

- Work with the region's airport operators and business community to define a region-wide marketing effort to promote alternatives to increased use of congested urban airports, consistent with the policy directions of airport operators
- Identify and define incentives that airports can effectively use to encourage airlines to provide new air service
- Establish a Regional Airport Ground Access Task Force to define potential projects and programs to improve airport accessibility to secondary airports, and reduce vehicular traffic generated by the large urban airports. The Task Force would help plan and promote rail and express bus service improvements and extensions to airports in the region, as well as an integrated regional system of remote air terminals ("FlyAways")

Airport Economics, Finance and Funding

The following policies are related to Airport Economics, Finance and Funding:

- New funding mechanisms should be identified for implementing regional infrastructure and airport ground access improvements
- Efforts by airport operators to develop strategic financial plans and explore non-aeronautical revenue-generating use of underutilized airport property should be supported
- Strategies that enhance the economic contribution of aviation to the regional economy should be identified and implemented

The following are recommended action steps:

- Sponsor and support new legislation that allows for more flexible use of airport revenues for off-airport ground access projects when requested by airport operators
- The Airport Ground Access Task Force should explore and develop potential new funding sources to support specific projects they have identified for improving regional airport accessibility
- Coordinate with the region's County Transportation Commissions and other transportation agencies to include joint funding of airport ground access projects identified in SCAG's Regional Transportation Plan in those agencies' plans
- Conduct regional aviation economic impact studies that identify the economic benefits to the region of different types and levels of regional aviation activity, and the likely economic impacts of implementing alternative policy options for serving future regional aviation demand

Airport Land Use Compatibility and Environmental Impacts

The following policies are related to Land-Use Compatibility and Environmental Impacts:

- Increased coordination between airport planning and land use planning on both regional and local levels should be promoted
- Regional support and coordination should be extended to the region's Airport Land Use Commissions
- Information on aviation environmental "best practices" should be shared and disseminated on a regional level
- Mechanisms for promoting cleaner and quieter aircraft at the region's airports should be identified and supported

The following are related action steps.

- Continue to pursue airport "smart growth" projects, using the Airport Smart Growth Framework developed for the Chino Airport Smart Growth Demonstration Project and applying it to different airport settings
- Incorporate airport "smart growth" land use principles in land use forecasts used by future regional transportation plans
- Periodically conduct information sharing forums for the region's Airport Land Use Commissions in cooperation with the Caltrans Division Aeronautics on "best practices" for airport land use compatibility planning
- Serve as a clearinghouse for information on aviation environmental "best practices" by airports for mitigating air, noise and water pollution and reducing greenhouse gas emissions
- Sponsor and support new legislation for creating substantial incentives for airlines to upgrade their aircraft fleets to cleaner, quieter aircraft and NextGen-compatible aircraft

Airspace Planning and New Technologies

The following are policies related to Airspace Planning and New Technologies:

- Modifications to the regional airspace system that reduce potential airspace conflicts, increase passenger safety, reduce costs to airlines, and reduce noise and air quality impacts should be identified and promoted
- Opportunities should be pursued for increasingly the region's airspace capacity, reducing potential future airspace conflicts and increasing airline efficiencies through new navigation and air traffic control technologies
- Existing and potential future airspace constraints should be incorporated into regional aviation planning

The following are related action steps:

- Continue to coordinate and provide input to the FAA's Optimization of Airspace and Procedures in the Metroplex (OAPM) Program for Southern California, and similar airspace modernization activities, including updated operational forecasts
- SCAG Aviation Technical Advisory Committee (ATAC) should continue and enhance its coordination with the Southern California Airspace Users Working Group (SCAUWG) on airspace issues of regional importance
- Continue to advocate that the region should serve as an early "test bed" for the phased implementation of new airspace technologies, including new satellite-based NextGen technologies developed by the FAA, that have the potential to reduce airspace conflicts and reduce noise and air quality impacts on local communities
- Explore how new navigation and air traffic control technologies can contribute to the region's airspace capacity, and should incorporate potential airspace constraints in aviation demand forecasts developed for future regional transportation plans

Goods Movement System

System Vision

Goods movement and freight transportation are essential to support the SCAG regional economy and quality of life. In 2010, over 1.15 billion tons of cargo valued at almost $2 trillion moved across the region's system.[1] Whether carrying imported goods from the San Pedro Bay Ports to regional distribution centers, supplying materials for local manufacturers, or delivering consumer goods to SCAG residents, the movement of freight provides the goods and services needed to sustain regional industries and consumer needs on a daily basis.

Working with its public and private sector partners, SCAG has established a vision for the goods movement system that is reflected in the 2012 RTP.

A world-class coordinated Southern California goods movement system that accommodates growth in the throughput of freight to the region and nation in ways that support the region's economic vitality, attainment of clean air standards, and the quality of life for our communities.

[1] FHWA Freight Analysis Framework: http://faf.ornl.gov/fafweb/Extraction0.aspx

Key Function and Markets

The goods movement system has developed in the SCAG region to serve a wide range of user markets. Each of these markets has unique performance needs that dictate the components of the system that they will use. A brief summary of these markets follows.

INTERNATIONAL TRADE

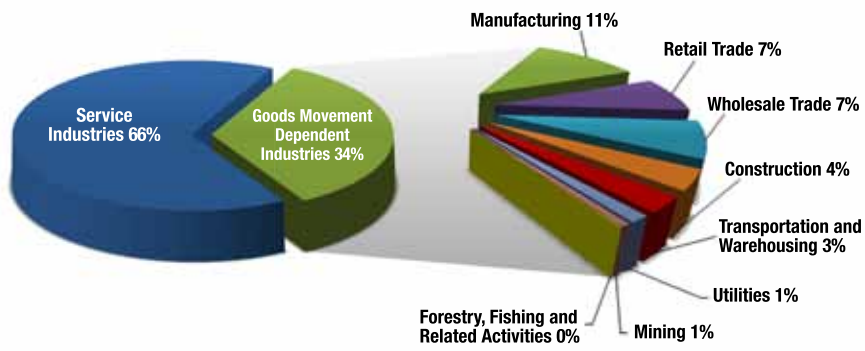
The SCAG region is the largest international trade gateway in the U.S. In 2010, the Los Angeles Customs District (which includes the Ports of Los Angeles, Long Beach and Hueneme and Los Angeles International Airport) handled $336 billion of maritime cargo and $78 billion of air cargo. In the same year, $10.4 billion of trade passed through the three international Ports of Entry (POEs) between the U.S. and Mexico in Imperial County. Trade moving through these international gateways is supported by an extensive transportation system including a highly-developed network of roadways and railroads, air cargo facilities, intermodal facilities, and an abundance of regional distribution and warehousing clusters.

LOCAL GOODS MOVEMENT – DEPENDENT INDUSTRY SUPPORT

An overwhelming majority of the goods movement activity in the SCAG region is generated by local businesses moving goods to local customers and supporting national domestic trade systems. These businesses are sometimes referred to as "goods movement-dependent industries." In 2010, these industries including manufacturing, wholesale and retail trade, construction and warehousing, employed over 2.9 million people throughout the region, and contributed $253 billion to the regional Gross Domestic Product (GDP) (**FIGURE 2.6**).[2] These industries are anticipated to grow substantially with manufacturing forecast to increase its GDP contribution 130 percent by 2035 and wholesale trade growing 144 percent.

Over 85 percent of truck trips in the SCAG region are related to goods movement-dependent industries.[3] Domestic manufacturers, wholesalers, and retailers also use the rail system and the air cargo system, though to a much more limited extent than international shippers.

FIGURE 2.6 GDP Contribution of Goods Movement Dependent Industries (2010)



LOGISTICS ACTIVITIES – INCLUDING WAREHOUSE AND DISTRIBUTION FACILITIES

The SCAG region hosts one of the largest clusters of logistics activity in North America. Logistics activities, and the jobs they provide, depend on a network of warehousing and distribution facilities, highway and rail connections, and intermodal rail yards. In addition to carrying needed inventories, many warehouses and distribution centers in the SCAG region provide transloading services, or the deconsolidation and reloading of freight from marine containers to domestic containers. Because domestic containers are larger than marine containers, importers and shippers are able to realize significant cost savings in transportation costs through economies of scale by transloading. The abundance of warehousing and distribution facilities, along with the highly-developed highway and rail network, serves as a competitive advantage for the SCAG region by attracting transloading activities that supply numerous local and regional jobs and revenue. Trucking access is particularly critical to warehousing and logistics businesses, and the transloading industry. However, distribution centers serving national demand also need access to rail intermodal terminals and air cargo facilities.

[2] SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy, REMI
[3] SCAG HDT Model

Components of the Regional Goods Movement System

EXHIBIT 2.7 depicts the region's multi-modal goods movement system. This system is comprised of the following major elements:

- **Seaports (Ports of Los Angeles, Long Beach and Hueneme):** Serving as the largest container port complex in the U.S., the Ports of Los Angeles and Long Beach handled 76 million tons, or $269 billion of imports, and 48 million tons, or $67 billion of exports in 2009.[4] Port Hueneme, in Ventura County, specializes in the import and export of automobiles, fresh fruit and produce and serves as the primary support facility for the offshore oil industry.
- **Land Ports:** The international border crossings in Imperial County are busy commercial land ports responsible for over $7 billion in imports and $5 billion in exports in 2007 driven by the maquiladora trade and movement of agricultural products.
- **Air Cargo Facilities:** The SCAG region is home to numerous air cargo facilities including Los Angeles International Airport (LAX) and Ontario International Airport (ONT) that together handled over 96 percent of the region's air cargo in 2010.
- **Interstate, Highways and Local Roads:** The region has about 53,400 road miles, 1,630 miles of which are interstate and freeway type.[5] Sections of I-710, I-605, SR-60, and SR-91 carry the highest volumes of truck traffic in the region, averaging over 25,000 trucks per day in 2008. Other major components of the regional highway network also serve significant numbers of trucks including I-5, I-10, I-15, and I-210, some with sections that carry over 20,000 trucks per day. These roads carry a mix of local, domestic trade, and international cargoes. The arterial roadway system also plays a critical role providing "last mile" connections to regional ports, manufacturing facilities, intermodal terminals and warehouses and distribution centers.
- **Class I Railroads:** Critical to the growth of the region's economy, the Burlington Northern Santa Fe Railway (BNSF) and Union Pacific (UP) carry international and domestic cargo to and from distant parts of the country. The BNSF mainline operates on the Transcontinental Line (and San Bernardino Subdivision) while the UP operates on Coast Line, Santa Clarita Line, Alhambra Line, LA Subdivision, and El Paso Line. Both railroads operate on the Alameda Corridor that connects directly to the San Pedro Bay Ports. The San Pedro Bay Ports also provide several on-dock rail terminals along with the six major intermodal terminals operated by the BNSF and UP.
- **Warehouse and Distribution Centers:** In 2008, the region had about 837[6] million square feet of warehousing space and another 185 million square feet in developable land.[7] An estimated 15 percent of the occupied warehouse space served port-related uses while the remaining 85 percent supported domestic shippers.[8] Many of these warehouses are clustered along key goods movement corridors (**EXHIBIT 2.7**). Port-related warehousing is concentrated in the Gateway Cities subregion while national and regional distribution facilities tend to be located in the Inland Empire.

4 America's Freight Transportation Gateways: Connecting Our Nation to Places and Markets Abroad. Research and Innovative Technology Administration, Bureau of Transportation Statistics, U.S. Department of Transportation, 2009

5 http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/hpmspdf/2009PRD.pdf (last accessed on December 10, 2010

6 SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy

7 Potentially developable warehouse space is estimated based on land zoned and suitable for warehouse development

8 Some domestic warehouse space may include use by domestic shippers mixing internationally-sourced and domestically-sourced goods

EXHIBIT 2.7 Regional Goods Movement System

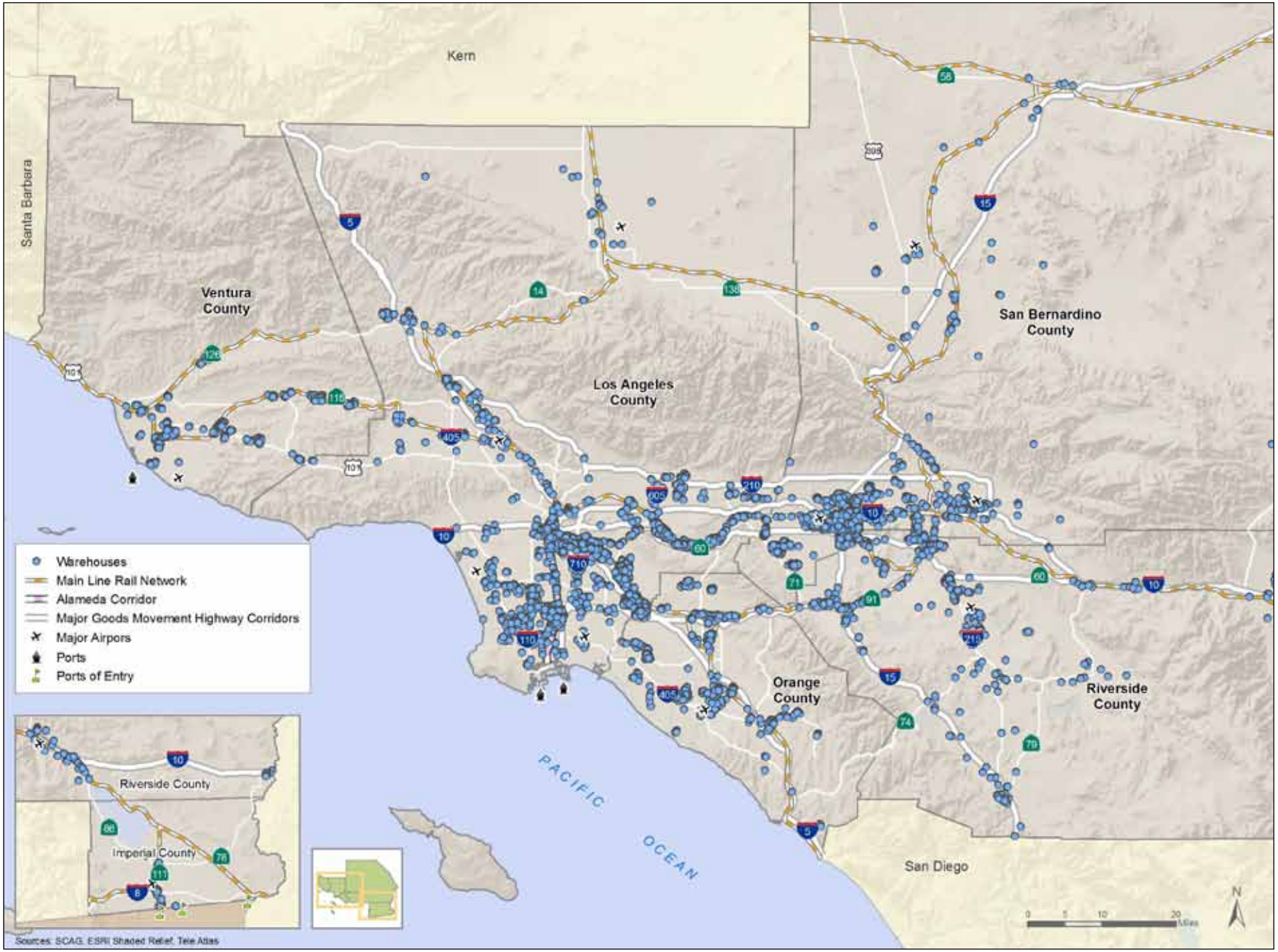


Image courtesy of the Port of Long Beach

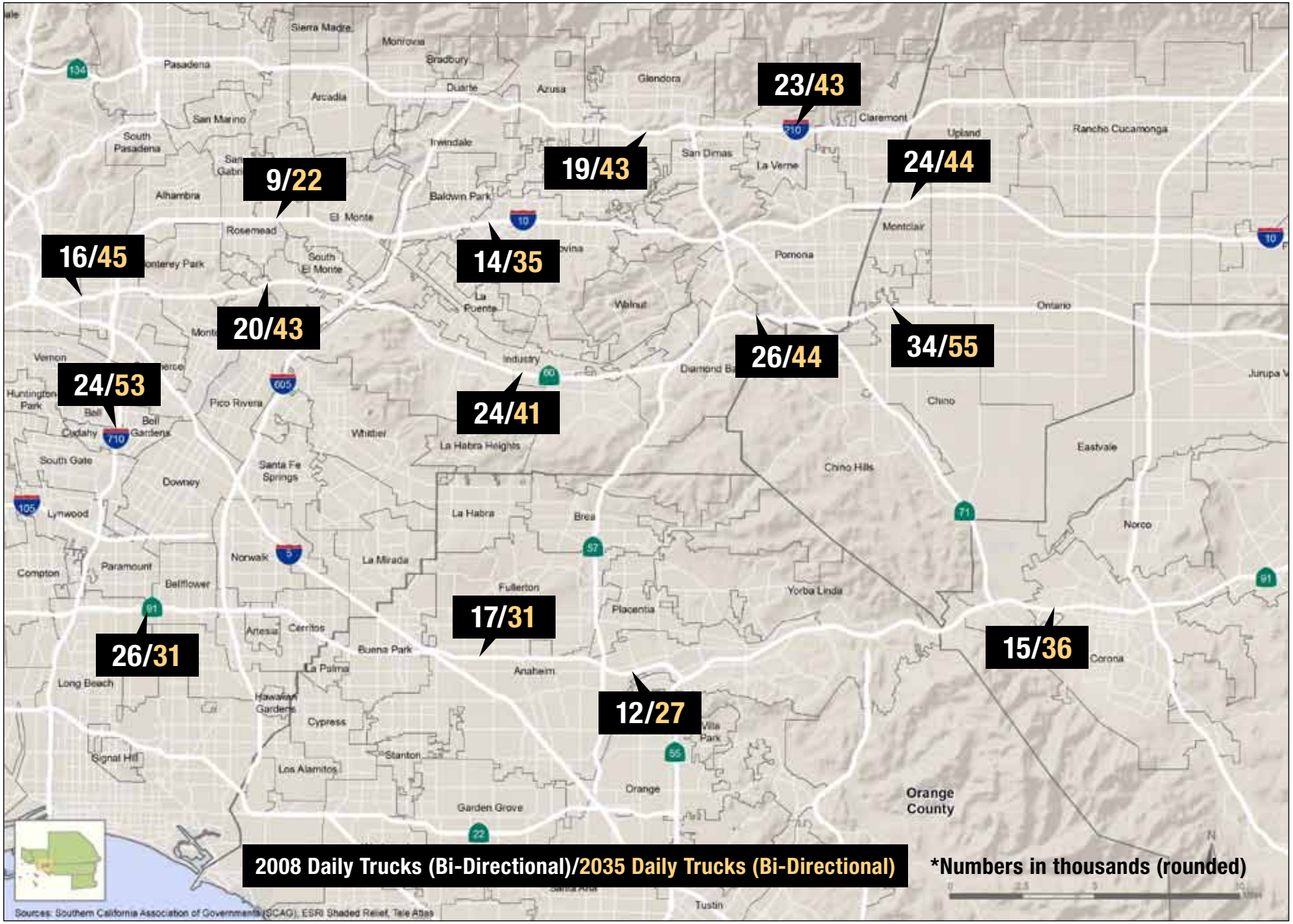
Goods Movement Trends and Drivers

There are a number of key trends that are anticipated to have major impacts on the goods movement system. These trends include:

- **Population and General Economic Growth:** Despite a current economic downturn brought on by challenging global conditions, population and employment in the SCAG region are expected to grow by approximately 24 percent and 22 percent by 2035, respectively. This growth will create increased consumer demand for products and the goods movement services that provide them. The increased demand will drive stronger growth in freight traffic on shared highway and rail facilities. Truck traffic on many key east-west corridors is anticipated to grow by 70–100 percent. Without an increase in capacity, truck and auto delay will increase substantially, truck-involved accidents will be more frequent, and the levels of harmful emissions will rise. Moreover, growing demand for commuter rail services on rail lines owned by the freight railroads will create needs for expanded capacity on these facilities.
- **Recovery and Expansion of International Trade:** Within the RTP time horizon, international trade is anticipated to recover with renewed demand for both import and export capabilities. Despite increasing competition with other North American ports and the expansion of the Panama Canal, the San Pedro Bay Ports anticipate cargo volumes to grow to 43 million containers by 2035[9]—more than tripling from current levels. This will create the need to expand marine terminal facilities, improve highway connections (particularly those connecting directly to the San Pedro Bay Ports, like I-710 and SR-47), and address on-dock and off-dock intermodal terminal capacities. If port-related rail traffic and commuter demand are to be satisfied, additional mainline capacity improvements will be required. Mitigating the impacts of increased train traffic on communities will continue be a considerable challenge.
- **Continued Expansion of Warehouse and Logistics Activity:** Southern California is an ideal place for expanded distribution and logistics activity and will continue to be a significant source of well-paying jobs in the region through 2035. Demand for port-related warehouse space is projected to grow at a faster pace than demand for domestic warehousing. As space near the San Pedro Bay Ports reaches capacity, port warehousing will push out to the Inland Empire. Expansion in national and regional distribution facilities is also likely to occur in the Inland Empire resulting in substantial congestion problems due to the increased truck volumes on regional highways. By 2035, the region may experience a shortfall of more than 228 million square feet in warehouse space relative to demand.
- **Air Quality Issues:** Much of the SCAG region does not meet federal ozone and fine particulate ($PM_{2.5}$) air quality standards. Goods movement is a major source of emissions that contribute to these regional air pollution problems (NO_X and $PM_{2.5}$). While emissions from goods movement are being reduced through efforts such as the San Pedro Bay Ports Clean Air Action Plan, these reductions are unlikely to be sufficient to meet regional air quality goals.

[9] San Pedro Bay Ports Container Forecast

EXHIBIT 2.8 Rising Truck Volumes in the Region



Goods Movement Strategy

To realize the benefits of efficient and sustainable goods movement, it is critical to identify strategies and projects that address expected growth trends. Recent regional efforts have focused on strategies to develop a coherent, refined, and fully integrated regional goods movement system. Following the completion of the 2008 RTP, SCAG initiated the Comprehensive Regional Goods Movement Plan and Implementation Strategy. This effort, involving diverse regional stakeholders, is intended to identify a multimodal regional freight plan that integrates existing strategies and projects with newly developed regional initiatives advanced through the study. Some of these strategies are highlighted below.[10]

REGIONAL CLEAN FREIGHT CORRIDOR SYSTEM

In past RTPs, SCAG has envisioned a system of truck-only lanes extending from the San Pedro Bay Ports to downtown Los Angeles along the I-710, connecting to an east-west segment, and finally reaching the I-15 in San Bernardino County. Such a system would address the growing truck traffic on core highways through the region and serve key goods movement industries in a manner that mitigates negative impacts on communities and the environment. Truck-only freight corridors are effective as they add capacity in congested corridors, improve truck operations and safety by separating trucks and autos, and provide a platform for the introduction and adoption of zero-emission technologies. Significant progress towards a regional freight corridor system has continued as evidenced by recent work on an environmental impact report (expected to be completed in 2012) for the I-710 segment. As part of the 2012 RTP, SCAG includes a refined concept for the east-west corridor component of the system and connections to an initial segment of I-15.

While numerous potential east-west freight corridor options were examined, the 2012 RTP identifies a corridor concept to be explored further that could fall within a five-mile span of the route illustrated in **EXHIBIT 2.9**.

EXHIBIT 2.9 Potential East West Freight Corridor

Non-freeway alignments may provide an opportunity to move the facility away from neighborhoods and closer to industrial uses that it would serve. Approximately 50 percent of the region's warehousing space, and 25 percent of its manufacturing employment lies along the identified route. After adoption of the 2012 RTP, it is anticipated that significant additional study of alignments will be conducted, including an alternatives analysis completed as part of a full environmental review.

The East-West Freight Corridor would carry between 58,000 and 70,000 trucks per day—trucks that would be removed from adjacent general purpose lanes and local arterial roads. As highlighted in **TABLE 2.8**, the corridor would benefit a broad range of goods movement markets: between 25–40 percent of the trucks would be port-related, almost 40 percent would serve local goods movement dependent industries, and the remainder would support domestic trade. Truck delay would be reduced by up to 11 percent while

[10] For more detailed information on the SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy, please see the Goods Movement Technical Appendix.

speeds for autos on SR-60 would be improved by 11–12 percent. Truck traffic on the SR-60 general purpose lanes would be reduced by 42–82 percent, depending on location, by as much as 33 percent on I-10, and by as much as 20 percent on adjacent arterials. Separating trucks and autos would also reduce truck involved accidents on east-west freeways that currently have some of the highest accident levels in the region (20–30 accidents a year on certain segments).[11]

For the 2012 RTP, the regional freight corridor system also includes an initial segment of I-15 that would connect to the East-West Freight Corridor, reaching just north of I-10. Additional study will be undertaken to complete specification of the I-15 component of this project.

TABLE 2.8 Benefits of an East-West Corridor Strategy

Benefits of an East-West Corridor Strategy	
Mobility	▪ Truck delay reduction of approximately 11% ▪ All traffic delay reduction of approximately 4.3% ▪ Reduces truck volumes on general purpose lanes—42–82% reduction on SR-60
Safety	▪ Reduced truck/automobile accidents (up to 20–30 per year on some segments)
Environment	▪ 50% clean truck utilization removes: 2.4 tons NO_X, 0.08 tons $PM_{2.5}$, and 2,001 tons CO_2 daily (2.7–6% of region's total)
Community	▪ Preferred alignment has least impact on communities ▪ Removes traffic from other freeways ▪ Zero-emissions technology (ZET)—reduces localized health impacts
Economic	▪ Supports mobility for goods movement industries—comprise 34% of SCAG regional economy and jobs

[11] SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy

BOTTLENECK RELIEF STRATEGY

In recent analysis of critical issues affecting the trucking industry conducted by the American Transportation Research Institute (ATRI), traffic congestion ranked near the top in 2011 after being less of a concern in 2009–2010 as a result of the economic downturn.[12] Besides causing delays to other highway users, heavy truck congestion results in wasted labor hours and fuel. In 2010, it was estimated that the cost of truck congestion in 439 major urban areas was approximately $23 billion.[13] Truck congestion in urban areas within the SCAG region resulted in approximately $2.6 billion in costs.[14] Given that driver wages and fuel costs represent over 50 percent of total motor carrier costs, truck congestion has major impacts on the bottom line of the trucking industry. Truck bottlenecks are also emission "hot spots," and generally have significantly degraded localized air quality caused by increased idling from passenger vehicles and trucks.

A coordinated strategy to address the top-priority truck bottlenecks is a cost-effective way to improve the efficiency of goods movement in the SCAG region. Bottleneck projects may also be easier to implement since they are often less intrusive than other types of projects, contribute to the region's environmental goals (by reducing emissions "hot spots"), and result in substantial, tangible benefits to commuters and goods movement industries alike.

SCAG recently studied key regional truck bottlenecks and associated projects. Through this analysis, project concepts that may address the highest priority truck bottlenecks and have the most significant impact on delay were identified and continue to be evaluated. The 2012 RTP allocates an estimated $5 billion to address goods movement bottleneck relief strategies. Examples of bottleneck relief strategies include ramp metering, extension of merging lanes, ramp and interchange improvements, capacity improvements, and auxiliary lane additions. Annually, 3.6 million hours of heavy truck delay during the most congested time periods on area roadways could be eliminated if the highest priority truck bottlenecks in the region are addressed.

[12] http://www.atri-online.org/2011_top_industry_issues.pdf
[13] Texas Transportation Institute 2011 Urban Mobility Report
[14] Texas Transportation Institute 2011 Urban Mobility Report. Urban areas as defined in the report include Los Angeles-Long Beach-Santa Ana, Riverside-San Bernardino, Lancaster-Palmdale, Bakersfield, Indio-Cathedral City-Palm Springs, and Oxnard-Ventura.

RAIL STRATEGY

The health of the Southern California economy depends on an efficient railroad system that has the capacity to accommodate projected growth in international and domestic freight rail. The railroad system in the SCAG region provides a critical connection between the largest port complex in the country and producers and consumers throughout the U.S. Over half of the international cargo arriving at the San Pedro Bay Ports utilizes rail (including on, near- and off-dock). Railroads also serve a myriad of domestic industries, predominantly for long-haul freight leaving the region. The extensive rail network in the SCAG region is a critical link in the regional supply chain offering shippers the ability to move large volumes of goods over long distances at lower costs versus other transportation options.

The SCAG region is served by two Class I freight railroads: Burlington Northern Santa Fe Railway (BNSF) and Union Pacific Railroad (UP). BNSF operates a single main line extending from connections to the Alameda Corridor near downtown Los Angeles to Barstow with a terminus in Chicago. UP operates two main lines between downtown Los Angeles and the City of Colton. Both railroads share trackage rights on rail segments between West Riverside and Barstow through existing agreements. The Alameda Corridor, a 20-mile, multi-track freight rail expressway, connects the San Pedro Bay Ports with railyards and BNSF and UP rail lines in downtown Los Angeles.

The railroad network connects the SCAG region with many locations in the U.S. Major rail hubs in Illinois (Chicago in particular) and Texas constitute over 50 percent of total tonnage moving to and from the SCAG region. In order to deliver the benefits of rail transport to the region and the nation, the Southern California freight rail system needs to address future capacity needs on both the Class I mainlines and at intermodal terminals where capacity is likely to be strained in light of future demand. The investments needed to meet these capacity needs will be made largely by the private railroads.

At the same time that the rail system is expanding to meet future demand, rail emissions need to be reduced further in order to contribute to the region's goal of meeting ambient air quality standards for the South Coast Air Basin. In addition, issues of grade crossing delay and safety in communities will need to be addressed. Lastly, growth in passenger rail services is an important component of regional mobility strategies and this will require expanded capacity. To the extent that passenger rail shares space on the freight rail system, the ability of the public sector to achieve regional goals within this capacity constrained environment will be challenged. SCAG's recent analysis of train volumes for selected rail segments is shown in **TABLE 2.9**.[15]

TABLE 2.9 Regional Train Volumes (Freight and Passenger)

Rail Line	Segment	2010	2035
BNSF San Bern Sub	Hobart to Fullerton	85	159
	Atwood to W. Riverside	59	133
	W. Riverside to Riverside	90	190
UP Alhambra Sub	LA to El Monte	22	48
	Industry to Pomona	28	54
	Kaiser to W. Colton	29	60
UP LA Sub	LA to Pomona	25	54
	Mira Loma to W. Riverside	30	58
BNSF Cajon Sub	Keenbrook to Silverwood	70	142
UP Yuma Sub	Colton to Indio	44	91

As part of the Comprehensive Regional Goods Movement Plan and Implementation Strategy, SCAG worked closely with regional stakeholders to develop a set of rail strategies aimed at increasing freight and passenger mobility, promoting job creation and retention, improving safety, and mitigating environmental impacts.

Several different components comprise this rail package:

Mainline rail improvements and capacity expansion: This includes rail-to-rail grade separations, double or triple-tracking certain rail segments, implementing new signal systems, building universal crossovers, and constructing new sidings. These improvements would benefit both freight rail and passenger rail service depending on their location.

[15] These forecasts are based upon simulation analysis conducted for planning purposes only as part of the SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy. BNSF and UP do not forecast train volumes through 2035.

Rail yard improvements: This includes upgrades to existing railyards as well as construction of new yards. These projects would provide vital improvements to the region's ability to handle the projected growth in cargo volumes.

Rail operation safety improvements: This includes technology such as Positive Train Control (PTC) that can greatly reduce the risk of rail collisions.

Grade separations of streets from rail lines: These projects reduce vehicular delay, improve emergency vehicle access, reduce the risk of accidents, and lower emissions levels.

Key rail projects in the 2012 RTP include:

- Rail-to-rail grade separation at Colton Crossing
- Additional mainline tracks for the BNSF San Bernardino and Cajon Subdivisions and the UPRR Alhambra and Mojave Subdivisions
- Southern California International Gateway (SCIG)
- Modernization of the Intermodal Container Transfer Facility (ICTF)
- Highway-rail grade separations
- Port-area rail improvements, including on-dock rail enhancements

The benefits of the rail strategies to the region are considerable, and include mobility, safety, and environmental gains. As shown in **TABLE 2.10**, these strategies could eliminate almost 6,000 hours of vehicle delay per day at grade crossings, decrease emissions (NO_X, CO_2, and $PM_{2.5}$) by almost 23,000 lbs. per day, and reduce overall train delay to 2005 levels.

TABLE 2.10 Benefits of the SCAG Regional Rail Strategy

Mobility	▪ Reduces train delay to 2005 levels ▪ Provides mainline capacity to handle projected demand in 2035 (includes 43.2 million TEU port throughput) ▪ Eliminates 5,782 vehicle hours of delay per day at grade crossings in 2035
Safety	▪ Eliminates 69 at-grade railroad crossings
Environment	▪ Reduces 22,789 lbs of emissions per day (CO_2, NO_X and $PM_{2.5}$ combined) from idling vehicles at grade crossings ▪ Facilitates on-dock rail ▪ Reduces truck trips to downtown rail yards and associated emissions

GOODS MOVEMENT ENVIRONMENTAL STRATEGY

In Southern California, goods movement and air quality are inextricably linked. Much of the SCAG region (and nearly all of the urbanized area) does not meet federal ozone and fine particulate ($PM_{2.5}$) air quality standards. Goods movement is a major source of emissions that contributes to these regional air pollution problems as well as localized air pollution "hot spots" that can have adverse health impacts.

Goods movement is also a major source of greenhouse gas (GHG) emissions that contribute to global climate change. Although reduction in GHG emissions from goods movement is not required under California Senate Bill 375 (which focuses solely on light-duty vehicle emissions), the State has established GHG reduction goals under California Assembly Bill 32. Clean goods movement activities can contribute to these goals. As such, the region's goods movement strategy is complementary to sustainable communities planning.

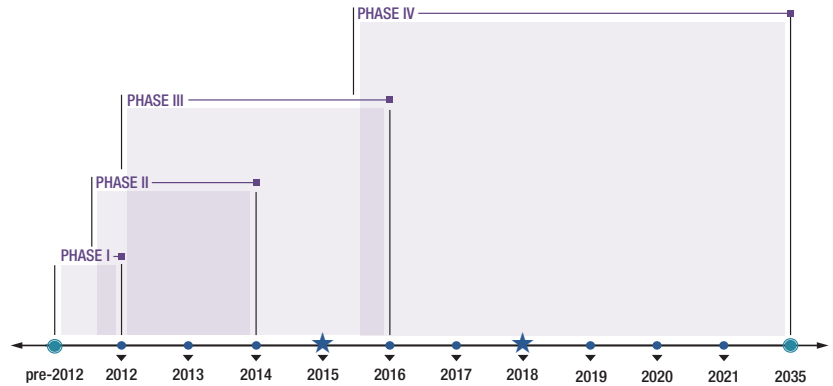
The two air pollutants of greatest concern in Southern California are nitrogen oxides (NO_X) and fine particulate matter ($PM_{2.5}$). The South Coast Air Basin is classified as an extreme nonattainment area per the federal ambient ozone standard, with a required attainment date of 2023. By approximately 2031, a second more stringent federal ozone standard must be attained. The federal Clean Air Act requires the region to demonstrate timely attainment of these standards or federal sanctions may result such as interruption or curtailment of funding for transportation projects. To attain the federal ozone standards, the region will need broad deployment of zero and near-zero emission transportation technologies in the 2023 to 2035 timeframe. The 2012 RTP includes a path forward to achieve this objective. Integration of advanced technologies into the region's goods movement strategies can contribute to other regional objectives such as energy security, economic development opportunities, and potentially broader public support for infrastructure initiatives.

The 2012 RTP focuses on a two-pronged approach for achieving an efficient freight system that reduces environmental impacts. For the near-term, the regional strategy supports the deployment of commercially-available, low-emission trucks and locomotives while centering on continued investments into improved system efficiencies. For example, upgrading switcher locomotive engines could reduce 1 to 3 percent of regional rail emissions. Additionally, heavy-duty hybrid trucks are already in use, but market penetration can be increased. In the longer term, the strategy focuses on a more fundamental shift in technology—taking critical steps toward phased implementation of a zero-emission or near zero-emission freight system. Two of many promising technologies that merit further investigation are electric trucks and electrified rail systems. Additionally, SCAG's planning efforts are cognizant of the need to incorporate evolving technologies into new infrastructure. These include technologies to fuel vehicles, as well as to charge batteries and provide power.

Both near-term and long-term approaches require substantial investment. A path forward to development and deployment of a zero and near-zero emission freight system follows and is summarized in **FIGURE 2.7**. This path is discussed in greater detail in the Technical Appendix.

Phase I: Project Scoping—current research and technology testing of some vehicle prototypes constitutes Phase 1.

FIGURE 2.7 Timeline to Implement a Zero & Near Zero Emission Freight System



Major Milestones
- *2012 – Identify potential funding to support truck, wayside power and rail evaluation and prototype demonstration efforts; incorporate into financially constrained RTP as appropriate*
- *2012 - Implement plan of advocacy to secure action by federal or other governments*
- *2012-2014- Continue to evaluate truck technology implementation and funding mechanisms*
- *2012-2013 – Continue to evaluate practicability of applying existing electrified rail technologies, and evaluate funding and implementation mechanisms*
- *2015-2016 – Incorporate decisions on wayside power and technology direction, including strategy, funding and timeframe into 2016 RTP update and SIP revisions; if existing rail technologies are practicable, identify technologies, infrastructure and implementation mechanisms in RTP update and SIP*
- *2016- Begin deployment of appropriate zero emission trucks and continue operational demonstration*
- *2018-2020 – If existing rail applications were not practicable, resolve need for new rail technologies and incorporate planning into the 2020 RTP*

Phase II: Evaluation, Development, and Prototype Demonstrations—convene working groups and increase understanding of logistics. Evaluate, develop and test prototype trucks and rail locomotives, as well as wayside power options. Work with public and private sector partners to secure funding commitments for the development of new technology prototypes and demonstrations.

Phase III: Initial Deployment and Operational Demonstration—Truck fleet evaluation testing and advanced technology locomotive demonstrations.

Phase IV: Full Scale Demonstrations and Commercial Deployment—includes implementation of regulatory and market mechanisms needed to launch commercialization.

It is important that the region work collaboratively to pursue advanced technologies and secure funding for their development and deployment. Although several regional forums currently exist, SCAG anticipates building on these efforts by establishing a logistics working group with key stakeholders. Participants may include government agencies, logistics industry representatives, and original equipment manufacturers (OEMs).

Modeling of environmental strategies has determined that significant emissions benefits could be achieved from implementation of different zero and near-zero emission environmental strategies. As summarized in **TABLE 2.11**, the zero-emission East-West Freight Corridor would eliminate 4.7 tons of NO_X, 0.16 tons of $PM_{2.5}$, and 4,000 tons of CO_2 emissions daily, and would set the stage for broader regional deployment of zero-emission technologies and additional emission reductions. Full electrification of the rail system, though still a concept at this point, would remove comparable amounts of NO_X, $PM_{2.5}$, and CO_2. Regionally, a 20 percent market penetration of plug-in hybrid trucks would achieve a reduction of 8.3 tons of NO_X, 0.16 tons of $PM_{2.5}$, and 3,200 tons of CO_2 daily.

TABLE 2.11 Environmental Benefits

Strategy	Impact		
	NO_X	$PM_{2.5}$	CO_2
East-West Freight Corridor with 100% Zero-Emission Vehicles (ZEVs)	4.7	0.16	4,000
Full Railroad Main Line Electrification*	10.4	0.19	2,400
20% Penetration of Plug-in Hybrid Trucks	8.3	0.16	3,200

* Further evaluation is required to determine feasible options for implementation of rail electrification or other zero-emission rail systems.

2012 RTP Environmental Mitigation

SAFETEA-LU, the reauthorization of TEA-21, was enacted into law by President Bush on August 10, 2005. Pursuant to Section 6001 of this legislation, statewide or metropolitan long-range plans must include a discussion of potential environmental mitigation activities and potential areas to carry out these activities. This includes activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan." As such, the RTP includes a discussion of mitigation measures in order to comply with this requirement. As a public agency in California, SCAG first and foremost fulfills mitigation requirements by complying with CEQA.

In addition, as part of the planning process, states and MPOs "shall consult, as appropriate, with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation concerning the development of a long-range transportation plan." They also must consider, if available, "conservation plans and maps" and "inventories of natural or historic resources."

California law requires SCAG to prepare and certify a Program Environmental Impact Report (PEIR) prior to adopting the RTP. The PEIR evaluates the environmental impacts of the RTP and proposes specific measures to mitigate impacts to the maximum extent feasible. Although the 2012 RTP, in and of itself, is a plan to mitigate the transportation-related effects of population growth, such as traffic congestion and poor air quality, because the transportation improvements can result in additional growth, the PEIR goes further by recommending additional environmental mitigation at the program level for those resource areas that would be affected by the Plan (and associated growth) such as land use, biological resources and open space, water and greenhouse gases.

The section below summarizes the mitigation program. A list of all the mitigation measures included in the 2012 RTP PEIR will be included in the Environmental Mitigation Report of the Final 2012 RTP. The general purpose of the mitigation measures included in the PEIR is to identify how to protect the environment, improve air quality, and promote energy efficiency in concert with the proposed transportation improvements and related planning. This provides a framework through which implementing agencies and subregions can address the environmental impacts of RTP projects, while implementing RTP goals and policies.

Mitigation Strategies

The PEIR provides three different categories of mitigation measures for consideration and implementation, as indicated below:

- Regional Mitigation Measures: Within this category are mitigation measures that can be implemented by SCAG at the regional level. These measures are generally aimed at gathering additional information that can assist in measuring impacts and determining appropriate mitigation and promoting policies and programs that would reduce impacts.
- Local Mitigation Measures: The second type of mitigation measures are those that would be implemented at the local level by individual cities and counties. These measures can strengthen planning documents to ensure the provision of appropriate mitigation measures in the planning process.
- Project-Specific Mitigation Measures: This category includes project-specific mitigation measures that are required by the appropriate agency under whose jurisdiction the project falls (i.e., city or county). As a programmatic document, many of the measures in the PEIR refer to performance standards because site-specific conditions cannot reasonably evaluated at the programmatic level.

Conservation Planning Policy

SAFETEA-LU requires that the RTP contain a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities. This includes activities that may have the greatest potential to restore and maintain environmental functions affected by the plan [Sec. 6001(i)(2)(B)(i)]. As such, this is being addressed in the RTP and is separate and distinct from the mitigation measures addressed in the PEIR. SCAG could demonstrate progress and satisfy SAFETEA-LU requirements through the large-scale acquisition and management of critical habitat to mitigate impacts related to future transportation projects.

Suggested steps to develop a conservation policy of this type could include the following:

- Engage in a strategic planning process to determine the critical components and implementation steps for identifying and addressing open space resources
- Identify and map regional priority conservation areas based on the most recent land use data for future consideration and potential inclusion in future plans.
- Engage with various partners, including CTCs, to determine priority conservation areas and develop an implementable plan.
- Develop regional mitigation policies or approaches for the 2016 RTP.

This strategy supports natural land restoration, conservation, protection and acquisition offering Greenhouse Gas (GHG) emissions reduction benefits. Post-RTP strategic planning efforts would include addressing various pertaining to this proposed approach such as identifying appropriate agencies to partner with and determining specific mapping parameters (for example, geographic scale).

In addition, this type of strategic planning approach could also be applied to address impacts to other resource areas.

Summary of the Environmental Mitigation Program

As required by SAFETEA-LU, the RTP includes an environmental mitigation program that links transportation planning to the environment. Building on its strong commitment to the environment as demonstrated in the 2008 PEIR, SCAG's mitigation program creates an implementation strategy to show varying levels of authority (state, regional, and local). This mitigation discussion also utilizes documents created by federal, state and local agencies to guide environmental planning for transportation projects. The following discussion focuses on specific resource areas and the proposed approaches to mitigate impacts to these areas.

BIOLOGICAL RESOURCES AND OPEN SPACE

The RTP Programmatic Environmental Impact Report (PEIR) includes two regional scale maps that identify sensitive environmental resources, such as protected lands and sensitive habitats.

According to the Federal Highway Administration, there are more than 3.9 million centerline miles of public roads that span the United States. Each day, an estimated one million animals are killed on roads, making road kill the greatest human cause of wildlife mortality in the country. As in previous RTPs, the 2012 RTP seeks to minimize transportation-related impacts on wildlife, and also better integrate transportation infrastructure into the environment.

Impacts to biological resources generally include displacement of native vegetation and habitat on previously undisturbed land; habitat fragmentation and decrease in habitat connectivity; and displacement and reduction of local, native wildlife including sensitive species. Building new transportation routes and facilities through undisturbed land or expanding facilities and increasing the number of vehicles traveling on existing routes will directly injure wildlife species, cause wildlife fatalities, and disturb natural behaviors such as breeding and nesting. This will result in the direct reduction or elimination of species populations (including sensitive and special-status species) and native vegetation (including special-status species and natural communities) as well as the disruption and impairment of ecosystem services provided by native habitat areas.

The biological resources mitigation program includes the following types of measures:

- Planning transportation routes to avoid/minimize removal of native vegetation,displacement of wildlife, and impacts to regionally and locally significant habitat types such as oak woodlands, vernal pools, estuaries, lagoons, and other riparian areas
- Including provisions for habitat enhancement such as mitigation banking, improving/retaining habitat linkages, preserving wildlife corridors and wildlife crossings to minimize the impact of transportation projects on wildlife species and habitat fragmentation
- Conducting appropriate surveys to ensure no sensitive species' habitator special-status natural communities is unnecessarily destroyed
- Avoiding and minimizing impacts to wildlife activities (such as breeding, nesting, and other behaviors) during construction of the project by avoiding construction during critical life stages or sensitive seasons
- Avoiding and minimizing impacts to habitat during project construction through actions such as fencing off sensitive habitat, minimizing vehicular accessibility, and salvaging native vegetation and topsoil
- Minimizing further impacts to wildlife and their habitats after project construction by replanting disturbed areas; providing vegetation buffers at heavily trafficked transportation facilities; and restoring local, native vegetation

LOCATIONS FOR MITIGATION

As part of the 2008 Regional Comprehensive Plan, SCAG mapped locations of the protected and unprotected areas in relation to wildlife linkages, linkage design areas, park and recreation areas (from SCAG's 2008 land use inventory), agricultural lands, and developed lands. Together, these form the region's open space infrastructure. Maps were created showing the distribution of protected and unprotected lands within the SCAG region and its vicinity. It also shows the location of county-level conservation efforts such as Habitat Conservation Plans (HCPs) and Natural Communities Conservation Plans (NCCPs). Although portions of these areas fall within the "protected" category, large portions of habitat within these areas remain "unprotected" and therefore should still be considered for mitigation activities. These maps will be updated as a function of post-RTP planning efforts.

Specifically, those areas that are "unprotected" could be possible locations for mitigation. SCAG does not have the authority to purchase or manage lands. Conservation of these areas will be achieved through already-established programs. SCAG will continue to work with its regional partners to help facilitate conservation.

Types of Mitigation Activities

The mitigation program of the 2012 RTP generally includes strategies to reduce impacts where transportation and sensitive lands intersect and also encourages smart land use strategies that maximize the existing system and eliminate the need for new facilities that might impact open space and habitat. Potential mitigation programs include better planning of transportation projects to avoid or lessen impacts to open space, recreation land, and agricultural lands through information and data sharing, increasing density in developed areas and minimizing development in previously undeveloped areas that may contain important open space.

The mitigation program also emphasizes the importance of integrating consideration of wildlife and habitat into the design of transportation facilities in those areas where impacts cannot be avoided. SCAG encourages project sponsors to review Ventura County's Wildlife Crossing Guidelines and FHWA's Critter Crossings. Both documents provide examples of context-sensitive solutions (CSS) which is a way of involving all stakeholders to develop transportation facilities that fit their physical setting and preserve scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist. CSS principles include the employment of early, continuous, and meaningful involvement of the public and all stakeholders throughout the project development process. Additional information on CSS is available on FHWA's website at: http://www.fhwa.dot.gov/context/index.cfm

In summary, the biological resources and open space mitigation programs include the following types of measures:

- Identifying open space areas that can be preserved and developing mitigation measures such as mitigation banking, transfer of development rights (for agricultural lands), and payment of in lieu fees
- Updating General Plan information from cities to provide the most recent land use data to the region
- Coordinating with cities and counties to implement growth strategies that maximize the existing transportation network
- Evaluating project alternatives and alternative route alignments where projects intersect with sensitive habitats
- Integrating the planning of transportation facilities with context-sensitive design elements such as wildlife crossings

GREENHOUSE GASES

California is the fifteenth largest emitter of GHGs on the planet. The transportation sector, primarily, cars and trucks that move goods and people, is the largest contributor with 36.5 percent of the State's total GHG emissions in 2008. On road emissions (from passenger vehicles and heavy duty trucks) constitute 93 percent of the transportation sector total. In order to disclose potential environmental effects of the RTP, SCAG has prepared an estimated inventory of the region's existing GHG emissions, identified mitigation measures, and compared alternatives in the PEIR.

The GHG mitigation program includes, but is not limited to, the following types of measures:

- Land use changes included in the SCS that reduce number and length of trips
- Encouragement of green construction techniques such as using the minimum amounts of GHG emitting construction equipment;
- Public outreach campaigns publicizing the importance of reducing GHG emissions
- Promotion of pedestrian and bicycle as modes of transportation

AIR QUALITY

The 2012 RTP includes programs, policies and measures to address air emissions. Measures that help mitigate air emissions are comprised of strategies that reduce congestion, increase access to public transportation, improve air quality, and enhance coordination between land use and transportation decisions. SCAG's vision includes the introduction of a high-speed, high-performance regional transport system that may potentially reduce airport and freeway congestion and provide an alternative to the single-occupancy automobile. In order to disclose potential environmental effects of the RTP, SCAG has prepared an estimated inventory of the region's emissions, identified mitigation measures, and compared alternatives in the PEIR. The mitigation measures seek to achieve the maximum feasible and cost-effective reductions in emissions.

The air quality mitigation program includes, but is not limited to, the following types of measures:

- ARB measures that set new on-road and off-road engine standards and accelerate turnover of higher emitting engines from the in-use fleet;
- Project specific measure to reduce impacts from construction activities such as the use of water and dust suppressants and restrictions on trucks hauling dirt, sand and soil; and
- Incorporating planting of shade trees into construction projects where feasible

In addition, the RTP includes Transportation Control Measures (TCMs), which are those mitigation measures that reduce congestion and improve air quality in the region.

TRANSPORTATION AND SAFETY

The 2035 transportation model takes into account the population, households, and employment projected for 2035, and therefore the largest demand on the transportation system expected during the lifetime of the 2012 RTP. In accounting for the effects of regional population growth, the model output provides a regional, long-term and cumulative level of analysis for the impacts of the 2012 RTP on transportation resources. The regional growths, and thus, cumulative impacts, are captured in the VMT, VHT, and heavy-duty truck VHT data.

Implementation of the 2012 RTP/SCS includes implementation of a series of projects which are described in the RTP. The 2035 transportation system performance is compared to the performance of the existing (2011) system for the purpose of determining the significance of impacts. The SCAG region is vulnerable to numerous threats that include

both natural and human-caused incidents. As such, a mitigation program related to safety is included in the 2012 PEIR. The mitigation program for the 2012 RTP aims for extensive coordination, collaboration and flexibility among all of the agencies and organizations involved in planning, mitigation, response and recovery.

The transportation and safety mitigation program includes the following types of measures:

- Increasing rideshare and work-at-home opportunities to reduce demand on the transportation system
- Investments in active transportation and maximizing the benefits of the land use-transportation connection
- Transportation Demand Management (TDM) measures
- Goods movement capacity enhancements
- Key transportation investments targeted to reduce heavy-duty truck delay
- Establishing transportation infrastructure practices that promote and enhance security
- Helping to enhance the region's ability to deter and respond to terrorist incidents, and human-caused or natural disasters by strengthening relationships and coordination with transportation agencies
- Working to enhance emergency preparedness awareness among public agencies and with the public at large

POPULATION AND HOUSING

Transportation projects including new and expanded infrastructure are necessary to improve travel time and can enhance quality of life for those traveling throughout the region. However, these projects also have the potential to induce population growth in certain areas of the region. Although SCAG does not anticipate that the RTP would affect the total growth in population in the region, the RTP has the ability to affect the distribution of that growth.

In addition to induced population growth, transportation projects in the RTP also have the potential to divide established communities, primarily through acquisition of rights-of-way.

The population and housing mitigation program includes the following types of measures:

- Develop advisory land use policies and strategies that utilize the existing transportation network and enhance mobility while reducing land consumption
- Require project implementation agencies to provide relocation assistance, as required by law, for residences and businesses displaced
- Require project implementation agencies to design new transportation facilities that consider existing communities

LAND USE

The 2012 RTP contains transportation projects to help more efficiently distribute population, housing, and employment growth. These transportation projects are generally consistent with the county- and regional-level general plan data available to SCAG; however, general plans are not updated consistently. In addition, the RTP's horizon year of 2035 is beyond the timeline of even the most recent general plans.

The land use mitigation program includes the following types of measures:

- Encourage cities and counties to update their general plans and provide the most recent plans to SCAG
- Work with member cities to ensure that transportation projects are consistent with the RTP and general plans
- Work with cities and counties to ensure general plans reflect RTP policies

AESTHETICS

The SCAG region includes several highway segments that are recognized by the State as designated scenic highways or are eligible for such designation. Construction and implementation of projects in the RTP could impact designated scenic highways and restrict or obstruct views of scenic resources such as mountains, ocean, rock outcroppings, etc. In addition, some transportation projects could add urban visual elements, such as transportation infrastructure (highways, transit stations) to previously natural areas.

In summary, the aesthetics mitigation program includes the following types of measures:

- Require project implementation agencies to implement design guidelines to protect views of scenic corridors Require project implementation agencies to use construction screens and barriers that complement the existing landscape
- Require project implementation agencies to complete design studies for projects in designated or eligible scenic highways
- In visually sensitive areas, require local land use agencies to apply development standards and guidelines that maintain compatibility

PUBLIC SERVICES AND UTILITIES

Impacts to public services from the 2012 RTP generally include additional demands on fire and police services, schools and landfills. Additional police and fire personnel would be needed to adequately respond to emergencies and routine calls, particularly on new or expanded transportation facilities.

The 2012 RTP's influence on growth could contribute to impacts on public schools, requiring additional teachers and educational facilities. Additional population growth could result in a greater demand for solid waste disposal facilities. Furthermore, collecting solid waste and transporting it to an available disposal facility would impact roads and railways.

In summary, the public services mitigation program includes the following types of measures:

- Require the project implementation agencies to identify police protection, fire service, emergency medical service, waste collection and public school needs and coordinate with local officials to ensure that the existing public services would be able to handle the increase in demand for their services
- Require the project implementation agencies to identify the locations of existing utility lines and avoid all known utility lines during construction
- Encourage green building measures to reduce waste generation and reduce the amount of waste sent to landfills
- Encourage the use of fire-resistant materials and vegetation when constructing projects in areas with high fire threat

As the region continues to add more people, households and jobs, the demand for energy will continue to grow. Every day, the SCAG region consumes more than 23 million gallons of oil and the SCAG region's vehicle fuel consumption has increased 20 percent over the last ten years. In the face of this growth in energy demand and concerns about future oil supplies, there is the mounting realization that we are living in an energy-constrained world. As such, the 2012 RTP includes strategies to reduce Vehicle Miles Traveled (VMT), and as a result, per capita energy consumption from the transportation sector. The PEIR also includes mitigation measures relating to energy designed to reduce consumption and increase the use and availability of renewable sources of energy in the region. Since these measures not only reduce energy consumption but also reduce GHG emissions they are addressed above under GHG.

GEOLOGY, SOILS, AND SEISMICITY

Impacts to geological resources generally include the disturbance of unstable geologic units (rock type) or soils, causing the loss of topsoil and soil erosion, slope failure, subsidence, project-induced seismic activity and structural damage from expansive soils. These activities, in addition to building projects on and around Alquist-Priolo Fault Zones and other local faults, could expose people and/or structures to the risk of loss, injury, or death.

The geological mitigation program includes the following types of measures:

- Employing appropriate grading, construction practices, siting, and design standards, such as adherence to the California Building Code and State of California design standards
- Obtaining site-specific geotechnical data from qualified geotechnical experts
- Complying with all relevant local, state, and federal construction and design requirements for structures located on or across Alquist-Priolo Fault Zones and other local faults

CULTURAL RESOURCES

Impacts to cultural resources generally include substantial adverse changes to historical and archaeological resources and direct or indirect changes to unique paleontological resources or sites or unique geological features. Adverse changes include the destruction of culturally and historically (recent or geologic time) significant and unique historical, archaeological, paleontological, and geological features.

The cultural resources mitigation program includes the following types of measures:

- Obtaining consultations from qualified cultural and paleontological resource experts to identify the need for surveys and preservation of important historical, archaeological, and paleontological resources
- Implementing design and siting measures that avoid disturbance of cultural and paleontological resource areas, such as creating visual buffers/landscaping or capping/filling the site to preserve the contextual setting of the resource
- Monitoring construction activity in areas with moderate to high potential to support paleontological resources and overseeing salvage operations of paleontological resources
- Consulting local tribes and the Native American Heritage Commission for project impacts to sacred lands and burial sites

WATER RESOURCES

Impacts to water resources from the 2012 RTP include potential water quality impairment from increased impervious surfaces. Increased impervious surfaces in water recharge areas potentially impact groundwater recharge and groundwater quality. Cumulative impacts from the projected growth induced by the RTP include increased impervious surfaces; increased development in alluvial fan floodplains; and increased water demand and associated impacts, such as drawdown of groundwater aquifers. Increased output of greenhouse gases from the region's transportation system impacts the security and reliability of the imported water supply.

The water resources mitigation program includes the following types of measures:

- Utilizing advanced water capture and filtration techniques, showing a preference for naturalized systems and designs, to control stormwater at the source

- Avoiding any new construction of impervious surfaces in non-urbanized areas, such as wetlands, habitat areas, parks, and near river systems
- Avoiding any new construction that provides access to flood-prone areas,such as in alluvial fans and slide zones
- Protection and preservation of existing natural flood control systems, such as wetlands and riparian buffers, and expansion of such systems in areas where they do not currently exist
- Constructing projects according to Best Management Practices for water quality protection and water conservation, including low-impact development and green building standards
- Coordinating project development and construction efforts across jurisdictional, agency, and departmental boundaries, to increase project benefits

HAZARDOUS MATERIALS

Implementation of the 2012 RTP would affect the transportation and handling of hazardous materials in the SCAG region. Expected significant impacts include risk of accidental releases due to an increase in the transportation of hazardous materials and the potential for such releases to reach neighborhoods and communities adjacent to transportation facilities. The hazardous materials mitigation program aims to minimize the significant hazard to the public or the environment that involves the release of hazardous materials into the environment. Potential mitigation programs include active coordination with regulatory agencies and first responders in order to ensure proper handling and transport of hazardous materials and their containers.

Mitigation measures also involve ensuring that the project implementation agency complies with all applicable laws, regulations, and health and safety standards set forth by federal, state, and local authorities that regulate the proper handling of such materials and their containers and that the routine transport, use, and disposal of hazardous materials does not create a significant hazard to the public or the environment.

The hazardous materials mitigation programs include the following types of measures:

- Coordinating with regulatory agencies and first responders in order to continue to govern goods movement and hazardous materials transportation throughout the region
- Considering existing and known planned school locations when determining the alignment of new transportation projects and modifications to existing transportation facilities
- Encouraging project sponsors to consider published lists of contaminated properties, which are continually updated, in order to identify cases where new development would involve the disturbance of contaminated properties
- Developing appropriate mitigation measures to assure that worker and public exposure is minimized to an acceptable level and to prevent any further environmental contamination as a result of construction
- Ensuring that project implementation agencies comply with all applicable laws, regulations, and health and safety standards set forth by federal, state, and local authorities that regulate the proper handling of such materials and their containers and that the routine transport, use, and disposal of hazardous materials does not create a significant hazard to the public or the environment

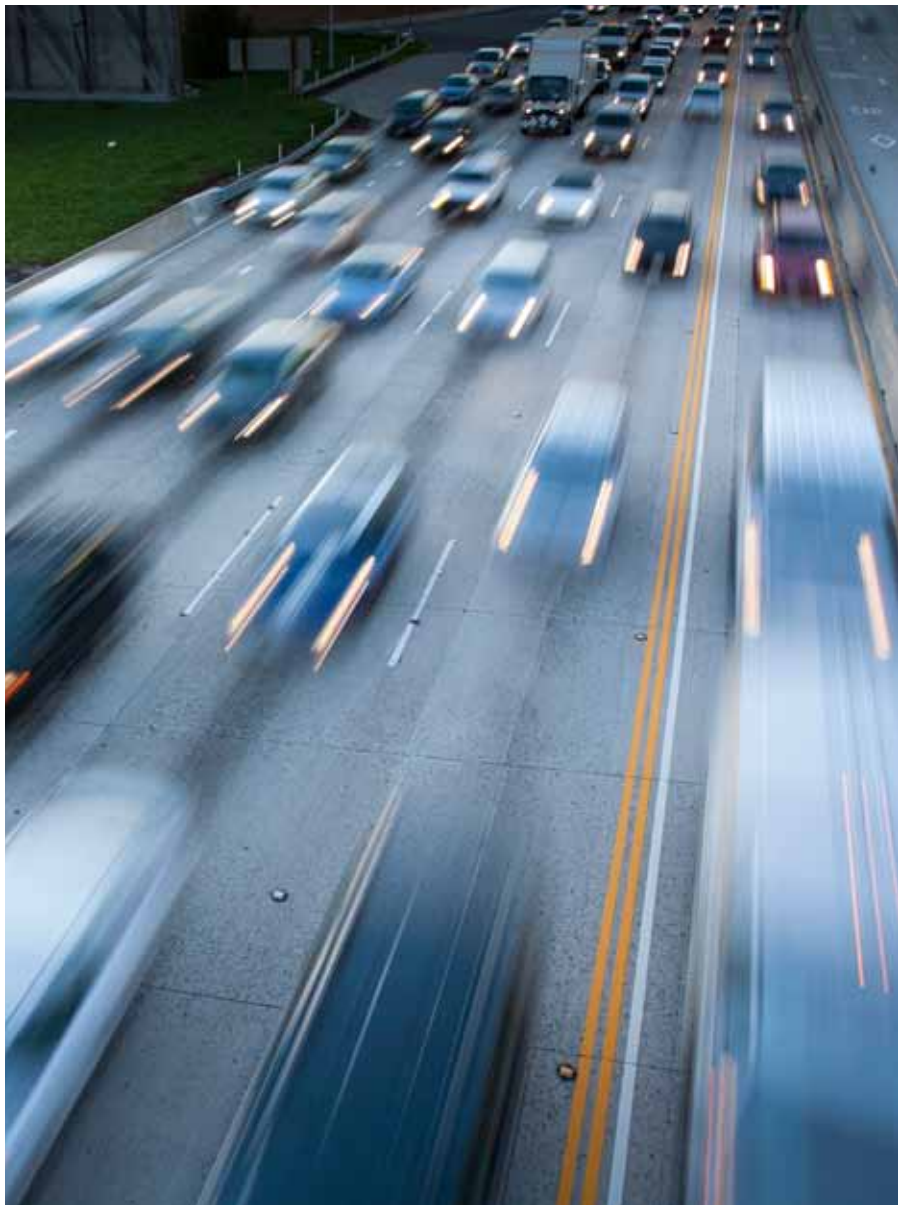
NOISE

Some of the principal noise generators within the SCAG region are associated with transportation (i.e., airports, freeways, arterial roadways, seaports, and railroads). Additional noise generators include stationary sources, such as industrial manufacturing plants and construction sites. Noise impacts resulting from the 2012 RTP generally include exposure of sensitive receptors to noise in excess of normally acceptable noise levels or substantial increases in noise as a result of the operation of expanded or new transportation facilities. As such, the noise mitigation program includes mitigation measures designed to minimize the impact of noise on sensitive receptors as a result of the implementation of the 2012 RTP. These mitigation measures include ensuring that project implementing agencies comply with all local sound control and noise level rules, regulations, and ordinances; utilizing the best available noise control techniques (including mufflers, intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds) in order to minimize construction noise impacts; and utilizing land use planning measures, such as zoning, restrictions on developments, buffers, etc., to minimize exposure to sensitive receptors.

The noise mitigation programs include the following types of measures:

- Encouraging project implementing agencies to comply with all local sound control and noise level rules, regulations, and ordinances
- Developing the best available noise control techniques in order to minimize construction noise impacts
- Conducting a project-specific noise evaluation as part of the appropriate environmental review of each project
- Encouraging project implementation agencies to maximize the distance between noise-sensitive land uses and new roadway lanes, roadways, rail, transit centers, park-and-ride lots, and other new noise-generating facilities

03 FINANCIAL PLAN



Introduction

The financial plan identifies how much money is available to support the region's surface transportation investments including transit, highways, local road improvements; system preservation and demand management goals. It also addresses the need for investment in goods movement infrastructure. Improving ground access in and around major goods movement facilities, and enhancing major highways and railways are critical to maintaining the health of Southern California's economy. The 2012 RTP calls for traditional and non-traditional revenue sources for implementing a program of infrastructure improvements to keep freight and people moving.

The 2012 RTP financial plan identifies a number of reasonably available revenue sources to provide additional funding to supplement existing transportation dollars. The SCAG region's financially constrained plan includes a core revenue forecast of existing local, state, and federal sources along with funding sources that are reasonably available over the time horizon of the RTP. The plan also includes action steps to obtain the revenues necessary for implementing the region's transportation vision.

The 2012 RTP acknowledges the considerable challenges associated with financing transportation investments. The plan highlights the importance of finding new and innovative ways to pay for transportation, including our ever-expanding backlog of investment needs just to maintain the existing system. Nationally, we are facing a very real, near-term insolvency crisis with the federal Highway Trust Fund as fuel tax receipts continue to take a precipitous decline. Additionally, the viability of California's State Highway Account remains in question as only a fraction of our needs are funded through state sources.

To backfill limited state and federal sources, our region continues to rely upon local initiatives (74 percent of core revenues) to meet transportation needs. With a total of seven sales tax measures throughout the region, including the passage of Measure R in Los Angeles County since the adoption of the 2008 RTP, we are increasingly becoming self-reliant. However, the national purpose served by Southern California's transportation system—particularly in the movement of goods—points to the need for stronger state and federal commitment. Our transportation system is the responsibility of all levels of government.

In the SCAG region, our decision-makers continue to take a leadership role in advancing innovative transportation solutions. The 2012 RTP establishes a framework toward a

more sustainable funding future with emphasis on continued research and development for transitioning our fuel tax based system toward a more direct, user charge approach. The user charge approach will generate revenues from those who benefit. Such a change requires critical investigation and legislative action by state and federal leaders over the time horizon of the 2012 RTP. Our region has undertaken numerous policy and technical studies in recent years and will continue to make a commitment towards further examining and demonstrating user charge systems, including toll networks and mileage-based user charges.

We have successfully implemented toll systems in the past with the Transportation Corridor Agencies' network of toll roads and the SR-91 Express Lanes in Orange County. This kind of innovation in transportation continues as neighboring counties within our region consider a broader network of toll systems. Moreover, federal programs have recently supported demonstration initiatives in the region (e.g., I-110 and I-10 Congestion Reduction Demonstration Program in Los Angeles County). We have secured the necessary resources identified to support transportation investments proposed in past RTPs. This plan will continue to meet the necessary milestones for implementation.

In developing the financial plan, SCAG followed a few basic principles to guide its regional financial forecast:

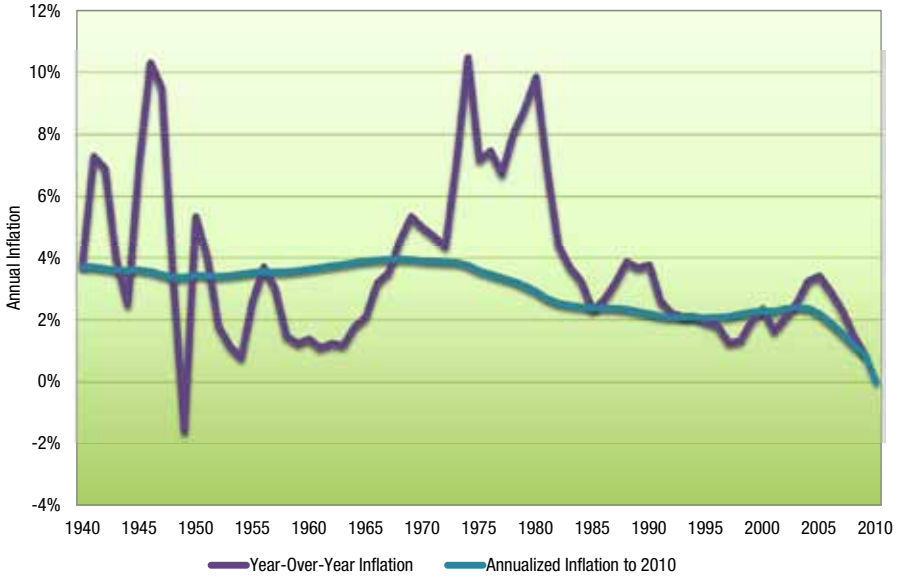
- Incorporate financial planning documents developed by local county transportation commissions and transit operators in the region where available.
- Ensure consistency with both local and state planning documents.
- Utilize published data sources to evaluate historical trends and augment local forecasts as needed.
- Recommend new, reasonably available funding sources that target beneficiaries of transportation investments.

The rest of the plan outlines our financial strategies and provides documentation of the financial assumptions and methodologies used for forecasting revenues and expenditures.

Economic Outlook

Overall economic conditions play a large role in determining the level of revenues available for transportation. Although it is difficult to predict the future, SCAG's financial model takes a conservative approach when forecasting the latter years of the RTP planning horizon. The approach also reflects historical growth trends and reasonable future expectations for key revenue sources, including locally generated sales tax revenues as well as state and federal gas excise tax revenues. The inability of existing excise taxes to keep pace with increasing transportation needs and the detrimental effects of increasing fuel economy on traditional revenue sources are key considerations in the 2012 RTP.

FIGURE 3.1 Historical Inflation Trends



Source: Office of Management and Budget, Budget of the United States Government, Fiscal Year 2011 Budget (FY2011)

Inflation

SCAG's revenue model takes into account historical inflation trends measured by the Gross Domestic Product (GDP) Price Deflator—an approach consistent with the one used by the Federal Office of Management and Budget in preparing the Budget of the United States Government. Inflation can have a profound effect over the long-term, particularly during the final years of the RTP when inflation has had nearly 25 years to erode the value of money.

FIGURE 3.1 shows the trends in inflation since World War II as measured by the GDP Price Deflator. Inflation rates have varied considerably over the time period. However, inflation has dropped dramatically since the late 1970s when the Federal Reserve needed to adopt measures to "tame" inflation. The Great Recession has put additional downward pressure on the inflation rate and caused some economists to worry about the potential eroding effects of deflation, but inflation has remained positive. Over the long term, inflation has trended between 2 and 4 percent. On the basis of this information, a 2.9-percent inflation rate is used to adjust constant dollar (revenue) forecasts into nominal (or year-of-expenditure) dollars.

Construction Cost Increases

While inflation clearly affects the nominal dollars reported for future revenues, the rise in construction costs can further erode the purchasing power of transportation revenues. After spiking dramatically in 2007, construction costs have corrected in recent years. **FIGURE 3.2** shows the increase and decline in California highway construction costs since the early 1970s. The United States Army Corp of Engineers Index for Roads, Railroads and Bridges shows similar trends. While the recent correction in construction costs has slowed the longer term increase in costs, the growth still remains above general inflation. The financial plan uses a 3.2-percent annual inflation factor to estimate future, nominal costs. The faster increase in construction costs than in revenues contributes to a decline in purchasing power for transportation funding over the RTP planning period.

FIGURE 3.2 Highway Project Costs

Source: California Department of Transportation

Retail Sales Growth

Changes in personal consumption, population, available land and retail locations are the biggest contributors to the growth in retail sales. The Great Recession has dealt a blow to retail sales, which reached their peak in FY2007. Retail sales have begun to improve and are expected to rise over the RTP planning period. Over the 30-year period from FY1979 to FY2009, retail sales grew 1.4 percent in real terms (when the effects of inflation are eliminated). However, the growth was uneven. The financial plan assumes uneven growth will continue to occur, with retail sales growth ranging from 1.2 percent to 3.9 percent in real terms.

Fuel Consumption

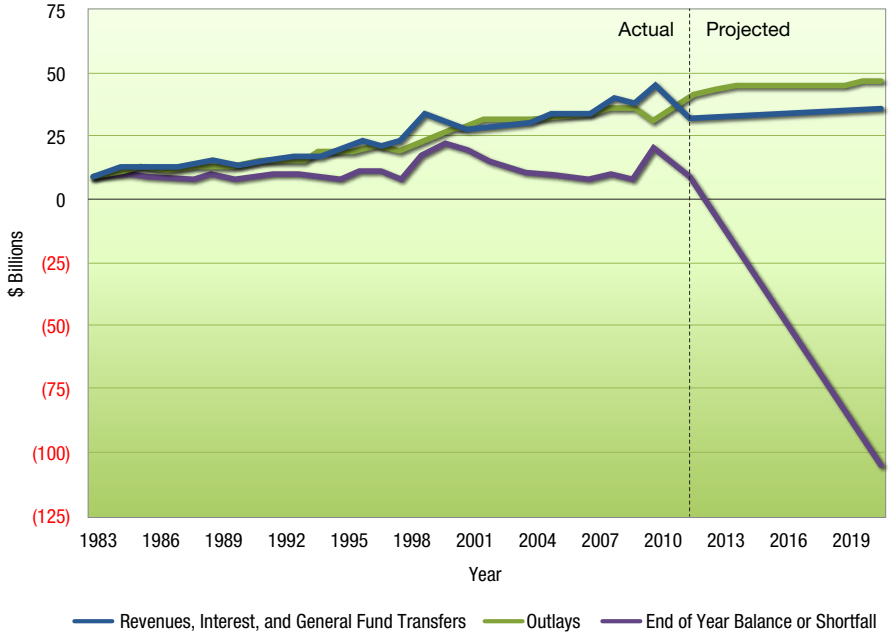
Excise taxes on gasoline and diesel fuels are the basis of most available federal and state transportation funding sources. Since these taxes are levied on a cents-per-gallon basis, they are dependent solely on fuel consumption and not indexed to inflation or construction costs. Over the last several decades, total fuel consumption and the excise taxes generated grew due to increases in vehicle-miles traveled (VMT). While changes in VMT will continue to play a role during the 2012 RTP planning period, increases in conventional fuel economy and the adoption of alternative fuel vehicles will reduce overall fuel consumption. The financial plan assumes that increases in vehicle fuel efficiency will reduce fuel consumption by 1 percent per year during the planning period.

Status of the Federal Highway Trust Fund

The Federal Highway Trust Fund provides federal highway and transit funding from a nationally imposed 18.3-cent per gallon gasoline excise tax. The health of the Trust Fund is of significant concern. Expenditures authorized under the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) have outstripped revenues generated by the excise tax. Since 2008, the Trust Fund has failed to meet its obligations and required the United States Congress to authorize $34.5 billion in transfers from the General Fund to keep it solvent.

FIGURE 3.3 shows a chart from a recent Congressional Budget Office (CBO) analysis of the Federal Highway Trust Fund. The negative balances shown on the chart illustrate the projected inability of the Trust Fund to pay its obligations in the highway account as incurred by the states. Since the Trust Fund cannot incur negative balances under current law, the difference would need to be made up by General Fund transfers or slower spending on programs financed by the Trust Fund.

FIGURE 3.3 Status of the Federal Highway Trust Fund



Source: Congressional Budget Office

At the time of the RTP, Congress is on its eighth extension to SAFETEA-LU without substantive agreement on a long-term solution to provide adequate funding for the Trust Fund despite two national commissions established under SAFETEA-LU that called for immediate action to increase fuel taxes and index as appropriate while transitioning to a mileage-based user-fee over the longer-term. The financial plan assumes that Congress will reach agreement on maintaining solvency of the Trust Fund over the RTP planning period. However, the core revenues available from the Trust Fund are expected to decline due to increasing fuel efficiency.

Status of the State Highway Account

The viability of the State Highway Account remains another critical issue. Despite a recent "gas tax swap," the effective state excise rates have remained unadjusted for more than 15 years. The excise tax revenues, however, remain the only source of funding for the State Highway Operation and Protection Program (SHOPP), which finances projects to maintain the State Highway System.

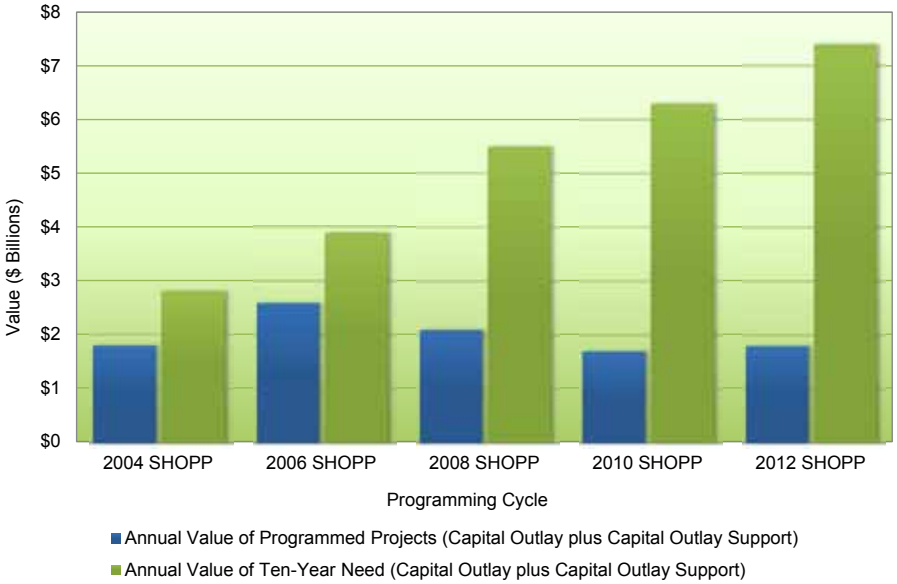
Despite the entire State Highway Account being dedicated to the SHOPP in some years, previous levels of funding have been considerably less than actual needs (see **FIGURE 3.4**). Continued under-investment in the rehabilitation and maintenance needs of the state highway system has serious ramifications—rapidly increasing the number of distressed lane-miles on the state highway system and eroding the condition of the state's bridges. As a result, the cost of bringing the highway assets back to a state of good repair is expected to grow exponentially.

Statewide, the 2011 Ten-Year SHOPP Plan identifies $7.4 billion in statewide annual needs, while expenditures programmed for the next four years are only $1.8 billion. Increased fuel efficiency will further erode State Highway Account funding available over the RTP planning period.

State Gas Tax Swap

In 2010, state gasoline sales tax revenues were "swapped" for an increased state excise tax. Effective July 1, 2010, gasoline excise tax increased by 17.3 cents. On July 1, 2011, sales taxes on diesel fuel increased by 1.75 percent and the excise tax decreased by a corresponding amount. To partially backfill the State Transit Assistance funding to local transit operators, their share increased from two-thirds to 75 percent. Each year, the California Board of Equalization is required to adjust the excise tax, so the state gas tax swap remains revenue neutral. As a result, the financial plan assumes that the state gas tax swap generates the same revenues as generated under the prior state sales tax on gasoline.

FIGURE 3.4 Status of the State Highway Operation and Protection Program



Source: California Department of Transportation, 2011 Ten-Year SHOPP Plan

Air Quality Attainment

Air quality determines the amount of Congestion Mitigation and Air Quality (CMAQ) funding available to the SCAG region. SCAG expects that the region will be in attainment for a number of pollutants and the severity level for other pollutants will lessen as a result of air quality initiatives. The financial plan assumes that CMAQ funding will decline by 25 percent in 2020 and another 25 percent in 2025 as a result of these air quality improvements.

Local Sales Tax Measures

As a means of backfilling declining federal and state sources, the SCAG region continues to rely heavily on local sales tax measures for the timely delivery of transportation projects. Most counties in the region impose local sales taxes to fund transportation projects. Ventura County is the only county in the region without a dedicated sales tax for transportation. While most counties impose a 0.5-percent sales tax to fund transportation projects, Los Angeles County levies a permanent 1-percent tax (a combination of two half-cent sales taxes).

Since the 2008 RTP, voters in Los Angeles County have passed Measure R, which imposes an additional 0.5-percent sales tax to fund transportation projects. Unlike the other Los Angeles County sales taxes, Measure R is not permanent and expires in 2039.

Additionally, several local sales taxes have been renewed in recent years. Prior to the 2008 RTP, Orange, Riverside, and San Bernardino counties extended their sales tax measures through 2039 or beyond. Since the 2008 RTP, Imperial County has renewed its Measure D through 2050. As a result of these extensions, revenues from the local sales tax measures will be available for the entire RTP planning period.

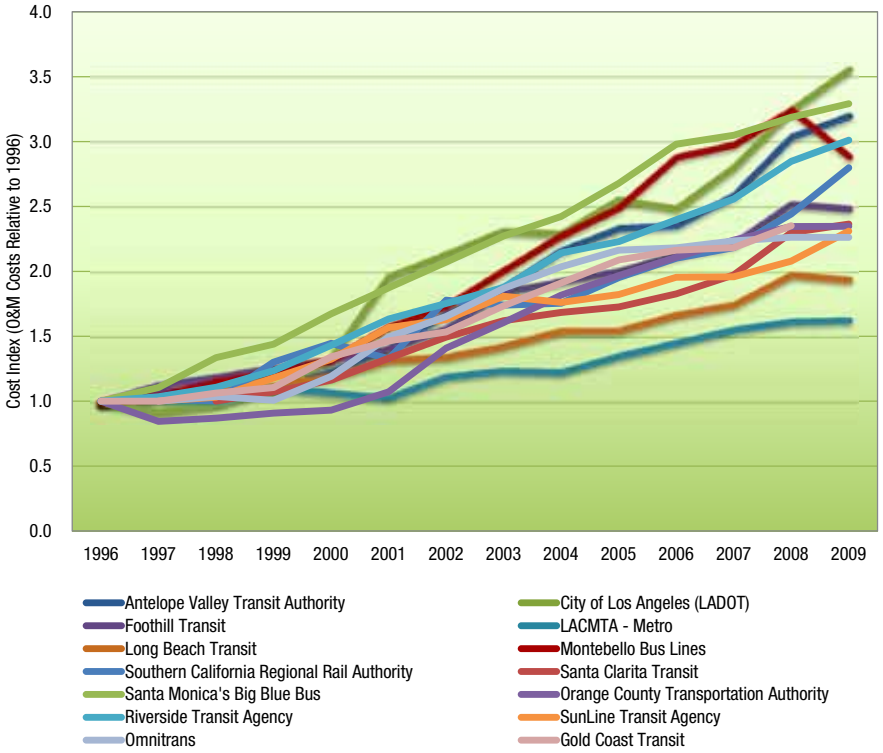
Transit Operating and Maintenance (O&M) Costs

Future transit O&M costs are difficult to predict because they depend on a variety of factors, such as future revenue-miles of service, labor contracts, and the age of rolling stock. The addition of new transit service and capital projects, such as the Exposition Transit Corridor, can add to ongoing O&M costs. Over the last decade, these O&M costs grew 1 to 10 percent annually depending on the transit operator (see **FIGURE 3.5**). Some of the differences in O&M growth are due to rapid expansion among the newer operators and outsourcing among the older operators.

For the 2012 RTP, transit O&M costs are estimated based upon historical increases:

- The regional average increase (3.6 percent) is used for most operators. This assumes that some of the extraordinary increases for individual operators due to rapid expansion will not continue into the future.
- For Los Angeles County, the financial plan relies on detailed forecasts from the county transportation commission. These forecasts are consistent with historical data and take into account large shifts in O&M costs due to major capital projects.

FIGURE 3.5 Growth in Transit Operating and Maintenance Costs



Source: SCAG Analysis of National Transit Database Statistics

Multi-Modal System Preservation and Maintenance

Along with deferred maintenance on the state highway system, the SCAG region faces the need to improve the state of good repair on local streets and roads and in the transit system. In an effort to quantify the extent of the transit needs, the California Transit Association in conjunction with Caltrans and the Federal Transit Administration conducted a study of California unmet transit funding needs. In a similar vein, the League of California Cities and the California State Association of Counties estimated future system preservation and maintenance needs to bring the local streets and roads to a state of good repair. **TABLE 3.1** summarizes the total system preservation and maintenance needs

assumed in the 2012 RTP to bring the transit, local streets and roads, and the state highway system to a state of good repair. While the 2012 RTP includes long-term resources for system preservation, mechanisms to ensure local control will continue to be developed through subsequent implementation efforts.

TABLE 3.1 Multi-Modal System Preservation and Maintenance Needs (in Nominal Dollars, Billions)

System	State of Good Repair Needs Included in Estimate	Estimated State of Good Repair Cost
Transit	O&M Existing Service; O&M Service Expansion; O&M Major New Service; Preservation	$139.3
Local Streets and Roads	Pavement; Essential Components; Bridges	$20.9
State Highway	Bridges, Pavement, Roadside; Mobility, Collision Reduction; Mandates, Facilities; Emergency Response	$56.7
Total		**$216.9**

Debt Service

Local agencies in the SCAG region have historically relied on debt financing to ensure that revenues are available to meet the cash flow requirements of future expenditures. The Los Angeles County Metropolitan Transportation Authority has a detailed county financial model that estimates debt service on a project basis. Other county transportation commissions prepare debt service forecasts for rating agencies and report current debt service in their comprehensive annual financial reports (CAFRs). The 2012 RTP includes all outstanding commitments and interest payments on future bonds and commercial paper. Issued debt is expected to remain under debt ceilings.

Revenue and Expenditure Categories

Core and Reasonably Available Revenues

For the 2012 RTP, SCAG prepared two types of revenue forecasts. Both are included in the financially constrained plan:

- Core revenues
- Reasonably available revenues

The *core revenues* identified are those that have been committed or historically available for the building, operations, and maintenance of the current roadway and transit systems in the SCAG region. Essentially, these revenues are existing transportation funding sources projected to FY2035. The core forecast does not include future increases in state or federal gas excise tax rates (other than the pro forma increases in the state excise tax due to the state gasoline sales tax swap) or adoptions of regional gasoline taxes, vehicle miles traveled (VMT) taxes, and new tax measures. These revenues provide a benchmark from which additional funding can be identified.

The region's *reasonably available revenues* include new sources of transportation funding likely to materialize within the 2012 RTP time frame. These sources include adjustments to existing state and federal gas tax rates based on historical trends and recommendations from two national commissions (*National Surface Transportation Policy and Revenue Study Commission* and *National Surface Transportation Infrastructure Financing Commission*) created by Congress, further leveraging of existing local sales tax measures, value capture strategies, potential national freight progam/freight fees, as well as passenger and commercial vehicle tolls for specific facilities. Reasonably available revenues also include innovative financing strategies, such as private equity participation. In accordance with federal guidelines, the plan includes strategies for ensuring the availability of these sources.

Expenditure Categories

Transportation expenditures in the SCAG region can be summarized into three main categories:

- Capital costs for state highways, regionally significant arterials, local streets and roads, as well as transit.
- Operating and maintenance costs for state highways, regionally significant arterials, local streets and roads, as well as transit.
- Debt service payments for current and anticipated bond issuances.

Core Revenues

A regional revenue model was developed to forecast the revenues over the entire RTP time horizon. The revenue model is comprehensive and supports analysis by county or funding source. The basic process for developing the revenue forecast is:

- Build on the revenue forecasts provided by the county transportation commissions.
- Add assumptions based on historical data.
- Compare historical data to Short-Range Transit Plans and other agency documents.
- Conduct Monte Carlo sensitivity testing of assumptions.
- Work with the transportation commissions to modify assumptions and forecasts as needed.

The region's revenue forecast horizon for the 2012 RTP is FY2011 through FY2035. Consistent with federal guidelines, the 2012 RTP takes into account inflation and reports statistics in nominal (year of expenditure) dollars. **TABLE 3.2** shows these core revenues in five-year increments by county.

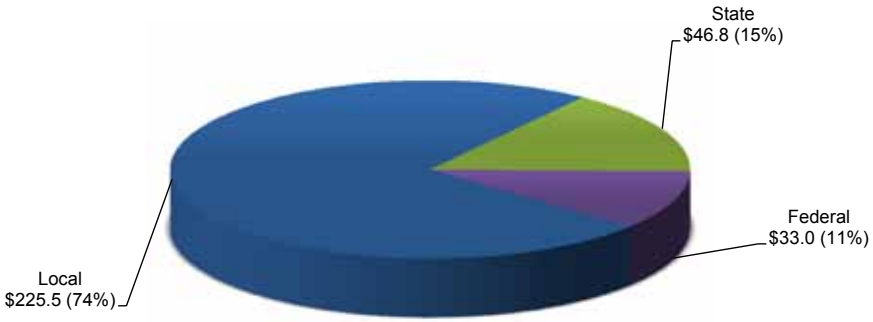
As shown in **FIGURE 3.6**, the majority of revenues in the SCAG region come from local sources. The share of state sources (15 percent) has declined since the last RTP (20 percent) as a result of the forecasted decline in fuel consumption and the increased share of local funds resulting from adoption of an additional sales tax in Los Angeles County.

TABLE 3.2 Core Revenue Forecast FY2011–FY2035 (in Nominal Dollars, Billions)

County	FY2011-FY2015	FY2016-FY2020	FY2021-FY2025	FY2026-FY2030	FY2031-FY2035	Total
Imperial	$0.3	$0.3	$0.4	$0.4	$0.5	$1.9
Los Angeles	$29.4	$32.7	$38.5	$46.2	$53.4	$200.2
Orange	$7.3	$8.1	$9.5	$11.3	$13.4	$49.6
Riverside	$4.2	$4.6	$5.1	$5.9	$6.8	$26.6
San Bernardino	$3.4	$4.0	$4.4	$5.0	$5.6	$22.4
Ventura	$0.8	$0.8	$0.9	$1.0	$1.2	$4.6
Total	**$45.3**	**$50.3**	**$58.7**	**$69.7**	**$80.9**	**$305.3**

Source: SCAG Revenue Model 2011
Note: Numbers may not add due to rounding

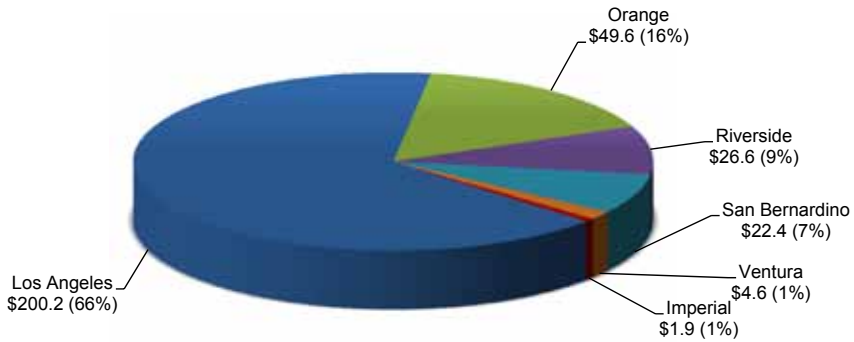
FIGURE 3.6 Regional Revenues (in Nominal Dollars) $305.3 Billion Total



Source: SCAG Revenue Model 2011
Note: Numbers may not add due to rounding

FIGURE 3.7 shows the breakdown of revenues by county. With the adoption of Measure R, Los Angeles accounts for nearly two-thirds (65 percent) of the funding available in the SCAG region. This is an increase from the 56 percent share in the 2008 RTP.

FIGURE 3.7 Regional Revenues by County (in Nominal Dollars) $305.3 Billion Total

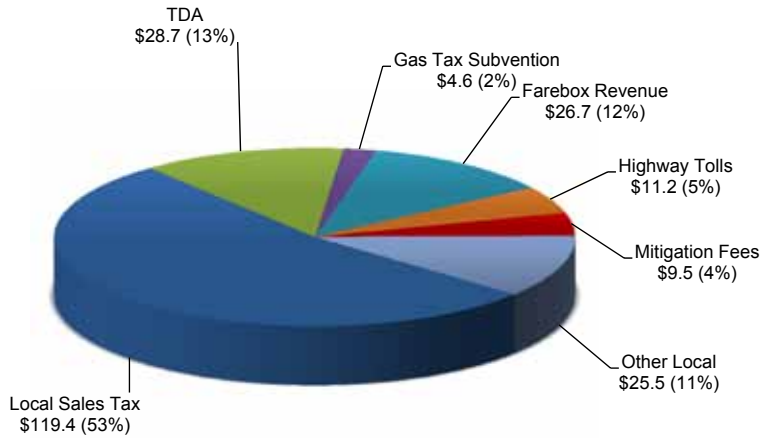


Source: SCAG Revenue Model 2011
Note: Numbers may not add due to rounding

Local option sales taxes provide the largest single source of local funding as shown in **FIGURE 3.8**. When local sales taxes in all five counties with such measures are included, these taxes account for more than half (53 percent) of local sources and nearly two-fifths (39 percent) of overall funding for the RTP. Local sales tax revenues have been boosted by the adoption of Measure R, which provides a further 0.5 percent sales tax in Los Angeles County through 2039. In addition, Imperial County extended its tax measure through 2050.

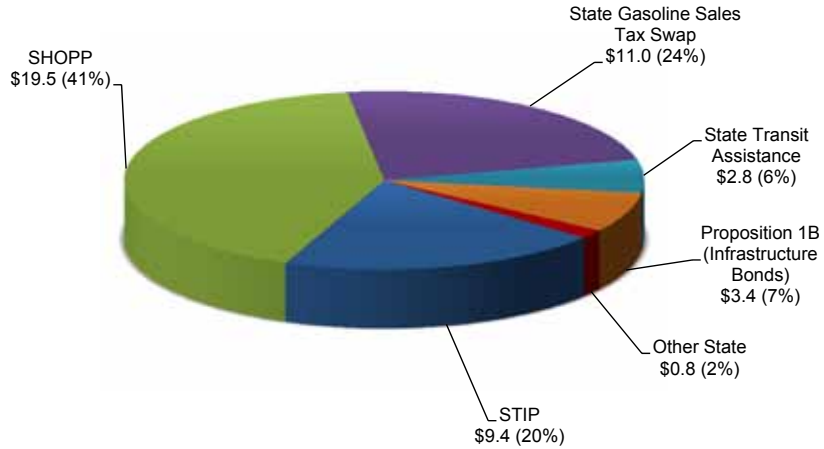
State sources generate a smaller share of revenues than in the 2008 RTP, due mostly to the assumption that fuel consumption declines in the future as a result of increased fuel efficiency. As shown in **FIGURE 3.9**, the State Transportation Improvement Program (STIP), the State Highway Operations and Protection Program (SHOPP), and the State Gasoline Sales Tax Swap account for the largest portions of the state funding available. The adjustments to the State Transit Assistance (STA) available under the gas tax swap are included in the State Gasoline Sales Tax Swap category.

FIGURE 3.8 Regional Revenues, Local Sources (in Nominal Dollars) $225.5 Billion Total



Source: SCAG Revenue Model 2011
Note: Numbers may not add due to rounding

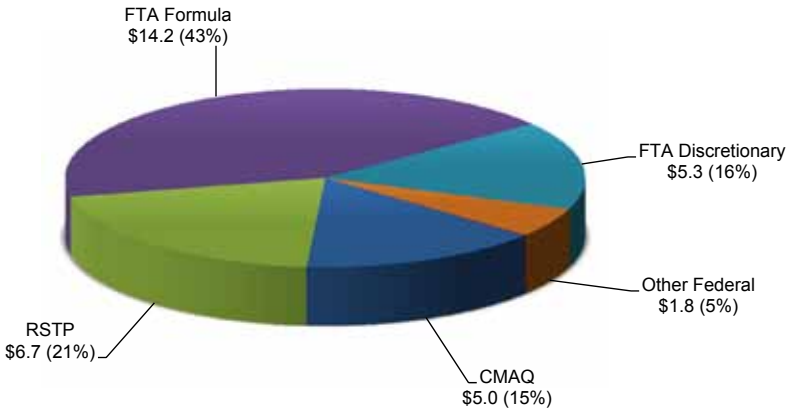
FIGURE 3.9 Regional Revenues, State Sources (in Nominal Dollars) $46.8 Billion Total



Source: SCAG Revenue Model 2011
Note: Numbers may not add due to rounding

As shown in **FIGURE 3.10**, federal sources are anticipated to represent a small portion of overall transportation funds ($33.0 billion). The Federal Highway Trust Fund is expected to remain solvent, but as with state funding, federal funding will decline due to increases in fuel efficiency. Federal Transit Administration (FTA) funding represents a larger share of federal funding due to large-scale New Starts in the SCAG region and a recent emphasis on transit allocations. The financial plan also assumes that CMAQ funding will decline in 2020 and 2025 due to the region achieving attainment for a number of pollutants and reducing the severity level of other pollutants.

FIGURE 3.10 Regional Revenues, Federal Sources (in Nominal Dollars) $33.0 Billion Total



Source: SCAG Revenue Model 2011
Note: Numbers may not add due to rounding

Reasonably Available Revenues

There are several new funding sources that are reasonably expected to be available for the 2012 RTP. SCAG considered a set of key guiding principles as a foundation for identifying regionally appropriate revenues that are reasonably available in developing the 2012 RTP financial strategies as follows:

- Establish a user-based system that better reflects the true cost of transportation, provides firewall protection for transportation funds, and ensures an equitable distribution of costs and benefits.
- Promote national and state programs that include return-to-source guarantees while maintaining flexibility to reward regions that continue to commit substantial local resources.
- Leverage locally available funding with innovative financing tools (e.g., tax credits and expansion of TIFIA) to attract private capital and accelerate project delivery.
- Promote funding strategies that strengthen federal commitment to the nation's goods movement system, recognizing the pivotal role that our region plays in domestic and international trade.

Based on these guiding principles, SCAG evaluated a number of revenue options. Various combinations of these options were considered as potential revenue packages. **TABLE 3.3** presents 10 categories of funding sources and financing techniques that were evaluated for the RTP. These were selected on the basis of their use in other areas of the state, the burgeoning potential, historical precedence, and their likelihood of implementation within the time frame of the 2012 RTP.

These funding sources are considered to be reasonably available and are included in the financially constrained plan. For each funding source, SCAG has examined the policy and legal context of implementation and has prepared an estimate of the potential revenues generated.

TABLE 3.3 New Revenue Sources and Innovative Financing Strategies (in Nominal Dollars, Billions)

Revenue Source	Description	Amount	Actions to Ensure Availability	Responsible Party
Bond Proceeds from Local Sales Tax Measures	Issuance of debt against existing sales tax revenues: Los Angeles, Orange, Riverside, and San Bernardino counties. (Note: although revenue estimates do not include new sales tax measures, this plan recognizes future opportunity including the potential for a sales tax measure in Ventura County if approved by the voters).	$25.6	Issuance of debt subject to County Transportation Commissions' respective Board policies.	County Transportation Commissions—CTCs (LACMTA, OCTA, RCTC, SANBAG)
State and Federal Gas Excise Tax Adjustment to Maintain Historical Purchasing Power	Additional $0.15 per gallon gasoline tax imposed at the state and the federal levels starting in 2017 to 2024—to maintain purchasing power.	$16.9	Requires action of State Legislature and Congress. Strategy is consistent with recommendations from two national commissions to move immediately with augmenting fuel tax resources through conventional Highway Trust Fund mechanisms.	State Legislature, Congress
Mileage-Based User Fee (or equivalent fuel tax adjustment)	Mileage-based user fees would be implemented to replace gas tax and augment—estimated at about $0.05 (2011$) per mile and indexed to maintain purchasing power starting 2025.	$110.3 (est. increment only)	Requires action of State Legislature and Congress. Strategy is consistent with recommendations from two national commissions to move towards mileage-based user fee system. Immediate steps necessary to take include coalescing state and national partners to fund further RD&D (research, development and demonstration) in advance of 2025 broad based implementation.	State Legislature, Congress
Highway Tolls (includes toll revenue bond proceeds)	Toll revenues generated from SR-710 Tunnel, I-710 South Freight Corridor, East-West Freight Corridor, segment of the High Desert Corridor, and Regional Express/HOT Lane Network.	$22.3	Assembly Bill (AB) 1467 (Nunez) Chapter 32, Statutes of 2006, authorized Caltrans and regional transportation agencies to enter into comprehensive development lease agreements with public and private entities, or consortia of those entities for certain types of transportation projects. Further, AB 521 (Runner) Chapter 542, Statutes of 2006 modified provisions in AB 1467. Senate Bill Second Extraordinary Session 4 (SBX2 4) Chapter 2, Statutes of 2009 (Cogdill) established the legislative authority until January 1, 2017, allowing for regional transportation agencies and Caltrans to enter into an unlimited number of Public-Private Partnerships (PPP) and deleted the restrictions on the number and type of projects that may be undertaken. These provisions also enable tolling.	MPO, CTCs, State Legislature
Private Equity Participation	Private equity share as may be applicable for key initiatives: e.g., toll facilities; also, freight rail package assumes railroad share of costs for mainline capacity and intermodal facilities such as SCIG and ICTF modernization.	$2.7	Region has authority as noted above. Current funding plans for specific intermodal facilities assume private sources.	MPO, CTCs, private consortium, State Legislature, and Union Pacific/BNSF as appropriate for specific facilities

Revenue Source	Description	Amount	Actions to Ensure Availability	Responsible Party
Freight Fee/National Freight Program	A national freight program is anticipated with the next federal reauthorization of the surface transportation act. The National Freight Program described in Senate proposed transportation reauthorization bill (MAP-21) would establish federal formula funding for infrastructure improvements supporting the national freight network. Early estimates indicate roughly $2 billion per year nationally. Regional estimate assumes a conservative percentage of national totals.	$4.2	Current effort at the local/regional level continue to endorse a federal program for freight. A national program may be formula based as outlined in the recently proposed MAP-21. Other mechanisms to ensure the establishment of a funding program for freight may entail working with local/regional, state, and federal stakeholders to assess a national freight fee. Freight fees could be assessed in proportion to relative impacts on the transportation system.	Congress and potentially State Legislature as well as local/regional stakeholders if freight program established on regional or statewide basis
E-Commerce Tax	E-commerce sales refer to the sale of goods and services where an order is placed, or price and terms of the sale are negotiated over the internet or other online system. Potentially, the revenue could be used for transportation purposes, given the relationship between e-commerce and the delivery of goods to California purchasers.	$3.1	The State estimates that most residents do not report use tax and this resulted in $1.1 billion in forgone use tax revenue during 2010. A state cannot compel out-of-state retailers to pay a sales or use tax, as federal law requires that retailers have a physical presence in the state. In its FY2012 budget, the State attempted to compel out-of-state retailers that are part of a commonly controlled group or work with affiliates to pay a use tax (through ABX1 28). In September 2011, the State repealed ABX1 28 and enacted AB 155, which includes many of the same provisions of ABX1 28, but delays implementation until September 2012.	State Legislature and potentially Congress
Interest Earnings	Interest earnings from toll bond proceeds.	$0.2	See Highway Tolls.	See Highway Tolls
State Bond Proceeds, Federal Grants & Other for California High Speed Rail Program	State general obligation bonds authorized under the Bond Act approved by California voters as Proposition 1A in 2008; federal grants authorized under American Recovery and Reinvestment Act and High-Speed Intercity Passenger Rail Program; potential use of qualified tax credit bonds; and private sources.	$33.0	Estimate for Southern California segments based on statewide system total per November 1, 2011 Draft California High Speed Rail Business Plan. Further coordination anticipated with the California High Speed Rail Authority in finalizing business plan; additionally, the High Speed Rail Authority will pursue private sector participation as a source of system financing.	MPO, California High Speed Rail Authority, local/regional stakeholders, private sector partners
Value Capture Strategies	Assumes formation of special districts (Infrastructure Financing Districts) including use of tax increment financing for specific initiatives: e.g., East-West Freight Corridor.	$1.2	Pursue necessary approvals for special districts by 2016. Benefit Assessment Districts require majority approval by property owners; Community Facility Districts require two-thirds approval; work with private entities for joint development opportunities as may be applicable.	MPO, CTCs, local jurisdictions, property owners along project corridors, developers

Summary of Revenue Sources and Expenditures

TABLE 3.4.1 Core and Reasonably Available Revenue Projections—Local Revenue Sources (in Nominal Dollars, Billions)

Revenue Source	Revenue Projection Assumptions	Revenue Estimate
LOCAL REVENUE SOURCES		
Local Option Sales Tax Measures	**Description:** Locally imposed ½ percent sales taxes in four counties (Imperial, Orange, Riverside, and San Bernardino). Permanent 1 percent (combination of two ½ cent sales taxes) plus Measure R through 2039 in Los Angeles County. **Assumptions:** Sales taxes grow consistent with county transportation commission forecasts and historical trends.	$119.4
Transportation Development Act (TDA) – Local Transportation Fund	**Description:** Local Transportation Funds (LTF) are derived from a ¼ cent sales tax on retail sales statewide. Funds are returned to the county of generation and used mostly for transit operations and transit capital expenses. **Assumptions:** Same sales tax growth rate as used for local option sales tax measures	$28.7
Gas Excise Tax Subventions (to Cities and Counties)	**Description:** Subventions to counties and local jurisdictions in region from the California state gas tax. Revenues for the forecast are proportionate to the percentage of streets and roads that are regionally significant. **Assumptions:** Fuel consumption declines in absolute terms by 1 percent due to increasing fuel efficiency in conventional vehicles and adoption of electric and hybrid vehicles. Regionally significant streets and roads (37 to 50 percent of total roads) are classified as either arterials or collectors.	$4.6
Transit Farebox Revenue	**Description:** Transit fares collected by transit operators in the SCAG region. **Assumptions:** Farebox revenues increase consistent with historic trends, planned system expansions, and operator forecasts.	$26.7
Highway Tolls (in core revenue forecast)	**Description:** Revenues generated from toll roads operated by the Transportation Corridor Agencies (TCA) and from the SR-91 Express Lanes operated by the Orange County Transportation Authority (OCTA). **Assumptions:** Consistent with the TCA Traffic and Revenue Report, revenues grow by 1.5 percent (compared to historical growth of about 8.5 percent) in core revenue forecast scenario.	$11.2
Mitigation Fees	**Description:** Revenues generated from development impact fees. The revenue forecast includes fees from the Transportation Corridor Agency (TCA) development impact fee program; the Riverside County's Transportation Uniform Mitigation Fee (TUMF) for both the Coachella Valley and Western Riverside County. **Assumptions:** The financial forecast is consistent with revenue forecasts from Riverside County Transportation Commission (RCTC).	$9.5
Local Agency Funds	**Description:** Includes committed local revenue sources such as transit advertising and auxiliary revenues, lease revenues, and interest and investment earnings from reserve funds. **Assumptions:** Revenues are based on financial data from transit operators and local county transportation commissions.	$25.5
LOCAL SUBTOTAL		**$225.5**

Note: Numbers may not add due to rounding

TABLE 3.4.2 Core and Reasonably Available Revenue Projections—State Revenue Sources (in Nominal Dollars, Billions)

Revenue Source	Revenue Projection Assumptions	Revenue Estimate
STATE REVENUE SOURCES		
State Transportation Improvement Program (STIP)	**Description:** The STIP is a five-year capital improvement program that provides funding from the State Highway Account (SHA) for projects that increase the capacity of the transportation system. The SHA is funded through a combination of state gas excise tax, the federal Highway Trust Fund, and truck weight fees. The STIP may include projects on state highways, local roads, intercity rail, or public transit systems. The Regional Transportation Planning Agencies (RTPAs) propose 75 percent of STIP funding for regional transportation projects in Regional Transportation Improvement Programs (RTIPs). Caltrans proposes 25 percent of STIP funding for interregional transportation projects in the Interregional Transportation Improvement Program (ITIP). **Assumptions:** Funds are based upon the 2006 STIP program of projects. Long-term forecasts assume no growth in fuel consumption, except in Los Angeles and Orange counties where the growth is less than historical trends and consistent with forecasts by the local transportation commissions.	$9.4
State Highway Operation and Protection Plan (SHOPP)	**Description:** Funds state highway maintenance and operations projects. **Assumptions:** Short-term revenues are based on overlapping 2004 and 2006 SHOPP programs. Long-term forecasts are consistent with STIP forecasts and assume no growth in the fuel consumption, except in Los Angeles and Orange counties.	$19.5
State Gasoline Sales Tax Swap	**Description:** Prior to 2010, state sales tax on gasoline funded discretionary projects through the Transportation Investment Fund, which distributed revenues to the STIP, local streets and roads, and transit. In 2010, the sales tax revenues were "swapped" for an increased excise tax (initially 17.3 cents) recalculated each year to ensure revenue neutrality. **Assumptions:** The financial forecast assumes that each county receives its fair share of state gasoline sales tax swap based upon county population. Future revenues grow by 1.5 percent to be revenue neutral consistent with the gasoline sales tax swap.	$11.0
State Transit Assistance Fund (STA)	**Description:** STA is funded with 50 percent of State Public Transit Account (PTA) revenues, which come from the diesel sales tax and "spillover" in the gasoline sales tax swap. Funding is distributed by population share and revenue share of the transit operators. **Assumptions:** The forecast is based on current funding levels reported by the State Controller. Future funding declines with fuel consumption using assumptions consistent with other sources.	$2.8
Highway Safety, Traffic, Air Quality, and Port Security Bond Act of 2006 (Proposition 1B)	**Description:** Proposition 1B authorized $19.9 billion to be spent statewide on existing and new statewide transportation-related infrastructure programs and projects through FY2014. Several programs were included under Proposition 1B. **Assumptions:** The forecast is consistent with Proposition 1B apportionments for the SCAG region in the Federal Transportation Improvement Program (FTIP) through FY2014.	$3.4
Other State Sources	**Description:** Other state sources include Service Authority for Freeways and Expressways (SAFE), Freeway Service Patrol, Air Quality Vehicle Registration Fee (AB 2766), Environmental Enhancement and Mitigation, and other miscellaneous state grants. The Clean Air and Transportation Improvement Act added Proposition 116 to use state general obligation bonds to finance rail infrastructure. **Assumptions:** The RTP uses forecasts provided by LACMTA for Los Angeles County for consistency with the LACMTA long-range transportation plan. These state revenues are not estimated for other counties.	$0.8
STATE SUBTOTAL (State STIP funds include FHWA IM and NHS funding categories)		**$46.8**

Note: Numbers may not add due to rounding

TABLE 3.4.3 Core and Reasonably Available Revenue Projections—Federal Revenue Sources (in Nominal Dollars, Billions)

Revenue Source	Revenue Projection Assumptions	Revenue Estimate
FEDERAL REVENUE SOURCES		
FHWA Non-Discretionary Congestion Mitigation and Air Quality (CMAQ) Program	**Description:** Program to reduce traffic congestion and improve air quality in non-attainment areas. **Assumptions:** Short-term revenues are based upon the Caltrans apportionment estimates. Long-term revenues assume that the federal Highway Trust Fund stays solvent, but fuel consumption declines by 1 percent annually. CMAQ funding is assumed to be reduced by 25 percent in 2020 and an additional 25 percent in 2025 due to improved air quality.	$5.0
FHWA Non-Discretionary Regional Surface Transportation Program (RSTP)	**Description:** Projects eligible for RSTP funds include rehabilitation and new construction on any highways included in the National Highway System (NHS) and Interstate Highways (including bridges). Also, transit capital projects, as well as intracity and intercity bus terminals and facilities, are eligible. **Assumptions:** Short-term revenues are based upon the Caltrans apportionment estimates. Long-term revenues assume that the Federal Highway Trust Fund stays solvent, but fuel consumption declines by 1 percent annually.	$6.7
FTA Formula Programs 5307 Urbanized Area Formula (Capital), 5310 Elderly and Persons with Disabilities Formula, 5311 Non-Urbanized Area Formula, 5309 Fixed Guideway Program	**Description:** This includes a number of FTA programs distributed by formula. 5307 is distributed annually to state urbanized areas with a formula based on population, population density and transit revenue miles of service. Program funds capital projects (and operations expenses in areas under 200,000 in population), preventative maintenance and planning activities. 5310 funds are allocated by formula to states for capital costs of providing services to the elderly and disabled. The 5311 program provides capital and operating expenses for rural and small urban public transportation systems. Section 5309 Fixed Guideway (FG) funds are also distributed to regions on an urbanized area formula. **Assumptions:** Formula funds are assumed to decline in proportion with the Federal Highway Trust Fund. As with the FHWA sources, the Trust Fund is expected to stay solvent, but fuel consumption declines by 1 percent annually.	$14.2
FTA Non-Formula Program 5309 New and Small Starts, 5309 Bus & Bus- Related Grants	**Description:** Capital projects include preliminary engineering, acquisition of real property, final design and construction, initial acquisition of rolling stock for new fixed guideway systems or extensions, including bus rapid transit, light rail, heavy rail, and commuter rail systems. Capital investment grants of less than $75 million are considered “small starts”. “Small starts” have separate funding category. Program funds bus acquisition and other rolling stock, ancillary equipment and the construction of bus facilities. Also includes bus rehabilitation and leasing, park and ride facilities, parking lots associated with transit facilities and bus passenger shelter. **Assumptions:** Operators are assumed to receive FTA discretionary funds in rough proportion to what they have received historically. The Federal Highway Trust Fund is expected to stay solvent, but fuel consumption declines by 1 percent annually.	$5.3
Other Federal Funds	**Description:** Includes other federal programs, such as Regional Transportation Enhancements, Highway Bridge Replacement and Rehabilitation, Homeland Security Grants, Bus Preferential Signal Systems, Highway Earmarks, Hazard Elimination Safety, and Railroad/Highway Grade Crossing Protection (Section 130). Also includes a marginal amount of American Recovery and Reinvestment Act (ARRA) for the first year of the forecast. **Assumptions:** LACMTA and OCTA provided forecasted revenues for these programs, which have been adopted in the LRTPs for Los Angeles and Orange counties. For other counties, Highway Bridge Program revenues are estimated in the short-term using program allocations provided by the Caltrans through FY2014. ARRA amounts also come from programmed funding. Longer-term estimates are based upon the assumption of a 1-percent annual decline in fuel consumption used for other federal funding sources.	$1.8
FEDERAL SUBTOTAL		**$33.0**

Note: Numbers may not add due to rounding

TABLE 3.4.4 Core and Reasonably Available Revenue Projections—Innovative Financing & New Revenue Sources (in Nominal Dollars, Billions)

Revenue Source	Revenue Projection Assumptions	Revenue Estimate
INNOVATIVE FINANCING & NEW REVENUE SOURCES		
Bond Proceeds from Local Sales Tax Measures	**Description:** Long-term debt financing secured by locally imposed ½ percent sales tax measures for Los Angeles, Orange, Riverside, and San Bernardino counties. **Assumptions:** Sales tax grows consistent with county historical trends. Assumes minimum debt service coverage of pledged revenue (net of any local return portion) in any year of 2.5x for Los Angeles County, 1.3x for Orange County, 1.5x for Riverside County (further restricted to a maximum of $975M outstanding), 1.3x for San Bernardino County—includes currently outstanding and new debt. No debt is assumed to be issued for Imperial County.	$25.6
State and Federal Gas Excise Tax Adjustment to Maintain Historical Purchasing Power	**Description:** Additional fifteen cents per gallon gasoline tax imposed by the state and federal government starting in 2017 through 2024. **Assumptions:** Forecast consistent with historical tax rate adjustments for both state and federal gas taxes.	$16.9
Mileage-Based User Fee (or equivalent fuel tax adjustment)	**Description:** Mileage-based user fees would be implemented to replace existing gas taxes (state and federal) by 2025. **Assumptions:** Consistent with recommendations from two national commissions established under SAFETEA-LU, it is assumed that a national mileage based user-fee system would be established during the latter years of the RTP. An estimated $0.05 per mile (in 2011 dollars) is assumed starting in 2025 to replace and augment existing gas tax revenues.	$110.3 (est. increment only)
Highway Tolls (includes toll revenue bond proceeds)	**Description:** Toll revenues generated from regional toll facilities including SR-710 Tunnel, I-710 freight corridor, East-West freight corridor, segment of the High Desert Corridor, and Regional Express/HOT Lane Network. **Assumptions:** Toll revenues based on recent feasibility studies for applicable corridors. Also includes toll revenue bond proceeds.	$22.3
Private Equity Participation	**Description:** Private equity share as may be applicable for key initiatives. **Assumptions:** Private capital is assumed for a number of projects including toll facilities; also, freight rail package assumes railroad share of costs for mainline capacity and intermodal facilities such as SCIG and ICTF.	$2.7
Freight Fees/ National Freight Program	**Description:** Establishment of a national freight program consistent with proposal under MAP-21 and/or establishment of a charge imposed nationally on cargo. **Assumptions:** Early estimates indicate roughly $2 billion per year nationally for the National Freight Program under MAP-21. Regional estimate assumes a conservative percentage of proposed national program. Other mechanisms may include establishment of freight fees nationally, whereby rates may be subject to timing and cash flows for qualified projects. Freight fee would be assessed in proportion to relative impacts on transportation system and sunset with the completion of qualified projects. Assumes establishment of a national program in scope starting in 2015.	$4.2
E-Commerce Tax	**Description:** E-commerce sales tax on goods and services negotiated over an internet or other online systems. **Assumptions:** Notwithstanding the uncertainty in the amount of revenue that is available from AB 155, the revenue could be used for transportation purposes, given the relationship between e-commerce and the delivery of goods to California purchasers. In the event the revenue is used solely for transportation, the revenue would need to be allocated to specific uses or areas within the State. One possible method would allocate the funds in proportion to population. Under this method, the SCAG region would receive an estimated $3.1 billion through 2035, assuming AB 155 statewide revenue grows at 3 percent per year.	$3.1

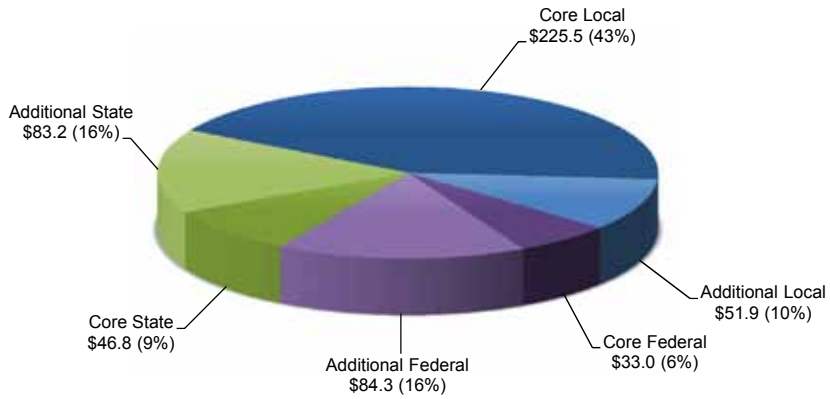
Revenue Source	Revenue Projection Assumptions	Revenue Estimate
Interest Earnings	**Description:** Interest earnings from toll bond proceeds. **Assumptions:** Interest earnings are assumed from toll bond proceeds, e.g., East-West Freight Corridor.	$0.2
State Bond Proceeds, Federal Grants & Other for California High Speed Rail Program	**Description:** Estimated total per November 1, 2011 Draft California High Speed Rail Business Plan. **Assumptions:** State general obligation bonds authorized under the Bond Act approved by California voters as Proposition 1A in 2008; federal grants authorized under ARRA and HSIPR; potential use of qualified tax credit bonds; and private sources.	$33.0
Value Capture Strategies	**Description:** Formation of special districts—Infrastructure Financing Districts and use of Tax Increment Financing. **Assumptions:** This strategy refers to capturing the incremental value generated by transportation investments. Specifically, SCAG assumes the formation of special districts, including Infrastructure Financing Districts (IFDs); also assumes the use of tax increment financing for specific projects (e.g., East-West Freight Corridor).	$1.2
NEW REVENUE SOURCE SUBTOTAL		**$219.5**
GRAND TOTAL		**$524.7**

Note: Numbers may not add due to rounding

The SCAG region's financially constrained RTP includes revenues from both core and reasonably available revenue sources, which sum to $524.7 billion from FY2011 through FY2035. While core revenues are comprised primarily of local sources (74 percent), the financially constrained RTP is funded by 53 percent local sources, 25 percent state sources, and 22 percent federal sources as is illustrated in **FIGURE 3.11**.

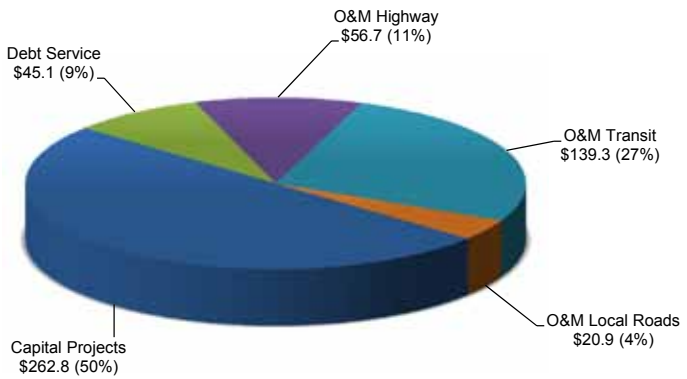
As shown in **FIGURE 3.12**, capital projects total $262.8 billion in nominal dollars. Operating and maintenance (O&M) costs total $216.9 billion while debt service obligations total $45.1 billion. Transit related costs comprise the largest share of O&M costs for the region totaling $139.3 billion.

FIGURE 3.11 2012 RTP Revenue Summary $524.7 Billion (in Nominal Dollars) FY2011–FY2035



Note: Numbers may not add due to rounding

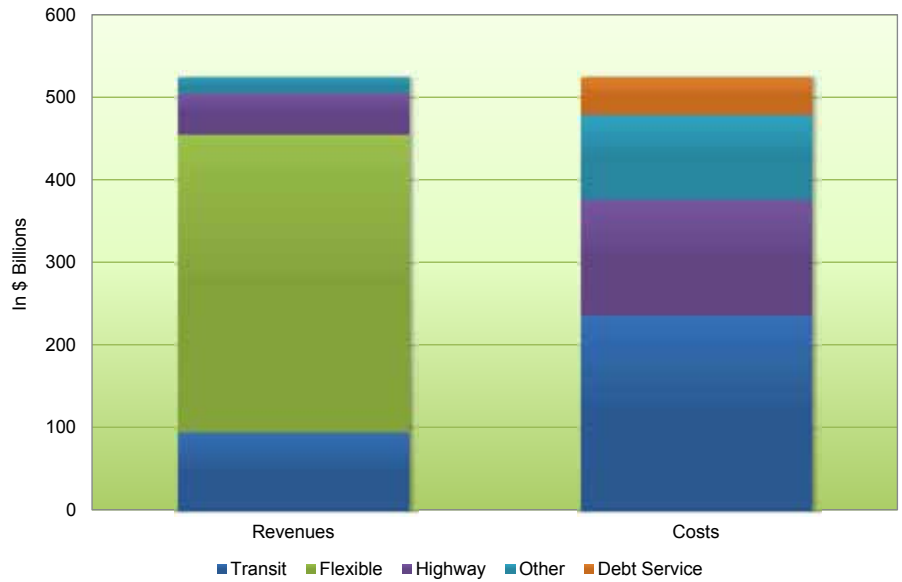
FIGURE 3.12 2012 RTP Expenditure Summary $524.7 Billion (in Nominal Dollars) FY2011–FY2035



Note: Numbers may not add due to rounding

As shown in **FIGURE 3.13**, transit expenditures account for almost half of the RTP costs at 45 percent. Highway expenditures account for 27 percent of the RTP costs. About 20 percent of costs are attributable to an "other" category, reflecting proposed investments in high speed rail, goods movement, grade separations, active transportation, transportation demand management, and transportation system management improvements. Consistent with historical practice, agencies in the region are expected to bond against future revenues to provide additional funding in the early years of the plan. As a result, debt service equal to historical payments and future bonding needs has been included as part of the RTP. Anticipated debt service payments make up 9 percent of total costs.

FIGURE 3.13 Revenues Compared to Costs by Mode



Note: Numbers may not add due to rounding

TABLE 3.5 provides details of the SCAG region's 2012 RTP revenue forecast by source in five-year increments from FY2011 through FY2035. This is followed by **TABLE 3.6**, which provides details of the region's expenditures by category in five-year increments.

TABLE 3.5 2012 Regional Transportation Plan Revenues (in Nominal Dollars, Billions)

	REVENUE SOURCES	FY2011–FY2015	FY2016–FY2020	FY2021–FY2025	FY2025–FY2030	FY2031–FY2035	TOTAL
LOCAL	Sales Tax	$16.3	$22.1	$28.7	$36.2	$44.7	$148.0
	– County	$13.1	$17.8	$23.1	$29.2	$36.1	$119.4
	– Transportation Development Act	$3.3	$4.3	$5.5	$6.9	$8.6	$28.7
	Gas Tax (Subvention to Cities & Counties)	$1.0	$1.0	$0.9	$0.9	$0.8	$4.6
	Other Local Funds	$5.3	$4.6	$4.7	$5.6	$5.2	$25.5
	Transit Fares	$3.2	$4.3	$5.3	$6.4	$7.5	$26.7
	Tolls	$1.4	$1.7	$2.1	$2.6	$3.3	$11.2
	Mitigation Fees	$1.4	$1.8	$1.9	$2.1	$2.3	$9.5
	LOCAL TOTAL	**$28.7**	**$35.4**	**$43.5**	**$53.9**	**$64.0**	**$225.5**
STATE	State Highway Operations and Protection Program (SHOPP)	$3.7	$4.2	$4.0	$3.8	$3.6	$19.5
	State Transportation Improvement Program (STIP)	$1.9	$2.0	$1.9	$1.8	$1.7	$9.4
	– Regional – RTIP	$1.3	$1.4	$1.3	$1.2	$1.2	$6.4
	– Interregional – ITIP	$0.6	$0.6	$0.6	$0.6	$0.5	$3.0
	State Gasoline Sales Tax Swap	$1.4	$1.7	$2.1	$2.6	$3.3	$11.0
	State Transit Assistance (STA)	$0.5	$0.5	$0.6	$0.6	$0.7	$2.8
	Proposition 1B (Infrastructure Bonds)	$3.0	$0.4	$0.0	$0.0	$0.0	$3.4
	Other State Funds (1)	$0.3	$0.1	$0.1	$0.1	$0.1	$0.8
	STATE TOTAL	**$10.8**	**$9.0**	**$8.7**	**$9.0**	**$9.4**	**$46.8**
FEDERAL	Federal Transit	$3.0	$3.6	$3.9	$4.3	$4.7	$19.5
	– Federal Transit Formula	$2.3	$2.6	$2.8	$3.1	$3.4	$14.2
	– Federal Transit Non-Formula	$0.7	$1.0	$1.1	$1.2	$1.3	$5.3
	Federal Highway & Other	$2.9	$2.6	$2.6	$2.6	$2.8	$13.5
	– Congestion Mitigation and Air Quality (CMAQ)	$1.3	$1.1	$0.9	$0.8	$0.9	$5.0
	– Surface Transportation Program (Regional)	$1.1	$1.2	$1.3	$1.5	$1.6	$6.7
	– Other Federal Funds (2)	$0.5	$0.3	$0.3	$0.3	$0.4	$1.8
	FEDERAL TOTAL	**$5.9**	**$6.1**	**$6.5**	**$6.9**	**$7.5**	**$33.0**
INNOVATIVE FINANCING & NEW REVENUE SOURCES	Bond Proceeds from Local Sales Tax Measures	$9.4	$10.4	$5.9	$0.0	$0.0	$25.6
	State and Federal Gas Excise Tax Adjustment	$0.0	$8.6	$8.3	$0.0	$0.0	$16.9
	Mileage Based User Fee	$0.0	$0.0	$8.9	$48.5	$52.9	$110.3
	Highway Tolls (including bond proceeds)	$3.0	$0.0	$9.8	$3.8	$5.7	$22.3
	Private Equity Participation	$1.3	$.01	$0.1	$1.2	$0.0	$2.7
	Freight Fees/National Freight Program	$0.1	$0.9	$1.0	$1.0	$1.2	$4.2
	E-Commerce Tax	$0.3	$0.6	$0.6	$0.7	$0.9	$3.1
	Interest Earnings	$0.0	$0.0	$0.1	$0.1	$0.1	$0.2
	California High Speed Rail Program Funding	$0.0	$3.9	$10.2	$14.3	$4.5	$33.0
	Value Capture Strategies	$0.0	$0.0	$1.2	$0.0	$0.0	$1.2
	INNOVATIVE FINANCING & NEW REVENUE SOURCES TOTAL	**$14.1**	**$24.5**	**$46.1**	**$69.6**	**$65.2**	**$219.5**
REVENUE TOTAL		**$59.5**	**$75.0**	**$104.8**	**$139.3**	**$146.1**	**$524.7**

Notes:
(1) Service Authority for Freeways and Expressways (SAFE), Freeway Service Patrol, Air Quality Vehicle Registration Fee (AB 2766), Environmental Enhancement and Mitigation.
(2) Includes other federal programs, e.g., Regional Transportation Enhancements, Highway Bridge Replacement and Rehabilitation, Homeland Security Grants, Bus Preferential Signal Systems, Highway Earmarks, local assistance, Hazard Elimination Safety, and Railroad/Highway Grade Crossing Protection (Section 130).
Numbers may not add due to rounding.

TABLE 3.6 2012 Regional Transportation Plan Expenditures (in Nominal Dollars, Billions)

RTP COSTS	FY2011–FY2015	FY2016–FY2020	FY2021–FY2025	FY2026–FY2030	FY2031–FY2035	TOTAL
Capital Projects:	**$37.3**	**$44.8**	**$57.1**	**$63.4**	**$60.1**	**$262.8**
Arterials	$5.3	$3.5	$3.7	$4.5	$5.0	$22.1
Grade Separations & Goods Movement	$7.6	$6.0	$11.1	$14.6	$8.6	$47.9
High Occupancy Vehicle/High Occupancy Toll Lanes	$6.0	$1.3	$0.8	$3.1	$7.5	$18.7
Mixed Flow and Interchange Improvements	$4.0	$6.0	$5.4	$2.3	0.6	$18.4
Toll Facilities	$2.0	$14.3	$7.4	$5.4	$6.1	$35.2
Transportation System Management (including ITS)	$1.2	$1.0	$0.9	$2.0	$1.7	$6.8
Transit	$9.8	$11.7	$26.7	$27.9	$25.2	$101.2
Active Transportation	$0.6	$0.3	$0.3	$1.9	$2.9	$6.0
Transportation Demand Management	$0.2	$0.2	$0.2	$1.3	$2.0	$4.0
Other (1)	$0.7	$0.4	$0.6	$0.4	$0.4	$2.5
Operations and Maintenance:	**$19.4**	**$22.9**	**$37.4**	**$63.7**	**$73.5**	**$216.9**
Highway	$3.4	$3.0	$12.5	$18.8	$19.1	$56.7
Transit	$14.9	$18.8	$23.8	$37.0	$44.8	$139.3
Local Streets and Roads	$1.1	$1.1	$1.2	$7.9	$9.6	$20.9
Debt Service	**$2.7**	**$7.3**	**$10.3**	**$12.2**	**$12.6**	**$45.1**
COST TOTAL	**$59.5**	**$75.0**	**$104.8**	**$139.3**	**$146.1**	**$524.7**

Note: (1) Includes: environmental mitigation, landscaping, and project development costs.
Numbers may not add due to rounding.

04 SUSTAINABLE COMMUNITIES STRATEGY

Image courtesy of City of Oxnard and The Daily Group

Introduction

Southern California today faces unprecedented challenges in accommodating the additional population and economic activity expected over the next 25 years. Once a major destination for people from other states, Southern California now sees population growth driven mostly by natural increase from within the region—births over deaths—and by international immigration. Over the last generation it has become one of the most diverse and multicultural regions in the world.

Southern California is now home to 18 million people. The region is now seen as crowded, congested, and—despite the recent downturn in the housing market—an expensive place to build a life.

While the region was once known worldwide as the "capital of sprawl," the region today has little raw land left to accommodate additional growth. Moreover, the region has struggled in its efforts to generate real economic growth over the past two decades.

In the face of all these long-term trends, Southern California is expected to accommodate an additional 4 million people over the next 25 years, with equally significant household and employment growth (see **FIGURE 4.1**). This future growth will put additional pressure on a transportation system that is already severely congested; on communities and neighborhoods that have been in existence for many decades; and on the region's fragile natural environment. **EXHIBITS 4.1, 4.2,** and **4.3** show the geographical distribution of the region's future growth in 2035.

Addressing these challenges successfully will require a major effort and coordination by the region's people, its institutions, and its public agencies. These "regional players" will have to agree on a common vision for the future of the region—and then work together to make that vision a reality. With such effort, Southern California will be able to accommodate additional growth and still create an improved quality of life, a resilient economy, and a healthy natural environment.

Since 2000, SCAG has worked actively with the people and institutions of Southern California to create a dynamic regional growth vision based on the following principles: *mobility, economy and sustainability*. Charged by federal law with preparing a Regional Transportation Plan every four years, SCAG has traditionally focused most on the mobility aspects of the region's growth. Under state law, SCAG is also charged with working with its member local governments on planning for an adequate regional housing supply.

However, the recent passage of SB 375 at the state level gives SCAG a new area of responsibility—and provides the region with a renewed opportunity to focus on an integrated planning effort for the future.

The purpose of SB 375 is to implement the state's greenhouse gas emissions (GHG) reduction goals in the sector of cars and light trucks. This mandate requires the California Air Resources Board to determine per-capita GHG emission reduction targets for each Metropolitan Planning Organization (MPO) in the state at two points in the future—2020 and 2035. In accordance with Govt. Code section 65080(b)(2)(B)(vii), the 2012 RTP/SCS will achieve GHG emission reductions of 8 percent per capita in 2020 and 16 percent per capita in 2035 (surpassing the 13 percent reduction target for 2035).

Because greenhouse gas emissions in the transportation sector relates closely with vehicle miles traveled (VMT), a mandated GHG reduction essentially requires SCAG to devise a regional plan and a series of strategies that will produce a per-capita reduction in VMT over the next 25 years. Under SB 375, SCAG and California's 17 other MPOs must address GHG reduction in a "Sustainable Communities Strategy" or SCS, that is part of the respective MPO's Regional Transportation Plan.

Transportation strategies contained in the RTP—managing transportation demand and making certain transportation system improvements – are major components of the SCS. However, the SCS also focuses on the general land use growth pattern for the region, because geographical relationships between land uses—including density and intensity—help determine the need for travel in the first place.

Therefore, SCAG's SCS includes not only projections about the transportation network but also about land use. Indeed, under SB 375, a SCS must, in summary:

- Identify existing and future land use patterns
- Consider statutory housing goals and objectives
- Identify areas to accommodate long-term housing need
- Identify areas to accommodate 8-year housing need
- Consider resource areas and farmland
- Identify transportation needs and the planned transportation network
- Set forth a future land use pattern to meet GHG emission reduction targets
- Comply with federal law for developing an RTP

These requirements, as outlined in California Government Code Section 65080(b)(2)(B), do not mean that the SCS creates a mandate for certain land use policies at the local level. In fact, SB 375 specifically states that the SCS cannot dictate local General Plan policies (see, Government Code Section 65080(b)(2)(J)). However, the SCS is intended to provide a regional policy foundation that local governments may build upon if they so choose and generally includes the quantitative growth projections from each city and county in the region going forward. In addition, some projects consistent with the SCS are eligible for streamlined environmental review.

One aspect of SB 375 that is unique to the SCAG region is that subregions within SCAG have the option of creating their own subregional SCS. Of SCAG's 15 subregions, two accepted this option: the Gateway Cities Council of Governments (Gateway COG) and the Orange County Council of Governments (OCCOG). These subregional SCS documents are incorporated into the regional SCS.

FIGURE 4.1 Anticipated Future Growth (2035)

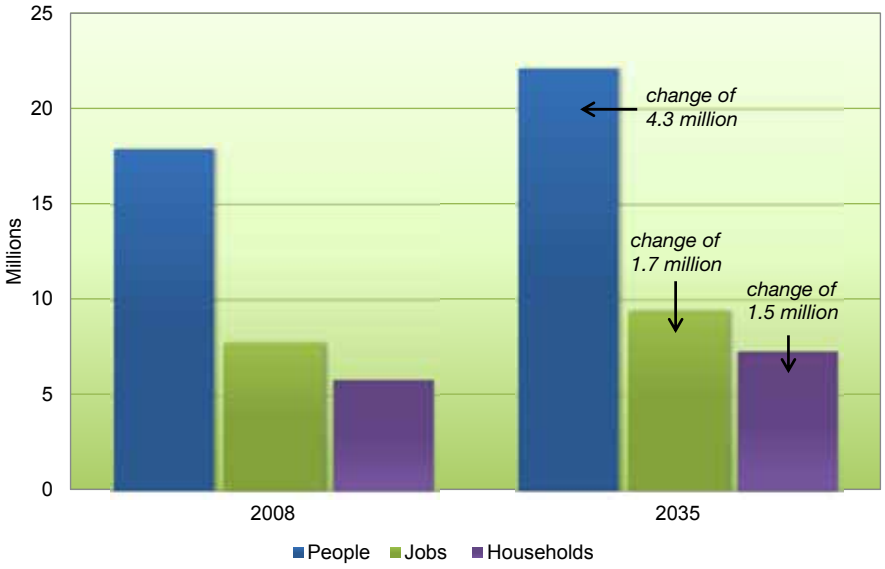


EXHIBIT 4.1 Population Growth SCAG Region (2035)

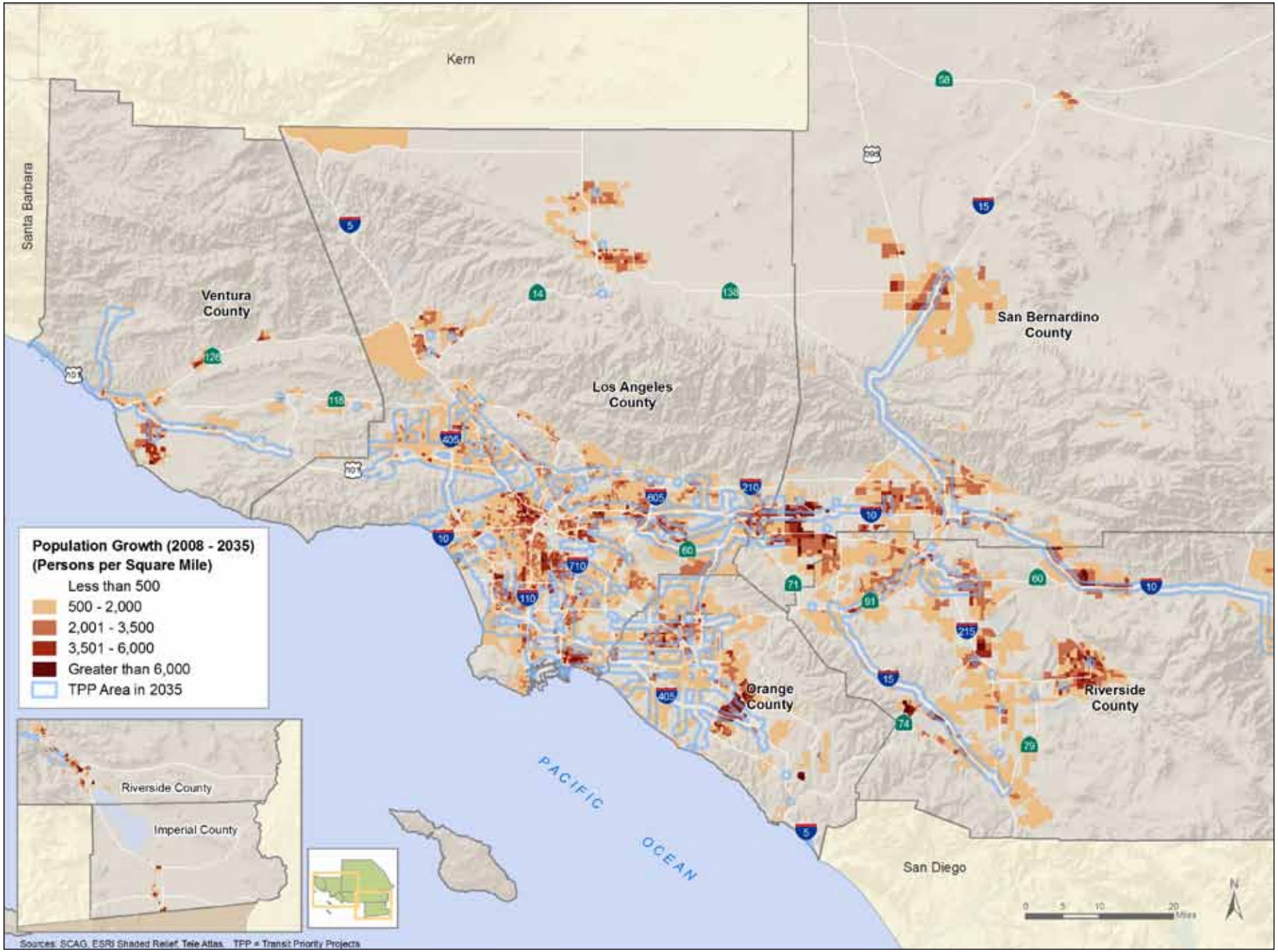


EXHIBIT 4.2 Employment Growth SCAG Region (2035)

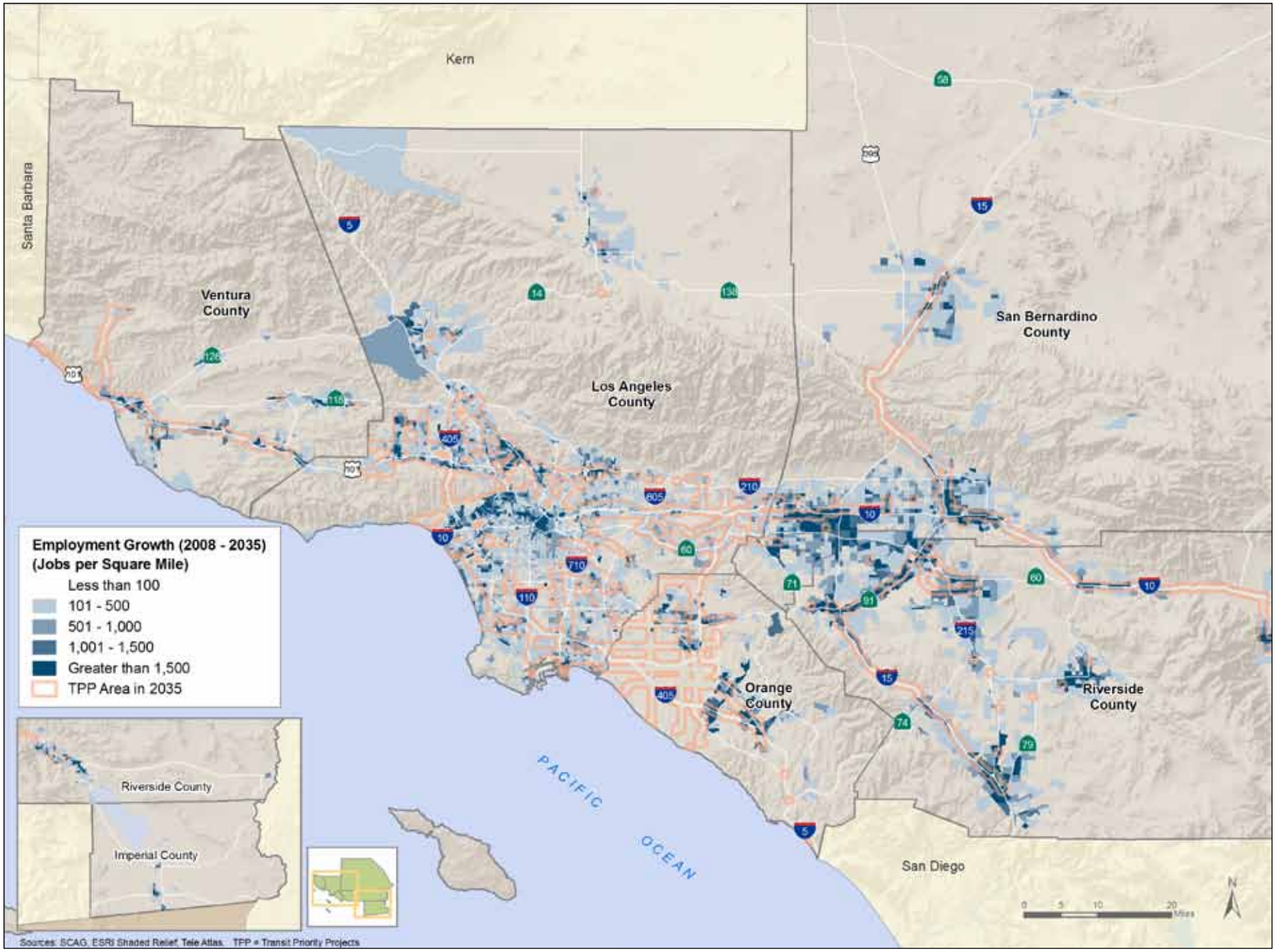
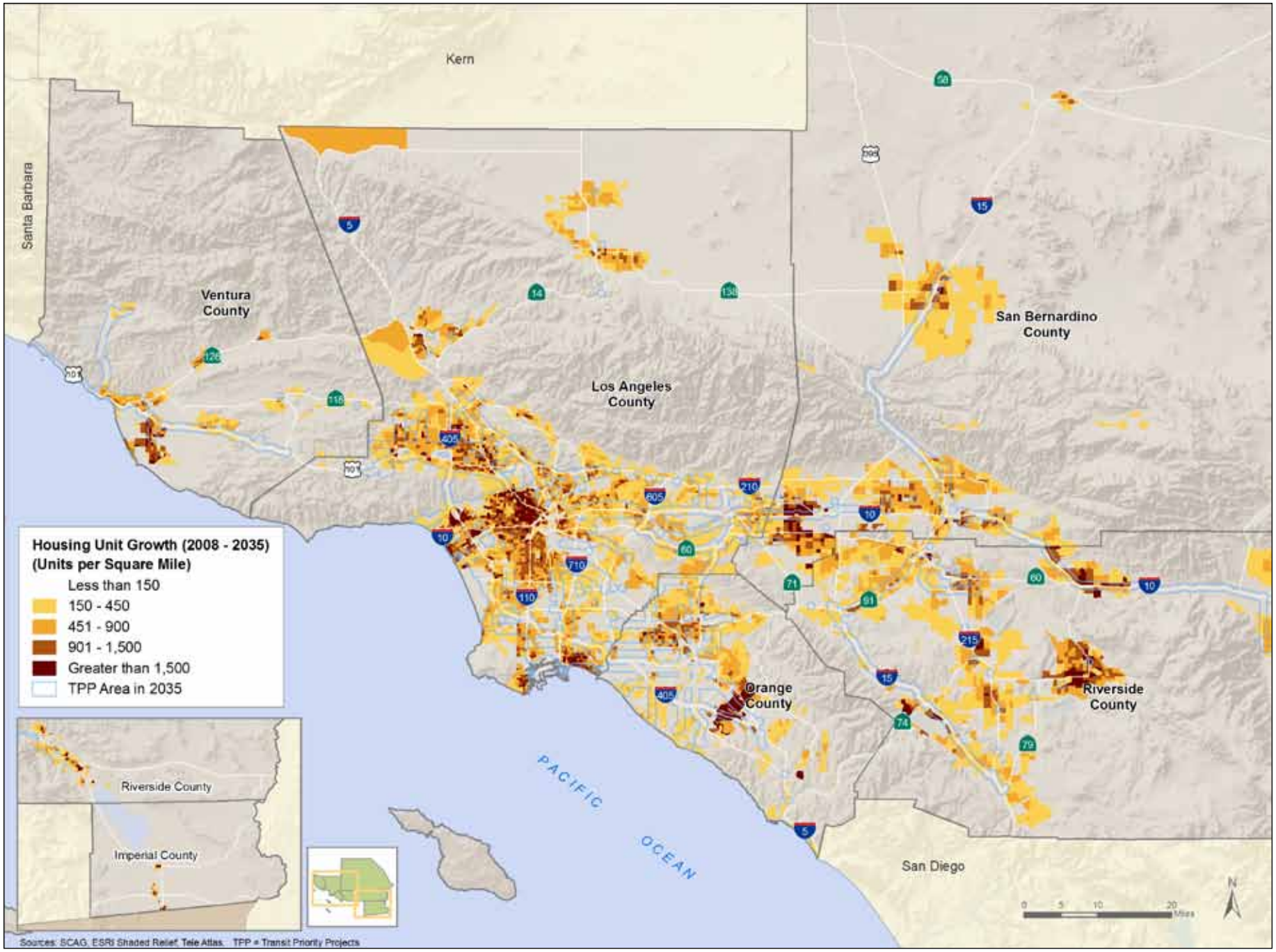


EXHIBIT 4.3 Housing Unit Growth SCAG Region (2035)



Goals and Benefits

Under SB 375, the primary goal of the SCS is to provide a vision for future growth in Southern California that will decrease per-capita greenhouse gas emissions from automobiles and light trucks. As stated above, in point of fact this means that we need to identify strategies that can reduce per-capita vehicle miles traveled over the next 25 years.

However, the strategies contained in the RTP/SCS will produce benefits for the region far beyond simply reducing GHG emissions. Because it is the latest refinement of an evolving regional blueprint that SCAG has been working on since 2000, the RTP/SCS will help the region deal with many ongoing issues across a wide range of concerns, including placemaking, the cost of living, the environment, health, responsiveness to the marketplace, and mobility.

1. **Better Placemaking**
   As Southern California becomes more congested and crowded, the issue of creating better and more livable places to live and work has become more important. A completely car-oriented lifestyle made sense in Southern California a couple of generations ago when the region was less dense and there were few options other than driving. Indeed, Southern Californians still need their cars and value them highly, but because of traffic congestion and the hassle factor, more people today also value good "placemaking"—that is, the process of developing locations where they can live and work that include a pleasant and convenient walking environment that reduces their reliance on their car. Communities that promote walkable environments and alternative transportation create more opportunities for an active lifestyle, improve safety and accessibility for marginalized communities, and help preserve natural areas and resources. The strategies outlined in the RTP/SCS promote the development of better places to live and work through measures that encourage more compact development, varied housing options, bike and pedestrian improvements, and efficient transportation infrastructure.
2. **Lower Cost to Taxpayers and Families**
   While attractive in many ways, the traditional suburban lifestyle is expensive both to families and taxpayers, which is one of the reasons why the cost of housing and the cost of living in Southern California are high. The cost of maintaining a large house and yard and multiple vehicles can consume most of a family's income. The cost of building the roads, water and sewer lines, and other infrastructure required for a low-density lifestyle is very high, and taxpayers usually wind up paying at least part of the bill, especially for ongoing maintenance. By creating more compact neighborhoods and placing everyday destinations closer to homes and closer to one another, the RTP/SCS's strategies can reduce the burden of development to the taxpayers and reduce the everyday cost of housing and transportation for families.
3. **Benefits to Public Health and the Environment**
   Public health and environmental protection have long been linked to the way our region is planned and the way public services are delivered. Municipal water and sewer systems, for example, ensure clean water. At the same time, concrete stormwater runoff channels harm water quality and sprawl eats into open space. Many strategies contained in the RTP/SCS will provide widespread benefits within the region for both public health and environmental protection. For example, better placemaking will allow people to use walking and bicycling more regularly in their daily lives, and promote the development of urban parks thus providing more opportunities for recreation and exercise. Reducing the footprint of new development has many benefits, including protection of farmland that provides regional food,

Image courtesy of City of Lancaster

maintaining wildlife habitat, decreasing air pollution and improving opportunities for green stormwater solutions that will improve water quality.

4. **Greater Responsiveness to Demographics and the Changing Housing Market**
   The traditional suburban development pattern that characterizes most of Southern California was appropriate for its time and still works well for millions of residents and homeowners. But the demographic profile of the region is changing, and as a result, the market for housing is changing as well. The number of empty-nesters (a parent whose children have grown and left home) is increasing dramatically, especially among older age groups. Already, many of these empty-nesters are looking for smaller housing and a more manageable, walkable lifestyle. Recent trends suggest that many will be looking to live near their families, their churches, and other local institutions, rather than commuting long distances. In addition, there is little question that all demographic groups will be looking for a "value lifestyle" in which both housing and transportation costs are minimized even as they maintain a high quality of life. RTP/SCS strategies focused on high-quality places, sensitive and compact infill development, and more housing and transportation choices will provide an important response to these newly emerging market forces.
5. **Improved Access and Mobility**
   Southern California today has outgrown its traditional auto-oriented mobility system. Congestion is ever-present and it is not possible for additional road construction to solve all mobility problems in the region. Strategies contained within the RTP/SCS will help the region confront congestion and mobility issues in alternative ways. The transportation strategies contained within the RTP/SCS will focus on "bang for the buck" solutions by improving critical road connections in the region and increasing public transit capacity. Land use strategies in the RTP/SCS will improve mobility and access by placing destinations closer together and decreasing the time and cost of moving between them.

It is important to note that the RTP/SCS does not envision a wholesale redevelopment of the Southern California region. The vast majority of neighborhoods and business districts that will exist in 2035 already exist today and most of them—especially residential neighborhoods—will be unchanged in the next 25 years. Rather, the RTP/SCS envisions a new development pattern for new neighborhoods and revitalized neighborhoods and business districts that will build upon the current pattern to give residents more choices and more opportunities as they consider where to live and work in the future.

Creating the RTP/SCS

The RTP/SCS contains ambitious goals to meet the region's challenges, yet these ideas and strategies are not new. In recent years, SCAG and its local jurisdictions have laid the groundwork for the RTP/SCS by engaging in a variety of efforts to plan for more sustainable communities. In order to build on this foundation, SCAG's first steps have been to coordinate with its local and regional partners in both information gathering and strategy development in order to create a highly realistic and implementable RTP/SCS. The "bottom-up" approach has included local jurisdictions, subregional Councils of Government (COGs), County Transportation Commissions (CTCs), air districts, and a wide array of stakeholders.

Data Collection

INTEGRATED GROWTH FORECAST

The RTP/SCS depends heavily on an accurate and credible forecast for future growth in population, housing, and employment. Beginning in summer 2009, SCAG conducted a series of one-on-one meetings with 175 cities and six counties to gain local input on the integrated population, household, and employment growth forecast for the 2012 RTP/SCS.

Over the last two years, the Integrated Growth Forecast has been updated to reflect the 2010 Census, employment data from the California Employment Development Department, and population and household data from the California Department of Finance. It also underwent an extensive peer-review process over the same two-year period. Ongoing discussions with local jurisdictions led to some additional adjustments, which resulted in SCAG's ability to obtain a consensus over the Integrated Growth Forecast to serve as the foundation for the RTP/SCS.

LOCAL PLANNING SESSIONS

In 2011, SCAG conducted a series of planning sessions with local governments to gather all relevant land use and transportation policies, plans and data required to formulate the SCS. Using survey instruments, one-on-one discussions and Geographical Information System (GIS) software, the local governments provided up-to-date information including

growth opportunities, local land use plans and measures, transportation demand management (TDM) measures, transportation systems management (TSM) measures and other local transportation strategies. Results from these local planning sessions can be found in Appendix: Public Participation and Consultation.

COUNTY TRANSPORTATION COMMISSIONS

As the agencies responsible for the implementation of transportation projects in their respective counties, SCAG's six County Transportation Commissions played an invaluable role in the development of the 2012 RTP/SCS. Early in the development process, the CTCs worked closely with SCAG to identify county priorities for consideration in the RTP/SCS's alternatives analysis process. The CTCs continued to remain actively involved throughout the entire analysis process, offering meaningful input as SCAG decision-makers considered the various policy alternatives. Furthermore, given the new requirements of SB 375, it will be critical for the CTCs to embrace the concept of integrating transportation planning with land use planning in order for this region to be able to develop a truly sustainable RTP/SCS. Fortunately, the CTCs within the SCAG region were moving in this direction long before the passage of SB 375, and served as excellent partners in the development of this RTP/SCS.

Creation of Land Use Scenarios

Once SCAG collected all relevant data and information from local governments and CTCs, the agency began developing scenarios using a process that would engage the entire region in envisioning a more sustainable future. A single framework model was used, allowing SCAG's technical staff to load the data and research-based assumptions about the future, and to test a variety of land use patterns and their transportation implications. Further details on the model can be found in Appendix: SCS Background Documentation.

Using this model, SCAG created four scenarios for the future of the region. The scenarios were designed to explore and clearly convey the impact of both where the 6-county SCAG region grows over the next 25 years – to what extent growth is focused within existing cities and towns; and how it grows – the shape and style of the neighborhoods and transportation systems that will shape growth over the period. These scenarios were precursors to the 2012 RTP/SCS alternatives. The scenarios facilitated public dialogue and feedback, which in turn allowed SCAG to develop substantially more detailed and refined Plan alternatives. These Plan alternatives were extensively analyzed in the 2012 RTP/SCS and the potential impacts of the 2012 RTP/SCS Plan alternative was evaluation in the Program Environmental Impact Report (PEIR). Note that the Plan alternatives are separate and distinct from the scenarios discussed here

The four scenarios vary in their land use assumptions and in the package of transportation investments that support the quality and location of growth in the scenarios. The range of the four workshop scenarios can be described by how they address the following key elements:

- **Development Location (Dispersed Growth vs. Focused Development):** The four scenarios vary in the proportion of growth accommodated at the edges of cities and the region's urbanized areas versus that located in and around existing cities and towns, particularly in the region's designated High-Quality Transit Areas (HQTA). A HQTA is generally a walkable transit village or corridor, consistent with the adopted RTP/SCS , that has a minimum density of 20 dwelling units per acre and is within a ½ mile of a well-serviced transit stop with 15-minute or less service frequency

Image courtesy of City of Irvine

during peak commute hours. This was represented by the proportion of Greenfield versus Refill (infill and redevelopment) growth in each of the scenarios.

- **Community/Neighborhood Design (Auto-Oriented vs. Walkable):** The shape and quality of growth in the scenarios vary, from a focus on walkable and transit oriented places where most daily needs are within walking, biking, or short driving distance from homes, to new communities which are centered around the car as the dominant form of transportation for nearly all trips. This was represented across the four scenarios by the proportion of Standard Suburban, Mixed Use/Walkable, and Urban Infill development in each of the scenarios.
- **Housing Options and Mix (Single Family Subdivision vs. Multi-family Focus):** The scenarios varied in future housing mix in order to depict the impacts of meeting (or not meeting) future housing demand, especially given the changing demographics and preferences of current and future Southern Californians. Housing that focuses more on larger-lot single family options are at one end of the spectrum, as compared to varying mixes of townhome and multi-family options at the other.
- **Transportation Investments (Road/Highway vs. Transit/Non-Auto Strategies):** While all scenarios are supported by a range of transportation options, they vary in the proportion of new investments that are focused on transit and non-auto modes versus highway and roadway improvements that facilitate local and regional automobile travel. These transportation 'packages' are informed by past and present RTPs and incorporate a range of transit emphasis up to and including Los Angeles County's recent Measure R and 30/10 Initiative. The scenarios were designed to capture a range of potential strategies and investments by considering the relative emphasis on investment by mode, or the inclusion of policy mechanisms such as TDM or congestion pricing. The scenarios do not consider or evaluate specific transportation networks, or individual projects.

Based on the four elements above, which are illustrated in **FIGURE 4.2**, the four scenarios illustrate different land use 'themes' for how the region can grow, and the transportation system that supports that growth. **FIGURE 4.3** illustrates the land use themes for each scenario. In turn, each has a different impact on critical fiscal, environmental, and transportation challenges facing the region, as detailed in Appendix: SCS Background Documentation.

Local Sustainability Planning Tool

As part of the SCS process, SCAG developed the Local Sustainability Planning Tool (LSPT), a GIS-based sketch planning tool that allows users to create land use scenarios and analyze their impacts. SCAG made the LSPT available to each of its jurisdictions, trained hundreds of users, and worked one-on-one with planners to assist in their use of the tool. Provided with preliminary scenarios of their planning areas for the years 2008, 2020 and 2035, local planners were then able to create, modify and compare a variety of scenarios, and their subsequent impacts on vehicle ownership, vehicle miles traveled, mode-use, and GHG emissions. This allowed the local government participation in the development of the SCS to be far more meaningful than it otherwise would have been.

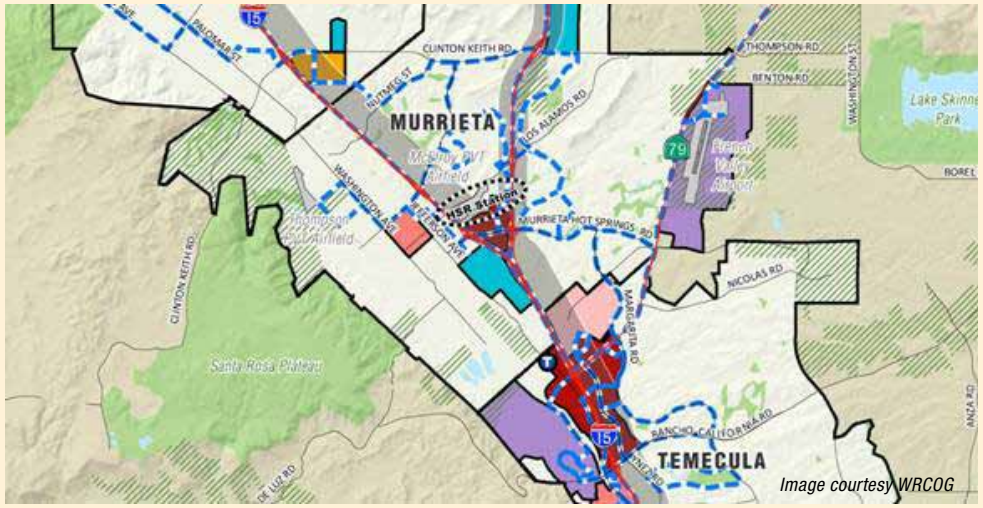
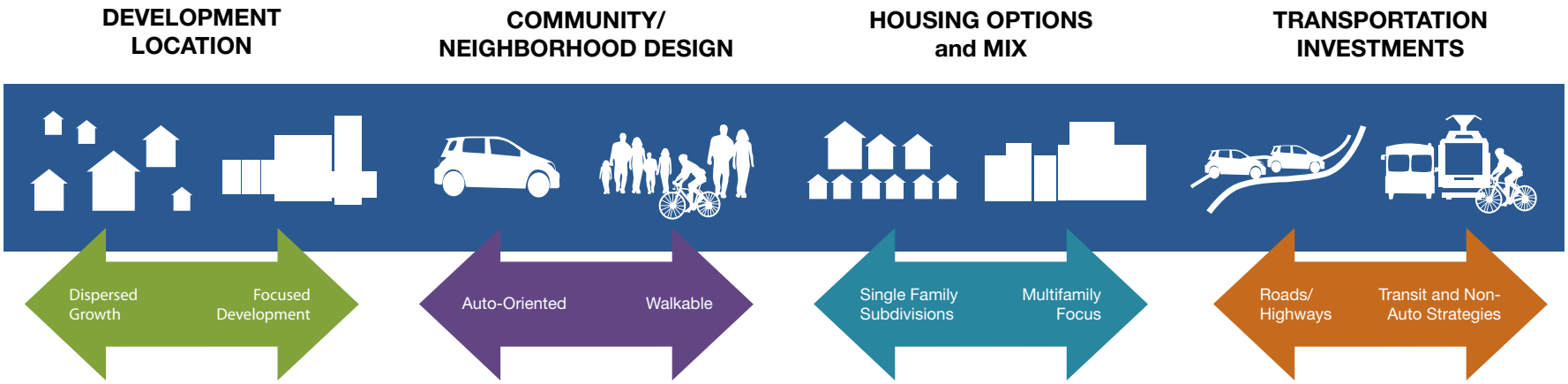


Image courtesy WRCOG

FIGURE 4.2 Workshop Scenario Elements



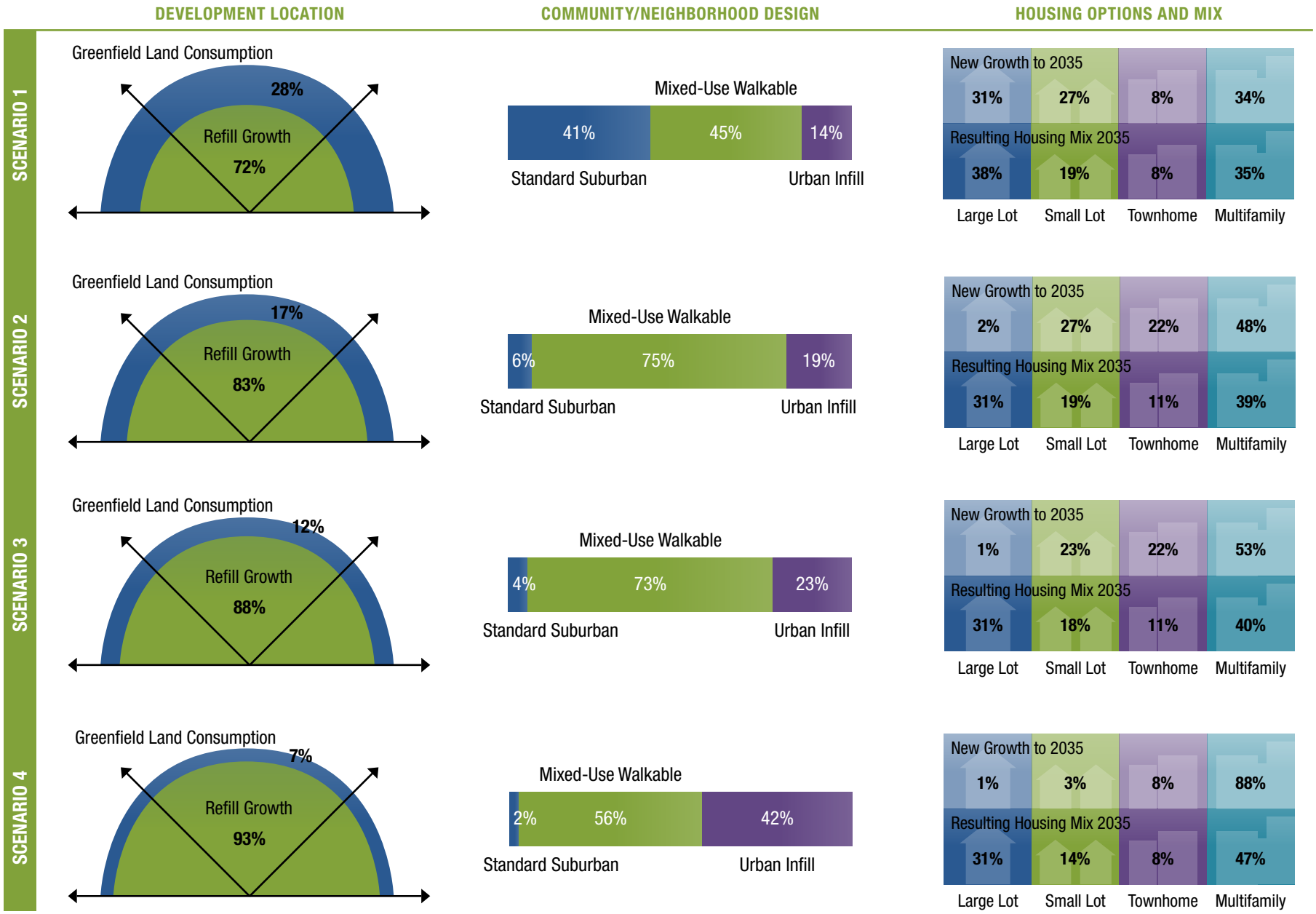
Scenario 1. This scenario is based on the General Plans prepared by cities and compiled by SCAG, with assistance from local planners, using the Local Sustainability Planning Tool (LSPT). It includes a significant proportion of suburban, auto-oriented development, but also recognizes the recent trend of increased growth in existing urban areas and around transit. New housing is mostly single family (58 percent), with an increase in smaller-lot single-family homes, as well as an increase in multi-family homes (42 percent). The transportation system is based on the package of improvements in the 2008 RTP. While these investments tend to favor automobile infrastructure, they also support new transit lines and other non-auto strategies and improvements.

Scenario 2. This scenario focuses more growth in walkable, mixed-use communities and in existing and planned high-quality transit areas. Under this scenario, there would be an increase in investments in transit and non-auto modes as compared to the 2008 RTP. Employment growth is focused in urban centers, around transit. Fewer new homes (29 percent) are single-family homes, as this scenario comes closer to meeting demand for a broader range of housing types, with new housing weighted less toward large-lot single-family homes (2 percent) and more towards smaller-lot single-family homes (27 percent), and multi-family condos, townhomes and apartments (70 percent).

Scenario 3. This scenario builds on the walkable, mixed-use focus of the growth in Scenario 2, and also aims to improve fiscal and environmental performance by shifting even more of the region's growth into areas that are closer to transit, and less auto-centric. Like Scenario 2, this scenario, aims to meet demand for a broader range of housing types, with new housing weighted towards smaller-lot single family homes, townhomes, and multi-family condos and apartments. In terms of percentage, the mix of housing types is very similar to Scenario 2, but the location of the growth within the region is shifted more toward transit-rich locations. Also like Scenario 2, transportation system investments would be more weighted towards transit investments, TDM, and non-auto strategies, which would support the move away from more auto-oriented development patterns.

Scenario 4. This scenario maximizes growth in urban and mixed-use configurations in already developed areas, and around existing and planned transit investments. To support this shift, transportation system investments are heavily weighted towards transit infrastructure and operational improvements (i.e., higher frequencies and more transit feeder service), as well as improvements to bicycle and pedestrian infrastructure. In order to maximize the transit investments and accommodate population in already developed areas, the vast majority of new housing (96 percent) is multi-family, while 4 percent is single-family development.

FIGURE 4.3 Workshop Scenarios (2035)



Although transportation system pricing, vehicle and fuels technology, and power generation policies will also play a role in meeting the region's goals, these factors were all held constant in the scenarios in order to more clearly communicate the impacts of land use and infrastructure policy options.

SCENARIO OUTCOMES

Once the four scenarios were created, the model was used to estimate a broad set of fiscal, environmental, and transportation impacts across the four scenarios in order to facilitate comparison. The comparative metrics generated included the following:

- Land consumption
- GHG (CO_2e) emissions from cars and buildings
- Air pollution and public health impacts
- Fuel use and cost
- Building energy and water use, and cost
- Fiscal impacts, including capital infrastructure costs, operations and maintenance costs, and local revenues

As each of these metrics was measured across the scenarios, a clear improvement in impacts was observed from Scenario 1 to Scenario 4. For instance, Scenario 1 consumes 251 square miles of undeveloped land—nearly twice as much as Scenario 2, which consumes 127 square miles—to accommodate growth to 2035. Scenario 3 consumes 84 square miles, and Scenario 4, which maximizes growth in urban and mixed-use configurations in already developed areas, brings that number down to 46 square miles. Additional results for all of the metrics can be found in Appendix: SCS Background Documentation .

Public Outreach Workshops

The four scenarios were developed specifically to be presented at a series of public workshops during the summer of 2011. These 18 workshops, required under SB 375, were held throughout the region. SCAG sought to make these workshops as transparent and interactive as possible, and obtained input from over 700 participants, including residents, public agencies, elected officials, community organizations, and environmental, housing and business stakeholders.

Through PowerPoint presentations and handouts, participants were provided with a description of each scenario and an understanding of how development location, neighborhood design, housing options and mix, and transportation investments compared between scenarios and resulted in varying impacts for the region.

With these intrinsic tradeoffs in mind, the group then engaged in a discussion of objectives and priorities for the 2012 RTP/SCS, including mobility, environment, health, modes of travel, economy, safety, equity, and housing. Input was collected through anonymous remote polling instruments (the results of which were presented in real-time) and through group discussions.

Collective input from all of the workshops showed the economy, environment, and transportation as top priorities for the region. Discussions focused on mobility, modes of travel, environmental and community impacts, and potential funding mechanisms. Polling results indicated a preference that future employment, commercial and residential areas be located in mixed use areas. Most participants also indicated a desire for increased travel mode choice in the region, and for transportation investments to be made in all modes (auto, bus, rail, bicycle, etc.). Additional results from the workshops can be found in Appendix: Public Participation and Consultation.

RTP/SCS Overall Land Use Pattern

SCAG used the feedback from local planning sessions, public outreach workshops, and consultation with local jurisdictions to work collaboratively with policymakers, stakeholders, and local governments to develop and analyze a series of 2012 RTP/SCS alternatives, and eventually arrive at the regional RTP/SCS.

The RTP/SCS was built primarily from local General Plans and input from local governments using the Local Sustainability Planning Tool, from the subregional COGs, and from the County Transportation Commissions, as previously discussed. The adopted Subregional SCSs of the Gateway Cities COG and Orange County COG were integrated as provided into the regional RTP/SCS. These subregional SCSs were developed in close collaboration with SCAG and utilize various strategies that help achieve estimated GHG reduction targets.

The Gateway Cities COG (GCCOG) Subregional SCS, found in Appendix: Subregional SCS Strategies, was built upon each local jurisdiction selecting GHG reduction strategies that are a blend of efforts that GCCOG and its communities have been pursuing over the last decade and future efforts that each jurisdiction plans to implement over the next 25 years. GCCOG implemented an outreach program that provided stakeholders and

Delegated Subregions

Unique to SCAG is a special provision within SB 375 that allows any subregional Council of Governments (COGs) the option of developing its own subregional SCS within the region. SCAG adopted a Subregional Framework and Guidelines (see Appendix 20) to establish standards for preparing and submitting a subregional SCS, while laying out SCAG's role in facilitating and supporting the subregional effort with data, tools, and other assistance.

The Orange County Council of Governments and the Gateway Cities Council of Governments chose to develop their own SCS and entered into Memoranda of Understanding with SCAG specifying submission schedules and standards for each component of the subregional SCS. While the subregional COGS were responsible for conducting their own research and outreach to develop their subregional SCS, they worked closely with SCAG through workshop preparation, data and information sharing, and regular meetings. SCAG's Local Sustainability Planning Tool was also made available to the subregions along with trainings and one-on-one working sessions to assist in the review and revision of the preliminary scenarios. The two subregional SCS documents can be found, in their entirety, in Appendix: Subregional SCS Strategies.

community members various opportunities to learn about the SCS process and provide feedback. The outreach program included a stakeholder briefing to provide information about the SCS process and to address questions on related topics; and public information open houses to present basic information and provide a forum for one-on-one dialogue with project team members.

The Gateway Cities COG SCS combines the following five bundles of strategies to meet estimated GHG reduction targets:

- Transportation Strategies
- Transportation Demand Management Strategies
- Land Use Strategies
- Regional Transportation Projects, including Measure R
- Interactive Effects between Land Use and Regional Transit Projects

The OCCOG Subregional SCS, also found in Appendix: Subregional SCS Strategies, combines strategies that show a collective effort by many Orange County jurisdictions, agencies, and groups to link transportation and land uses through a variety of processes and progressive measures. OCCOG conducted a series of outreach events to provide information and to solicit input on the development of the subregional OC SCS. The outreach program included public meetings at various milestones in the development of the OC SCS; a series of roundtable discussions with Orange County nonprofit organizations; and a web tool to facilitate and document public engagement. Each component of the outreach program introduced SB 375 and the OCCOG SCS process, provided status reports, and facilitated the opportunity for public review and comment.

Central to the OCCOG SCS are the strategies identified to reduce GHG emissions. These strategies illustrate that there is already a collective effort among Orange County jurisdictions, agencies, and groups to link transportation and land uses through a variety of processes and an array of measures. The sustainability strategies are compiled as completed projects, ongoing projects, future projects, and General Plan policies. The scope of current and planned strategies is broad and encompasses significant investment by both the public and private sectors for implementation strategies include the following:

- Promoting a land use pattern that accommodates future employment and housing needs

- Using land in ways that make developments more compact and improves linkages among jobs, housing and major activity centers
- Protecting natural habitats and resource areas
- Implementing a transportation network of public transit, managed lanes and highways, local streets, bikeways, and walkways built and maintained with available funds
- Managing demands on the transportation system (TDM) in ways that reduce or eliminate traffic congestion during peak periods of demand
- Managing the transportation system (TSM) through measures that maximize the efficiency of the transportation network
- Utilizing innovative pricing policies to reduce vehicle miles traveled and traffic congestion during peak periods of demand

COMPONENTS OF THE OVERALL LAND USE PATTERN

A review of local plans and subregional strategies points to the common ground that is inherent in SCAG's own advisory land use policies. These policies and strategies were first conceived through regional growth visioning efforts and have continued to evolve as SCAG has developed its understanding and expertise in land use and transportation integration. SCAG utilizes the following advisory land use policies and strategies as a foundation for the overall regional land use development pattern:

- **Identify regional strategic areas for infill and investment** – Identify strategic opportunity areas for infill development of aging and underutlized areas and increased investment in order to accommodate future growth.
- **Structure the plan on a three-tiered system of centers development** – Identify strategic centers based on a three-tiered system of existing, planned and potential, relative to transportation infrastructure.
- **Develop "complete communities"**– Create mixed-use districts or "complete communities" in strategic growth areas through a concentration of activities with housing, employment, and a mix of retail and services, located in close proximity to each other.
- **Develop nodes on a corridor** – Intensify nodes along corridors with people-scaled, mixed-use developments.
- **Plan for additional housing and jobs near transit** – Support and improve transit use and ridership by creating pedestrian-friendly environments and more compact development patterns in close proximity to transit.
- **Plan for a changing demand in types of housing** – Adddress shifts in the labor force that will likely induce a demand shift in the housing market for additional development types such as multi-family and infill housing in central locations, which will appeal to the needs and lifestyles of these large populations.
- **Continue to protect stable existing single-family areas** – Continue to protect stable existing single-family neighborhoods as future growth and a more diverse housing stock are accommodated in infill locations near transit stations.
- **Ensure adequate access to open space and preservation of habitat** – Ensure access to open space and habitat preservation despite competing quality-of-life demands driven by growth, housing and employment needs, and traditional development patterns.
- **Incorporate local input and feedback on future growth** – Continue public outreach efforts and incorporate local input through public workshops, scenario planning, and stakeholder outreach.

These policies have evolved over time and serve as the basis for SCAG's Compass Blueprint, a regional program that offers innovative planning tools, creative strategies and collaborative partnerships to all local governments within the region. Since its inception, Compass Blueprint has supported local demonstration projects that seek to improve mobility for all residents, foster livability in all communities, enable prosperity for all people, and promote sustainability for future generations.

In addition to Compass Blueprint, cities and counties within the SCAG region continue to implement their own local land use and transportation projects that support the goals of the RTP/SCS. These local efforts were considered in the development of the overall land use pattern of the RTP/SCS. Throughout this chapter, there are examples of plans and projects that advance the goals of the RTP/SCS at the local level. A complete list of RTP/SCS supportive projects can be found in Appendix: SCS Background Documentation, and a complete list of transportation projects can be found in Appendix: Project List.

SCAG reviewed the input received from local jurisdictions between May 2009 and August 2011 and analyzed land use trends that have been occurring within the region over the

Compass Blueprint

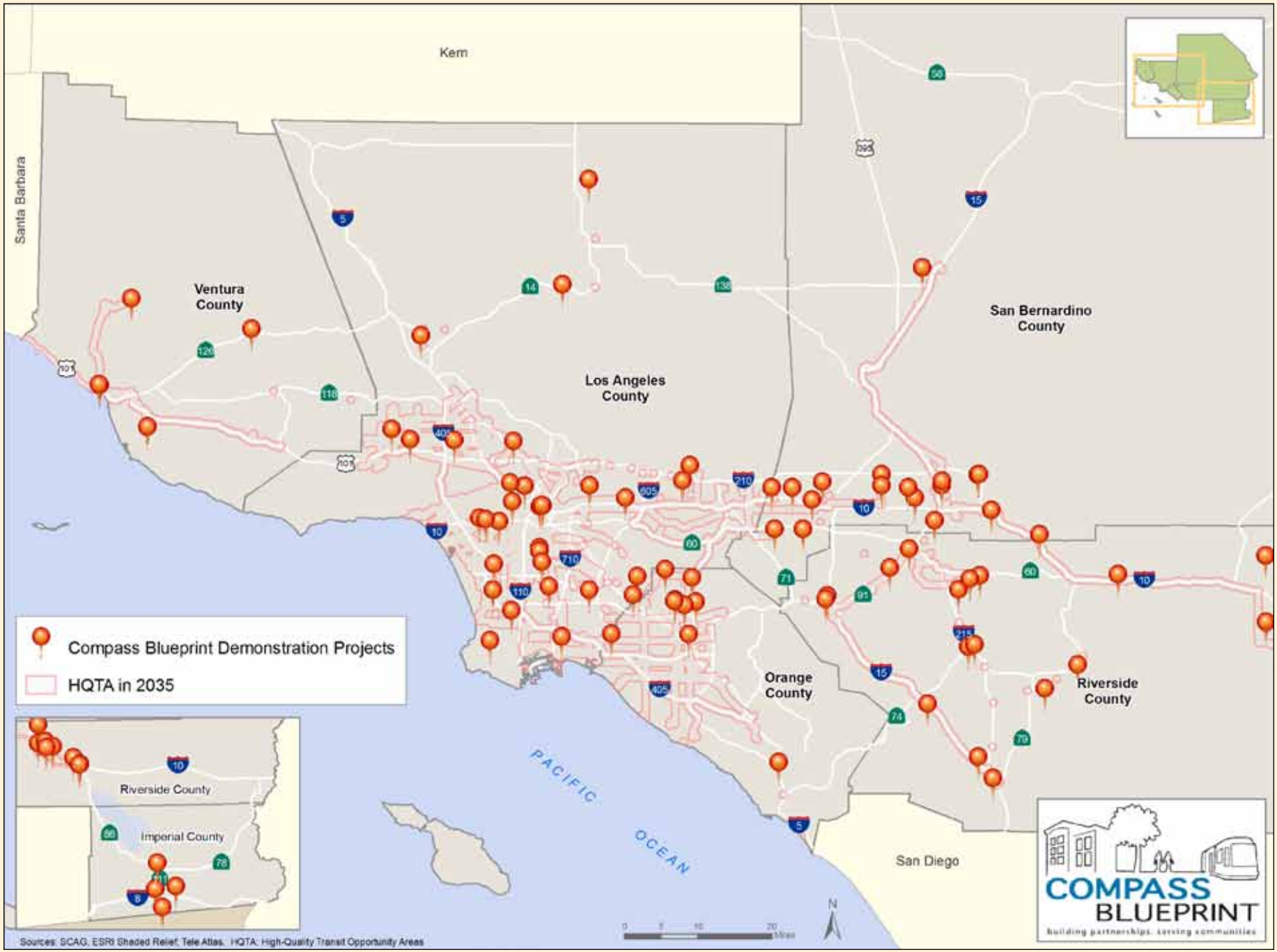
Since 2004, Compass Blueprint has been a model for integrating land use and transportation planning and turning regional vision into local reality. Guided by four core principles, Mobility, Livability, Prosperity and Sustainability, these efforts have effectively given the region a "jump-start" in implementing this SCS. At the core of Compass Blueprint are Demonstration Projects – incentive-based, voluntary partnerships between SCAG and local governments that apply innovative approaches and tools to local plans that support regional priorities. As of September 2011, SCAG has provided over $10.5 million in incentive funds for 132 Demonstration Projects in 95 local jurisdictions. Projects have included transit-oriented development plans for station areas along new light-rail alignments, downtown revitalization efforts, community visioning projects in low-income communities, and other projects that support shared local and regional goals. EXHIBIT 4.4 shows all completed Compass Blueprint Demonstration Projects to date. A complete list of past and current Compass Blueprint Demonstration projects can be found in Appendix: SCS Background Documentation.

Future Demonstration Projects will continue to serve as models throughout the region by focusing on regionally-significant local plans that directly implement the SCS and its goal of translating policy to on-the-ground land use changes and multi-modal transportation improvements. Concurrently, Compass Blueprint will further incentivize local implementation of the SCS through the Compass Blueprint Awards Program recognizing models of innovative planning in the region, and through the Toolbox Tuesdays program - free, monthly, professional training events for local planners in cutting-edge planning tools and approaches developed in Demonstration Projects.

Image courtesy of SANBAG

Image courtesy of City of Los Angeles

EXHIBIT 4.4 Compass Blueprint Demonstration Projects



past years. It is clear that there has been, and continues to be, a significant trend of development policies and decisions within local jurisdictions towards better integration of land use and transportation. Some of these recent trends include:

- Changing demographics and housing market demand
- Redevelopment of main streets, downtowns and corridors to vibrant mixed-use neighborhoods
- Transit-oriented development adjacent to rail station areas and along major bus corridors
- Protection of resource areas and farmland

In most cases, current adopted local general plans do not go out as far in time as the 2012 RTP/SCS horizon year – 2035. Thus, in developing the overall land use development pattern SCAG identified strategic opportunity areas within city and county boundaries to logically continue recent development trends to 2035. While maintaining local jurisdictions' local input for growth totals for both 2020 and 2035, the RTP/SCS incorporates the following within the regional model:

- Compass Blueprint Demonstration Projects that can reasonably be expected to be implemented by 2035;
- Additional local growth that jurisdictions have indicated subsequent to the local input process being completed earlier this year;
- Future multiple family residential and employment growth that are emphasized in planned High-Quality Transit Areas (HQTAs) post-2020 to a greater extent than currently portrayed in current General Plans, which do not go out to 2035;
- Future multiple family residential and employment growth that are also emphasized along main streets, historic downtowns and other appropriate corridors post-2020 to create mixed use, and walkable "transit-ready" communities to a greater extent than currently portrayed in current General Plans, which do not go out to 2035; and
- A shift from single-family residential development towards multi-family residential development post-2020 to a greater extent than currently portrayed in General Plans to reflect recent trends seen during the past 20 years.

(Note: Land use inputs for OCCOG and GCCOG SCS were unchanged.)

Transportation Analysis Zones (TAZs) and Community/ Development Types

To conduct required modeling analysis for the RTP/SCS, SCAG distributes the growth forecast data to transportation analysis zones (TAZs) to capture localized effects of the interaction of land use and transportation. Additionally, SB 375 offers local governments potential CEQA relief for qualified development projects consistent with an adopted SCS. SCAG suggests that utilizing community types at the TAZ level of geography (with an average size of 160 square acres) offers local jurisdictions adequate information and flexibility to make appropriate consistency findings for projects to be eligible to receive CEQA streamlining benefits.

To further facilitate regional modeling of land use information from nearly 200 separate jurisdictions, SCAG developed a simplified series of Community Types to represent the land use categories taken from the region's many general plans. Each Community Type is comprised of various characteristics related to employment and housing density, urban design, mix of land uses, and transportation options. The land use pattern maps presented in this chapter use five Community Types: urban, city, town, suburban and

Image courtesy of Humane Design

rural. These five are further divided into 13 Development Types that each additionally express use designations, densities and building intensities. For any given community type, there is one residential density indicated, which is considered a potential ultimate average for the TAZ and not an absolute project-specific requirement that must be met in order to determine consistency with the RTP/SCS. Details describing the characteristics contained within each of the five Community Types and 13 Development Types are available in Appendix: SCS Background Documentation.

Utlizing TAZs and Community/Development Types, and incorporating local input and land use trends, the overall land use pattern considers the following factors:

- Urbanized Core vs Periphery
- Changing Demographics and Housing Market Demand
- Adjustments for Housing Capacity
- Main Streets, Downtowns and Corridors
- Resource Areas and Farmland
- Transit Stations and High-Quality Transit Areas (HQTA)

Urbanized Core vs Periphery

As the largest Metropolitan Planning Organization in the nation, SCAG encompasses a geographical area of great diversity. From its population, to its industries, lifestyles, environments and political climates, planning for a region of this size and scope is never a "one size fits all" feat. The greatest distinction is between the region's urbanized core and its peripheral areas.

EXHIBIT 4.5 shows the locations of urban centers within the SCAG region. These are areas where strategies such as compact community design, mixed-use development, redevelopment of aging retail areas, greater housing variety, and additional transit service are more likely to succeed. Conversely, less dense areas in the periphery may benefit from different strategies. The overall land use pattern takes these differences into account.

Changing Demographics and Housing Market Demand

SB 375 combines transportation and housing planning by integrating the Regional Housing Needs Assessment (RHNA) process with the RTP/SCS. Specifically, Government Code Section 65080(b)(2)(B), subparagraphs (iii) and (vi), require that the SCS identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region and consider the state housing goals specified in Government Code Sections 65580 and 65581. SCAG has been engaged in the RHNA process concurrently with the development of the RTP/SCS. This process requires SCAG to work with its member agencies to identify areas within the region that can provide sufficient housing for all economic segments of the population and ensure that the state's housing goals are met.

The SCAG region's official regional housing need from the California Department of Housing & Community Development (HCD) for the planning period 2014–2021 is 409,000–438,000 housing units. Of these, approximately 164,000–176,000 are expected to be in the very low- and low-income category (affordable to those who make less than 80 percent of area median income), 72,000–77,000 are expected to be in the moderate-income category (affordable to those who make between 80 percent and 120 percent of median income), and 173,000–185,000 are expected to be offered at above moderate-income category.

The regional target determined by HCD considered projected household growth and socioeconomic data based on local input, the 2010 Census, and the California Department of Finance. As part of its determination, HCD considered current economic conditions, which have contributed to a high number of vacancies for many communities, often in excess of a healthy market rate. For this reason, HCD permitted the application of a one-time excess vacancy credit due to abnormal market conditions, slightly lowering preliminary growth expectations for the eight-year planning period.

The RHNA Allocation was developed with reliance on local input on projected household growth and responses to local surveys. Results from the surveys support consistency with the state housing goals by encompassing a variety of planning factors that identify opportunities and constraints for jurisdictions to plan for housing at all income levels. These factors include the availability of suitable land, market demand for housing, distribution of household growth along transit corridors, and replacement need. To address increasing concerns regarding affordability, each jurisdiction's future housing

Community Types

To facilitate regional modeling of land use information from nearly 200 separate jurisdictions, SCAG developed a simplified series of "community types" to represent the dominant land use patterns and themes contained in the region's many general plans. The community types employed in the RTP/SCS are not intended to represent detailed land use policies, but are used to describe the general conditions likely to occur within a specific area. The following community types are each comprised of specific characteristics related to jobs and housing density, urban design and mix of land uses, and transportation options. These five are further divided into 13 Development Types, which additionally express land use designations, densities and building intensities. Detailed descriptions of these community types and more specific development types are found in Appendix: SCS Background Documentation.

Urban

Urban areas are the highest intensity community types. These centrally located districts have significant amounts of employment and corresponding residential uses and retail, typically located in a dense cluster of multi-story buildings and high-rise buildings. Urban areas are also typically located at the convergence of a number of high capacity transit facilities complemented by non-auto infrastructure that also provide access and connectivity.

City

The City community type is on average one-half the intensity of the Urban community type. These areas contain significant employment centers and a mix of medium- and high-density housing, supported by retail and daily services. One to two high capacity transit facilities, a number of bus routes, and non-auto infrastructure provide access and connectivity to a range of activities and locations.

Town

The Town community type provides low- to medium-density housing opportunities that are located close to local-serving retail and daily services. These areas are characterized by an employment core or an independent job center in low- to mid-rise structures. Sidewalks and bike facilities are adequate and the areas benefit from one high capacity transit facility and local buses.

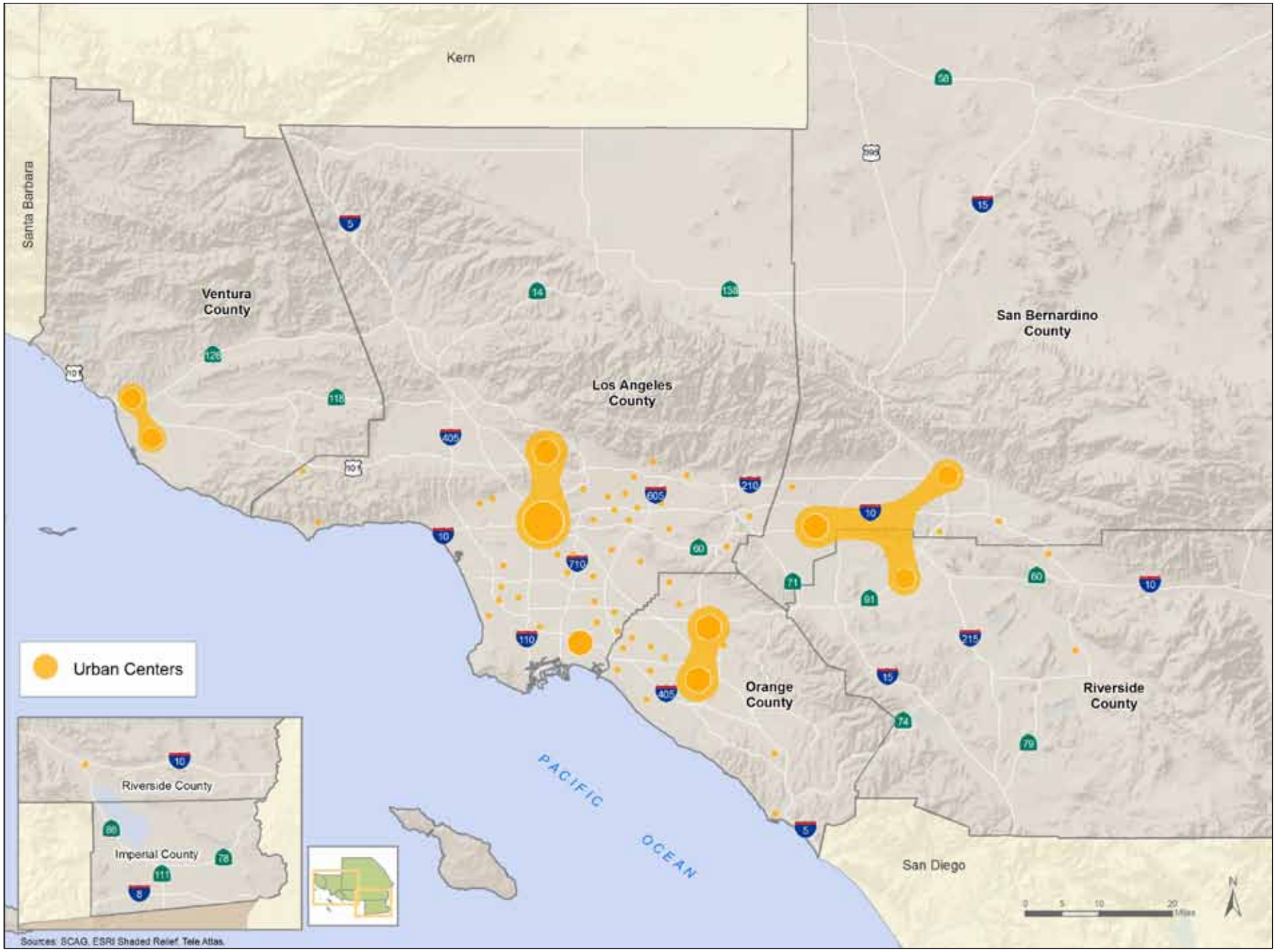
Suburban

Suburban areas contain a mix of uses, but often have one predominant use, such as residential or office. Residential areas are typically low-density with larger lots and are separated from retail and other daily service uses. Though these areas are predominantly served by automobiles, bus service and commuter rail may also operate in certain neighborhoods.

Rural

Rural areas include both jobs and housing, though these two uses are rarely found in close proximity to each other. Housing is characterized by acreage lots and ranches, and is often far from commercial and employment activities, which occur in isolated nodes located on rural cross-roads and highway services zones. Transit and non-auto facilities rarely serve these areas, making automobile use the most frequent mode of travel.

EXHIBIT 4.5 Urban Centers SCAG Region



Local Efforts

El Centro Downtown Revitalization

Downtown El Centro is a historic and distinct part of Imperial County that contains many businesses, restaurants, shops, services and public spaces. After many years of focusing on new development in other portions of El Centro, the City and local stakeholders recognized a need for revitalization. A highly collaborative visioning effort, undertaken in partnership with SCAG's Compass Blueprint, resulted in a new Downtown Plan that contains incentives and design guidelines for improved walkability and mixed use development, including housing.

Image courtesy of City of El Centro

need is adjusted to balance the proportion of affordable housing by county across the region. This adjustment considers areas that have a high proportion of certain income groups and adjusts future household growth towards a goal of social equity. This mitigates overconcentration of income groups and encourages planning for affordable housing in areas with limited opportunities in affordable housing.

The RTP/SCS incorporates the overall RHNA target for the SCAG region and provides a land use pattern that shows where new housing growth can be accommodated in the future. In 2008, the SCAG region was comprised of about 17.9 million people, 5.8 million homes and 7.7 million jobs. The 2035 Integrated Growth Forecast projects that the region will grow by another 4 million people by 2035, and nearly 1.5 million households and 1.7 million jobs will be added. The RTP/SCS land use pattern contains sufficient residential capacity to accommodate the region's future growth, including the 8-year regional housing need, as shown in **TABLE 4.1**. The land use pattern accommodates approximately 648,000 additional housing units in the SCAG region in 2020, and over 1.5 million additional housing units in 2035. As shown in **TABLE 4.2**, the land use pattern also encourages improvement in the jobs-housing balance by accommodating 680,000 additional jobs in 2020 and approximately 1.7 million additional jobs in 2035.

TABLE 4.1 Summary of Total Housing Units Forecasted in RTP/SCS

Community Type	Existing Housing Units (2008)	Total Forecasted Housing Units (2020)	New Housing Units (2008–2020)	Total Forecasted Housing Units (2035)	New Housing Units (2008–2035)
Urban	139,000	180,000	41,000	226,000	87,000
City	685,000	755,000	70,000	948,000	263,000
Town	2,496,000	2,760,000	264,000	3,159,000	663,000
Suburban	2,333,000	2,556,000	223,000	2,750,000	417,000
Rural	162,000	212,000	50,000	241,000	79,000
Total	**5,815,000**	**6,462,000**	**648,000**	**7,324,000**	**1,509,000**

TABLE 4.2 Summary of Total Jobs Forecasted in RTP/SCS

Community Type	Existing Jobs (2008)	Total Forecasted Jobs (2020)	New Jobs (2008-2020)	Total Forecasted Jobs (2035)	New Jobs (2008-2035)
Urban	503,000	531,000	28,000	573,000	70,000
City	1,029,000	1,077,000	48,000	1,193,000	164,000
Town	2,872,000	3,098,000	226,000	3,575,000	703,000
Suburban	3,183,000	3,515,000	332,000	3,874,000	691,000
Rural	147,000	195,000	48,000	221,000	74,000
Total	**7,734,000**	**8,416,000**	**682,000**	**9,436,000**	**1,702,000**

Currently, SCAG is home to approximately 6 million households, 55 percent of which currently live in detached single-family homes. As noted earlier, the region is expected to add 648,000 new households by 2020 and a total of 1.5 million new households by 2035. But the changing nature of these households means that there will most likely be less demand for single-family homes, especially those on large lots. In the postwar era that shaped the popular image of Southern California, most households consisted of parents with children. In the 21st Century this no longer holds true, and today, only a small minority of households have children at home and the number of households without children—including senior citizens and young people forming their first household—is dramatically increasing. As a result, there is an expected increase in demand for small-lot single-family houses and multi-family housing in close proximity to amenities, including local shopping and transit service.

This significant shift in demographics and household demand is apparent in the land use development pattern of the RTP/SCS, which assumes a significant increase in small-lot single-family and multi-family housing that will mostly occur in infill locations near transit infrastructure. In some cases, the land use pattern assumes that more of these housing types will be built than is currently anticipated in local general plans, and in most cases, this shift in housing type—especially the switch from large-lot to small-lot single-family homes—will occur naturally in the marketplace as developers shift to products in high demand. In 2008, 45 percent of total housing units were multi-family products. The RTP/SCS projects that in 2035, 68 percent of new homes in the SCAG region will be multi-family units.

Of the 648,000 new housing units expected in 2020, 28 percent will be at a minimum 30 dwelling units per acre; and of the 1.5 million new housing units expected in 2035, 34 percent will be at a minimum 30 dwelling units per acre. In accordance with Government Code Section 65080(b)(2)(B)(ii), these projected housing densities will help the region accommodate the projected housing needs at all income levels over the life of the RTP, especially housing at the lower income categories. Additionally, SCAG moves towards improving the current distribution of households by income category in the region through the allocation of projected housing needs at the local level. Appendix: SCS Background Documentation lists the draft local RHNA allocations by jurisdiction. When the final RHNA plan is adopted in October 2012, SCAG jurisdictions will revise their Housing Elements to meet their respective allocations. The SCS's strategies will inform the development of those Housing Elements.

As significant changes occur in existing communities there is potential for "gentrification," or the displacement of lower-income residents if new development brings higher-income residents into a neighborhood. As the RTP/SCS is implemented, jurisdictions in the SCAG region must be sensitive to the possibility of gentrification and work to employ strategies that can ameliorate it. One strategy is the general approach of higher-density infill development, which means that neighborhoods will be adding to the local housing stock rather than maintaining the current stock and simply changing the residential population. A second is the development of permanently affordable housing, through deed restrictions or development by nonprofit developers, which will ensure that some units will remain affordable to lower income households. SCAG will work with local jurisdictions and community stakeholders to seek resources and provide assistance to address any possible gentrification effects of new development on existing communities and vulnerable populations.

Adjustments for Housing Capacity

As SCAG and its partner jurisdictions underwent the process of creating the overall land use pattern, it became apparent that some parts of the urbanized core planned for household growth greater than the amount in the Integrated Growth Forecast, while some areas in the periphery had less housing capacity than the forecast assumptions. For this

reason, the land use development pattern of the RTP/SCS shifts an additional 15,000 households from the periphery into the urbanized core by 2020 and an additional 50,000 households by 2035, per consultation with the local juridictions.

The areas receiving additional growth are well served by transit, with a mix of uses and other design elements that are likely to reduce the need for auto travel. Thus, this adjustment allowed the land use pattern to conform more closely to local expectations, while reducing the amount of vehicle miles traveled.

Main Streets, Downtowns, and Corridors

The demand for smaller lots and multi-family housing often goes hand-in-hand with a desire to be close to amenities, retail, restaurants and recreation. The land use pattern places a high percentage of new housing and jobs in main streets, downtowns, and along corridors where infrastructure already exists. This geographical placement makes sense given the SCAG region's trend toward revitalization of these older, traditionally commercial areas. Such a pattern has many co-benefits, including walking access to community amenities, lower VMT, lower transportation cost for both cities and individuals, and lower overall infrastructure cost.

Resource Areas and Farmland

In identifying the overall land use pattern, the RTP/SCS also considers areas that are to be protected from development, as required by Government Code Section 65080(b)(2)(B)(v). These areas, which include parklands, open space, natural resource areas, and farmland, are critical for the region's environmental and economic health. **EXHIBITS 4.6, 4.7** and **4.8** show the locations of these areas. Data gathered from the sources listed below were compiled into relevant datasets and provided to local jurisdictions within the region for review and revision. The updated information was then used to ensure the protection of resources areas in the development of the overall land use pattern.

- California Natural Diversity Database (California Department of Fish and Game)
- Flood Insurance Rate Maps (Federal Emergency Management Agency)
- Natural Community Conservation Planning Program (California Department of Fish and Game)
- California Protected Areas Database (GreenInfo)
- Farmland Mapping & Monitoring Program (Division of Land Resource Protection in California Department of Conservation)

SCAG is also developing a natural lands acquisition and open space conservation strategy to encourage large-scale acquisition and management of critical habitat to mitigate impacts, including greenhouse gas emissions, related to future transportation projects. The strategy will identify appropriate agencies with which to collaborate in order to develop a regional conservation plan based on identified priority areas. SCAG will then develop a regional mitigation plan for inclusion in the 2016 RTP.

Transit Stations and High-Quality Transit Areas (HQTA)

The overall land use pattern focuses jobs and housing in the region's designated High-Quality Transit Areas (HQTA) that have been identified within the region, as illustrated in **EXHIBIT 4.9**. A HQTA is generally a walkable transit village, consistent with the adopted SCS that has a minimum density of 20 dwelling units per acre and is within a ½ mile of a well-serviced transit stop, and includes transit corridors with minimum 15-minute or less service frequency during peak commute hours. The RTP/SCS assumes that 51 percent of new housing developed between 2008 and 2035 will be within HQTAs, along with 53

Image courtesy of Safe Routes to School

percent of new employment growth (compared with 39 and 48 percent, respectively in 2008). Aligning a high quality transit network and new housing and jobs offers Southern Californians more complete communities that offer a variety of transportation and housing choices, while reducing the negative impacts of automobile use on public health and the environment.

TRANSPORTATION NETWORK AND STRATEGIES

The land use and housing mix in the RTP/SCS is inextricably linked to a transportation network and a set of transportation strategies that, as required by Government Code Section 65080(b)(2)(B)(iv), services the transportation needs of the region. Chapter 2 of the 2012 RTP/SCS lays out various transportation measures that offer a variety of mode choices, increase efficiency and mobility, and improve access for all users in the region. As such, the RTP/SCS incorporates the following transportation network enhancements and management approaches:

Transportation Network

The 2012 RTP/SCS calls for an expanded transportation network that will complement the overall land use pattern's focus on locating new growth in High-Quality Transit Areas and other opportunity areas, which in turn allows the RTP/SCS to leverage greater improvement in transportation capacity and system operations than would otherwise be the case. Working together, these complementary land use and transportation strategies can significantly reduce VMT- a primary goal of SB 375- by increasing transit ridership, increasing walking and biking, and reducing the length of auto trips.

As shown in **EXHIBIT 4.10**, the RTP/SCS calls for an expansion of the public transit network and transit service on new and existing routes, resulting in greater transit accessibility and connectivity throughout the region—a complement to the strategy of focusing new growth in HQTAs. Funded in large part by local county sales tax programs, transit network expansion includes the addition of new corridors and lengthening existing

Benefits of Integrating Land Use and Transportation

1. Better Placemaking

Creating better places for people to live and work, such as walking and bicycling opportunities, varied housing options and more compact development can reduce travel time and relieve road congestion.

2. Lower Cost to Taxpayers and Families

Developing more compact neighborhoods and placing everyday destinations closer together can reduce the burden of development to taxpayers and reduce the everyday cost of housing and transportation for families.

3. Benefits to Public Health and the Environment

Better placemaking and reducing the footprint of new development will provide more opportunities for an active lifestyle and protect natural resources and greenfield sites.

4. Greater Responsiveness to Demographics and the Changing Housing Market

More walkable neighborhoods with varied housing options and transportation choices will be more responsive to the changes in market demand being driven by the region's demographic changes.

5. Improved Access and Mobility

Enhancing critical auto connections and increasing alternative transportation options can improve people's ability to move around the region and provide easy access to everyday destinations.

EXHIBIT 4.6 Natural Resource Areas SCAG Region

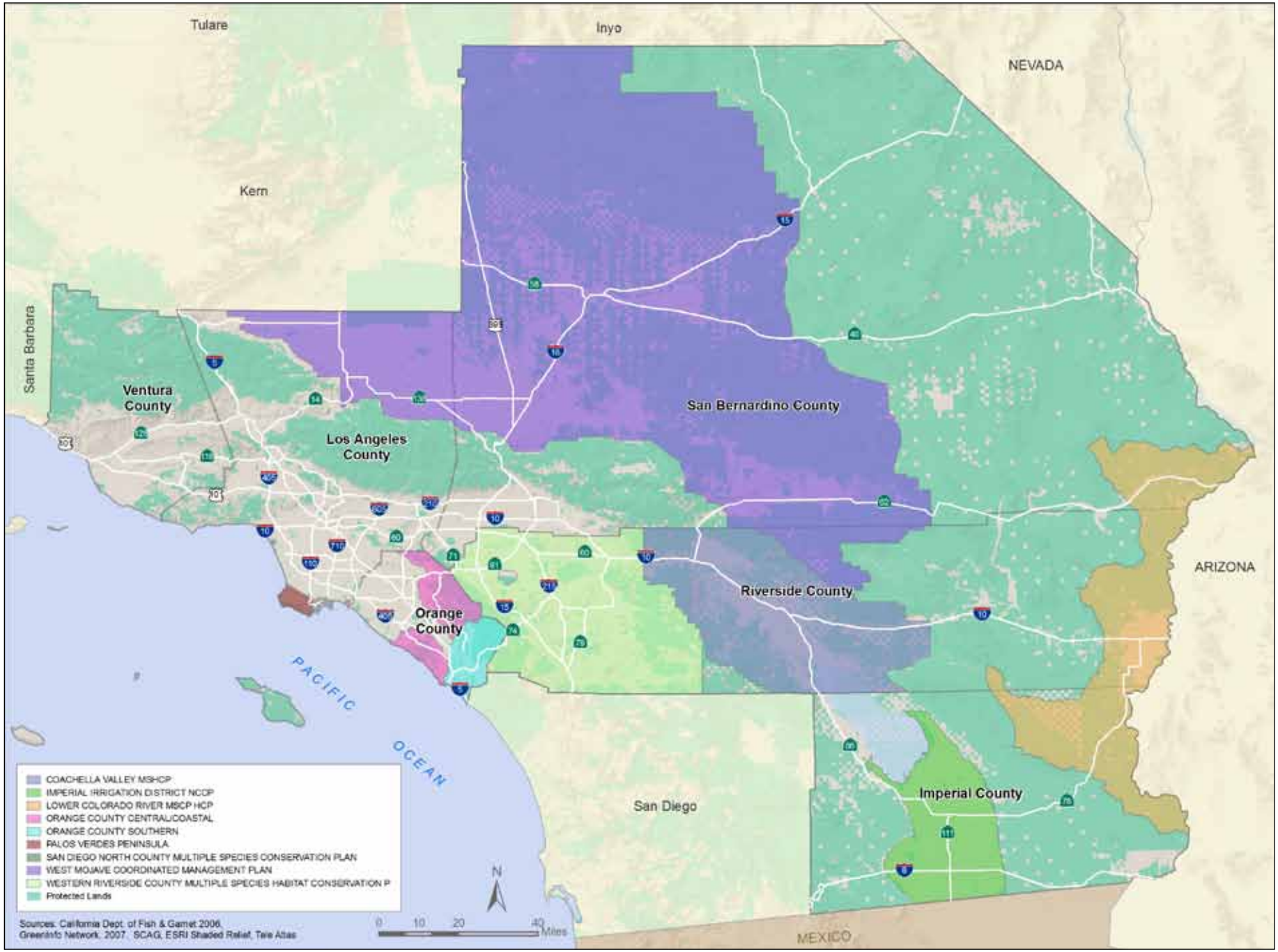


EXHIBIT 4.7 Open Space SCAG Region

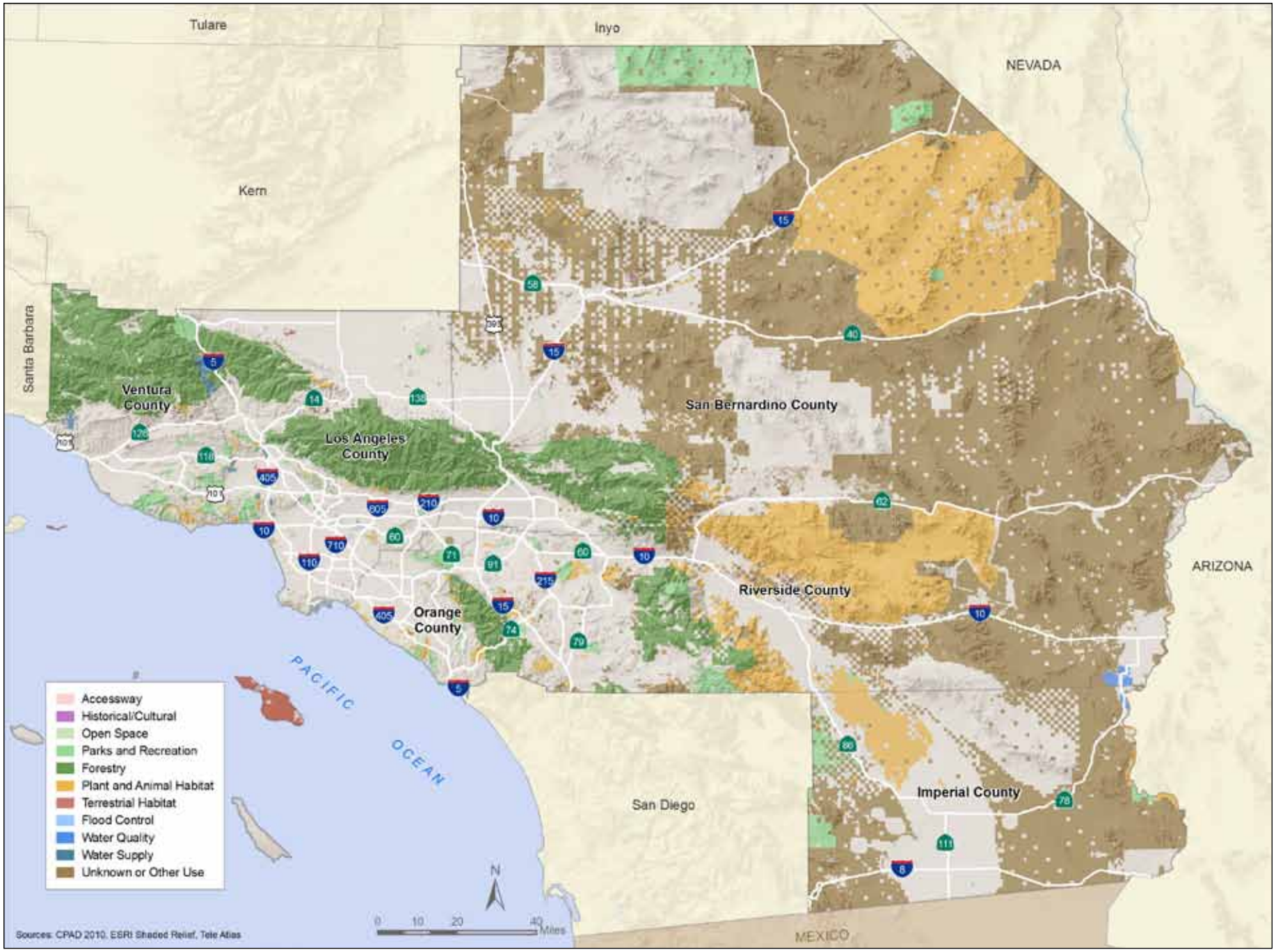
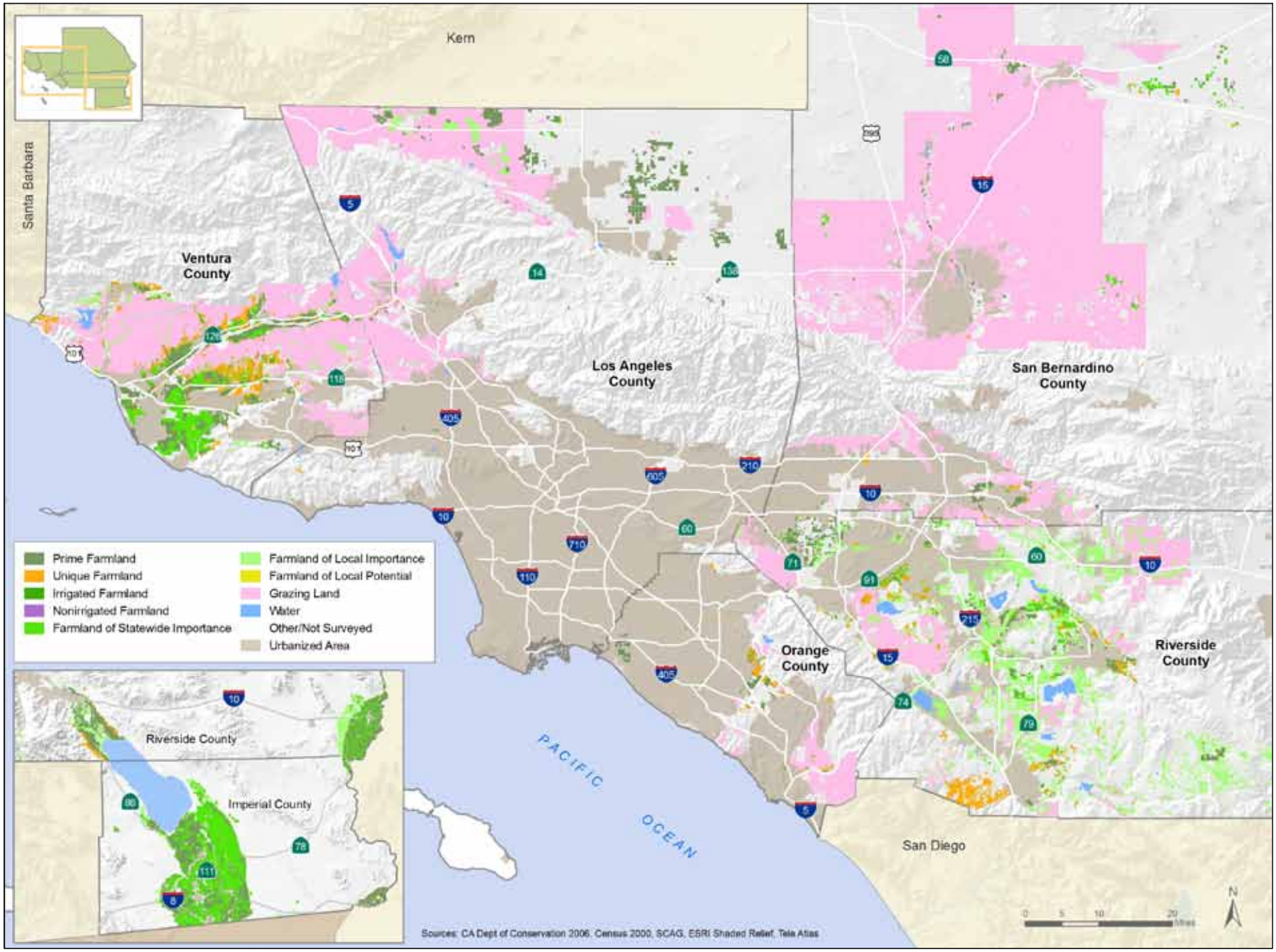


EXHIBIT 4.8 Farmland SCAG Region



ones in Los Angeles County through Measure R; introduction of the first bus rapid transit (BRT) systems and increasing Metrolink service in Orange County, Riverside County and San Bernardino County; establishment of new trolley systems in the cities of Santa Ana, Anaheim and Garden Grove; and the introduction of the rail connection from Downtown San Bernardino to Redlands. The RTP/SCS also proposes three passenger rail strategies that will provide additional travel options for long distance travel within the region and to neighboring regions. These include improvements to the LOSSAN Corridor, improvements to the existing Metrolink system and implementation of the California High Speed Train (HST) project.

The 2012 RTP/SCS also includes a notable increase in the regional active transportation network, as shown in **EXHIBIT 4.11**. Rainfall in the SCAG region typically averages only 30 days per year, which provides ideal conditions for walking and bicycling. Active transportation is an essential part of the SCAG transportation system, is low cost, does not emit greenhouse gases, can help reduce roadway congestion, and increase health and the quality of life of residents. Active transportation will receive a total of $6 billion in available revenues under the 2012 RTP/SCS, compared to $1.8 billion in the 2008 RTP, which represents an increase of more than 200 percent. This emphasis signifies an important opportunity to advance the goals of SB 375 by increasing non-motorized modes of transportation; thereby, expanding access to a variety of land uses and transit; and improving public health and air quality.

Along with strategic capacity enhancements and technological improvements of the existing highway (as shown in **EXHIBIT 4.12**) and local streets, including the implementation of a high occupancy toll (HOT) network, these transit, rail, and active transportation expansions complement the preferred land use pattern and support the expected growth throughout the region. The overall land use pattern's focus on locating additional growth in High-Quality Transit Areas relies on the development of high capacity transit stations and efficient transportation corridors that leads to significant VMT reductions and other benefits due to higher walk/bike mode share, more transit use and shorter auto trips.

Local Efforts

Feasibility Study of San Bernardino Mountain-Valley Railway System

SCAG recently partnered with the San Bernardino Associated Governments (SANBAG) and Inland Valley Development Agency (IVDA) to study the feasibility of a San Bernardino Mountain-Valley railway system that would provide a reliable, clean form of transportation for residents and visitors between the San Bernardino Valley and the mountain communities, including Big Bear Lake, with connecting travel options at both ends.

Los Angeles County's Measure R

The 2012 RTP/SCS's network includes all projects funded by the region's newest sales tax measure, Los Angeles County's Measure R. This measure provides more funding to transit than any other category, with about a dozen projects that improve and expand the region's transit system. These projects include Metrolink capital improvements, extensions to several Metro Rail lines, and new clean-fuel bus purchases.

Photograph courtesy of Metro. ©2011 LACMTA

EXHIBIT 4.9 High-Quality Transit Areas (HQTA) SCAG Region

EXHIBIT 4.10 Transit Network SCAG Region

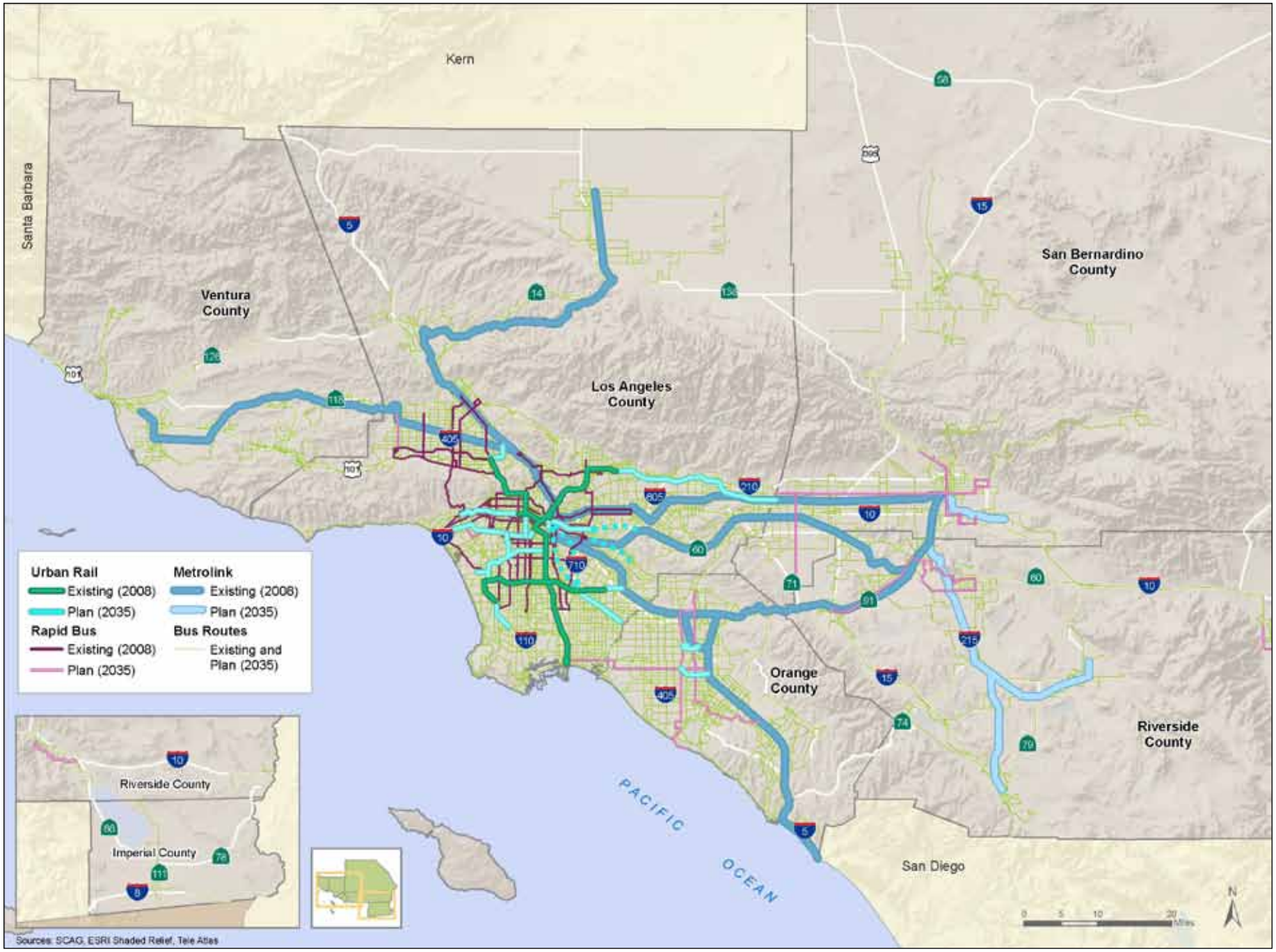


EXHIBIT 4.11 Proposed Bikeway Network SCAG Region

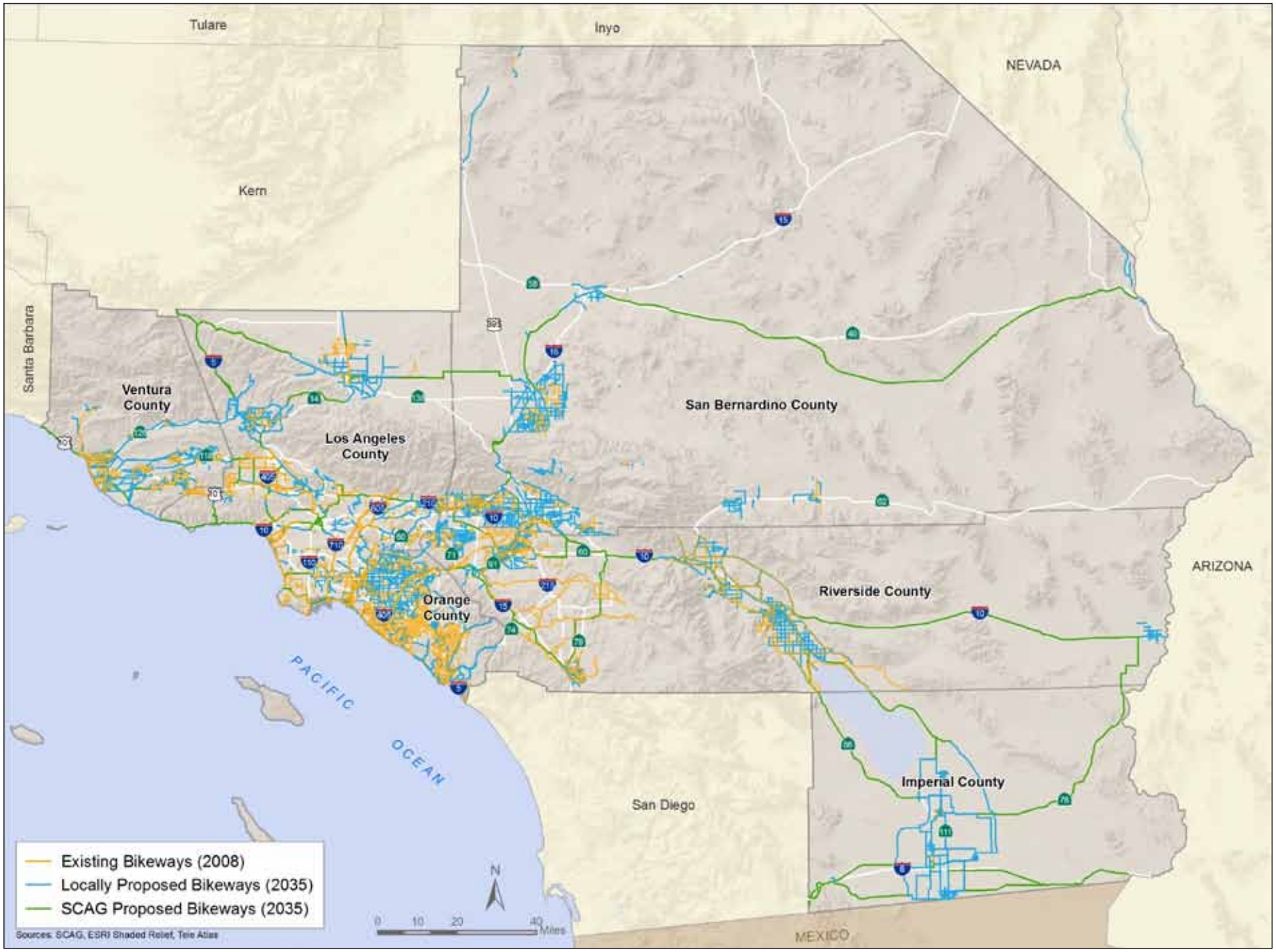


EXHIBIT 4.12 Proposed Highway Improvements SCAG Region

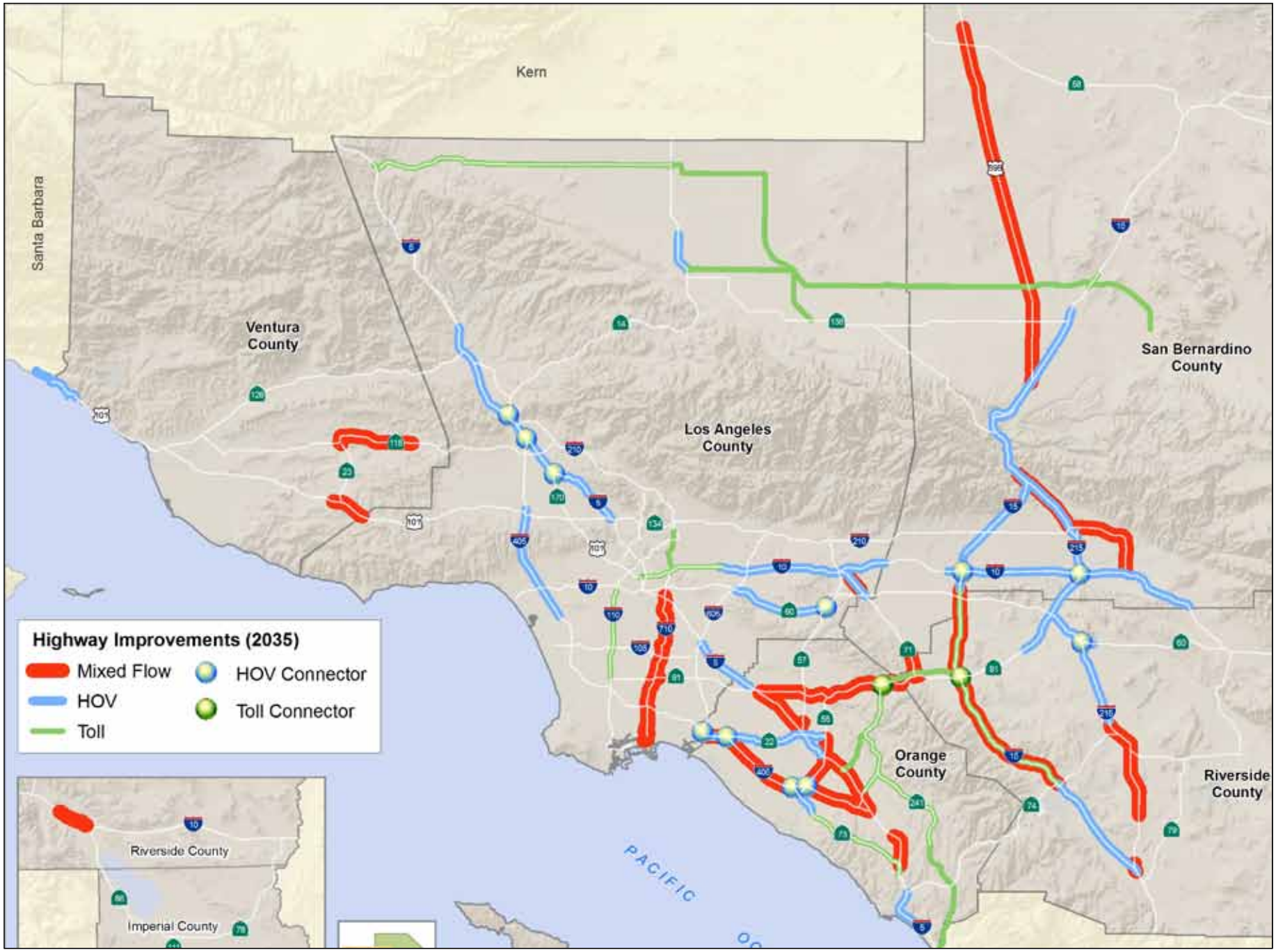


Image courtesy of City of Fullerton

Image courtesy of City of Long Beach

Image courtesy of City of Temecula

Local Efforts

Fullerton Transportation Center and Corridor Redevelopment

The City of Fullerton has embraced sustainability as a framework for planning its future in both the transportation and land use arenas. Most notably, the area around the Fullerton Transportation Center is a model of transit-oriented design that encourages walking, bicycling and transit. The City's ongoing plans in this area continue to attract development of housing, restaurants, retail, and other amenities. Furthermore, its commitment to redeveloping its auto-oriented corridors serves to improve connections to nearby hospitals, schools and employment centers.

Long Beach Boulevard Corridor

Along the Long Beach Boulevard Corridor, out-of-date parking standards have hindered development and impacted housing affordability. To address this, the City of Long Beach began a multi-phase project to implement a new zoning code that facilitates transit-oriented development along the Metro Blue Line. The City also continues its commitment to respond to the changing needs of the area by seeking grant funding for new bike and pedestrian infrastructure.

Temecula Old Town Specific Plan

For the residents of Temecula, Old Town represents a place where tradition and new opportunities combine to form the heart of the community. To support this vision, the City updated the Old Town Specific Plan to encourage a pedestrian-oriented, urban downtown that allows for a variety of land uses. The plan sets forth land use designations and development standards for more flexible and creative use of properties and provides for a balance between commercial and residential development in the area.

Travel Demand Management (TDM)

In addition to the transportation network, the RTP/SCS also relies on strategic and extensive Travel Demand Management (TDM) measures that support the expected land use pattern. These relatively cost-effective strategies improve the effectiveness and capacity of the transportation system by supporting a shift from single-occupancy vehicle use to other alternatives. Many local jurisdictions in our region have become national leaders in the implementation of TDM strategies. For example, SCAG is working with local jurisdictions to close the gaps in the regional bikeway network and bring 12,000 miles of deficient sidewalks into compliance with the Americans with Disabilities Act (ADA). TDM measures will receive a total of $4 billion in available revenues compared to $1.3 billion in 2008, which indicates a 200 percent increase.

The 2012 RTP/SCS employs the following TDM measures to improve mobility and access:

- Bringing the majority of sidewalks and intersections in our region into American Disabilities Act (ADA) compliance to increase the usability and effectiveness of our active transportation system.
- Promoting telecommuting and flexible work schedules
- Development of mobility hubs for first mile/last mile connectivity
- Expanding parking cash out programs in urban areas
- Promoting Guaranteed Ride Home Programs

Transportation System Management (TSM)

Transportation System Management (TSM) measures also support the goals of the RTP/SCS by seeking to identify improvements to increase capacity and improve operational efficiency. These techniques contribute to improved traffic flow, better air quality, and improved system accessibility and safety. The following TSM measures support the forecasted land use development pattern of the RTP/SCS:

- Enhanced incident management
- Advanced ramp metering
- Corridor System Management plans
- Traffic signal synchronization
- Improved data collection

Local Efforts

Ventura Downtown Parking Management District

In order to solve the apparent parking shortage in its downtown area, the City of Ventura performed a downtown parking study. The study revealed ample spaces were available in nearby city-owned lots, while other prime spaces in close proximity to local business were in high demand and always occupied. Local business employees were parking in spaces most coveted by customers and patrons. The city of Ventura was able to identify a solution to the problem: a flexible demand-responsive parking paid district. Parking in downtown Ventura has since improved, therefore contributing to a better downtown experience.

Image courtesy of Rachel So

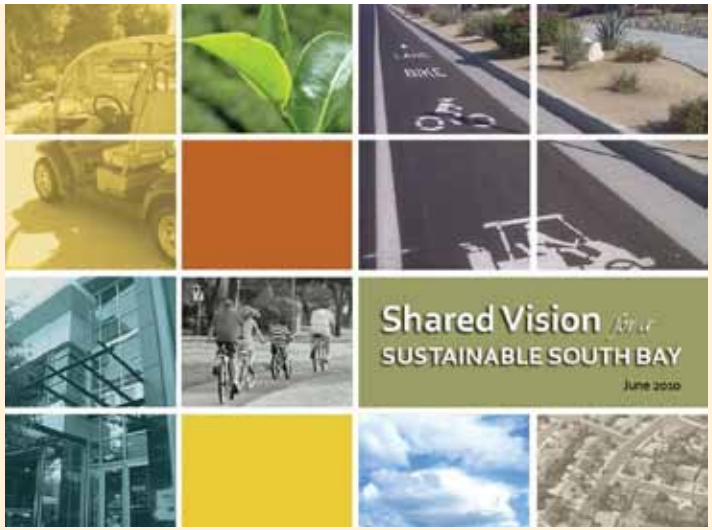
Transportation Conformity

The policy \objectives and strategies set forth in the RTP/SCS are aimed at reducing travel distances and providing additional travel choices to the automobile. As such, in accordance with Govt. Code section 65080(b)(2)(B)(viii), the RTP/SCS complies with the conformity requirements of the Clean Air Act as further detailed in Appendix: Transportation Conformity.

OVERALL LAND USE PATTERN MAPS

The following maps, **EXHIBIT 4.13** through **EXHIBIT 4.19**, identify the RTP/SCS overall forecasted land use pattern for the region and its counties in 2035. The RTP/SCS land use development pattern accommodates over 50 percent of new housing and employment growth in High-Quality Transit Areas (HQTA), while keeping jurisdictional totals consistent with local input. It moves the region towards more compact, mixed-use development leading to more opportunities for walking and biking, more transit use, and shorter auto trips. The Community Types used meet the demand for a broader range of housing types, including the development of smaller-lot single family homes, townhomes, and multi-family condominiums and apartments. The detailed underlying data for these maps that represents the general location of uses, residential densities and building intensities can be found in Appendix: SCS Background Documentation pursuant to Govt. Code section 65080(b)(2)(B)(i).

Photograph courtesy of Safe Routes to School



Local Efforts

South Bay Cities Council of Governments Neighborhood Oriented Design Program

The South Bay Cities Council of Governments adopted the Sustainable South Bay Strategy in September 2010 to promote sustainable land use and transportation investment in the South Bay. Founded on the concept of Neighborhood Oriented Development (NOD), this plan will create compact, mixed commercial nodes in the center of each residential neighborhood. Specifically, it sets forth a strategy that would intensify commercial uses at the corners of major arterials, transition mid-block strip commercial to residential, and encourage street-fronting buildings with parking at the rear. The resulting development pattern will provide a cluster of destinations within walking distance of every residence with mid-range trips accessible by local use (electric) vehicles.

EXHIBIT 4.13 Land Use Pattern SCAG Region (2035)

EXHIBIT 4.14 Land Use Pattern Ventura County (2035)

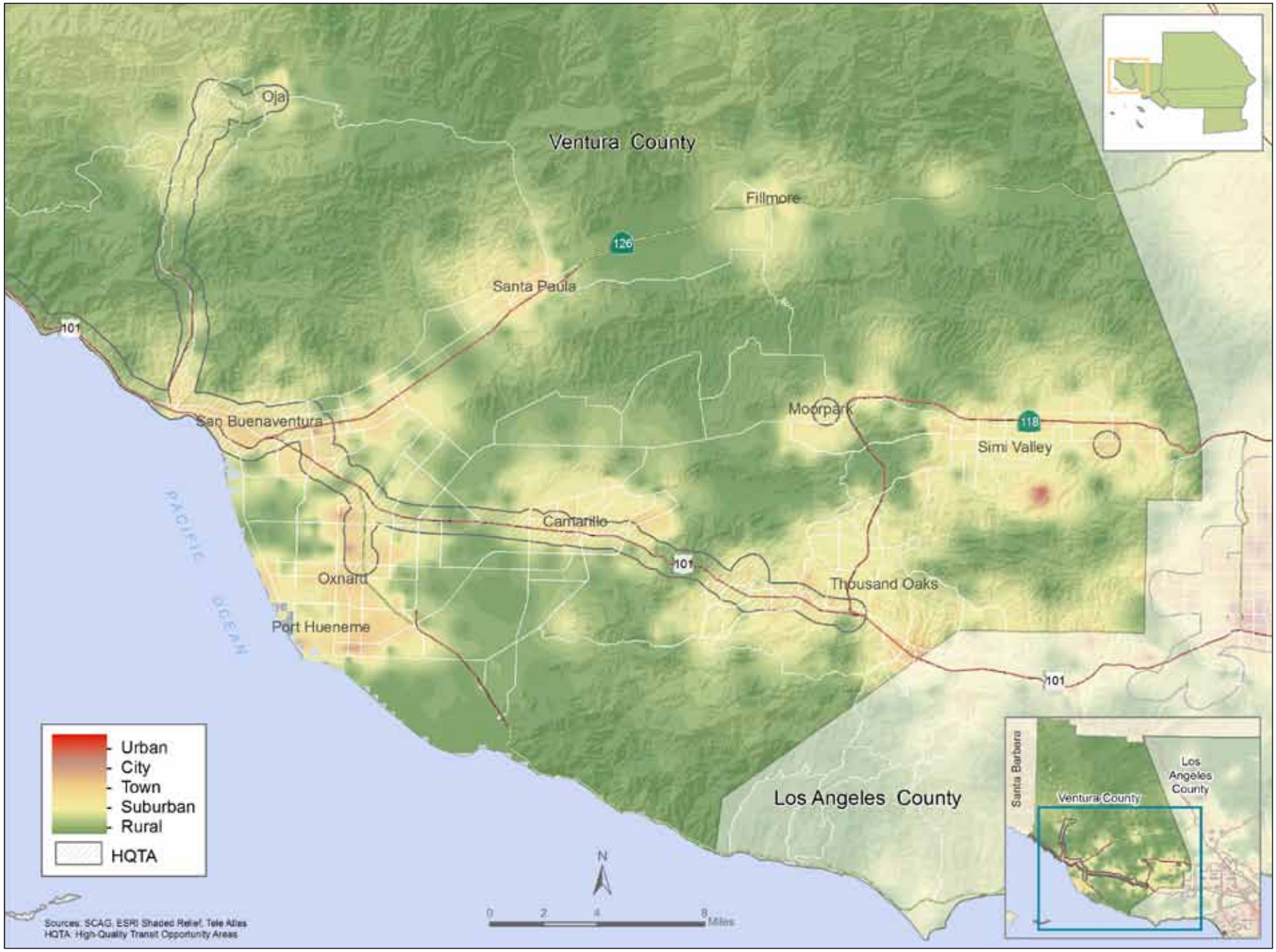


EXHIBIT 4.15 Land Use Pattern Los Angeles County (2035)

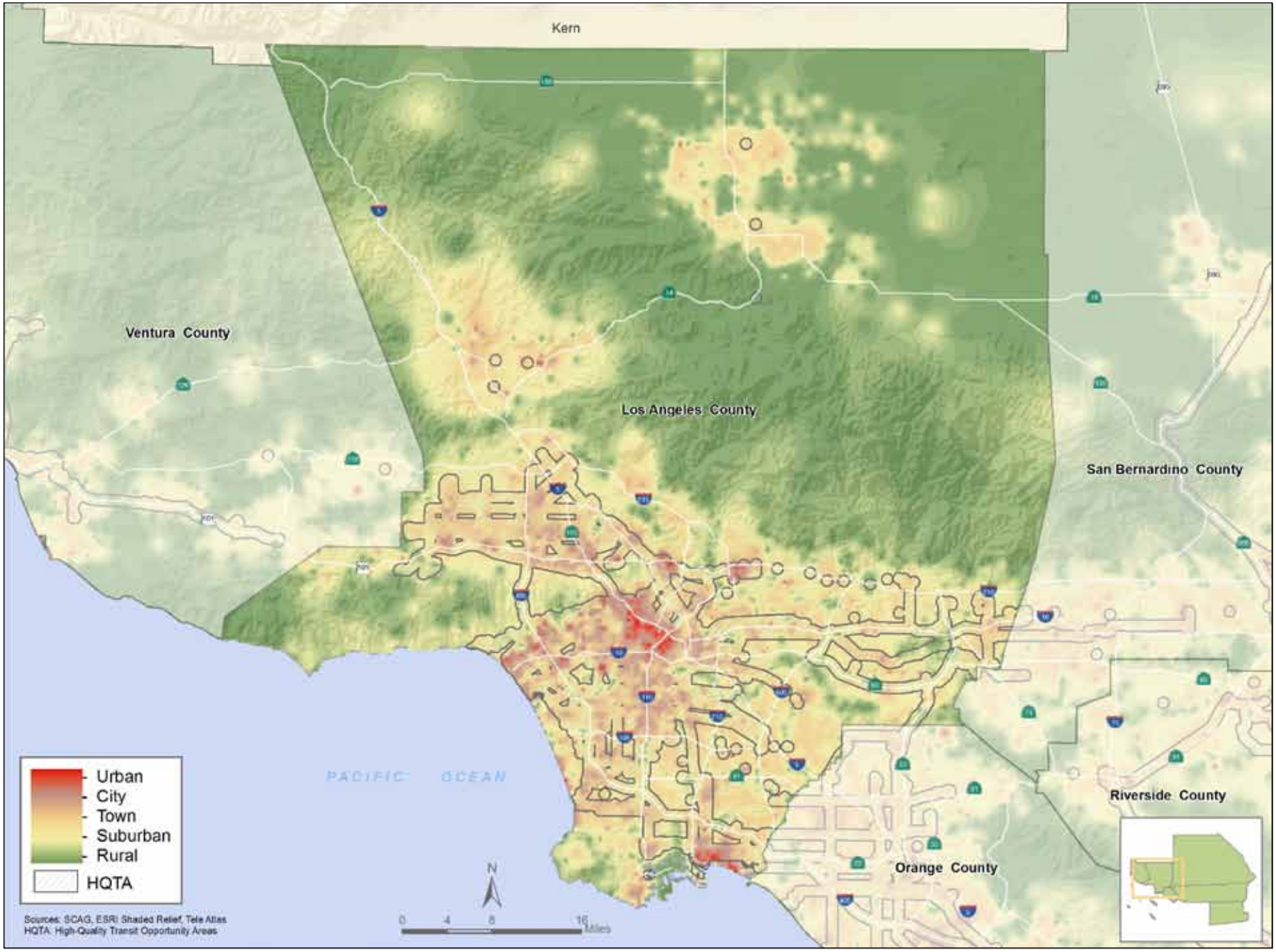


EXHIBIT 4.16 Land Use Pattern San Bernardino County (2035)

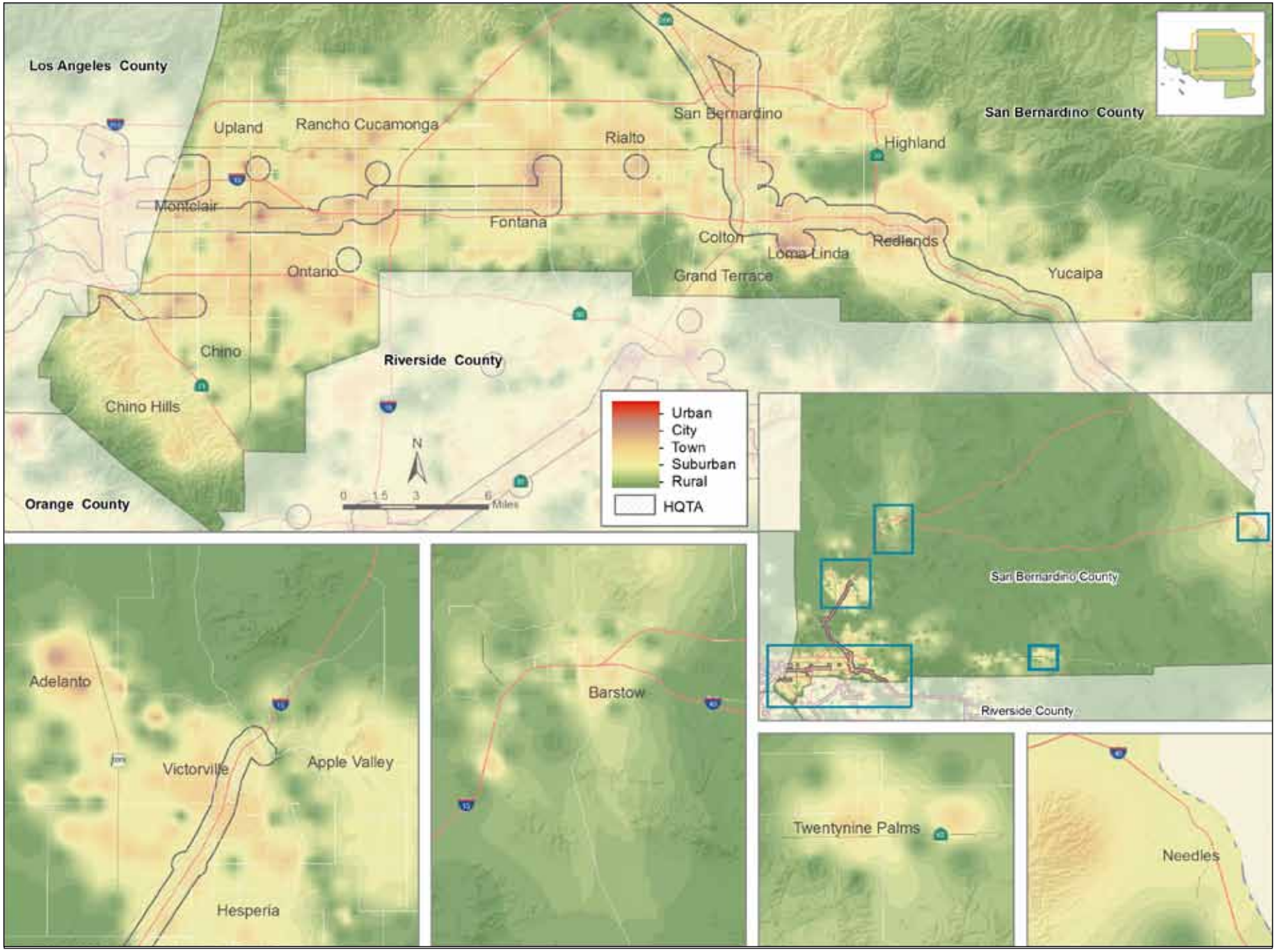


EXHIBIT 4.17 Land Use Pattern Orange County (2035)

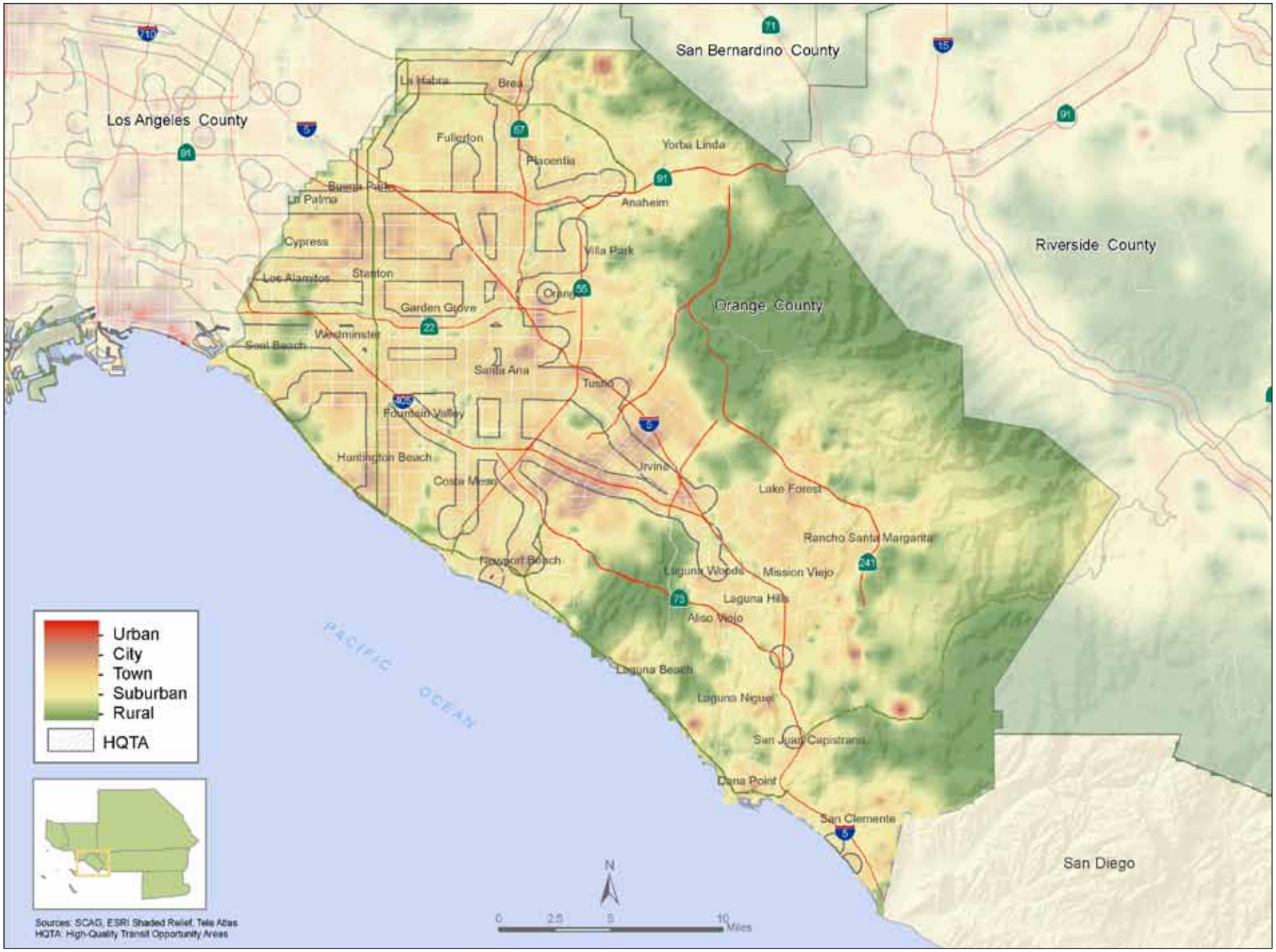


EXHIBIT 4.18 Land Use Pattern Riverside County (2035)

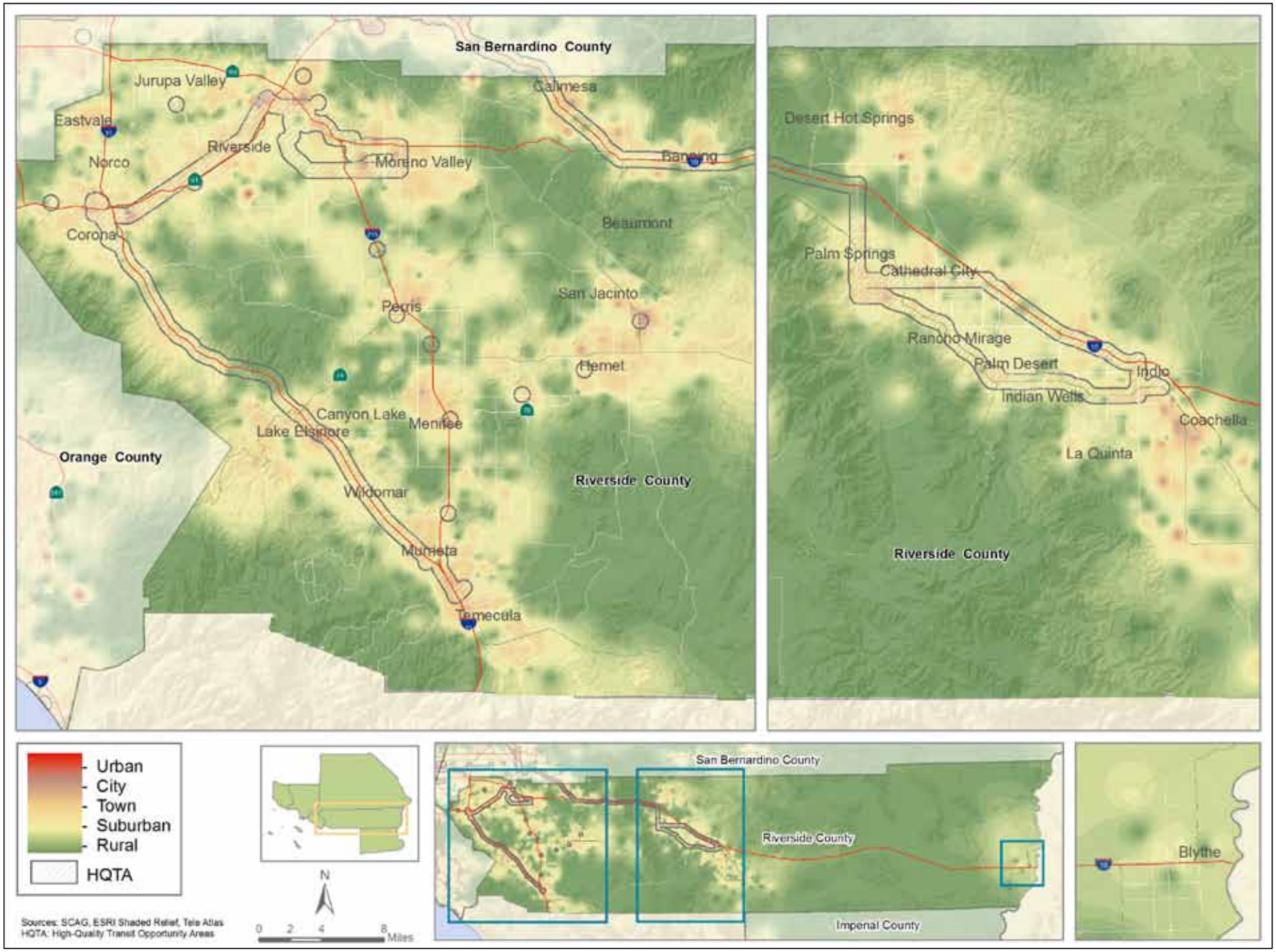
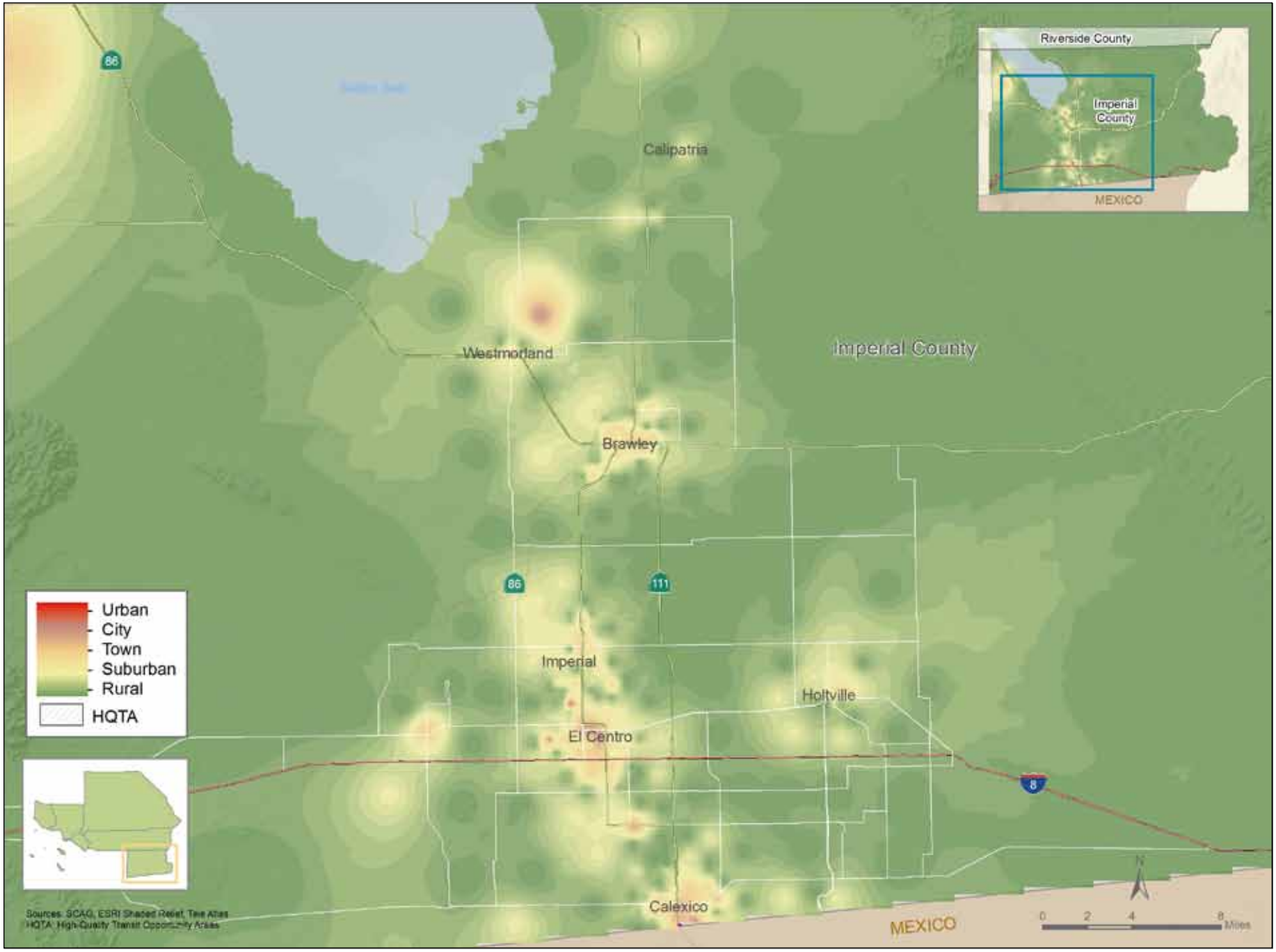


EXHIBIT 4.19 Land Use Pattern Imperial County (2035)



CEQA Incentive

SB 375 provides incentives in the form of CEQA streamlining to encourage community design that supports reduction in per capita GHG emissions. Generally, two types of projects are eligible for streamlined CEQA review once a compliant RTP/SCS has been adopted: (1) residential/mixed use projects (consistent with the SCS) or (2) a Transit Priority Project (TPP). See Appendix: SCS Background Documentation for more information on CEQA streamlining incentives through SB 375.

Residential/Mixed-Use Projects

Residential and mixed-use projects that are consistent with the SCS qualifies for streamlined CEQA review if at least 75 percent of the total building square footage consists of residential use (or a project that is a TPP). If a project meets these requirements and is consistent with the use designation, density, building intensity and applicable policy of the SCS, any environmental review conducted will not be required to discuss growth inducing impacts, any project specific or cumulative impacts from cars and light duty truck trips generated by the project upon its completion on climate change or the regional transportation network; or a reduced density alternative.

Transit Priority Projects (TPP)

A Transit Priority Project (TPP) is eligible for CEQA streamlining if it is consistent with the SCS; contains at least 50 percent residential use; is proposed to be developed at a minimum 20 dwelling units per acre; and is located within ½ mile of a major transit stop or high quality transit corridor that is included in the RTP. If a project meets these criteria, it may be analyzed under a new environmental document created by SB 375, called the Sustainable Communities Environmental Assessment (SCEA), or through an EIR for which the content requirements have been reduced. Alternatively, a TPP can be considered a Sustainable Communities Project (SCP) and be eligible for a new full CEQA exemption if it further meets the additional requirements beyond the base criteria.

The land use input for the SCS was created with the use of Traffic Analysis Zones (TAZ) and Development Types. The Development Types used in the SCS do not represent detailed, parcel-level land use designations such as those found within a local jurisdiction's General Plan, but rather represent the aggregation of multiple land uses, densities and intensities that are expected to preponderate or average out within a neighborhood-sized area by 2035. Each Development Type is comprised of various characteristics related to employment and housing density, urban design, mix of land uses, and transportation options. Details describing the characteristics contained within each Development Type are available in Appendix: SCS Background Documentation. The lead agency, not SCAG, will be responsible for making the determination of consistency for CEQA streamlining purposes, pursuant to the provisions of SB 375, for any given proposed project. See Govt. Code § 65080(b)(2). One way of determining consistency is if a proposed residential/mixed use or TPP conforms with the Development Type designated for a TAZ

The Development Types are expressed in terms of use designations, densities and building intensities; and, for any given type, there is one residential density indicated. For example, the "Town Center" Development Type reflects an estimated average density of 22 residential units per acre. However, it is important to note that the designation is a potential ultimate average for the TAZ—and is not an absolute project-specific requirement that must be met in order to determine consistency with the SCS. In other words, the SCS was not developed with the intent that each project to be located within any given TAZ must exactly equal the density and relative use designations that are indicated by the SCS Development Type in order for the project to be found consistent with the SCS's use designation, density, building intensity and applicable policies. Instead, any given project, having satisfied all of the statutory requirements of either a residential/mixed-use project or TPP as described above, may be deemed by the lead agency to be consistent with the SCS so long as the project does not prevent achieving the estimated average uses, densities and building intensities indicated by the Development Type within the TAZ, assuming that the TAZ will be built-out under reasonable local planning and zoning assumptions.

SCAG's growth projection data is available on its website for lead agencies to utilize to determine whether projects are consistent with the SCS.

RTP/SCS Next Steps

The 2012 RTP/SCS is first and foremost a transportation plan. However, the transportation network in the RTP/SCS and the growth patterns envisioned in the Plan Alternative must complement each other. Integration of transportation and land use is essential for improved mobility and access to transportation options.

SB 375 calls for the integration of land use policies with transportation investments, and asks that Metropolitan Planning Organizations identify, quantify to the extent possible, and highlight these co-benefits throughout the processes.

To achieve the goals of the RTP/SCS, public agencies at all levels of government will need to implement a wide range of strategies that focus on four key areas:

- A Land Use growth pattern that accommodates the region's future employment and housing needs, and protects sensitive habitat and natural resource areas;
- A Transportation Network that consists of public transit, highways, local streets, bikeways and walkways;
- Transportation Demand Management (TDM) measures that reduce peak-period demand on the transportation network; and
- Transportation System Management (TSM) measures that maximize the efficiency of the transportation network.

The following tables list specific implementation strategies that local governments, SCAG and other stakeholders can and should undertake in order to successfully implement the SCS.

Image courtesy of City of Ontario

Local Efforts

Ontario New Model Colony General Plan

Since 1998, the City of Ontario has been developing a bold vision for its future growth, including the adoption of its General Plan and 3,303 acres of former agricultural land into its Sphere of Influence. The City's recent plans call for 13,000 new housing units across a broad range of housing types and a mix of business spaces oriented towards three mixed-use centers that are served by pedestrian-friendly roadways and a large central park. Emphasizing connections to corridors and transit, the City is creating a major regional center for Southern California.

TABLE 4.3 Land Use Actions and Strategies

Proposed Action/Strategy	Responsible Parties
Coordinate ongoing visioning efforts to build consensus on growth issues among local governments and stakeholders	SCAG
Provide incentives and technical assistance to local governments to encourage projects and programs that balance the needs of the region	SCAG
Collaborate with local jurisdictions and agencies to acquire a regional fair share housing allocation that reflects existing and future needs	SCAG, Local Jurisdictions, HCD
Expand Compass Blueprint program to support member cities in the development of bicycle, pedestrian, Safe Routes to Schools, Safe Routes to Transit, and ADA Transition plans.	SCAG, State
Collaborate with the region's public health professionals to enhance how SCAG addresses public health issues in its regional planning, programming, and project development activities.	SCAG, State
Seek partnerships with state, regional and local agencies to acquire funding sources for innovative planning projects	Local Jurisdictions, SCAG, State
Update local zoning codes, General Plans, and other regulatory policies to accelerate adoption of land use strategies included in the RTP/SCS Plan Alternative	Local Jurisdictions
Pursue joint development opportunities to encourage the development of housing and mixed-use projects around existing and planned rail stations or along high-frequency bus corridors, and in transit-oriented development.	Local Jurisdictions, CTCs
Working with local jurisdictions, identify resources that can be used for employing strategies to maintain and assist in the development of affordable housing.	SCAG, Local Jurisdictions
Consider developing healthy community or active design guidelines that promote physical activity and improved health	Local Jurisdictions
Support projects, programs, policies and regulations to protect resources areas, such as natural habitats and farmland, from future development	Local Jurisdictions, SCAG
Create incentives for local jurisdictions and agencies that support land use policies and housing options that achieve the goals of SB 375	State
Continue partnership with regional agencies to increase availability of state funding for integrated land use and transportation projects in the region	State, SCAG
Engage in a strategic planning process to determine the critical components and implementation steps for identifying and addressing open space resources	SCAG
Identify and map regional priority conservation areas for potential inclusion in future plans.	SCAG
Engage with various partners, including CTCs and local agencies, to determine priority conservation areas and develop an implementable plan.	SCAG, CTCs
Develop regional mitigation policies or approaches for the 2016 RTP	SCAG, CTCs

TABLE 4.4 Transportation Network Actions and Strategies

Proposed Action/Strategy	Responsible Parties
Perform and support studies with the goal of identifying innovative transportation strategies that enhance mobility and air quality, and determine practical steps to pursue such strategies.	SCAG, CTCs
Cooperate with stakeholders, particularly county transportation commissions and Caltrans, to prioritize funding sources for preservation and maintenance of the existing transportation network.	SCAG, CTCs, Local Jurisdictions
Encourage the development of new transit modes in our subregions such as BRT, rail, limited-stop service, and point-to-point express services utilizing the HOV and HOT lane networks.	SCAG, CTCs, Local Jurisdictions
Encourage transit providers to increase frequency and span-of-service in TOD/HQTA and along targeted corridors where there is latent demand for transit usage.	SCAG, CTCs
Encourage regional and local transit providers to develop rail interface services at Metrolink, Amtrak and high-speed rail stations.	SCAG, CTCs, Local Jurisdictions
Expand the Toolbox Tuesdays program to include bicycle safety design, pedestrian safety design, ADA design, training on how to use available resources that expand understanding of where collisions are happening, and information on available grant opportunities to improve bicycle and pedestrian safety.	SCAG, State
Prioritize transportation investments to support compact infill development that includes a mix of land uses and housing options, where appropriate, to maximize the benefits for existing communities, especially vulnerable populations, and to minimize any negative impacts.	SCAG, CTCs, Local Jurisdictions
Explore and implement innovative strategies and projects that enhance mobility and air quality, including those that increase the walkability of communities and accessibility to transit via non-auto modes	SCAG, CTC's, Local Jurisdictions
Collaborate with local jurisdictions to plan and develop residential and employment development around current and planned transit stations	SCAG, Local Jurisdictions
Collaborate with local jurisdictions to provide a network of local community circulators that serve new TOD and HQTAs, providing an incentive for residents and employees to make trips on transit	SCAG, CTCs, Local Jurisdictions
Similar to SCAG's partnership with the City of Los Angeles and LACMTA, offer to all County Transportation Commissions a mutually-funded, joint first mile/last mile study for each region.	SCAG, CTCs
Develop first-mile/last-mile strategies on a local level to provide an incentive for making trips by transit, bicycling or walking	CTCs, Local Jurisdictions
Encourage transit fare discounts and local vendor product and service discounts for residents and employees of TOD/HQTAs, or for a jurisdiction's local residents in general who have fare media	Local Jurisdictions
Work with transit properties and local jurisdictions to identify and remove barriers to maintaining on time performance	SCAG, CTCs, Local Jurisdictions
Develop policies and prioritize funding for strategies and projects that enhance mobility and air quality	State
Work with the California High-Speed Rail Authority and local jurisdictions to plan and develop optimal levels of retail, residential and employment development that fully takes advantage of new travel markets and rail travelers.	State
Lobby the state to provide funding for increased transit service in TOD/HQTA in support of reaching SB 375 goals.	SCAG, State
Continue to work with neighboring Metropolitan Planning Organizations to provide alternative modes for interregional travel, including Amtrak and other passenger rail services.	SCAG, State

TABLE 4.5 Transportation Demand Management (TDM) Actions and Strategies

Proposed Action/Strategy	Responsible Parties
Examine major projects and strategies that reduce congestion and emissions, and optimize the productivity and overall performance of the transportation system	SCAG
Develop comprehensive regional active transportation network along with supportive tools and resources that can help jurisdictions plan and prioritize new active transportation projects in their cities	SCAG, CTCs, Local Jurisdictions
Encourage the implementation of a Complete Streets policy	SCAG, CTCs
Support work-based programs that encourage emission reduction strategies	SCAG, Local Jurisdictions
Develop infrastructure plans and educational programs to promote active transportation options	Local Jurisdictions
Encourage the development of telecommuting programs by employers through review and revision of policies that may discourage alternative work options	Local Jurisdictions, CTCs
Emphasize active transportation projects as part of complying with the Complete Streets Act (AB 1358)	State, SCAG, Local Juridictions

TABLE 4.6 Transportation System Management (TSM) Actions and Strategies

Proposed Action/Strategy	Responsible Parties
Work with relevant state and local transportation authorities to increase the efficiency of the existing transportation system	SCAG, Local Jurisdictions, State
Collaborate with local jurisdictions to develop regional policies regarding TSM	SCAG, Local Jurisdictions
Contribute to and utilize regional data sources to ensure efficient integration of the transportation system	SCAG, CTCs
Provide training opportunities for local jurisdictions on TSM strategies, such as Intelligent Transportation Systems (ITS)	SCAG, Local Jurisdictions
Collaborate with local jurisdictions to continually update the ITS inventory	SCAG, Local Jurisdictions
Collaborate with CTCs to regularly update the county and regional ITS architecture	SCAG, CTCs, Local Jurisdictions
Collaborate with the State and Federal Government to examine potential innovative TSM strategies.	SCAG, State

Other Supportive Strategies

REGIONAL AND LOCAL EFFORTS TO ADOPT CLEAN VEHICLE TECHNOLOGY

SCAG is leading a regional effort with the goal of accelerating fleet conversion to electric and other zero-emission transportation technologies. To accommodate the anticipated increase in Plug-In Electric Vehicles (PEV), a significant expansion of charging infrastructure is needed throughout the region, among other preparedness steps. In response to PEV market forecasts, SCAG has developed a robust work program to prepare for the influx of PEVs, in collaboration with the South Coast Air Quality Management District, Southern California Edison, Western Riverside Council of Governments (WRCOG), the South Bay Cities Council of Governments (SBCCOG) and a wide array of stakeholders.

With funding assistance from the U.S. Department of Energy and the California Energy Commission, SCAG will develop a Regional PEV Readiness Plan with two complementary subregional plans for WRCOG and SBCCOG. The subregional plans will serve as models for other subregions as they begin to develop their own PEV Readiness Plans. A key outcome of the planning effort will be charge port infrastructure plans including updated maps of prime charging locations and strategies for accelerating the deployment of PEV charging equipment. It will include best practices for "PEV-ready" buildings and guidelines for streamlining the permitting, installation and inspection of charging equipment. The goal is to promote wider adoption of alternatively fueled vehicles to reduce the use of fossil fuels, improve air quality and simultaneously reduce GHG emissions in the SCAG region and the state.

In response, the 2012 RTP/SCS supports the increased adoption of near zero and zero emission technologies. This RTP/SCS includes policies supporting and promoting the introduction of electric and other zero-emission vehicles, commits to the work program and pending studies as part of an implementation effort to facilitate acceleration of fleet turnover, and estimates the impact of regional, subregional, and local activities on transportation GHG in the region. Additional information regarding air quality and energy is included in Chapter 1 and Appendix: The Role of Vehicle Technology in Meeting Long-Term Air Quality and Energy Challenges.

TABLE 4.7 Clean Vehicle Technology Actions and Strategies

Proposed Action/Strategy	Responsible Parties
Develop a Regional PEV Readiness Plan with a focus on charge port infrastructure plans to support and promote the introduction of electric and other zero-emission vehicles in Southern California	SCAG
Support subregional strategies to develop infrastructure and supportive land uses to accelerate fleet conversion to electric technologies. The activities committed in the two subregions (Western Riverside COG and South Bay Cities COG) are put forward as best practices that others can adopt in the future (See Appendix: The Role of Vehicle Technology in Meeting Long-Term Air Quality and Energy Challenges, for more information)	SCAG, Local Jurisdictions

Evaluation and Revision

SCAG will update its RTP/SCS in 2016, in accordance with applicable federal and state laws. As part of this update, SCAG will be reviewing its progress in implementing the strategies identified in this plan. In addition, the GHG emission reduction targets are reevaluated at least every eight years, and may be revised every four years by CARB. This will enable the state and SCAG to consider changes in circumstances, funding availability, technological advances, new legislation, and other considerations that could arise over time.

SCAG will also track its progress in implementing its RTP/SCS strategies in conjunction with the preparation and adoption of its Overall Work Program and Annual Budget. The OWP / Budget process provides an opportunity for SCAG to allocate staff resources and funding to implement short-term and mid-term strategies contained within the RTP/SCS. In addition, SCAG will periodically monitor the progress being made by the State, the CTCs, local jurisdictions, and other agencies and entities in implementing the strategies identified in this plan.

Monitoring Progress

While SB 375 places a great deal of attention on meeting GHG emission reduction targets, SCAG has also established other important goals in its RTP/SCS that will lead to overall improvement in the quality of life in the region. It will be important for SCAG to continue to improve its performance monitoring programs, such as the State of the Region report, etc., to track how well the region is doing in terms of overall progress toward meeting these goals.

Sustainable Communities Strategy Requirements Matrix

The following table outlines the requirements of SB 375 and how each is addressed in the 2012 RTP/SCS.

TABLE 4.8 Sustainable Communities Requirements Matrix

Required Element	Addressed
CGC Section 65080(b) (2).(B) *Each metropolitan organization shall prepare a sustainable communities strategy, subject to the requirements of Part 450 of Title 23 of, and Part 93 of Title 40 of, the Code of Federal Regulations, including the requirement to utilize the most recent planning assumptions considering local general plans and other factors.*	The RTP/SCS complies with all requirements. Reference: 2012 RTP/SCS Chapter 4: Sustainable Communities Strategy, p. 105
CGC Section 65080(b) (2).(B) i. *Identify the general location of uses, residential densities, and building intensities within the region*	The SCS identifies the future land use pattern of the SCAG region in Exhibit 4.13-Exhibit 4.19, and additional exhibits in Appendix: Background Documentation. Residential densities and building intensities are determined by community types, which are made-up of information relating to the characteristics of the landscape including jobs and housing density, urban design and mix of land uses. Reference: 2012 RTP/SCS Chapter 4: Sustainable Communities Strategy, p. 117 2012 RTP/SCS Appendix: SCS Background Documentation 2012 RTP/SCS Appendix: Growth Forecast
CGC Section 65080(b) (2).(B) ii. *Identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan taking into account net migration into the region, population growth, household formation and employment growth*	The SCS identifies areas sufficient to house the entire population in the region in Exhibit 4.13-Exhibit 4.19, and additional exhibits in Appendix: Background Documentation. Projected capacity for these areas utilized the Integrated Growth Forecast for population, jobs, and households as contained in Appendix: Growth Forecast. Table 4.1 and Table 4.2 show projected housing capacity by community type for 2020 and 2035. Reference: 2012 RTP/SCS Chapter 4: Sustainable Communities Strategy, p. 123 2012 RTP/SCS Appendix: SCS Background Documentation 2012 RTP/SCS Appendix: Growth Forecast

Required Element	Addressed
CGC Section 65080(b) (2).(B) iii. *Identify areas within the region sufficient to housing an eight-year projection of the regional housing need for the region pursuant to Section 65584*	The RTP/SCS identifies areas sufficient to house an eight-year projection of the regional housing need in Exhibit 4.13-Exhibit 4.19, and additional exhibits in Appendix: SCS Background Documentation. Table 4.1 and Table 4.2 show projected housing capacity by community type for 2020 and 2035. Reference: 2012 RTP/SCS Chapter 4: Sustainable Communities Strategy, p. 123 2012 RTP/SCS Appendix: SCS Background Documentation
CGC Section 65080(b) (2).(B) iv. *Identify a transportation network to service the transportation needs of the region*	The RTP/SCS identifies the regional transportation network in Exhibit 4.10, Exhibit 4.11, and Exhibit 4.12. Detailed descriptions of SCAG's transportation network is found in Chapter 2 of the 2012 RTP. Reference: 2012 RTP/SCS Chapter 4: Sustainable Communities Strategy, p. 129 2012 RTP/SCS Chapter 2: Transportation Investments, p. 35
CGC Section 65080(b) (2).(B) v. *Gather and consider the best practically available scientific information regarding resource areas and farmland in the region as defined in subdivisions (a) and (b) of Section 65080.01*	The RTP/SCS lists sources for the best available scientific information regarding resource areas and farmland in the region, and identifies these areas in Exhibit 4.6, Exhibit 4.7 and Exhibit 4.8. Reference: 2012 RTP/SCS Chapter 4: Sustainable Communities Strategy, p. 128 2012 RTP/SCS Chapter 2: Transportation Investments, p. 75
CGC Section 65080(b) (2).(B) vi. *Consider the state housing goals specified in Sections 65580 and 65581*	The RTP/SCS considers the state housing goals as specified in Sections 65580 and 65581. Reference: 2012 RTP/SCS Chapter 4: Sustainable Communities Strategy, p. 123 2012 RTP/SCS Appendix: SCS Background Documentation

Required Element	Addressed
CGC Section 65080(b) (2).(B) vii. *Set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board*	Exhibit 4.13-Exhibit 4.19 of the SCS identifies the forecasted development pattern for the region. Along with the identified transportation network in Exhibit 4.10-Exhibit 4.12, the identified land use pattern achieves the GHG emission reduction targets of 8% in 2010 and 13% in 2035. Detailed analysis and performance results of the integrated land use pattern and transportation network and strategies is found in Chapter 5 and Appendix: Performance Measures. Reference: 2012 RTP/SCS Chapter 4: Sustainable Communities Strategy, p. 140 2012 RTP/SCS Chapter 5: Measuring Up, p. 161 2012 RTP/SCS Appendix: Transportation Conformity Analysis 2012 RTP/SCS Appendix: Performance Measures
CGC Section 65080(b) (2).(B) viii. *Allow the regional transportation plan to comply with Section 176 of the federal Clean Air Act (42 U.S.C. Sec. 7506)*	The RTP/SCS complies with this requirement. Reference: 2012 RTP/SCS Chapter 4: Sustainable Communities Strategy, p. 140 2012 RTP/SCS Appendix: Transportation Conformity Analysis
CGC Section 65080(b) (2).(D) *The metropolitan planning organization shall conduct at least two informational meetings in each county within the region for members of the board of supervisors and city councils on the sustainable communities strategy and alternative planning strategy.*	SCAG has adopted a public participation plan that includes at least two informational meetings in each county for members of city councils and board of supervisors. Reference: 2012 RTP/SCS Chapter 6: Public Participation Plan, p. 193 2012 RTP/SCS Appendix: Public Participation and Consultation
CGC Section 65080(b) (2).(E) *Each metropolitan planning organization shall adopt a public participation plan, for development of the sustainable communities strategy and an alternative planning strategy, if any, that includes the following:*	SCAG has adopted a public participation plan. Reference: 2012 RTP/SCS Chapter 6: Public Participation Plan, p. 193 2012 RTP/SCS Appendix: Public Participation and Consultation
(i) Outreach efforts to encourage active participation of a broad range of stakeholder groups in the planning process, consistent with the agency's adopted Federal Public Participation Plan, including, but not limited to, affordable housing advocates, transportation advocates, neighborhood and community groups, environmental advocates, home builder representatives, broad-based business organizations, landowners, commercial property interest, and homeowner associations.	The public participation plan details planning efforts that comply with and exceed the requirements. SCAG met extensively with partner agencies, non-profit, advocacy, neighborhood and community groups beginning with target setting consultation and continuing through the workshop process. Reference: 2012 RTP/SCS Chapter 6: Public Participation Plan, p. 193 2012 RTP/SCS Appendix: Public Participation and Consultation

Required Element	Addressed
(ii) Consultation with congestion management agencies, transportation agencies, and transportation commissions.	The public participation plan includes consultation with these agencies. Reference: 2012 RTP/SCS Chapter 6: Public Participation Plan, p. 193 2012 RTP/SCS Appendix: Public Participation and Consultation
(iii) Workshops throughout the region to provide the public with the information and tools necessary to provide clear understanding of the issues and policy choices. At least one workshop shall be held in each county in the region. For counties with a population greater than 500,000, at least three workshops shall be held. Each workshop, to the extent practicable shall include urban simulation computer modeling to create visual representation of the sustainable communities strategy and the alternative planning strategy.	The public participation plan details planning efforts that comply with and exceed the requirements. SCAG held 18 workshops throughout the region, in addition to countless local agency planning sessions. Reference: 2012 RTP/SCS Chapter 6: Public Participation Plan, p. 193 2012 RTP/SCS Appendix: Public Participation and Consultation
(v) At least three public hearings on the draft sustainable communities strategy in the regional transportation plan and alternative planning strategy, if one is prepared. If the metropolitan transportation organization consists of a single county, at least two public hearings shall be held. To the maximum extent feasible, the hearings shall be in different parts of the region to maximize the opportunity for participation by members of the public throughout the region.	The public participation plan includes at least three public hearings on the draft RTP/SCS. Reference: 2012 RTP/SCS Chapter 6: Public Participation Plan, p. 193 2012 RTP/SCS Appendix: Public Participation and Consultation
(vi) A process for enabling members of the public to provide a single request to receive notices, information and updates.	The public participation plan includes a process for members of the public to provide a single request to receive notices, information and updates on the RTP/SCS. Reference: 2012 RTP/SCS Chapter 6: Public Participation Plan, p. 193 2012 RTP/SCS Appendix: Public Participation and Consultation
CGC Section 65080(b) (2).(F) *In preparing a sustainable communities strategy, the metropolitan planning organization shall consider spheres of influence that have been adopted by the local agency formation commissions within its region.*	SCAG's Growth Forecast considers the spheres of influence adopted by the local agency formation commission. Reference: 2012 RTP/SCS Appendix: Growth Forecast
CGC Section 65080(b) (2).(G) *Prior to adopting a sustainable communities strategy, the metropolitan planning organization shall quantify the reduction in greenhouse gas emissions projected to be achieved by the sustainable communities strategy and set forth the difference, if any, between the amount of that reduction and the target for the region established by the state board.*	The RTP/SCS complies with this requirement. Reference: 2012 RTP/SCS Chapter 4: Sustainable Communities Strategy, p. 105

Required Element	Addressed
CGC Section 65080(b) (2).(J) *Neither a sustainable communities strategy nor an alternative planning strategy regulates the use of land, nor, except as provided by subparagraph (I), shall either one be subject to any state approval. Nothing in a sustainable communities strategy shall be interpreted as superseding the exercise of the land use authority of cities and counties within the region. Nothing in this section shall be interpreted to limit the state board's authority under any other provision of law. Nothing in this section shall be interpreted to authorize the abrogation of any vested right whether created by statute or by common law. Nothing in this section shall require a city's or county's land use policies and regulations, including its general plan, to be consistent with the regional transportation plan or an alternative planning strategy. Nothing in this section requires a metropolitan planning organization to approve a sustainable communities strategy that would be consistent with Part 450 of Title 23 of, or Part 93 of Title 40 of, the Code of Federal Regulations and any administrative guidance under those regulations. Nothing in this section relieves a public or private entity or any person from compliance with any other local, state, or federal law.*	The RTP/SCS complies with this requirement.
CGC Section 65080(b) (2).(K) *Nothing in this section requires projects programmed for funding on or before December 31,2011, to be subject to the provisions of this paragraph if they (i) are contained in the 2007 or 2009 Federal Statewide Transportation Investment Program, (ii) are funded pursuant to Chapter 12.49 (commencing with Section 8879.20) of Division 1 of Title 2, or (iii) were specifically listed in a ballot measure prior to December 31, 2008, approving a sales tax increase for transportation projects. Nothing in this section shall require a transportation sales tax authority to change the funding allocations approved by the voters for categories of transportation projects in a sales tax measure adopted prior to December 31, 2010. For purposes of this subparagraph, a transportation sales tax authority is a district, as defined in Section 7252 of the Revenue and Taxation Code, that is authorized to impose a sales tax for transportation purposes.*	The RTP/SCS complies with this requirement.
CGC Section 65080(b) (4).(C) *The metropolitan planning organization or county transportation agency, whichever entity is appropriate, shall consider financial incentives for cities and counties that have resource areas or farmland, as defined in Section 65080.01, for the purposes of, for example, transportation investments for the preservation and safety of the city street or county road system and farm to market and interconnectivty transportation needs. The metropolitan planning organization or county transportation agency, whichever entity is appropriate, shall also consider financial assistance for counties to address countywide service responsibilities in counties that contribute towards the greenhouse gas emission reduction targets by implementing policies for growth to occur within their cities.*	The RTP/SCS complies with this requirement.

Required Element	Addressed
CGC Section 65080.1 *Each transportation planning agency designated under Section 29532 or 29532.1 whose jurisdiction includes a portion of the California Coastal Trail, or property designated for the trail, that is located within the coastal zone, as defined in Section 30103 of the Public Resources Code, shall coordinate with the State Coastal Conservancy, the California Coastal Commission, and the Department of Transportation regarding development of the California Coastal Trail, and each transportation planning agency shall include provisions for the California Coastal Trail in its regional plan, under Section 65080.*	The RTP/SCS complies with this requirement.
CGC Section 65080.3 *(a) Each transportation planning agency with a population that exceeds 200,000 persons may prepare at least one "alternative planning scenario" for presentation to local officials, agency board members, and the public during the development of the triennial regional transportation plan and the hearing required under subdivision (c) of Section 65080.* *(b) The alternative planning scenario shall accommodate the same amount of population growth as projected in the plan but shall be based on an alternative to attempts to reduce the growth in traffic congestion, make more efficient use of existing transportation infrastructure, and reduce the need for costly future public infrastructure.* *(c) The alternative planning scenario shall be developed in collaboration with a broad range of public and private stakeholders, including local elected officials, city and county employees, relevant interest groups, and the general public. In developing the scenario, the agency shall consider all of the following:* *(1) Increasing housing and commercial development around transit facilities and in close proximity to jobs and commercial activity centers.* *(2) Encouraging public transit usage, ridesharing, walking, bicycling, and transportation demand management practices.* *(3) Promoting a more efficient mix of current and future job sites, commercial activity centers, and housing opportunities.* *(4) Promoting use of urban vacant land and "brownfield" development.* *(5) An economic incentive program that may include measures such as transit vouchers and variable pricing for transportation.*	N/A The SCAG region has chosen to prepare an SCS, which is in Chapter 4 of the 2012 RTP/SCS.

Required Element	Addressed
(d) The planning scenario shall be included in a report evaluating all of the following: *(1) The amounts and locations of traffic congestion.* *(2) Vehicle miles traveled and the resulting reduction in vehicle emissions.* *(3) Estimated percentage share of trips made by each means of travel specified in subparagraph (C) of paragraph (1) of subdivision (b) of Section 65080.* *(4) The costs of transportation improvements required to accommodate the population growth in accordance with the alternative scenario.* *(5) The economic, social, environmental, regulatory, and institutional barriers to the scenario being achieved.* *(e) If the adopted regional transportation plan already achieves one or more of the objectives set forth in subdivision (c), those objectives need not be discussed or evaluated in the alternative planning scenario.* *(f) The alternative planning scenario and accompanying report shall not be adopted as part of the regional transportation plan, but it shall be distributed to cities and counties within the region and to other interested parties, and may be a basis for revisions to the transportation projects that will be included in the regional transportation plan.* *(g) Nothing in this section grants transportation planning agencies any direct or indirect authority over local land use decisions.* *(h) This section does not apply to a transportation plan adopted on or before September 1, 2001, proposed by a transportation planning agency with a population of less than 1,000,000 persons.*	

05 MEASURING UP

Introduction

The investments identified in the 2012 RTP/SCS are expected to result in significant benefits to the region, not only with respect to transportation and mobility, but also air quality, economic activity and job creation, sustainability and environmental justice. This chapter describes the benefits and outcomes projected to result from the implementation of the RTP/SCS with respect to the adopted performance measures. This chapter also describes how the RTP/SCS addresses the statutory requirements regarding environmental justice, SB 375, and transportation conformity.

Performance Outcomes

This section summarizes how well the 2012 RTP/SCS performs. **TABLE 5.1** lists the performance outcomes and associated measures used to forecast performance using the SCAG Regional Travel Demand Model (RTDM). In addition, this section provides estimates of performance improvements for two different outcomes that do not rely on the RTDM: productivity and reliability. While this chapter includes summaries of the performance improvements expected from the implementation of the RTP/SCS, more detail is provided under separate cover in the Performance Measures technical appendix.

Two new outcomes have been added in the 2012 RTP/SCS: location efficiency and public health. The location efficiency outcome reflects the degree to which land use is improved to provide shorter and easier access to desired destinations, therefore encouraging the transit and active transportation modes. The health outcome monitors pollution emitted from transportation, which causes health problems such as asthma and even premature deaths.

In the discussion of performance and outcomes, three scenarios are referenced: Base Year, Baseline, and Plan. The 2008 Base Year represents existing conditions, and is based on the transportation system on the ground and in service in 2008. The 2035 Baseline assumes current land use trends and represents a future in which only committed programs and projects are implemented, and is based on projects programmed in the 2011 Federal Transportation Improvement Program (FTIP) that have received environmental clearance. The 2035 Plan represents future conditions in which the 2012 RTP/SCS investments and strategies are fully realized. The specific projects associated with Baseline and Plan are identified in the 2012 RTP/SCS Project List report.

TABLE 5.1 Adopted 2012 RTP Outcomes and Performance Measures/Indicators

Outcome	Performance Measure/ Indicator	Definition	Performance Target	Data Sources Used
Location Efficiency	Share of growth in High Quality Transit Areas (HQTAs)	Share of the region's growth in households and employment in HQTAs	Improvement over No Project Baseline	Census (including annual American Community Survey), InfoUSA
	Land consumption	Additional land needed for development that has not previously been developed or otherwise impacted, including agricultural land, forest land, desert land and other virgin sites	Improvement over No Project Baseline	Rapid Fire Model
	Average distance for work or non-work trips	The average distance traveled for work or non-work trips separately	Improvement over No Project Baseline	Travel Demand Model
	Percent of work trips less than 3 miles	The share of total work trips which are fewer than 3 miles	Improvement over No Project Baseline	Travel Demand Model
	Work trip length distribution	The statistical distribution of work trip length in the region	Improvement over No Project Baseline	Travel Demand Model
Mobility and Accessibility	Person delay per capita	Delay per capita can be used as a supplemental measure to account for population growth impacts on delay.	Improvement over No Project Baseline	Travel Demand Model
	Person delay by facility type (mixed flow, HOV, arterials)	Delay – excess travel time resulting from the difference between a reference speed and actual speed.	Improvement over No Project Baseline	Travel Demand Model
	Truck delay by facility type (Highway, Arterials)	Delay – excess travel time resulting from the difference between a reference speed and actual speed.	Improvement over No Project Baseline	Travel Demand Model
	Travel time distribution for transit, SOV, HOV for work and non-work trips	Travel time distribution for transit, SOV, HOV for work and non-work trips	Improvement over No Project Baseline	Travel Demand Model
Safety and Health	Collision/accident rates by severity by mode	Accident rates per million vehicle miles by mode (all, bicycle/pedestrian and fatality/killed)	Improvement over Base Year	CHP Accident Data Base, Travel Demand Model Mode Split Outputs
	Criteria pollutants emissions	CO, NO_X, $PM_{2.5}$, PM_{10}, and VOC	Meet Transportation Conformity requirements	Travel Demand Model/ ARB EMFAC Model

Outcome	Performance Measure/ Indicator	Definition	Performance Target	Data Sources Used
Environmental Quality	Criteria pollutant and greenhouse gas emissions	CO, NO_X, $PM_{2.5}$, PM_{10}, and VOC Per capita greenhouse gas emissions (CO_2)	Meet Transportation Conformity requirements and SB375 per capita GHG reduction targets	Travel Demand Model/ ARB EMFAC Model
Economic Well Being	Additional jobs supported by improving competitiveness	Number of jobs added to the economy as a result of improved transportation conditions which make the region more competitive	Improvement over No Project Baseline	Regional Economic Model REMI
	Additional jobs supported by transportation investment	Total number of jobs supported in the economy as a result of transportation expenditures.	Improvement over No Project Baseline	Regional Economic Model REMI
	Net contribution to Gross Regional Product	Gross Regional Product due to transportation investments and increased competitiveness	Improvement over No Project Baseline	Regional Economic Model REMI
Investment Effectiveness	Benefit/Cost Ratio	Ratio of monetized user and societal benefits to the agency transportation costs	Greater than 1.0	California Benefit Cost Model
System Sustainability	Cost per capita to preserve multi-modal system to current and state of good repair conditions	Annual costs per capita required to preserve the multi-modal system to current conditions	Improvement over Base Year	Estimated using SHOPP Plan and recent California Transportation Commission 10-Year Needs Assessment

Performance measures tied to goals for reliability, preservation, productivity, health, energy efficiency, and security cannot currently be reliably forecasted and are not included in Table 5.1. However, SCAG has identified related measures to be used for monitoring purposes, and these are discussed in the Performance Measures technical report.

Location Efficiency

This is a new outcome for the 2012 RTP/SCS. This outcome has several associated performance measures that reflect the impact of improved land use and transportation coordination in support of the Sustainable Community Strategies (SCS) required under SB 375.

This outcome reflects the degree to which improved land use and transportation coordination measures impact the efficient movement of people and goods. The measures used to describe this outcome include:

- Share of growth in High Quality Transit Areas
- Land consumption (total and per capita),
- Average distance for work or non-work trips,
- Percent of work trips less than three miles, and
- Work trip length distribution.

There are several additional measures that will be used for on-going monitoring, and these will be discussed in the technical appendix.

SHARE OF GROWTH IN HIGH-QUALITY TRANSIT AREAS (HQTA)

Between 2008 and 2035, both the shares of growth in both household and employment in the HQTAs are projected to increase from the Baseline scenario to the Plan scenario. Specifically, the share of growth in households in HQTAs increases from 24 percent under the Baseline to 51 percent under the Plan. During the same period, the share of growth in employment in HQTAs increases from 31 percent under the Baseline to 53 percent under the Plan.

LAND CONSUMPTION

Greenfield land consumption refers to development that occurs on land that has not previously been developed or otherwise impacted, including agricultural land, forest land, desert land and other virgin sites. As discussed above, the Plan directs more growth into the HQTAs than the Baseline. The vast majority of HQTAs is within the existing urbanized areas. Accordingly, the Plan consumes 408 square miles less “greenfield” land than the Baseline, 334 square miles compared to 742 square miles.

AVERAGE DISTANCE FOR WORK OR NON-WORK TRIPS

In 2035, the average distance for work trips is projected to decrease from 14.8 miles under the Baseline to 14.7 miles under the Plan. The average distance for non-work trips is projected to increase slightly from 8.5 miles under the Baseline to 8.7 miles under the Plan.

PERCENT OF WORK TRIPS LESS THAN THREE MILES

The vast majority of work trips in Southern California have consistently relied on the single-occupant automobile. When the work trip length becomes shorter, particularly within a few miles, it increases the likelihood of using alternative modes such as transit or biking. By 2035, the share of work trips less than three miles is projected to increase from 15.5 percent under the Baseline to 16.4 percent under the Plan.

WORK TRIP LENGTH DISTRIBUTION

Under the Plan, more than half (52 percent) of the total work trips are less than 10 miles. Eighteen percent of the total work trips are longer than 25 miles. Additional information on work trip length distribution is provided in the Performance Measures technical appendix.

Mobility and Accessibility

In the 1998 California Transportation Plan, this outcome is defined as, "Reaching desired destinations with relative ease within a reasonable time, with reasonable choices." In prior RTPs, mobility and accessibility were included as separate outcomes. For the 2012 RTP/SCS, these have been combined into a single outcome with multiple performance measures. This section discusses the mobility and accessibility performance indicators and provides results based on outputs from the SCAG RTDM.

MOBILITY

The mobility performance measure relies on the commonly used measure of delay. Delay is the difference between the actual travel time and the travel time at some pre-defined reference or "optimal" speed for each mode alternative under analysis. It is measured in vehicle-hours of delay (VHD), which can then be used to derive person hours of delay. This is a relatively straightforward measure to calculate using real-world and modeled data, is understandable by both transportation professionals and the general public, and can be forecast for the 2035 future scenarios.

The mobility measures used to evaluate alternatives for this outcome are:

- Person Movement Delay by Facility Type (Mixed Flow, HOV, Arterials),
- Person Delay per Capita, and
- Truck delay by facility (Highway, Arterial).

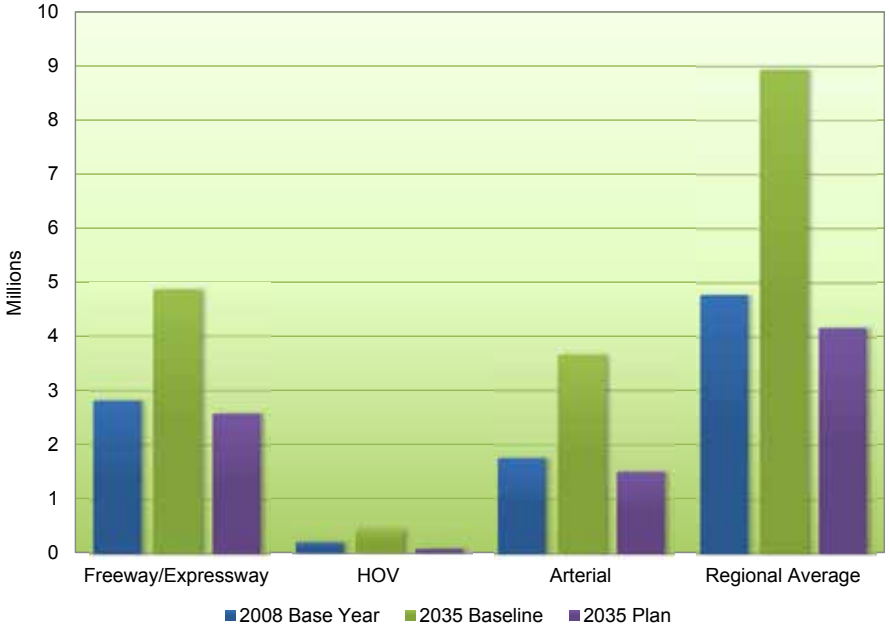
One additional measure for delay that is readily available for on-going monitoring, but that cannot be readily forecast, is non-recurrent delay. Recurrent congestion is the day-to-day congestion that occurs because too many vehicles are on the road at the same time. Non-recurrent congestion is the congestion that is caused by accidents, weather, special events, or other atypical incidents.

Non-recurrent congestion can be mitigated or reduced by improving incident management strategies. Other smart uses of technologies such as traffic signal coordination and the provision of real-time information about unexpected delays allows travelers to make better decisions about available transit or other alternatives.

Person Delay by Facility Type (Mixed Flow Freeways, HOV, Arterials)

For the 2012 RTP/SCS, this measure has been expanded to differentiate between single-occupancy vehicle (SOV) and high occupancy vehicle (HOV) delay. As shown in **FIGURE 5.1**, person-hours of delay is expected to increase from Base Year to Baseline, but overall the Plan will improve on Baseline conditions by 48 percent, to conditions that are better than what is experienced today.

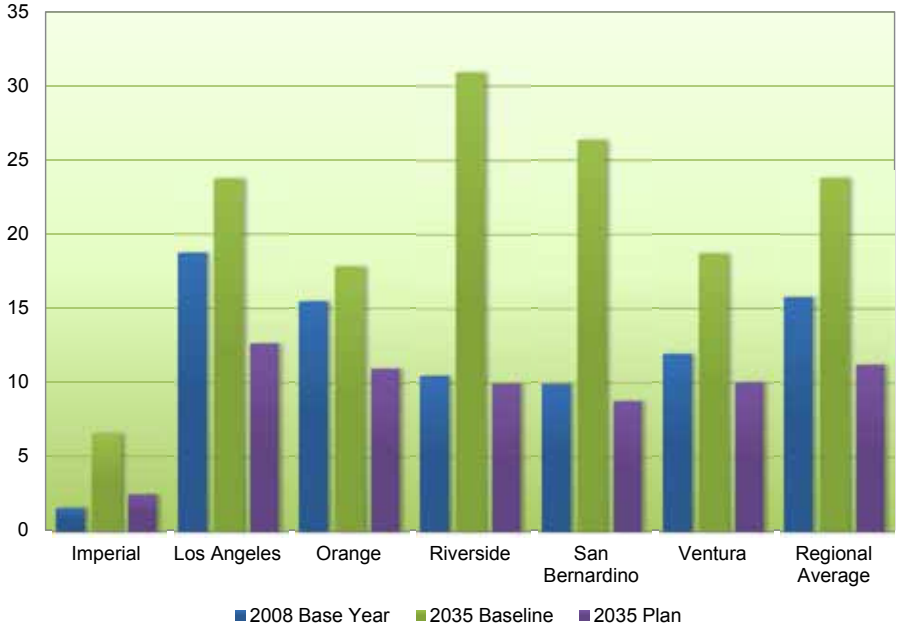
FIGURE 5.1 Person-Hours of Delay by Facility Type



Person Delay per Capita

FIGURE 5.2 shows the person-hours of delay per capita for each of the six counties in the region and for the SCAG region as a whole. Normalizing delay by the number of people living in an area provides insight as to how well the region is mitigating traffic congestion in light of increasing population growth. Delay per capita is expected to grow considerably, particularly in the Inland Empire counties of Riverside and San Bernardino, under the Baseline conditions. However, implementation of the Plan is expected to reduce delay substantially, to below 2008 levels. The regional average delay per capita is expected to improve from over 20 minutes under the Baseline, to over 10 minutes under the Plan. Not only does this represent a 48 percent improvement over Baseline, but a 30 percent improve over Base Year as well.

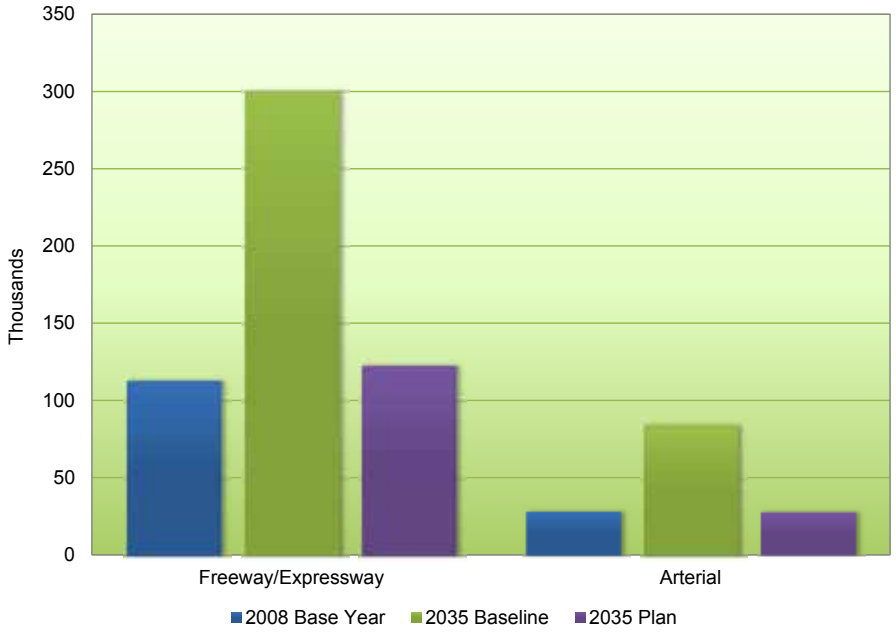
FIGURE 5.2 Person-Hours of Delay per Capita by County



Truck Delay by Facility Type (Highway, Arterials)

This measure estimates the average daily truck delay by facility type for freeways and arterials (**FIGURE 5.3**). The RTP/SCS includes significant investments in a regional freight corridor and other improvements to facilitate goods movement. The Plan is estimated to reduce truck delay by 55 percent over Baseline on the freeway system, and by 58 percent on the arterial system. However, the truck delay under the Plan will still be above Base Year levels.

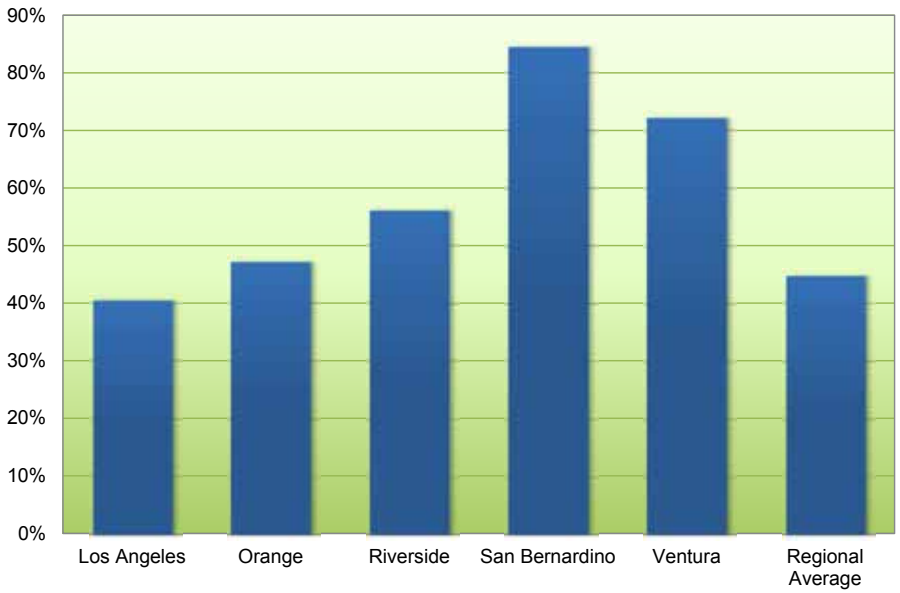
FIGURE 5.3 Heavy Duty Truck Hours of Delay



Highway Non-Recurrent Delay

This indicator identifies how much congestion can be considered to be atypical. Non-recurrent congestion is the congestion caused by accidents, weather, special events or other incidents. This type of congestion can be addressed by strategic operational investments such as traveler information, incident management, and ramp metering. **FIGURE 5.4** shows the relative amount of freeway congestion that is estimated to be caused by non-recurrent events. Regionwide, approximately 45 percent of freeway congestion is estimated to be non-recurrent, but this estimate varies widely by county.

FIGURE 5.4 Non-Recurrent Congestion by County (2009)



More suburban or rural areas with less overall congestion have a higher percentage of all congestion represented by non-recurring events. San Bernardino County, for example, is estimated to have a majority of its congestion as non-recurrent in 2009. (The actual percentage is likely exaggerated due to the manner in which PeMS handles some data; more research is needed to verify this assessment.) In contrast, the more urbanized Los Angeles County had just over 40 percent of its total congestion represented by non-recurring incidents.

Speed Maps

EXHIBITS 5.1 through **5.3** depict the region's freeway speed conditions during the afternoon peak period (3pm to 7pm) based upon the SCAG RTDM results for Base Year 2008, Baseline 2035 and Plan 2035. Additional speed maps are provided in the Highways and Arterials technical appendix.

EXHIBIT 5.1 Base Year 2008 Freeway Speed – PM Peak (3pm–7pm)

EXHIBIT 5.2 Baseline 2035 Freeway Speed – PM Peak (3pm–7pm)

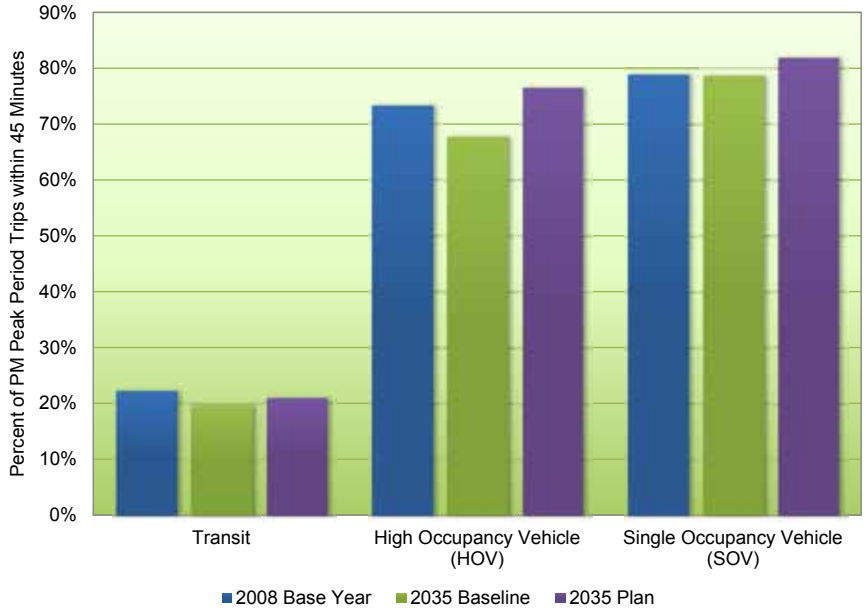
EXHIBIT 5.3 Plan 2035 Freeway Speed – PM Peak (3pm–7pm)

ACCESSIBILITY

Accessibility is used to capture how well the transportation system performs in providing people access to opportunities. Opportunities can include anything from jobs, education, medical care, recreation, shopping, or another activity that helps improve a person's life. For the 2012 RTP/SCS, accessibility is simply defined as the distribution of trips by mode by travel time.

As with the 2008 RTP, accessibility is measured by taking afternoon or PM peak period travel demand model results for the base and forecast years, and identifying the percentage of commute or home-based work trips that are completed within 45 minutes. **FIGURE 5.5** shows these results. In all cases, the 2035 Plan improves accessibility for home-based work trips over the baseline.

FIGURE 5.5 Percentage of PM Peak Period Home-Based Work Trips within 45 Minutes



The 2012 RTP/SCS provides a more comprehensive measure of accessibility by including transit and HOV accessibility as well as non-work and work trips in the indicator. Results for the following were added to the 2012 RTP/SCS based upon stakeholder input:

- Distributions of travel time (i.e., not just percent completed within 45 minutes),
- High occupancy vehicles (HOV) for each of the three modeled years,
- AM, midday, evening and night accessibility for each of the three modeled years for all three modes (transit, SOV, and HOV), and
- Non work trips for each of the three modeled years for all three modes (transit, SOV, and HOV) for all five time periods.

Productivity and Reliability

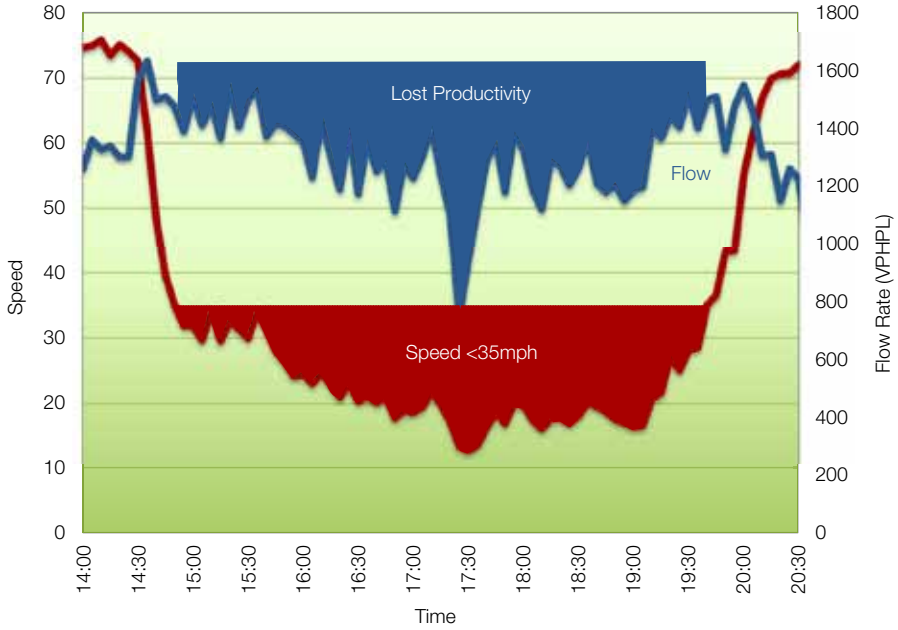
As with the non-recurrent congestion measure described in the previous section, the productivity and reliability outcomes cannot be readily forecast and are not used for alternatives analysis in the 2012 RTP/SCS. They do, however, provide some guidance on how much benefit can be obtained by regional investments in operational improvements. The productivity and reliability estimates presented here are based in part on Corridor System Management Plans (CSMPs) developed recently in the SCAG region. Productivity and reliability are critical since they reflect the improvements in efficiency and non-recurrent congestion, respectively. SCAG plans to monitor the progress achieved in improving productivity and reliability on a regular basis moving forward.

PRODUCTIVITY

The productivity outcome reflects the degree to which the transportation system performs during peak demand conditions. It is a system efficiency measure. The productivity indicator is defined as the percent utilization during peak demand conditions.

For highways, productivity is particularly important because when we need capacity the most, we often get the lowest "production" from our system. On some corridors throughput can decline as much as 50 percent during peak periods, and most congested urban corridors typically lose 25 percent of their capacity during rush hour. This loss of productivity is shown in **FIGURE 5.6**, which depicts how much vehicle throughput declines (i.e., productivity is lost) during rush hour.

FIGURE 5.6 Illustrative Highway Productivity Losses



Source: Caltrans Freeway Performance Measurement System (PeMS) for Los Angeles I-5 southbound; postmile 11.54, Washington Blvd; 10/19/2011; vehicle detector station 716924.

FIGURE 5.7 summarizes the current estimate for productivity losses on the region's freeway system and the expected improvements due to Plan investments. Maximizing the system's productivity is a critical goal of this RTP, and the overall system management approach aims to recapture lost productivity. The incremental investment of $6.2 billion to implement advanced operational strategies on our freeways and arterials is projected to recapture 20 percent of the lost productivity. These projections are based on recent studies indicating that investments in ramp metering, arterial signal coordination, traveler information, and incident management can achieve such improvements and more.

FIGURE 5.7 Highway System Productivity (Lost Lane-Miles)

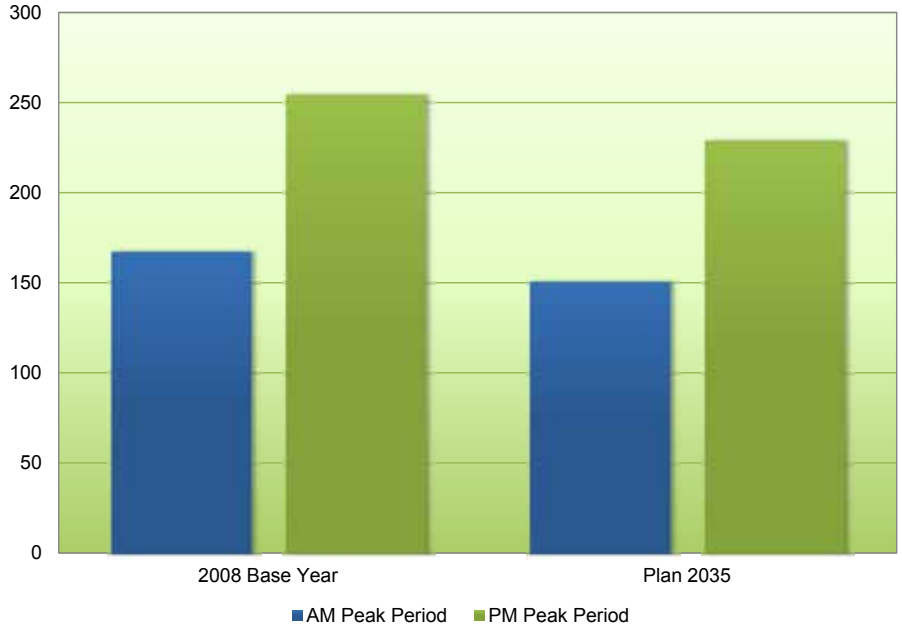
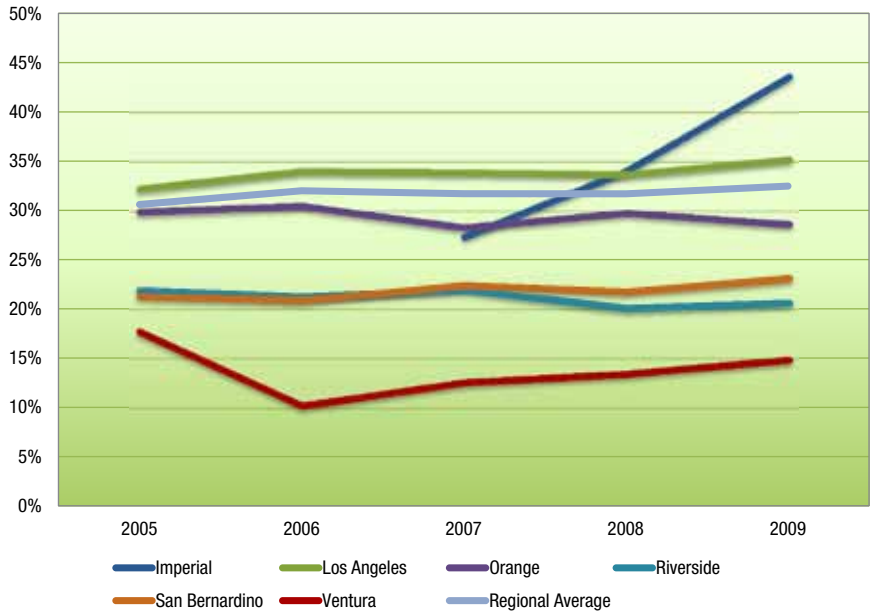


FIGURE 5.8 shows the percent of transit passenger miles traveled compared to the total number of seat miles provided, a measure of transit productivity.

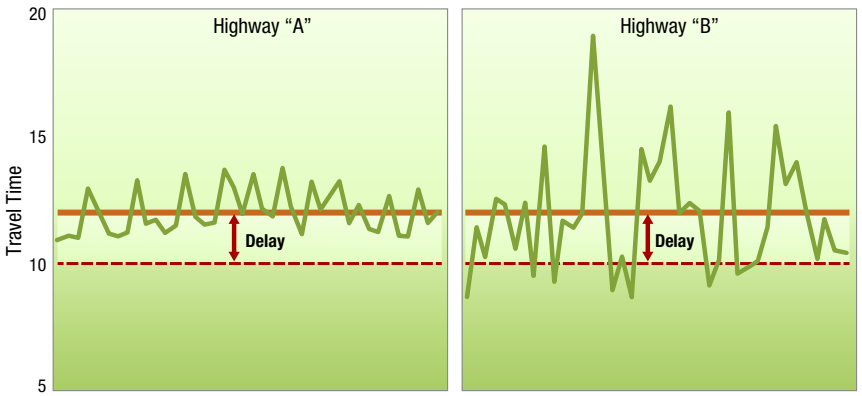
FIGURE 5.8 Transit Passenger Miles/Seat Miles



RELIABILITY

Reliability captures the relative predictability of the public's travel time. Unlike mobility, which measures how fast the transportation system is moving people and goods, and accessibility, which addresses how much time people must spend traveling in total, reliability focuses on how much mobility and accessibility vary from day to day. This variability is illustrated in **FIGURE 5.9**, where Highway "A" and Highway "B" both have the same average travel time, meaning that they experience the same level of mobility. However, when each day's travel time is taken into account, one sees that Highway "A" has lower variability than Highway "B".

FIGURE 5.9 Difference Between Reliability and Mobility



Same Mobility (same travel time and delay), but Highway "A" is much more reliable

Reliability is the level of variability in transportation service between the expected travel time and the actual travel time between origin-destination pairs. Reliability can be calculated by using statistical tools. The standard deviation is one such tool that provides an estimate of how much the travel time on any given day will "deviate" from the average travel time. It provides the probable range of time that a motorist will arrive within his or her scheduled time. Dividing the standard deviation by the average time spent traveling produces the percent variability for an OD pair.

Reliability can only be monitored and not forecasted. This is because travel demand models cannot evaluate variations in travel times, but can only estimate average travel times and delay (i.e., mobility). However, **TABLE 5.2** presents the estimated improvements in reliability for three different hours during the day. These improvements are expected as a result of the TSM investments, especially as they relate to incident management. These estimates are based in part on the recently completed Corridor System Management Plans (CSMPs) in the SCAG region.

TABLE 5.2 Estimated Improvements in Reliability

Hour	Average Travel Time (minutes)	Variability of Travel Time	Travel Time Based on Level of Confidence of Arriving on Time (minutes)		
			67%	95%	99%
8:00 AM	23	29%	30	37	43
Noon	20	16%	24	27	30
5:00 PM	27	38%	38	48	59

Safety and Health

The safety outcome for evaluating projects has been carried over from the 2008 RTP, but the 2012 RTP/SCS effort also includes a new health outcome. Safety addresses how well the transportation system minimizes accidents and is measured in fatalities, injuries, and property damage accidents per million vehicle miles by mode.

Safety and health impacts of regional transportation improvements cannot be easily forecast, but total accidents can show a reduction in future years if people shift from higher accident modes to lower accident modes. Total number of accidents is generally used as the performance measure, and can be partially projected by using mode specific accident rates (e.g., for highways, arterials, transit). This approach is used for the 2012 RTP/SCS, but it is important to note that this approach does not take into account safety improvements for each mode. It just reflects the changes based on modal or facility shifts. It is not possible to forecast this measure by ethnicity or income group. Finally, for monitoring ,this measure can be reported historically by time period month and by mode (including for non-motorized transportation), but it cannot be projected at this level of detail. The safety outcome results are discussed in further detail in the Performance Measures technical appendix.

Health is a new outcome to the 2012 RTP/SCS. There are health measures that will be used for on-going monitoring for the region, but to evaluate alternatives, the health measure will be the tons of pollutants since these are highly correlated to health problems such as asthma. This measure supports both the Health outcome as well as the Environmental Quality outcome.

Environmental Quality

This outcome is measured in terms of criteria pollutant emissions. Emissions are estimated using the SCAG RTDM results, which are input to the ARB's Emission Factors (EMFAC) model. Pollutant emissions are reported in detail as part of the Transportation Conformity technical appendix.

Economic Well-Being

Never before have the crucial linkages and interrelationships between the economy, the regional transportation system, and land use been as important as now. For the first time, the 2012 RTP/SCS includes a significant consideration of the economic impacts and opportunities provided by the transportation infrastructure plan set forth in the RTP/SCS, considering not only the economic and job creation impacts of the direct investment in transportation infrastructure, but also the efficiency gains in terms of worker and business economic productivity and goods movement. The RTP/SCS outlines a transportation infrastructure investment strategy that will beneficially impact Southern California, the state, and the nation in terms of economic development, competitive advantage, and overall competitiveness in the global economy in terms of attracting and retaining employers in the Southern California region.

Implementation of SCAG's RTP/SCS will create or sustain jobs today to build transportation infrastructure projects for tomorrow. SCAG's RTP/SCS totaling more than $500 billion in transportation investments will put thousands of Southern Californians back to work in much needed jobs, not only in construction, but in a broad cross-section of industry clusters. Over the twenty-five year period, the plan will generate 4.2 million total jobs in

the six-county region, or an annual average of 167,900 (**TABLE 5.3**). In addition, the rest of the state of California will benefit from spillover impacts of an additional 237,700 annual jobs, and an additional 306,500 annual jobs will accrue to other states.

TABLE 5.3 Total Employment Impact

	FY 2011-2015	FY 2016-2020	FY 2021-2025	FY 2026-2030	FY 2031-2035	TOTAL
Total Jobs	902,700	829,700	787,900	919,800	756,700	4,196,800
Annual Average	180,500	165,900	157,600	184,000	151,300	167,900

The Goods Movement, Logistics & Distribution, Tourism, Manufacturing, and many other transportation reliant sectors are heavily dependent on efficient transportation infrastructure and are key Southern California job generators for all six SCAG-region counties. Reductions in congestion also have a positive impact on regional employment and gross regional product (or output.) A ten percent reduction in travel time in the region produces an estimated 132,000 new total jobs from 2012 through 2035, based on recent REMI modeling. Without making the investments in Southern California's transportation system outlined in this plan, economic recovery and job creation will be markedly slower throughout the region. Longer term, failure to make sufficient regional transportation investments will cost Southern California economically and the region's business competitiveness will be at risk.

Investment Effectiveness

The cost-effectiveness outcome indicates the degree to which the Plan's expenditures generate benefits that transportation users can experience directly. This outcome is important to the public because it describes how the Plan's transportation investments make productive use of scarce funds.

The benefit-cost ratio is the indicator for the cost-effectiveness outcome, and it compares the incremental benefits to the incremental costs of the modal investments. The benefits are divided into several categories, including:

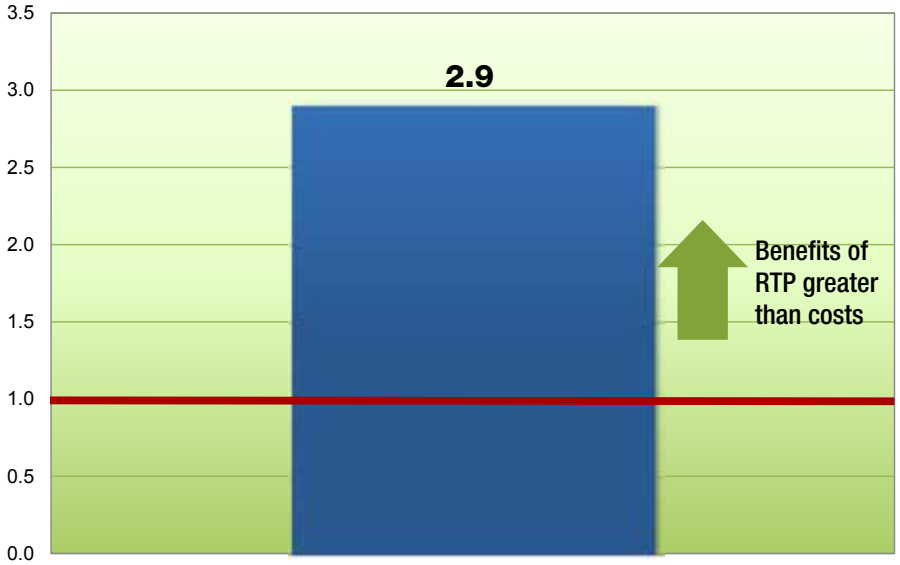
- Delay savings,
- Air quality improvements, and
- Reductions in vehicle operating costs.

For these categories, travel demand and air quality models are used to estimate the benefits of the Plan compared to the Baseline. Most of these benefits are a function of changes in Vehicle-Miles Traveled (VMT) and Vehicle-Hours Traveled (VHT). For example, a highway project that increases VMT would hurt air quality and vehicle operating costs, while a transit project that decreases VMT would have the opposite effect. Not all impacts are linear, so reductions in congestion can increase or decrease vehicle operating costs and emissions. Delay savings are reflected directly in the VHT statistics.

To estimate the benefit-cost ratio, the benefits in each category are converted into dollars and added together. These are divided by the total incremental costs of the Plan's transportation improvements to produce a ratio. **FIGURE 5.10** summarizes the results of this analysis.

The investments in the 2012 RTP provide a return of $2.90 for every dollar invested. For this analysis, all benefits and costs are expressed in 2011 dollars. Benefits are estimated over the 25-year RTP planning period from 2011 to 2035. The user benefits are estimated using California's Cal-B/C benefit-cost framework and incorporate SCAG's RTDM outputs. The costs include the incremental public expenditures over the entire RTP planning period.

FIGURE 5.10 Results of Regional Benefit/Cost Analysis



System Sustainability

A transportation system is sustainable if it maintains its overall performance over time with the same costs for its users. Sustainability, therefore, reflects how our decisions today affect future generations. The indicator for sustainability is the total inflation-adjusted cost per capita to maintain overall system performance at current conditions.

The performance measures presented in this chapter show that the planned transportation system in 2035 will perform better compared to today. This RTP/SCS commits itself to maintaining a sustainable system by allocating $217 billion to maintaining the system in a state of good repair over the period of the plan. This is an average annual per capita investment of more than $400 per person for each year of the plan period.

RTP/SCS Performance for Co-Benefits

In addition to the transportation performance results discussed above, the RTP/SCS's more focused land pattern, increased investments in transit, and support for communities that foster walk and bike modes as serious transportation options, leads to additional benefits in fiscal, economic, environmental, and other quality of life performance. These results compare the RTP/SCS with a future trend-based scenario that more closely follows the development trends of the past decades. Unlike the RTP/SCS, this trend-based future scenario relies more heavily on growth in undeveloped lands at the edges of cities and beyond and focuses more new housing towards single-family products in suburban patterns. Different from the modeling process used for the mobility-based performance measures, these performance results were derived using the single framework model described in Appendix 19.

Better Placemaking

The challenges of traffic congestion and long commutes make the value of creating better places to live and work even more important. The RTP/SCS focuses over 50 percent of new housing and job growth for 2035 in areas served by high quality transit, as well as other opportunity areas in existing main streets, downtowns, and along corridors where infrastructure already exists. This more compact land use pattern, combined with the identified transportation network improvements and strategies, results in improved pedestrian and bicycle access to community amenities, lowers average trip length, and reduces vehicle miles traveled. These outcomes not only reduce GHG emissions, but also support the development of more livable communities that provide more housing choices, conserve natural resources, offer transportation options, and promote a better quality of life.

Lower Cost to Taxpayers and Families

LOCAL INFRASTRUCTURE CAPITAL AND OPERATIONS AND MAINTENANCE COSTS

Increased land consumption can lead to higher costs for local and sub-regional infrastructure, as new development in "greenfield" lands (areas, including agricultural lands,

not previously developed for urban uses) requires significant capital investments to extend or build new local roads, water and sewer systems, and parks. Conversely, growth focused in urban areas takes advantage of existing infrastructure and more efficient service to higher concentrations of jobs and housing. This cost difference increases when operations and maintenance (O&M) costs are taken into account. O&M costs include the ongoing city expenditures required to operate and maintain the infrastructure serving new residential growth. More dispersed development, which requires greater lengths of roads and sewer pipes, incur higher O&M costs to local jurisdictions than more compact development, which capitalizes on shared infrastructure capacity.

The RTP/SCS shows that growth in urban and mixed-use developments in already developed areas can reduce costs significantly, as demonstrated by adding up capital infrastructure and ongoing O&M costs to 2035. If the development trend of the past decades continue, new growth would require $33.2 billion in capital infrastructure and O&M costs. By contrast, following the land use pattern of the RTP/SCS leads to $27.2 billion in costs, representing a savings of $6 billion.

LOCAL REVENUES

To determine the RTP/SCS's impact on local revenues, SCAG utilized estimates of potential revenues from property and property transfer taxes, sales taxes, and vehicle license fees generated by new housing units. By 2035, the RTP/SCS's more compact development generates $13,800 per acre in local revenues, which is approximately $4,000 per acre more than a land use pattern of more dispersed development.

HOUSEHOLD COSTS

If the land use patterns of the past decades persist, average household cost associated with driving and residential energy and water use will be up to $19,000 in 2035. By comparison, the RTP/SCS would cost each household $16,000. Over time, the differences in annual expenditures would amount to a significant sum for each household, which increases further if the effect of local infrastructure cost burdens, which are typically passed on to homeowners and renters in the form of taxes, fees, home prices, and assessments, is considered.

Benefits to Public Health and the Environment

LAND CONSUMPTION

New land consumption includes all land that will be newly urbanized, including residential and employment areas, roadways, open space, and public lands. Through infill, redevelopment, and more efficient use of new greenfield land to accommodate new growth, a land use pattern with a greater share of urban infill and compact development consumes less land overall. By contrast, a pattern that places a greater share of new growth in dispersed standard development patterns consumes more land. The development trend of the past decades would consume approximately 740 square miles of greenfield land, nearly twice as much as the RTP/SCS which consumes approximately 330 square miles, to accommodate growth in 2035.

BUILDING ENERGY USE

Building energy use is determined by the mix of housing types and the proportion of development in temperate climate zones within the SCAG region. A land use pattern that contains more mixed-use/walkable and urban infill development accommodates a higher proportion of growth in more energy-efficient housing types like townhomes, apartments, and smaller single family homes, as well as more compact commercial building types. By contrast, a large proportion of standard development leads to a higher proportion of larger single-family homes, which are typically less energy-efficient. Location also comes into play—buildings in the warmer areas at the edges of the region and beyond use more energy each year, in part because they require more energy to cool during the summer months.

Differences in land use patterns lead to substantial differences in the amount of electricity and natural gas used. These differences will vary depending on policies regulating how efficient buildings become. Assuming the same efficiency standards, the RTP/SCS uses 8 percent less energy per year when compared to a land use pattern that more closely aligns with the past development trend. Additionally, the overall energy savings that come from developing more compactly translate to meaningful savings in residential energy bills. On average, the RTP/SCS saves approximately $950 million per year in total by 2035, or about $130 per household.

RESIDENTIAL WATER USE

Variations in land use patterns and their related building profiles also lead to substantial differences in residential water use and cost. Residential water use is a function of both indoor and outdoor water needs, with outdoor use (landscape irrigation) accounting for the majority of the difference among housing types. Because homes with larger yards require more water for landscape irrigation, lot size is generally interrelated with a household's overall water consumption. Thus, a land use pattern with a greater proportion of the standard development, which includes more large-lot single-family homes, require more water than a land use pattern with a greater proportion of compact and urban infill development, which include more attached and multifamily homes. And, as is the case for energy use, the location of new development has a significant bearing on water use—homes in warmer areas use more water to maintain lawns and other landscaping.

Water use will vary based on efficiency and conservation policies, which will be increasingly important as California faces future constraints to water supply. Assuming the same modest improvements, the RTP/SCS uses approximately 970 billion gallons of water (6 percent less than a land use pattern based on past development trends). Saving water also saves on costs, and the RTP/SCS saves approximately $245 million per year in total by 2035.

HEALTH INCIDENCES AND COSTS

Auto-related air pollution results in a spectrum of health incidences, including cases of chronic bronchitis; respiratory and cardiovascular hospitalizations; respiratory-related ER visits; acute bronchitis; work loss days; premature mortality; asthma exacerbation; and acute, lower, and upper respiratory symptoms. Using research-based rates and valuations produced by the American Lung Association, the RTP/SCS results in a 24 percent reduction in total health incidences, and saves over $1.5 billion per year in total costs.

Greater Responsiveness to Demographics and the Changing Housing Market

There is little question that the demographic profile of Southern California is changing, resulting in different housing and transportation needs. The traditional suburban development pattern that characterizes most of the region is still appropriate for many residents and homeowners, but the increasing demand for small-lot and multi-family housing, walkable and bikeable environments, and shorter commutes calls for more varied housing options located in more compact development.

The RTP/SCS responds to this emerging need through an overall land use pattern that focuses new housing growth in urban centers served by various transportation options, including high-quality transit and active transportation. Approximately 70 percent of this new housing will be multi-family products.

Environmental Justice

Title VI and Environmental Justice Overview

The concept of environmental justice is about equal and fair access to a healthy environment, with the goal of protecting underrepresented and poorer communities from incurring disproportionate environmental impacts. Consideration of environmental justice in the transportation planning process stems from Title VI of the Civil Rights Act of 1964 (Title VI). Title VI establishes the need for transportation agencies to disclose to the public the benefits and burdens of proposed projects on minority populations. The understanding of civil rights has expanded to include low-income communities, as further described below. Title VI states that "No person in the United States shall, on the ground of race, color or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Additionally, Title VI not only bars intentional discrimination, but also unjustified disparate impact discrimination. Disparate impacts result from policies and practices that are neutral on their face (i.e., there is no evidence of intentional discrimination), but have the effect of discrimination on protected groups.

A 1994 Presidential Order (Executive Order 12898) directed every Federal Agency to make environmental justice part of its mission by identifying and addressing the effects of all programs, policies and activities on underrepresented groups and low-income populations. Reinforcing Title VI, this Presidential Order ensures that every federally funded project nationwide consider the human environment when undertaking the planning and decision-making process. The Presidential memorandum accompanying E.O. 12898 identified Title VI as one of several Federal laws that should be applied "to prevent minority communities and low-income communities from being subject to disproportionately high and adverse environmental effects." Given the overlap in Title VI and Environmental Justice policies, this report will use the term "environmental justice" as an inclusive term to mean minority and low-income populations.[1]

In addition to Federal requirements, SCAG must comply with California Government Code Section 11135, which states that, "no person in the State of California shall, on the basis of race, national origin, ethnic group identification, religion, age, sex, sexual orientation, color, or disability, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency, is funded directly by the state, or receives any financial assistance from the state."

The State of California also provides guidance for those involved in transportation decision-making to address environmental justice. In 2003, Caltrans published the Desk Guide on Environmental Justice in Transportation Planning and Investments to provide information and examples of ways to promote environmental justice. The Desk Guide identified requirements for public agencies, guidance on impact analyses, recommendations for public involvement, and mitigation.

[1] See Title VI Legal Manual, U.S. Department of Justice Civil Rights Division (2001), page 59.

Major Environmental Justice Issues in the Region

The SCAG region is experiencing major challenges to its quality of life and affordability. For example, the region's residents have a high cost burden with 45 percent of owner-occupied households and 54 percent of renter-occupied households spending 30 percent or more of their incomes on housing. In the SCAG region, less than 55 percent of households own their homes, a 2 percentage point decline from 2007 and 11 percent below the national average for homeownership (66 percent). There were 8.1 million renters in the region in 2009.[2]

In general, housing is considered affordable if it costs 30 percent or less of a household's income. However, a more refined indicator called the Housing + Transportation Affordability Index was developed by the Center for Neighborhood Technology to better gauge the true cost of housing based on its location. Based on this index, 67 percent of households in the SCAG region spend 45 percent or more of their incomes on housing and transportation, among the highest percentages in the nation.[3]

The poverty rate in the SCAG region stands at 15 percent with 2.6 million residents living in poverty. This is 3 percentage points higher than the national average. In 2009, per capita income was $42,784, which is about $17,000 less than the San Francisco Bay Area. Adding to the high poverty rate, real average wages (adjusted for inflation) have been stagnant for a decade. Further, for the past three years the SCAG region has experienced unemployment rates over 12 percent, about 3 percentage points higher than the national average. The lower income levels may be associated with the educational attainment levels in the region. Only 25 percent of adults have a bachelor's degree or higher in the SCAG region, compared to almost 40 percent in the San Francisco Bay Area. In Riverside and San Bernardino counties, 17 percent of adults have a bachelor's degree or higher. In Imperial County, only 12 percent of adults had a bachelor's degree or higher.[4]

Additional environmental concerns include exposure to toxic pollutants and obesity levels. Exposure to air pollutants is an environmental justice issue due to the disproportionate share of minority and low-income populations living in close proximity to heavily traveled corridors, particularly near port and logistics activity. This exposure to unhealthy

[2] U.S. Census. American Community Survey. 2009.

[3] Center for Neighborhood Technology. Housing and Transportation Affordability Index. Last accessed October 15, 2011 from http://htaindex.cnt.org/.

[4] U.S. Census. American Community Survey. 2009.

air results in 5,000 premature deaths and 140,000 children with asthma and respiratory symptoms. More than half of Americans exposed to $PM_{2.5}$ pollution exceeding the national standard reside in the SCAG region.[5] Additionally, populations living in areas without access to parks, safe walking environments and fresh food have a greater prevalence of obesity and associated ailments such as diabetes.[6] Although the SCAG region's level of obesity (24 percent) is lower than the national average of 33.8 percent, there are still disparities among racial groups, based on data from the CDC. For example, the prevalence of obesity among Non-Hispanic white women is 33 percent, whereas the obesity rates among Non-Hispanic black women and Mexican American women is 49.6 percent and 45.1 percent, respectively.[7] This raises policy questions about the opportunities for physical activity, access to healthy foods, and safety.

SCAG's Title VI and Environmental Justice Policy & Program

As a government agency that receives federal funding, SCAG is required to conduct an environmental justice analysis for its RTP. SCAG's environmental justice program includes two main elements: technical analysis and public outreach. Specifically, it is SCAG's role to ensure that when transportation decisions are made, low-income and minority communities have ample opportunity to participate in the decision-making process and that they receive an equitable distribution of benefits and not a disproportionate share of burdens.

SCAG adheres to all directives on environmental justice. The environmental justice movement stems from Title VI of the Civil Rights Act of 1964. Title VI of the Civil Rights Act of 1964 provides one very significant means by which the public can seek greater accountability from transportation agencies. Title VI states that "No person in the United States shall, on the ground of race, color or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."

Under federal policy, all federal agencies must make environmental justice part of their mission and adhere to three fundamental Title VI/environmental justice principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

In the 1990's, the federal executive branch issued orders on environmental justice that amplified Title VI, in part by providing protections on the basis of income as well as race. These included President Clinton's Executive Order 12898 (1994) and subsequent U.S. Department of Transportation (DOT) and Federal Highway Administration orders (1997 and 1998, respectively), along with a 1999 DOT guidance memorandum.

On August 4, 2011 seventeen federal agencies signed the "Memorandum of Understanding on Environmental Justice and Executive Order 12898." The signatories, including the U.S. Department of Transportation (DOT), agreed to develop environmental justice strategies to protect the health of people living in communities overburdened by pollution and provide the public with annual progress reports on their efforts. The MOU advances agency responsibilities outlined in the 1994 Executive Order 12898 and directs each of the Federal agencies to make environmental justice part of its mission and to work with other agencies on environmental justice issues as members of the Interagency Working Group on Environmental Justice.

In response to this MOU, the DOT revised its Environmental Justice Strategy. The revisions reinforce the DOT's programs and policies related to environmental justice and strengthen its efforts to outreach to minority and low-income populations. Further, on September 29, 2011, the Federal Transit Authority issued two proposed circulars on Title VI and Environmental Justice to clarify the requirements and offer guidance. FTA Circular 4702.1A, Title VI Requirements and Guidelines for Federal Transit Administration Recipients (Docket No. FTA-2011-0054) provides information required in the Title VI Program, proposes changing the reporting requirement from every four years to every three years, and adds a requirement for mapping and charts to analyze the impacts of

[5] California Air Resources Board, South Coast Air Quality Management District, and Southern California Association of Governments. Powering the Future. August 2011.

[6] Sonia Caprio, MD, et.al. Diabetes Care November 2008 vol. 31 no. 11 2211-2221

[7] Centers for Disease Control and Prevention: National Diabetes Surveillance System. Last accessed October 18, 2011 from http://apps.nccd.cdc.gov/DDTSTRS/default.aspx and Centers for Disease Control and Prevention. Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960–1962 Through 2007–2008. June 2010.

the distribution of State and Federal public transportation funds. SCAG has reviewed the proposed Circulars as additional guidance for the development of the RTP/SCS. The FTA Circular 4703.1, Environmental Justice Policy Guidance for Federal Transit Administration Recipients (Docket number FTA-2011-0055) provides recommendations to MPOs (and other recipients of FTA funds) on how to fully engage environmental justice populations in the public transportation decision-making process; how to determine whether environmental justice populations would be subjected to disproportionately high and adverse human health or environmental effects as a result of a transportation plan, project, or activity; and how to avoid, minimize, or mitigate these effects. The proposed Environmental Justice Circular does not contain any new requirements, policies or directives. Nonetheless, SCAG complies with the framework provided to integrate the principles of environmental justice into our decision-making processes.

Finally, under SB 375, SCAG is required to include a Sustainable Communities Strategy within the 2012 RTP/SCS. The RTP/SCS represents the collective vision of the six counties in the SCAG region and provides a framework for the future development of our regional transportation system. Through SB 375, the State establishes a target for GHG reduction for cars and light trucks from the SCS. The targets for the SCAG region are 8 percent in 2020 and 13 percent in 2035, from 2005 levels. As part of the early target setting process, the ARB appointed a Regional Target Advisory Committee (RTAC) to recommend factors to be considered and methodologies to be used for setting the targets. The RTAC report was finalized in September 2009 and included a recommendation on Housing and Social Equity. The report recognized the impact that policies to reduce VMT have on social equity, specifically that the provision of appropriately located affordable housing matches local wage levels. The RTAC further recommended that displacement and gentrification, as a result of changing land uses and increased housing costs, should be addressed and specifically avoided to the extent possible in the SCS. As a result of this recommendation and input from our environmental justice stakeholders, SCAG has updated its methodology to include new areas of analysis, including gentrification and displacement.

SCAG's Title VI and Environmental Justice Outreach

A key component of the RTP/SCS development process is seeking public participation. Public input from our environmental justice stakeholders helped SCAG prioritize and address needs in the region. As part of the environmental justice outreach effort, SCAG compiled a list of key stakeholders to be contacted regarding RTP/SCS programs and policies. This list is comprised of over 250 persons and organizations involved with the 2008 RTP as well as additional stakeholders, such as the South Coast Air Quality Management District's (SCAQMD) Environmental Justice Working Group, which included new groups such as local community advocates, air quality non-profit organizations, and unions. SCAG maintains this list regularly and allows interested persons to sign-up for the mailing list online.

SCAG held two environmental justice workshops and convened focus groups on the environmental justice analysis to ensure that all members of the public have an opportunity to participate meaningfully in the planning process. On June 24, 2010, SCAG held a workshop to review the planning process and familiarize the participants with the environmental justice analysis process. The workshop drew 37 participants throughout the region, with webcasting made available from SCAG's regional offices.

The following is a summary of the main topics discussed at the workshop:

- SCAG was requested to conduct a presentation on SCAG's modeling process,
- The environmental justice analysis should include baseline data of major issues facing the region,
- Public health was identified as a topic that should be further analyzed,
- SCAG was requested to include the housing plus transportation affordability index in its analysis, and
- Gentrification needs to be addressed, particularly with SB 375's emphasis on transit oriented development.

As a result of these workshops, SCAG determined that new analysis areas were necessary to capture the concerns raised from our stakeholders. These new areas are discussed in greater depth below but include impacts from rail transportation, gentrification and displacement, pollution exposure along heavily traveled corridors, and impacts from revenue generating mechanisms such as congestion pricing.

On June 30, 2011, SCAG held a follow-up workshop to discuss the proposed new analysis areas with our stakeholders and seek further input. In response to comments from the first workshop, SCAG also included a summary of the modeling process. This workshop drew 45 participants from all six regional offices.

The participants provided thoughtful comments and feedback on SCAG's proposed analysis and planning process including:

- $PM_{2.5}$ should be analyzed in the EJ report,
- The Environmental Justice community should be included early in the decision-making processes and advisory committees,
- The report should identify communities of concern and compare those areas with the location of investments,
- SCAG should produce maps that show long range trip projections compared to system capacity,
- Housing should be included in the performance measures, including housing/jobs fit (costs vs. wages), and
- The impacts of freight movement should be analyzed and mitigated.

In response to comments made at the workshop, SCAG followed up by organizing focused meetings to further discuss the methodology and ensure it addresses the concerns raised by our environmental justice stakeholders. Also, participants were urged to attend subsequent public workshops. Many of those who attended the Environmental Justice workshops did attend the RTP/SCS workshops. Furthermore, to address the comments made during SCAG's workshops, the environmental justice analysis will be updated in the following key ways:

- Focus more on non-motorized transportation,
- Identify and quantify the primary environmental justice challenges in transportation in the region including the development of a baseline for key issues such as poverty, exposure to pollutants, and concentration of pollutants,
- Bring public health to the forefront—focus on pollutants and cancer concentration in communities of concern,
- Begin to analyze potential gentrification impacts from urban infill and transit oriented development, and
- Provide an environmental justice mitigation toolbox with recommended mitigation measures for subsequent projects.

Technical Analysis

SCAG has established itself as a leader in environmental justice analyses and has been recognized for its technical approach to understand the benefits and burdens our regional plan. Each planning cycle presents new and emerging concerns for the region to address. For example, in the 2008 RTP, SCAG analyzed accessibility to public parks including the distribution of parks by income and park accessibility by travel mode and income. In keeping with the trend of developing robust environmental analyses, the current RTP/SCS analyzes impacts from rail transport, exposure to pollutants along heavily traveled corridors, gentrification and displacement, and impacts from revenue generating mechanisms such as a VMT fee. As with previous RTPs, the goal of the 2012 RTP/SCS is to ensure that when transportation decisions are made, low-income and minority communities have ample opportunity to participate in the decision-making process and receive an equitable distribution of benefits and not a disproportionate share of burdens.

IDENTIFYING DEMOGRAPHIC GROUPS

Executive Order 12898 and the DOT and FHWA Orders on Environmental Justice define "minority" as persons belonging to any of the following groups, as well as "other" categories that are based on self-identification of individuals in the U.S. Census[8]: Black, Hispanic, Asian, and American Indian and Alaskan Native. SCAG bases its analysis on the latest census data for ethnic/racial groups in the SCAG region by census track and by transportation analysis zone (TAZ).

Identifying low-income and minority populations is necessary both for conducting effective public participation and for assessing the distribution of benefits and burdens of transportation plans and projects. For the purposes of this analysis, SCAG focused on all low-income groups and minority populations. The minority population in the SCAG region comprises 65 percent of the population. The predominant minority groups are Hispanics and Asian/Pacific Islanders, which combine to account for over 50 percent of the total minority population within the SCAG region.

[8] Department of Transportation, Federal Highway Administration. Environmental Justice Emerging Trends and Best Practices Guidebook, Document Number: FHWA-HEP-11-024. August 2011.

Poverty level is a federally established income guideline used to define persons who are economically disadvantaged as defined by the U.S. Department of Health & Human Services guidelines.[9] The poverty level applicable to the SCAG region is chosen on the basis of regional average household size for the census year. For example, for a regional mean of 2.98 persons—rounded to 3—per household, the threshold would consist of the sum of the value for the first person plus two additional people. The household counts in each income range are then used to determine the number and percentage of households in each census tract below the poverty level. In 2010, a family of three earning less than $17,374 was classified as living in poverty.[10]

In addition to complying with federal guidance, SCAG also conducts income equity analyses based on five income quintiles. A quintile, by definition, is a category into which 20 percent of the ranked population falls. For each new analysis, SCAG defines regional income quintiles based on the most recent census data on household income. Once the income quintiles are established, the incidence of benefits and costs can be estimated and compared across these income categories. **TABLE 5.4** lists the demographic categories used in SCAG's environmental justice analysis.

TABLE 5.4 Demographic Categories

Ethnic/Racial/Other Categories (persons)	Income Categories (Households)
White (Non-Hispanic)	Below Poverty Level
African-American	Income Quintile 1 (lowest)
American Indian	Income Quintile 2
Asian/Pacific Islander	Income Quintile 3
Hispanic (Latino)	Income Quintile 4
Other Racial Categories	Income Quintile 5
Disabled/Mobility Limited	
Age 65 and Above	
Non English speaking	
Individuals without High School Diploma	
Households without a car	
Foreign born population	
Sensitive Receptors: hospitals, daycare facilities, schools, senior centers, parks/open space	

Plan versus Baseline

As with the other performance outcomes presented in this chapter, the comparison of the Plan versus Baseline is the primary focus of the environmental justice analysis for the 2012 RTP. The Plan represents the selected strategy to guide the region's transportation planning over the next few decades, while the Baseline represents "business as usual" and assumes current land use trends and the completion of projects programmed in the 2011 Federal Transportation Improvement Program (FTIP) that have received environmental clearance. The data for the analysis is based on the SCAG RTDM results.

[9] Department of Transportation, Federal Highway Administration. Environmental Justice Emerging Trends and Best Practices Guidebook, Document Number: FHWA-HEP-11-024. August 2011.

[10] Weighted average threshold. U.S. Census Bureau. Poverty Thresholds. Last accessed October 14, 2011 from http://www.census.gov/hhes/www/poverty/data/threshld/index.html

PERFORMANCE MEASURES

In development of the Plan, SCAG utilized eleven performance measures designed to discuss the overall social and environmental equity.

1. RTP Revenue Sources in Terms of Tax Burdens
2. Share of Transportation System usage
3. RTP/SCS Investments
4. Impacts of Proposed VMT fees
5. Distribution of travel time savings and travel distance reductions
6. Jobs-housing Imbalance or Jobs-housing Mismatch
7. Accessibility to Employment and Services
8. Accessibility to Parks
9. Gentrification and displacement
10. Environmental Impact Analyses (Air, Health, Noise)
    - Historical Air Quality and Health Impacts
        - Regional
        - Environmental Impacts along freeways and highly traveled corridors
    - Environmental Impacts of Plan and Baseline Scenarios
    - Noise Impacts
        - Aviation
        - Roadway
11. Rail-related impacts

The following section summarizes the findings for each of the eleven performance measures analyzed as part of the Environmental Justice Report. The full results can be found in the Environmental Justice Appendix.

Performance Measure 1: RTP Revenue Sources in Terms of Tax Burdens

Different funding sources (i.e. income taxes, property taxes, sales, fuel, etc.) can impose disproportionate burdens on lower income and minority groups. Sales and gasoline taxes, which are the primary sources of funding for the region's transportation system, were evaluated for the purposes of this analysis. The amount of taxes paid was analyzed to demonstrate how tax burdens fall on various demographic groups. As in previous RTP Environmental Justice reports, the 2012 RTP/SCS environmental justice analysis examined in detail, the incidence or distribution of, the burden of taxation.

The 2012 RTP/SCS environmental justice analysis performed a comparative examination of the amount of taxes (sales, gasoline, and income) paid by the five respective income groups and by ethnicity. The proceeding figure, Share of Taxes Paid by Income Quintile, indicates that taxes paid as a percent of disposable income are expected to fall heavily on lower-income groups. This is the so-called "regressive" nature of the excise gasoline tax and retail sales tax levy on primarily consumer durable and non-durables that are necessities of daily living. The lower quintile groups (Quintile I and Quintile II) are anticipated to pay 21.4 percent of all regional sales and gasoline taxes. Thus, those with limited financial means will not pay a disproportionate amount of overall taxes under the Plan compared with their usage of the transportation system and their shares of RTP/SCS investment.

The analysis indicates that tax burdens are expected to fall more heavily on non-minority groups with non-Hispanic whites paying 48.8 percent of the income taxes and 40.8 percent of the retail and gasoline tax.

Performance Measure 2: Share of Transportation System Usage

In order to determine the existing level of system usage, SCAG analyzed the 2010 National Household Travel Survey (NHTS). The NHTS is a household-based travel survey conducted periodically by the Federal Highway Administration (FHWA). The NHTS is the authoritative source of national data on the travel behavior of the American public.

SCAG then analyzed the transportation system usage by mode by race/ethnicity and income quintile. The data show that most bus and urban rail riders are lower income quintile households—the lowest two income quintile households combined account for 84 percent of bus riders and 93 percent of urban rail riders. By ethnicity, Hispanics use disproportionately more bus, urban rail, and pedestrian facilities than their share of total household or population, while non-Hispanic whites use disproportionately more auto and bike modes, similar to their mode usage for work trips.

Performance Measure 3: 2012 RTP/SCS Investments

One of the most prominent environmental justice issues is the transportation investment strategy, which can impact the transportation choices of low income and minority communities. A disproportionate allocation of resources for various transit investments can indicate a pattern of discrimination.

As a regional MPO, SCAG aims to identify and address the Title VI of the Civil Rights Act and the environmental justice implications of its planning processes and investment decisions. This analysis intends to determine where the 2012 RTP/SCS is putting its investments and will evaluate whether resources are being allocated equitably. The 2012 RTP/SCS utilized a benefit assessment method that considered to what extent various socio-economic groups were receiving value from existing and funded transportation investments. SCAG compared the total share of transportation funding borne by low-income households against other income groups. In this analysis, SCAG reported expenditure distribution in several ways. First, SCAG estimated the share of total RTP expenditures allocated to each category of household income. This was done by totaling expenditures on each type of mode (bus, HOV lanes, commuter/high speed rail, highways/arterials, and light/heavy rail). These expenditures were then allocated to income categories based on each income group's use-share of these modes.

The results in the 2012 RTP/SCS revealed that approximately 25 percent of Plan investments will be allocated to the lowest quintile group (compared with the group system usage of just under 17 percent), while 19 percent will be invested for the highest income category (Quintile V) with total transportation system usage of almost 25 percent. In other words, transportation investments would go to modes likeliest to be used by lower-income households.

The current analysis for the 2012 RTP/SCS further reveals that Plan investments will be distributed equitably on the basis of system usage by ethnic/racial groups. The full analysis is available in the Environmental Justice Appendix.

Performance Measure 4: Impacts of Proposed VMT fees

This is a new analysis area based on the finance strategy in the 2012 RTP/SCS, which recommends a vehicle mile traveled (VMT) based user fee. This VMT fee would be implemented to replace the gasoline tax, and is estimated to cost about $0.05 (in 2011 dollars) per mile and indexed to maintain purchasing power starting in 2025. The implementation of this strategy requires actions of both the State Legislature and Congress.

This section discusses the land use impact from the 'VMT fee' scenario. This is a cursory analysis using SCAG's PECAS land use model. To parameterize the VMT fee scenario for a model run, the following assumptions were applied:

- Current gasoline tax, $0.364 per gallon, would gradually increase until 2025 to $0.50 per gallon.
- After then, a $0.05 per mile of VMT fee would replace the gasoline tax at year 2026.
- Relative to the PECAS model's base year, 2007, the travel cost would be 10 percent higher at year 2025 than in 2007. Between 2008 and 2024, this cost increase is linear. At year 2026, the travel cost would be 20 percent higher than in 2007, and thereafter stabilized.

In general, the results suggest that with higher travel costs region-wide as reflected in the VMT-based user fees, people and households will tend to move to nearby local centers where accessibility to job opportunities is plentiful, so as to offset the impacts from an increase in travel costs. On the other hand, employers will relocate to key locations to better align themselves with the newly emerging concentration of workers and households.

Performance Measure 5: Distribution of Travel Time and Travel Distance Savings

SCAG assessed both the distribution of travel time and distance savings that are expected to result from the implementation of the 2012 RTP/SCS by analyzing demographic data and the associated mode usage statistics for each Transportation Analysis Zone (TAZ) in the region. With this input, an estimate for the time savings for each income and ethnic group can be identified for trips involving transit (i.e. local bus and all transit) and automobiles.

The analysis resulted in the following observations:

- Share of travel times savings by income groups are generally consistent with the mode usage for each income group. Higher income quintile groups captured more savings in person hour traveled proportionally to their relative higher usage of auto

mode. On the other hand, lower income groups received more benefits from transit related time savings for their higher usage in the transit mode.

- Similarly, person-mile travel changes are also in line with usage by income groups in terms of auto mode.
- The outcomes for share of travel time savings and person-mile benefits by ethnic groups are also very balanced, and in line with each ethnic group's use of the transportation system.
- In terms of relative improvements by income/ethnicity group, lower income quintile groups received greater improvements in person-mile travel reductions and local bus travel time savings than higher income groups, and about the same level of improvement in person hour savings as higher income households. Alternatively, higher income households enjoyed a moderately better improvement in all transit mode time savings.
- The improvements in mobility and person-mile travel benefits are fairly similar and close for all ethnic groups.

Performance Measure 6: Jobs-Housing Imbalance or Jobs-Housing Mismatch

In current urban transportation and land use literature and numerous repeated discussions, forums, workshops, yet unsolved, regarding several key contributors to traffic congestion, and some even labeled them as "injustice" are job housing imbalance and job housing mismatch. Among the arguments:

- Workers are priced out from the job rich areas such that long distance travel and congestion are inevitable
- Coastal counties have not built enough housing and workers are forced to move to Inland counties where housing is affordable. This results in long distance commuting and traffic congestion

While this analysis is not expecting to allay all concerns of the job-housing imbalance and/or job housing mismatch, however, the statistics are provided to investigate socio-economic profiles of long distance commuters—defined here as "inter-county commuters—such that stakeholders and policy makers can better understand the demographic composition of long distance commuters.

From an economics point of view, transportation and driving are expensive; workers without a car or people with less income who cannot afford vehicle or driving expenses have to either live close to their jobs where they can walk/bike or have access to transit. Moreover, since long distance commuting is expensive people will not do it unless there are subsidies to own a dependable vehicle, they have access to relatively fast and cheap transit, or have a well-paying job.

The analysis indicates that, almost without exception, all inter-county commuters command much higher wages than those commuters who work and live in the same county. Those commuters also command wages higher than workers who work and reside in their destination work counties. From an environmental justice perspective, this research does not provide definitive results. Rather, it raises additional questions that could be investigated to better understand how travel and income patterns impact low-income and minority populations.

Performance Measure 7: Accessibility to Employment and Services

Accessibility is a foundation for social and economic interactions. As an indicator, accessibility is measured by the spatial distribution of potential destinations, the ease of reaching each destination, and the magnitude, quality and character of the activities at the destination sites. Travel costs are central: the lower the costs of travel, in terms of time and money, the more places that can be reached within a certain budget and, thus, the greater the accessibility. Destination choice is equally crucial: more destinations and the more varied the destinations, the higher the level of accessibility.

Job and shopping accessibility calculations are presented in the following tables. The base year job and shopping accessibility and improvements from the 2012 RTP/SCS are shown in the following figures. Summary highlights from the base year job and shopping accessibility analysis include the following:

- Elderly population showed only above average accessibility to job opportunity by auto; all other measures come out slightly below average for both job and shopping accessibility. As mentioned earlier, staff plan to research and study further about residential location and land use in surrounding areas for this population group, in particular because the region is facing an aging population in the next 20-25 years.

- In general, lower income quintile households and population below poverty all showed higher job and shopping accessibility in base year 2008 under every transportation mode.
- As the case of distance-based accessibility, non-Hispanic Native Americans and non-Hispanic other, similar to non-Hispanic White, have below average accessibility in both job and shopping accessibility.
- Nonetheless, through the implementation of recommended strategies in the 2012 RTP/SCS, elderly, non-Hispanic Native American and non-Hispanic other will experience much better improvements than the average population in both job and shopping opportunities (See figures of the 2012 RTP/SCS Impact on Job/Shopping Opportunity).

Performance Measure 8: Accessibility to Parks

Similar to the method in measuring job accessibility, park accessibility is defined as the percentage of park acreage reachable within 45-minute travel time via 1) automobile; 2) local bus; and 3) all transit options. SCAG's existing typical weekday model was utilized for the analysis, as there is currently no weekend transportation model for the region.

The results of this park accessibility analysis by auto, local bus, and all transit modes for 45-minute of travel are presented in following table and figures. General conclusions from the table and figures include:

- Park accessibility statistics indicate that park accessibility by transit is much lower than that by automobile for all groups. This is true for all parks, national, state, or local parks. By transit, there is almost no access to national parks, and very limited access to state parks in all scenarios—base year 2008, baseline, or under the plan. This observation is consistent with the conclusions of the 2008 RTP Environmental Justice report that there is a near complete lack of public transportation services into, in particular, the National Forests.
- Income quintiles IV and V will have moderately higher access to either state and/or local parks in the region via automobile. Population groups showing marginally lower accessibility to national parks by auto include: non-Hispanic black, income quintile I and V, and population below poverty. As to state park accessibility by auto, all population groups show slightly lower than average accessibility except for non-Hispanic white and the two higher income quintile households. More Environmental Justice population groups, including Hispanics, non-Hispanic Asians, income quintile II, and the disabled population show higher than average accessibility to local parks than the average population in the region.
- In addition to elderly, non-Hispanic Native Americans and non-Hispanic other, further analysis should also focus on non-Hispanic blacks where their park accessibility by auto is below the average for all parks. However, the 2012 RTP/SCS provides improvements for these population groups than accessibility changes for the rest of the region's population groups.

Performance Measure 9: Gentrification and Displacement

The integration of transportation and land use has been recognized for its ability to reduce vehicle miles traveled, air pollution, greenhouse gases while increasing physical activity. However, there are concerns associated with transit oriented development. Specially, there has been criticism of smart growth in relation to affordability. Some opponents have suggested that concentrating growth in cities and towns to avoid sprawl can lead to higher household costs, an effect completely opposite of what was intended. In some cases where transit service has spurred significant new TOD, the result can be that people with average incomes are unable to afford to buy homes in or near the new developments. This highlights the need for strategies that, at a minimum, set aside some portion of new development and surrounding households as affordable housing adjacent to transit and in surrounding households. [11]

In response to these concerns, SCAG developed a methodology to model and monitor the demographic trends in and around transit oriented communities. With this methodology, SCAG has the ability to track demographic changes over time in those areas designated as key growth areas. The results will help SCAG and our partners to better understand what demographic shifts occurred from the development of TOD along urban and commuter rail lines. It will also serve as baseline data for comparison in future RTP cycles. More information on this methodology can be found in the Environmental Justice Appendix.

[11] Department of Transportation, Federal Highway Administration. Environmental Justice Emerging Trends and Best Practices Guidebook, Document Number: FHWA-HEP-11-024. August 2011.

Performance Measure 10: Environmental Impact Analyses (Air, Health, Noise)

HISTORICAL AIR QUALITY AND HEALTH IMPACTS

Emissions Impact on Environmental Justice Populations at the Regional Level

Exposure to air pollutants is an environmental justice issue due to the disproportionate share of minority and low-income populations living in close proximity to heavily traveled corridors, particularly near port and logistics activity. This exposure to unhealthy air results in 5,000 premature deaths and 140,000 children with asthma and respiratory symptoms. More than half of Americans exposed to PM 2.5 pollution exceeding the national standard reside in the SCAG region.[12]

New to the Title VI and Environmental Justice analysis for the 2012 RTP/SCS, SCAG has mapped exposure to ozone, concentration of particulate matter emissions, cancer risks, and respiratory hazard risks. In order to assess the impact of emissions on various demographic groups throughout the region, emissions information was summarized to the Environmental Justice Communities. These findings are available in the Environmental Justice Appendix.

ENVIRONMENTAL IMPACTS ALONG FREEWAYS AND HIGHLY TRAVELED CORRIDORS

The concentration of air pollutants along heavily traveled corridors, particularly PM 10 and PM 2.5, is a major concern in Southern California. SCAG identified major corridors defined as urban roads with 100,000 average daily trips and rural roads with 50,000 daily trips. Next, SCAG overlaid the income, race and ethnic composition of those households within 500 feet of the corridor. This analysis allows SCAG to better understand the impacted populations and allow for greater outreach to those communities of concern.

The analysis illustrated the distribution of Environmental Justice Communities residing within 500 feet of a heavily traveled corridor. Low-income groups comprise 7 percent of the population living within 500 feet of a heavily traveled corridor, while 7.1 percent of minorities reside in these areas. This is higher than the regional level, which shows that 5.7 percent of the region's population lives within 500 feet of a heavily traveled corridor.

ENVIRONMENTAL IMPACTS OF PLAN AND BASELINE SCENARIOS

Minorities and low-income groups may be particularly vulnerable to the effects of air pollution. SCAG's air pollutant emissions analysis was based on emission estimates for pollutants that have localized health effects: carbon monoxide (CO) and particulate matter (PM). An analysis was also conducted for PM exhaust emissions from heavy-duty vehicles: an indicator for diesel toxic air contaminants. The results were calculated based on the average emissions at the TAZ level and weighted according to the population of each ethnic or income group in that TAZ. This analysis focuses on air emissions and noise impacts generating from aviation, highways, and rail corridors.

It is important to note that total emissions of all pollutants in the region will decrease compared to existing conditions with or without the Plan, due to the combination of measures being taken to meet air quality standards. Since the Plan must demonstrate conformity with regional air quality management plans that call for reductions in emissions of air pollutants, the Plan itself will likewise result in reductions of pollutant emissions. This is generally because the Plan investments will alleviate roadway congestion and provide a greater range of transportation alternatives. The following analysis, however, is based on a comparison of Plan to Baseline conditions, rather than a comparison of Plan to current conditions.

Overall, the region as a whole will generally experience an improvement in air quality as a result of reductions in transportation-related emissions. However, emissions of CO and PM_{10} in some TAZ's will increase under the Plan compared to the Baseline conditions. For PM_{10}, region-wide about 23 percent of total population will experience increase in PM_{10} exposure, 76 percent of the population will benefit from reductions in PM_{10}, while about 2 percent of the population will have no changes in PM_{10} exposure. For CO, 29 percent of total population will experience worse CO emissions while the rest (71 percent) of the population will benefit from reductions in CO emissions.

There are disproportionately higher concentrations of Environmental Justice Communities along the heavily traveled corridors. The TAZs with higher concentrations of CO and PM

[12] California Air Resources Board, South Coast Air Quality Management District, and Southern California Association of Governments. Powering the Future. August 2011.

also have a higher share of minorities and low income residents than the regional average. Those TAZs that will experience a reduction in CO and PM emissions from the proposed plan have a lower share of minorities and low income residents than the regional average. This examination of equity impacts is provided in full in the Environmental Justice Appendix.

NOISE IMPACTS

Roadway Noise

The SCAG region has an extensive roadway system with nearly 21,000 centerline miles and 65,000 lane miles. It includes one of the country's most extensive High-Occupancy Vehicle lane systems and a growing network of toll lanes, as well as High Occupancy Toll (HOT) lanes. The region also has a vast network of arterials and other minor roadways. Roadway facilities noise may cause significant environmental concerns.

Noise associated with highway traffic depends on a number of factors that include traffic volumes, vehicle speed, vehicle fleet mix (cars, trucks), as well as the location of the highway with respect to sensitive receptors (i.e., schools, daycare facilities, parks, etc.). According to Federal Highway Administration (FHWA) guidance, noise impacts occur when noise levels increase substantially when compared to existing noise levels. For the purposes of this analysis (consistent with FHWA guidance), noise increases of 3 dB along highways where noise levels are currently, or would be in the future, above 66 dB are considered to be significant, regardless of adjacent land use.

Highways that would be expected to have an increase of 3 dB or more include those where any of the following would occur: (1) the total traffic volumes increase by 100 percent compared to existing conditions; (2) the medium/heavy truck traffic volumes increase by 130 percent compared to existing conditions; or (3) the medium/heavy truck traffic volumes increase by 100 percent and there is an increase in other traffic volumes by 50 percent. These highway segments were identified using the results of SCAG's regional transportation model.

On some highways, there is no potential for noise levels to reach 66 dB. To eliminate these from the analysis, the following criteria were applied: (1) arterials where the FHWA's Traffic Noise Model (TNM) indicated that the motor vehicle volume (and the percentage of medium/heavy trucks) would result in traffic noise levels less than 66 dB; (2) arterials where the calculated motor vehicle speed was less than 17 mph; or (3) freeways where the average volume-to-capacity ratio was equal to or greater than 1.0, which would result in vehicle speeds of less than 30 mph. If a highway met any one of these criteria, it was eliminated from further consideration.

For each highway segment where a significant increase in noise would occur, a 150-foot impact zone was determined on either side (See the Environmental Justice Appendix for roadway segments selected from the 2012 RTP/SCS). Using GIS, the percentage of each affected TAZs land area that fell within this zone was identified, and this percentage was applied to the demographic data forecast for this TAZ. This methodology was utilized in both the 2008 and 2004 RTP.

The results show that minority populations were primarily affected by highway noise impacts. As indicated by the distribution of households in Highway Noise Areas by Ethnic/Racial Category, minority populations, specifically Hispanics, would be disproportionately impacted by highway noise. Approximately, 60 percent of Hispanics would be residing in highway noise areas by 2035. This is a 1 percent increase from the results of the 2008 RTP Environmental Justice analysis.

SCAG further investigated the impacts on areas and the number of people affected by improvement of roadway noise from the proposed 2012 RTP/SCS as it compared with the 2035 baseline conditions. As illustrated in the roadway segment maps where noise impacts are identified for both baseline and for the proposed plan, areas or number of segments under proposed plan are much smaller/less than those under the baseline condition. Thus, it is projected that there will be 183,000 fewer people (13.9 percent reduction) and 63,000 less households (15.3 percent reduction) affected by roadway noise than those under baseline condition (1,321,600 people/426,700 households).

While the proposed 2012 RTP/SCS improves the roadway noise conditions by reducing the areas, roadway segments, and the number of people affected by roadway noise, the benefits are not proportionally shared by each Environmental Justice category as observed in the roadway noise impacted areas or in the region as whole. SCAG's analysis found that the roadway noise reductions will disproportionately benefit non-Hispanic whites and the two highest income quintile groups. Several other Environmental Justice Communities also receive greater benefits from roadway noise improvements including non-Hispanic Asian, non-Hispanic others, elderly, and disabled.

Aviation Noise

The SCAG Region supports the nation's largest regional airport system in terms of number of airports and aircraft operations, operating in a very complex airspace environment. The system has six established air carrier airports including Los Angeles International (LAX), Bob Hope (formerly Burbank), John Wayne, Long Beach, Ontario and Palm Springs. There are also four emerging air carrier airports in the Inland Empire and North Los Angeles County. These include San Bernardino International Airport (formerly Norton AFB), March Inland Port (joint use with March Air Reserve Base), Southern California Logistics Airport (formerly George AFB) and Palmdale Airport (joint use with Air Force Plant 42). The regional system also includes 45 general aviation airports and two commuter airports, for a total of 57 public use airports. Although the projected demand for airport capacity has decreased compared to the 2008 RTP, there is still moderate growth for the future. The challenge is striking a balance between the aviation capacity needs of Southern California with the local quality of life for the affected populations.

Projected noise impacts from aircraft operations at the region's airports in 2035 were modeled for inclusion in the Programmatic Environmental Impact Report for the RTP. For each airport, modeling produced a contour or isoline for the 65 dB Community Noise Equivalent Level (CNEL), a measure of noise that takes into account both the number and the timing of flights, as well as the mix of aircraft types. The Federal Aviation Administration (FAA) considers residences to be an "incompatible land use" with noise at or above 65dB. To identify potentially impacted populations, the anticipated population within the 65 dB CNEL contour was calculated using the following steps:

1. Calculate the percentage of TAZs that would lie within a 65 dB CNEL contour.
2. Assign the SCAG projected population to the TAZ.
3. Apply the demographic breakdown of the TAZ as a whole to the population within the 65 dB CNEL contour.

It should be noted that after 9-11 and "Great Recession" experienced since 2008, the global aviation industry remains in a depressed state. SCAG region air passenger demand and cargo forecasts have been revised downward repeatedly in 2004 RTP and 2008 RTP from the aviation scenario and forecasts adopted in the 2001 RTP. Currently for the 2012 RTP, projections of aviation demand and air cargo remained significantly less than those projected and adopted in 2001 RTP. Thus the downward revisions in projected demand at airports resulted in the reduction of Airport Noise Areas and the corresponding communities that will be studied.

For the purposes of this study, Aviation Noise Areas are defined as areas that are adversely affected by aircraft and airport noise. As part of the Environmental Justice Analysis, special attention will be paid to income, disability, age, and race/ethnicity of affected populations.

The analysis indicates that the 2012 RTP/SCS results in a disproportionate aviation noise impact to low income and minority populations. Under the 2012 RTP, the lowest income group (Quintile 1) will represent 27 percent of the households impacted by noise above the 65 dB CNEL, while the highest income group (Quintile 5) will only represent 13 percent of the households impacted by noise above the 65 dB CNEL.

Similarly, a disproportionate number of households below the poverty threshold will be affected by airport noise levels above the 65 dB CNEL. While 14 percent of the SCAG region households are projected to be living below the poverty level, 19 percent of those that live within the Noise Contour Areas will be below the poverty line.

In terms of race/ethnicity, the aviation plan of the 2012 RTP/SCS is projected to have a disproportionate aviation noise impact on minority groups who make up 89 percent of population within the noise contours compared with a regional average of 76 percent of minority population in 2035. Specifically, Hispanic and African-American populations are disproportionately affected. These two groups will make up 55 percent and 6 percent of the regional population in 2035 respectively, but represent 62 percent and 21 percent of those that will live within the impacted Noise Contour Area.

Performance Measure 11: Rail-related impacts

Environmental pollution from locomotives, rail yards and other rail facilities is a major public health concern at the national, regional and community level. The movement of goods by rail involves diesel-powered locomotives and equipment, resulting in significant emissions of particulate matter (PM), nitrogen oxides (NO_X), hydrocarbons, and other air toxins throughout the process. In response to input from our federal partners, SCAG developed this summary analysis to address potential environmental justice impacts in areas adjacent to railroads and rail facilities, although further discussion and analysis is recommended. This section includes an analysis of Environmental Justice Communities adjacent to railroads and rail facilities, a comparison of cancer risk areas adjacent to

railroads, rail impacts to sensitive receptors, and a summary examination of potential environmental justice concerns adjacent to grade separation projects, the share of most Environmental Justice Communities residing in close proximity to railroads is higher than regional average both in 2000 and in 2005–09. The only exception is elderly population. These observations suggest that rail-related environmental burdens, such as air pollution and noise from locomotives, rail yard and other rail facility, are relatively higher to low-income and minority communities than regional average. However, SCAG recommends further analysis with our partner agencies to verify this observation.

ADDITIONAL SCAG STRATEGIES: ENVIRONMENTAL JUSTICE MITIGATION TOOLBOX

New to the 2012 RTP/SCS, SCAG has developed a toolbox of recommended mitigation measures to address potential impacts to Environmental Justice Communities. These measures were identified through a review of the literature, the PEIR and recent planning activities.[13]

Recommended Mitigation for Noise Impacts

Project sponsors can and should, to the extent feasible and practicable, and where their jurisdictional authority permits:

- As part of the appropriate environmental review of each project, conduct a project specific noise evaluation and identify and implement appropriate mitigation.
- Employ land use planning measures, such as zoning, restrictions on development, site design, and use of buffers to ensure that future development is compatible with adjacent transportation facilities.
- Maximize the distance between noise-sensitive land uses and new roadway lanes, roadways, rail lines, transit centers, park-and-ride lots, and other new noise-generating facilities.
- Construct sound reducing barriers between noise sources and noise-sensitive land uses. Sound barriers can be in the form of earth-berms or soundwalls. Constructing roadways so as appropriate and feasible that they are depressed below-grade of the existing sensitive land uses also creates an effective barrier between the roadway and sensitive receptors.
- Improve the acoustical insulation of dwelling units where setbacks and sound barriers do not sufficiently reduce noise.
- Implement speed limits and limits on hours of operation of rail and transit systems, where such limits may reduce noise impacts.
- Maximize distance of new route alignments from Environmental Justice Communities.
- As a last resort, eliminate noise-sensitive receptors by acquiring freeway and rail rights-of-way. This would ensure the effective operation of all transportation modes.

Recommended Mitigation for Air Quality Impacts Along Heavily Traveled Corridors

Local air districts, local jurisdictions and project sponsors can and should implement measures adopted by ARB designed to attain federal air quality standards for PM2.5 and 8-hour ozone. ARB's strategy includes the following elements:

- Set technology forcing new engine standards;
- Reduce emissions from the in-use fleet;
- Require clean fuels, and reduce petroleum dependency;
- Work with US EPA to reduce emissions from federal and state sources; and
- Pursue long-term advanced technology measures.
- In addition, consider proposed new on-road transportation-related SIP measures include:
  - Improvements and Enhancements to California's Smog Check Program
  - Expanded Passenger Vehicle Retirement
  - Modifications to Reformulated Gasoline Program
  - Cleaner In-Use Heavy-Duty Trucks
  - Ship Auxiliary Engine Cold Ironing and Other Clean Technology
  - Cleaner Ship Main Engines and Fuel

[13] The EJ Mitigation Toolbox draws from, among other sources, mitigation measures included in the 2012-2035 RTP/SCS Program Environmental Impact Report (PEIR), particularly for air quality and noise impacts. As captured here, Environmental Justice mitigation is geared toward reducing impacts for Environmental Justice communities as defined in this appendix, whereas PEIR measures are more broadly geared to sensitive receptors as defined in the PEIR. Mitigation activities cited here (e.g. performing corridor specific analysis) are consistent between this toolbox and the PEIR.

- Port Truck Modernization
- Accelerated Introduction of Cleaner Line-Haul Locomotives
- Clean Up Existing Commercial Harbor Craft

Conduct corridor-level analysis for proposed projects in areas where air quality impacts may be concentrated among Environmental Justice Communities.

Recommended Mitigation for Rail Related Impacts

- Accelerated Introduction of Cleaner Line-Haul Locomotives
- Construct sound reducing barriers between noise sources and noise-sensitive land uses
- Improve the acoustical insulation of dwelling units where setbacks and sound barriers do not sufficiently reduce noise
- Implement, to the extent feasible and practicable, speed limits and limits on hours of operation of rail system, where such limits may reduce noise impacts

Recommended Mitigation for Road Pricing Mechanisms

- Transit, vanpools, or other options as alternatives in locations not served by transit
- Upper limits on road pricing
- Exemptions or discounts for persons who are disadvantaged people such as those whose earnings are below a certain income level and people with disabilities
- Limits on the number of priced crossings in a period for cordon charges
- Allowances for unlimited use of priced facilities in certain periods, typically off-peak hours and holidays.[14]
- Develop detailed program design including billing and collection technology, rate structure, enforcement, spillover guards, revenues and gas tax replacement strategy, and mitigation for perceived geographic inequity before communicating with public.[15]
- Develop explicit benefit plan for increased revenues dovetailing with goals and mitigation concerns (e.g., enhanced transit, spillover protections, better enforcement).[16]
- Include environmental justice mitigation actions as part of the NEPA review.[17]

SB 375 Greenhouse Gas Emission Targets

California's Sustainable Communities and Climate Protection Act, or SB 375, requires SCAG to develop a Sustainable Communities Strategy to reduce per capita GHG emissions through integrated transportation, land use, housing and environmental planning. Pursuant to SB375, ARB set per capita GHG emission reduction targets from passenger vehicles for each of the state's 18 MPOs. For the SCAG region, the targets are set at eight percent below 2005 per capita emissions levels by 2020 and 13 percent below 2005 per capita emissions levels by 2035. The 2012 RTP/SCS achieves per capita GHG emission reductions relative to 2005 of eight percent in 2020 and 16 percent in 2035.

Transportation Conformity

Transportation conformity is required under CAA section 176(c) to ensure that federally supported highway and transit project activities "conform to" the purpose of the SIP. Conformity currently applies to areas that are designated non-attainment, and those re-designated to attainment after 1990, maintenance areas, with plans developed for the specific transportation related criteria pollutants. Conformity for the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. The conformity tests and analyses are: regional emissions analysis, timely implementation of Transportation Control Measures, financial constraint analysis, and public involvement (see Transportation Conformity appendix for details). The Regional Council makes the conformity determination finding as part of the approval of the 2012 RTP

[14] Department of Transportation, Federal Highway Administration. Environmental Justice Emerging Trends and Best Practices Guidebook, Document Number: FHWA-HEP-11-024. August 2011.

[15] National Cooperative Highway Research Program Report 686. Road Pricing: Public Perceptions and Program Development (2011).

[16] Ibid.

[17] Ibid.

06 PUBLIC PARTICIPATION

Introduction

SCAG values public participation in the development of its RTP and the SCS. Public involvement is essential to ensure that stakeholders gain a clear understanding of SCAG, its role as a Metropolitan Planning Organization (MPO), critical elements of the RTP/SCS and its development process. Furthermore, public involvement helps SCAG policymakers and staff better understand the needs and concerns of stakeholders, leading to more meaningful planning efforts and activities.

In compliance with federal and state requirements and to guide effective public involvement, SCAG utilizes its Public Participation Plan. The Public Participation Plan provides the direction for public participation activities, outlining the processes and strategies SCAG uses to reach out to a broad range of stakeholders and gain their input. SCAG's Public Participation Plan was most recently amended to incorporate requirements of SB 375 for a Sustainable Communities Strategy and make appropriate revisions with respect to the 2012 RTP. SCAG's Regional Council is scheduled to approve the revised Public Participation Plan in December 2011. The full Public Participation Plan is included in the Public Participation and Consultation technical appendix.

Activities

The 2012 RTP/SCS was developed in consultation with interested parties from the private and public sectors, academia, and other stakeholders, including those listed in **TABLE 6.1**. SCAG values public participation in the development of its regional plans and programs and aims to ensure that the various stakeholders have a reasonable opportunity to comment on the contents of the RTP/SCS.

To ensure compliance with federal and state requirements, SCAG implements a public involvement process to provide information, timely public notice and full public access to key decisions, and to support early and continuing public involvement in developing its regional plans. Since its inception, SCAG has engaged in a public involvement process in developing its regional transportation plans and programs. As a result of changes in SAFETEA-LU in 2005, SCAG has broadened its current participation activities to engage a more extensive group of stakeholders in its planning and programming processes, as reflected in SCAG's current Public Participation Plan first adopted by the Regional Council in March 2007. In subsequent amendments, SCAG has continued to consult with a range

of interested parties to refine the agency's public participation strategies, procedures and techniques; soliciting comments from a diverse number of stakeholders through mailings, email correspondence, workshops, presentations, meetings, telephone communications, and website postings.

TABLE 6.1 Participatory Non-Governmental Groups

Participatory Non-Governmental Groups
Bicycle users and advocates
Citizens
Educational institutions
Environmental groups
Ethnic and minority groups
Freight shippers
Freight transportation service providers
Nonprofit organizations
Older and retired persons
Pedestrians
Private sector
Private transportation providers
Public transit users
Representatives of the disabled
Special-interest nonprofit agencies
Transportation advocates
Urban and rural advocacy groups
Women's organizations

By using the Public Participation Plan, SCAG has continued to enhance the techniques and strategies for RTP/SCS outreach, including:

- Developing presentation materials for public outreach in a variety of formats to reach broad audiences, including interactive PowerPoint presentations, fact sheets, surveys, brochures, and maps,
- Enhancing website capabilities that allows SCAG to post all RTP/SCS related information on its website to ensure that it is accessible and transparent to the public (the website is compliant with the 1990 Americans with Disabilities Act),
- Coordinating outreach efforts with other stakeholder organizations to maximize outreach opportunities,
- Developing an outreach schedule that notifies individuals and groups throughout the region of activities where SCAG will be presenting the RTP and encourages attendance,
- Supporting multiple committees and task forces involving SCAG partners, stakeholders, and interested groups to develop the key components of the Plan,
- Holding multiple public workshops before the release of the Draft RTP/SCS to allow direct participation by interested parties,
- Reaching out to traditionally underrepresented and/or underserved audiences,
- Considering comments received in the deliberations regarding proposed plans and programs, and
- Evaluating public participation activities to continually improve the outreach process

In addition to these targeted outreach efforts, all regular and special meetings of the RTP task forces, the Transportation Committee (TC) and the SCAG Regional Council are publicly noticed and opportunities for public comment are provided. Federally required interagency consultation is done through the monthly meetings of the Transportation Conformity Working Group (TCWG). Specific public comments on the Draft RTP/SCS are being recorded and considered by SCAG in the development of the 2012 RTP/SCS.

Across the region, hundreds of Southern Californians from all walks of life helped shape the Draft 2012 RTP/SCS. From January through March 2011, SCAG conducted eleven Subregional Planning Sessions to receive input on projected population, household and employment growth in the respective areas. From these policies, plans and data, four planning scenarios were developed and presented in a series of 18 public workshops held during the Summer of 2011. These Sustainable Community Strategy workshops were held throughout the SCAG region, with over 700 individuals in attendance. (Please see **FIGURES 6.1** and **6.2** for a sample of questions and responses from these workshops.) Residents, elected officials, representatives of public agencies, community organizations, and environmental, housing and business stakeholders truly made this a "bottom up" process.

Participants were provided with a description of the four scenarios and how development location, neighborhood design, housing options and mix, and transportation investments within each scenario would impact greenhouse gas emissions, land use, fuel consumption, water consumption and other costs in the region.

Following the presentations, the groups engaged in discussions of objectives and priorities for the 2012 RTP/SCS, including mobility, environment, health, modes of travel, economy, safety, equity, and housing. Attendees were also surveyed on current transportation habits, access to public transportation, as well as priorities for their community. Results from the workshops can be found in the Public Participation and Consultation technical appendix.

New Issues, New Strategies

From comments relating to the 2008 RTP, SCAG staff identified Environmental Justice as a key concern for further follow-up, and a special focus group was convened in June 2011. Approximately 60 participants, including residents and representatives of local community organizations, attended the meeting and provided valuable feedback on a variety of issues, such as gentrification and health impacts near transportation corridors. A summary of this workshop is available in the Public Participation and Consultation technical appendix.

As illustrated in Chapter 2, a greater emphasis has been given in the 2012 RTP/SCS to active transportation solutions to help address public health issues and curb greenhouse gas emissions. To better address these issues, SCAG used innovative public participation strategies to develop the active transportation portion of the 2012 RTP/SCS. Much of the active transportation plan was developed online using a Wiki—a managed website that allows for collaborative creation and editing. As of November 2011, the Wiki had over 1,000 registered users who represent various bicycle advocacy groups, county transportation officials and other stakeholders. In addition, the Bike/Ped Twitter account actively engages over 500 followers, providing them with updates on the RTP/SCS and other planning items in the region.

Recognizing Diversity

To help inform the region's stakeholders of opportunities for public input on the 2012 RTP/SCS, SCAG posted announcements and videos on its website, blog sites, and its social networking pages (Facebook, Twitter); prepared factsheets and other outreach materials in English, Spanish and Chinese; placed ads and public service announcements in newspapers, government access cable television stations, and e-newsletters; and sent announcements to media, including ethnic press.

SCAG has strived to ensure that the Native American voice is heard during the development of the RTP. There are 16 federally recognized Tribes within the SCAG region. Seven are represented on the Regional Council and Policy Committees and have voting power. In addition to presentations made by staff to individual tribes, SCAG conducted a workshop for the regional, state and federal resource agencies and Tribal governments in November 2011 and has targeted additional outreach after the release of the Draft 2012 RTP/SCS.

Raising the Bar

The 2012 RTP/SCS is a grand vision with many components. SCAG understands that access to relevant information is necessary for greater awareness and understanding

among stakeholders. Therefore, SCAG has put great effort in developing visual tools and utilizing new technologies to enhance public engagement in the planning process.

SCAG's website is the organization's most important tool in disseminating information and its primary interface with the public. In 2010, SCAG began exploring ways to provide better access to the RTP/SCS, which was projected to exceed 200 pages in printed form. Rather than have visitors download PDF files individually, SCAG developed plans for a new website that would allow visitors to navigate easily through the various chapters and view all the ancillary maps, tables and data visualizations without leaving the page they were reading. This new interactive RTP website will allow users to navigate to various sections, and also allow for custom PDF downloads of specific pages and sections of interest.

The use of video has helped create greater awareness and visibility for the RTP/SCS. An introductory video was produced and screened at the RTP/SCS workshops in the summer of 2011, included in subsequent staff presentations, and also made available on the SCAG website. In clear and simple terms, the video explained the need for a regional transportation plan, the role of SCAG and the purpose of the workshop. The result was a more dynamic presentation that helped participants visualize and better understand the plan, as well as a high level of interaction between staff and workshop participants.

SCAG has taken this approach a step further and will release a new RTP/SCS video to coincide with the release of the 2012 Draft RTP/SCS and the beginning of the public comment period. This new RTP/SCS video will discuss SCAG's role, the contents of the 2012 Draft RTP/SCS and the benefits of implementing the plan. As a highlight, it features interviews with key stakeholders, residents of the SCAG region, and community leaders. SCAG will showcase this video at presentations throughout the region as well as make it accessible on the SCAG website.

Looking Ahead

To ensure that as many people as possible are able to participate in the regional planning process going forward, SCAG is committed to increasing public participation opportunities and creating greater access.

SCAG's videoconferencing facilities (located at five regional offices and three video conferencing sites across the Southern California region), have enabled more people to participate in the public outreach than in previous RTP cycles. SCAG will continue to utilize this technology to conduct public workshops, meetings and other forms of public outreach, as well as expand the number of videoconferencing sites.

SCAG's new interactive RTP website will also improve public feedback. The website allows visitors to submit comments on specific sections of the Draft RTP from almost any page of the site. In designing the website, SCAG has also followed the three most prominent sources and standards for website accessibility guidelines:

- The Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C),
- Section 508 of the Rehabilitation Act of 1973, and
- Legal guidelines in conformance with the US Americans with Disabilities Act (ADA).

As part of its redesign of the main website, SCAG will ensure Americans with Disabilities Act compliance so that all web content is accessible to all people, regardless of disability.

Following the adoption of the RTP, the website will be updated to reflect any changes or amendments to the RTP, and continue to serve as an easy-to-navigate digital, searchable resource for the public.

While technology, including the utilization of social media, is important to public outreach, SCAG will continue to use traditional methods and techniques that have proven effective in ensuring wide participation. These include in person, face-to-face engagement with residents, businesses and community groups in urban and rural areas, representatives and advocacy groups for underrepresented and/or low-income communities and direct work with ethnic media.

SCAG will conduct a survey to obtain feedback on the effectiveness of its outreach for continued improvement and enhancement of its outreach efforts. SCAG is committed to constantly evaluating its strategies and approaches to enhance public participation. As the nation's largest metropolitan planning organization, SCAG must address the broad range of interests, regional priorities, and needs of diverse populations within the Southern California region. Public engagement and participation has become an organizational-wide value.

FIGURE 6.1 Sample of Question Used at RTP/SCS Public Workshops, Summer 2011

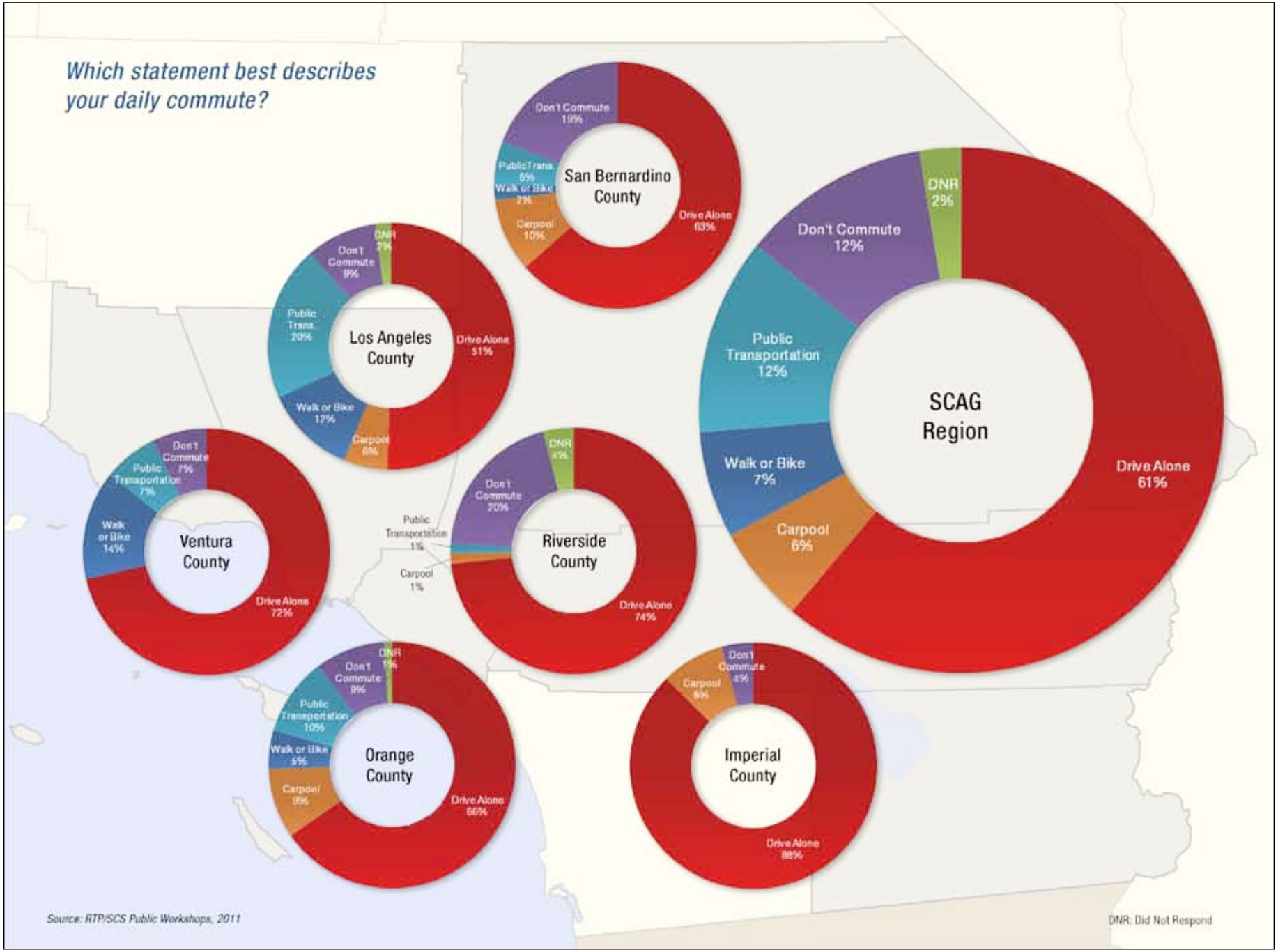
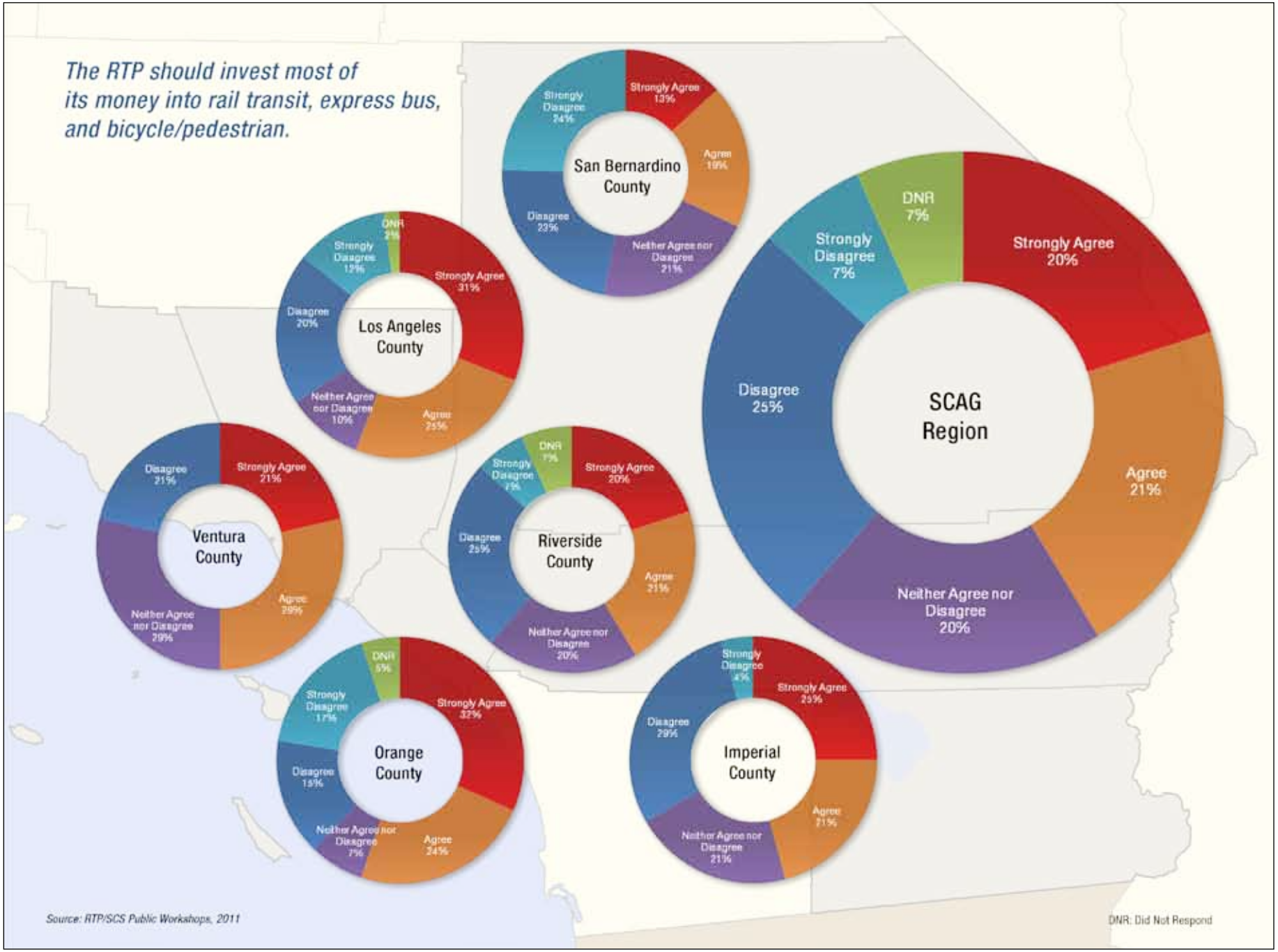


FIGURE 6.2 Sample of Question Used at RTP/SCS Public Workshops, Summer 2011



07 STRATEGIC PLAN

Looking Ahead – Beyond the Horizon

The RTP strategies discussed in Chapter 2: Transportation Investments, represent the region's collective vision for addressing our transportation needs within the constraints of committed, available, or reasonably available revenue sources. Despite the substantial commitments of over $500 billion contained in the RTP and the associated benefits discussed in Chapter 5: Measuring Up, this level of investment does not meet the full needs identified through the RTP development process. If we truly want to address all the needs set forth in this RTP, we must look toward additional strategies and investments to get us there. Often this will entail controversial and difficult choices that will push the envelope and test the boundaries of what is politically acceptable. For now, these elements are contained in the Strategic Plan with the recognition that they merit further study and that, over time and with further consensus-building, these programs and policies may move forward into the constrained RTP.

The concept of a Strategic Plan was first incorporated into the 2008 RTP. It was envisioned that the 2012 and subsequent RTPs would draw from the projects contained in the Strategic Plan. This has in fact occurred. The 2012 RTP/SCS investments discussed in Chapter 2 attest to the success of the 2008 Strategic Plan, since several of its projects and strategies have now moved to the constrained portion of the 2012 RTP/SCS. These include:

- **Preservation Investments** – The 2008 Strategic Plan called for a higher level of investment to preserve the region's multi-modal system. The 2012 RTP/SCS includes $65 billion in additional preservation funding.
- **Operations Investments (TSM)** – The 2008 Strategic Plan recommended increasing funding to the cost-effective transportation system management strategies that increase the productivity of the existing system. The 2012 RTP/SCS allocates $5 billion to TSM.
- **Dedicated Lanes for Clean-Technology Trucks on the East West Corridor** – The 2008 Strategic Plan called for more detailed study of the different east west corridors and recommending one for inclusion in the RTP. The 2012 RTP/SCS includes the recommended East West Freight Corridor and provides full funding for it.
- **Metrolink and LOSSAN Rail Improvements** – The 2008 Strategic Plan included unfunded improvements to the Metrolink and LOSSAN Rail corridors. The 2012 RTP/

SCS fully funds these improvements, partially using newly available federal and state funds.

- **The Westside Purple Line Extension** – The 2008 Strategic Plan included the unfunded Purple Line Extension to Westwood. The 2012 RTP/SCS now fully funds this extension, relying on the recently adopted Measure R in Los Angeles.

The 2008 Strategic Plan strongly influenced the 2012 Constrained Plan as originally intended. Moving forward, it is again envisioned that updates to the 2012 RTP/SCS would draw from the projects contained in this Strategic Plan; exceptions would be handled on a case-by-case basis.

The remainder of this chapter provides a brief illustrative overview of the additional strategies and investments that the region would pursue if additional funding were to become available, and after further consensus building to solidify commitment around specific projects and policies.

Long-Term Emission Reduction Strategies for Rail

Included in this strategic RTP/SCS is a recommendation to continue ongoing work with railroads, air quality management agencies and other stakeholders to reach our goal of a zero emissions rail system. Freight rail activity emits five percent and four percent of regional NO_X and PM goods movement related emissions, respectively. Mitigation of rail emissions is currently underway with agreements to upgrade engines and reduce idling at certain rail yards, but more must be done to improve regional air quality, help meet federal requirements and reduce health impacts for communities near rail activity. There are several options for a zero emission rail system including electrification, battery-hybrid systems and fuel cells. Since 2008, SCAG has worked with representatives from major rail lines, the AQMD and the ARB to carefully evaluate potential zero emissions options for freight rail. In particular, three forms of electrification have been considered to date.

- **Electric Catenary Rail Systems** – These are perhaps the most technologically ready, however, construction of an electrified rail system in Southern California would be a major undertaking in terms of labor, timeline, and cost for the SCAG region, and would require large investment as well as cooperation and investment by the BNSF and UP railways.
- **Dual Mode Locomotives** – These have been deployed for passenger rail applications but would need development for freight applications. They have the ability to operate both on a catenary or with traditional diesel power. The ability to operate in both modes could potentially reduce operational difficulties associated with the need to remove the engine at the end of the electrified system. However, additional operational considerations remain to be addressed.
- **Linear Synchronous Motors** – This technology propels rail cars by creating an electromagnetic field from motors embedded in the railway. One advantage of LSM is that overhead electric lines would not be needed, allowing the electric rail system to extend further into ports and rail yards. LSM technology is in its early stages and costs cannot be estimated, however demonstration projects are underway.

The 2012 RTP specifies further study of these technologies to resolve operational challenges and to better quantify the costs of implementation and potential savings or cost increases of eliminating diesel fuel. In addition, several other technologies such as hybrid diesel-electric locomotives and battery electric tender cars will be considered. Such technologies have the potential to reduce or even eliminate the need for catenary wire infrastructure. We also plan to participate in regional efforts to develop prototypes, proof of concept testing and both small and full scale demonstrations of these technologies. Please see the Technical Appendix of the RTP and the SCAG Rail Electrification Study for more information about these technologies and next steps for development and deployment.

Long-Term Emissions Reduction Strategies for Trucks

Equally important to SCAG's long term vision of a zero emission goods movement system is the reduction or elimination of emissions from heavy duty trucking. Heavy Duty Trucks comprise 75 percent of regional goods movement NO_X emissions and 58 percent of goods movement related PM emissions. In the near term, the RTP proposes an aggressive program to bring more currently available, clean fuel trucks and hybrid trucks into service. In the longer term, we suggest that our infrastructure serve as a catalyst for the development and deployment of zero and near zero emission trucks such as those powered by hybrid, fuel-cell, or battery technologies.

The trucking market offers unique challenges due to heavy weights, operational performance requirements, and high incremental costs. However, several reduced emissions trucks are currently commercially available and many zero and near zero emission trucks are under development for future deployment. For instance, reduced emission natural gas trucks have already been deployed at the ports and several hundred hybrid electric trucks are on the road due to the ARB's Hybrid Truck and Bus Voucher Incentive Project (HVIP).

Other promising technologies include plug-in hybrid-electric trucks, which have batteries that are charged through an external power source and battery electric trucks which can generate their own power or receive power from an outside source. Plans for zero emission truck lanes on the I-710 and the East West Freight Corridor offer the opportunity to include wayside power systems that could extend the range of these trucks. The provision of zero emission corridors may also provide the certainty needed for original equipment manufacturers to more heavily invest in new technology. More research is needed to determine if wayside power is the right strategy for our region, but the RTP plans for flexible design of new infrastructure to allow for this use.

SCAG intends to work closely with our partners and existing collaborative efforts to facilitate development of these technologies. Stakeholder input will be critical to understand the performance needs of the technology and any operational concerns. As technologies are developed, appropriate funding support and other incentive mechanisms should be applied. Existing efforts are proposed to lead to formation of a logistics working group to promote, evaluate and secure funding for these technologies. For more information on steps towards development and deployment of these technologies, please see the Technical Appendix.

Unfunded Operational Improvements

It has been shown around the state and the region that some well-targeted investments in physical operational improvements on roadway system (both highway and arterials) can significantly improve their productivity. These investments include interchange improvements, auxiliary lanes, ramp widening, and others. The recent Caltrans CSMP development process identified a number of these projects for a subset of the State Highway System. Between now and the 2016 RTP/SCS, SCAG will work with its stakeholders and partners to identify additional cost effective investments and seek funding.

Unfunded Capital Improvements

Regionally significant major corridor improvements and strategies in the Strategic Plan are identified in **TABLE 7.1**. A more complete list is contained in the RTP Project List available at www.scag.ca.gov/rtp2012.

TABLE 7.1 Major Strategic Plan Projects

Strategic Plan Project Description
Additional Transit Station Improvements to Irvine Station, Fullerton Transportation Center, and Santa Ana Regional Transportation Center
Bus Rapid Transit on Beach, Edinger, La Palma, and Katella, and in South County
California High-Speed Train System Phase II
California/Nevada Super-Speed Train Anaheim to Ontario IOS
Coachella Valley Daily Rail Service Between Downtown Los Angeles and Indio
Cordon Pricing Demonstration Projects (locations to be determined)
DesertXpress High-Speed Rail Between Palmdale-Victorville-Las Vegas
Expanded Express/HOT Lane Network
Express Bus Service Throughout Orange County, and Between Orange County and Los Angeles and Riverside Counties
Long-Term Goods Movement Emission Reduction Strategies for Rail and Trucks
Metro Gold Line Eastside Extension Beyond Phase II Terminus
Metro Gold Line Extension to Ontario International Airport
Metro Green Line Extension to San Pedro, Long Beach, and LA/Orange County Line
Metro Purple Line Extension Further West
Metrolink and LOSSAN Strategic Plans
Mileage-Based User Fee Demonstration Projects and Implementation Strategy
Orangeline High-Speed Transit (Union Station to Santa Clarita)
San Bernardino Mountain-Valley Railway System Between San Bernardino/Highland and Big Bear Lake
Santa Paula Branch Line
US-101 HOV Lanes From Route 23 to Topanga Canyon

Ultimate Vision for a High-Speed Rail System

Our ultimate vision for a true High-Speed Train System that would link major urban areas and activity centers within our region and beyond would be incomplete without Phase II of the proposed California High-Speed Train (HST) system. Phase II would link Los Angeles Union station to San Diego via the Inland Empire in our region. The project is being planned in segments all in different degrees of project readiness. This corridor is approximately 160 miles long, stretching from Union Station in downtown Los Angeles through San Bernardino and Riverside Counties, and terminating in San Diego County. With 20.8 million residents, these four counties make up approximately 56 percent of the state's current population and will grow significantly by 2050.

Phase II of the CA HST project, by adding connections to the Inland Empire and San Diego County, completes the backbone of a true regional High-Speed Transport system. The LOSSAN, Metrolink system, and CA HST Phase I investments discussed in previous chapters will provide high-speed travel alternatives in Northern Los Angeles County, the San Fernando Valley, the Gateway Cities, and Orange County; Phase II will extend those alternatives to the San Gabriel Valley and the Inland Empire. Upon completion, Phase II will provide important access to planned and existing regional centers, including Los Angeles Ontario Airport, the March Inland Port, and possibly San Bernardino International and Corona airports, helping to meet SCAG's long-term goal of regionalizing air travel in Southern California. Furthermore, Phase II may one day be the basis for further high-speed rail extensions into Nevada or Arizona.

The CA HST system will provide excellent regional connectivity to our region by connecting with a robust network of intercity and commuter rail, subway and light-rail, and fixed-route transit systems. The proper planning and service levels of these connecting services will allow them and the CA HST to feed and complement each other. While commuter, intercity and interregional rail services are distinct travel markets, the proper coordination of their schedules will further increase the region's rail and transit ridership by attracting crossover passengers to these different markets. It will also significantly relieve capacity constraints of the existing air and highway transportation system as increases in intercity travel demand in California occur. By attracting a large number of trips from current auto and air travel markets, a significant decrease in GHG emissions will be achieved in our region. In addition, the HST project will provide a much cheaper

alternative to building additional airport and highway capacity to serve intrastate aviation routes and auto trips.

In addition, several other high-speed rail transportation projects are part of the Strategic Plan that, if completed, would deliver a robust regional high-speed transport system. The DesertXpress proposal would one day link our region with Las Vegas, providing a high-speed alternative to the highly congested I-15 corridor, and relieving traffic in our region's fifth largest domestic air travel market. High-speed transport systems connecting Anaheim with Ontario and Santa Clarita would provide important onward connections for those using the state HST system, and link important regional destinations. Similarly, daily Amtrak corridor service to the Coachella Valley would link an additional SCAG subregion to our regional rail network.

Greater Vision for our Commuter Rail System

Metrolink provides our region's commuter rail service operating 164 trips on seven lines carrying 42,000 passengers on weekdays. With the investments proposed within the Constrained Plan in Chapter 2, we expect to achieve more than double the ridership by 2035. But, we believe, the Metrolink system has even greater untapped potential for our region.

Our region boasts 4.32 commuter rail route miles per 100,000 residents, which is over 2.5 times the median for large metropolitan regions. However, in 2008, residents of the SCAG region took only 0.7 per capita trips on the commuter rail system, well below the national median of 0.82. Chicagoans, by contrast, took 8.28 trips per capita, on a network that provides 11.8 route miles for every 100,000 residents. Residents of Baltimore took 34 percent more commuter rail trips per capita on a network similar to that of the SCAG region.

The average speed for Metrolink is about 40 mph today. The average speeds vary by line and while top speeds are 79 mph, the number of stops and physical capacity and geographic constraints result in this average system speed which is lower than one would think. This shows the need to fund capital projects in order to speed up the service and make Metrolink more attractive to the SOV commuter.

The recent release of the CAHSRA's draft 2011 Business Plan puts off the arrival of the CA HST system in our region to 2033, and greatly escalates the official project cost. This confirms long-standing stakeholder concerns of the project's implementation timeline and viability, and therefore confirms the need to spend HSR dollars on our region's current rail services. In fact, the new Business Plan calls for "blended" rail services whereby incremental operating segments of the CA HST system will connect with existing rail services until the entire project gets built.

Our Strategic Plan vision for Metrolink speed and service improvements calls for an intensive investment in capital projects to further increase speed and service levels over and above the Constrained Plan. The Strategic Plan results in even more segments of the network operating at speeds of 110 mph or greater. These projects include additional double tracking, sidings, station improvements, grade separations, and grade crossings. Not only will this benefit commuter rail trips in our region, but will benefit Amtrak inter-city and CA HST inter-regional trips also as the three systems feed and complement each other. While these are three distinct travel markets, improving all three networks encourages crossover rail travel market trips.

In addition to capital improvements, our strategic vision calls for:

- A doubling of system use by 2020, and possibly doubling again by 2035,
- Considerably more express trips,
- Regular special event services,
- A connection to Ontario airport,
- The implementation of new BRT services that directly connect with the Metrolink system,
- A robust growth of TOD around Metrolink stations, and
- The implementation of first mile/last mile policies for robust bicycle and pedestrian improvements around Metrolink stations.

Our Vision for Active Transportation Beyond 2035

The 2012 RTP Constrained Plan proposes investing over $6 billion towards active transportation, including the development of over 7,000 miles of bikeways and improvements to add over 1,200 miles of sidewalks. In addition to these projects, SCAG hopes to substantially increase bicycling and walking in the region by creating and maintaining an active transportation system that includes well-maintained bicycle and pedestrian facilities, easy access to transit facilities, and increased safety and security for all users. The active transportation vision for the strategic transportation system is one where bicycling or walking are simply the most logical and efficient choices for most short trips. To achieve that vision, SCAG and local jurisdictions must create the conditions by which active transportation is more attractive than driving for short trips (less than three miles for bicycles, one-half mile for walking). The goals are to develop and build a dense bicycle network so that all SCAG residents and visitors can easily find and access a route to their destination, incorporate Complete Streets policies in street design/redesign and Compass Blueprint strategies for land use, and ensure ADA compliance on all sidewalks.

BIKEWAYS

Further enhancements to the active transportation system should be considered to make bicycling and walking a more feasible and desirable transportation option. The strategic bikeway plan envisions a three tiered system to achieve those goals: an expanded regional bikeway network, citywide bikeways in each city, and neighborhood bikeways.

- The Regional Bikeway Network is expanded over the constrained plan, developing a grid pattern where possible in urbanized areas. Each designated regional bikeway links to other regional bikeways and to city bikeways for commuters and recreational riders. Although not free-flowing as freeways, the regional bicycle network links the cities in the region in a similar manner. To the greatest extent possible, the regional bikeway network should be Class 1, Class 2 bikeways/cycle tracks or even painted sharrows with appropriate signage and wayfinding.
- Citywide bikeways link neighborhood bikeways to regional bikeways and major city destinations, such as employment, retail and entertainment centers. These will

often be on arterial and collector streets, which are already part of the grid system. Bikeways will likely need to be either Class 2 bikeways (painted or unpainted) or Cycle tracks. When going through large suburban areas, they can be designated bicycle boulevards. Citywide bikeways should be no farther than one half mile apart.

- Neighborhood bikeways link neighborhoods to local amenities, such as schools, parks, grocery stores and local retail, eating and entertainment. These facilities will be primarily on low speed streets and be identified through sharrows, bicycle boulevards and wayfinding signage. While every residential street should be considered a neighborhood bikeway, the focus should be on streets that connect across blocks and neighborhoods. In addition, neighborhood bikeways should link to other neighborhood bikeways providing a low speed, low stress environment for families and youths to bicycle with minimal interaction with faster, busier streets.

Completion of this system will require coordination among cities as well as parallel improvements within each city and unincorporated areas of counties. It will involve roughly a doubling of the bicycle network beyond the constrained plan to 24,000 miles, with a cost estimated at around $12 billion.

PEDESTRIANS

Pedestrian accessibility and mobility may be addressed through increased safety and security and land use. Integration of Safe Routes to School strategies, Safe Routes to Parks programs, incorporating active transportation in SCAG's Compass Blueprint Projects, and developing active transportation best practices around transit stations, may further enhance the walking environment. In addition, local jurisdictions can integrate active transportation and Complete Street concepts with their land use decisions. Inclusions of bulb-outs, median sanctuaries, and traffic calming can increase pedestrian safety by reducing collisions, particularly at intersections. Other strategies include more prominent deployment of left-turn signals and no-right turn on red signals in high pedestrian environments. In addition, SCAG encourages and is prearped to work with appropriate implementation agencies to mapping, development, and implementation of recreational trails throughout the region, including the SCAG portion of the California Coastal Trail, river trails, urban and wilderness hiking areas/trails.

The cost for completion of this element varies widely, depending upon the level of improvements and methodologies used, and ranges from $6 billion to $35 billion.

Strategic Finance

Following the adoption of the 2008 RTP, SCAG initiated a comprehensive study of congestion pricing strategies, which has come to be known as the Express Travel Choices Study. The emerging regional congestion pricing strategy is structured to help the region meet its transportation demand management and air quality goals while providing a reliable and dedicated revenue source. The pricing strategy could allow users of the transportation system to know the true cost of their travel, resulting in informed decision-making and more efficient use of the transportation system. Pricing strategies evaluated through the Express Travel Choices Study include a regional high-occupancy toll (HOT or Express) lane network and a mileage-based user fee, both of which are incorporated into the 2012 RTP. Nevertheless, these strategies still face a number of significant hurdles before their full benefits can be realized. A second phase on the Express Travel Choices Study will continue beyond the adoption of the 2012 RTP and establish an implementation plan for the regional congestion pricing strategy. SCAG will also participate in state and national efforts to address the long-term transition of excise fuel taxes to mileage-based user fees.

In addition to SCAG's regional congestion pricing initiative, a number of local efforts to establish additional transportation revenues are underway or may be in the near future. In 2004, the voters in Ventura County were asked to approve a local sales tax measure for transportation. While the voters did not approve the sales tax increase, it remains a popular option for the region's counties to generate a significant amount of revenues dedicated to transportation. All of the other counties in the SCAG region have a local sales tax measure dedicated to transportation.

The Los Angeles County Metropolitan Transportation Authority (MTA) is evaluating the feasibility of a Congestion Mitigation Fee as part of a proposed restructuring of its Congestion Management Program (CMP). If enacted, the fee would be imposed on new development and would generate new revenue to assist MTA in addressing congestion caused by growth. MTA has also proposed and is advocating for a program known as "America Fast Forward" (formerly known as the "30/10 Initiative"). The concept of America Fast Forward is to use the long-term revenue from the Measure R sales tax as collateral for long-term bonds and a federal loan which will allow MTA to build 12 key mass transit projects in 10 years, rather than 30. Accelerating construction of these projects will result in substantial cost savings. SCAG intends to work closely with our partners to deliver a more sustainable funding future, including identifying specific actions that can help leverage existing revenue sources and expedite project delivery.

Glossary

AASHTO | American Association of State Highway and Transportation Officials – A non-profit, nonpartisan association representing highway and transportation departments in the 50 states, the District of Columbia and Puerto Rico.

AB 32 | Assembly Bill 32 – Signed into law on September 26, 2006, it requires that the state's global warming emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on global warming emissions that will be phased in starting in 2012. In order to effectively implement the cap, AB 32 directs the California Air Resources Board (CARB) to develop appropriate regulations and establish a mandatory reporting system to track and monitor global warming emissions levels.

AB 169 | Assembly Bill 169 – Provides for the sixteen federally recognized tribes in the SCAG Region to join the SCAG Joint Powers Authority (JPA) to participate in the Southern California Association of Governments by voting at the SCAG General Assembly.

ACE | Alameda Corridor East – A 35-mile corridor extending through the San Gabriel Valley between East Los Angeles and Pomona and connecting the Alameda Corridor to the transcontinental railroad network.

ADA | Americans with Disabilities Act of 1990 – Guarantees equal opportunity for individuals with disabilities in public accommodations, employment, transportation, state and local government services, and telecommunications. It prescribes federal transportation requirements for transportation providers.

AJR | Assembly Joint Resolution No. 40 – Introduced on August 23, 2007, the Resolution calls upon the governor to declare a state of emergency in respect to the air quality health crisis in the South Coast Air Quality Basin related to emissions of PM2.5, and to direct steps necessary to address the emergency.

ANCA | Federal Airport Noise and Capacity Act of 1990 – Establishes a national aviation noise policy that reviews airport noise and access restrictions on operations for Stage 2 and Stage 3 aircraft.

Antelope Valley AQMD | Antelope Valley Air Quality Management District – The air pollution control agency for the portion of Los Angeles County north of the San Gabriel Mountains.

AQMP | Air Quality Management Plan – Regional plan for air quality improvement in compliance with federal and state requirements.

ARB | Air Resources Board – Refer to CARB, California Air Resources Board.

ATIS | Advanced Traveler Information Systems – Technology used to provide travelers with information, both pre-trip and in-vehicle, so they can better utilize the transportation system.

ATMS | Advanced Transportation Management Systems – Technology used to improve the operations of the transportation network.

AVO | Average Vehicle Occupancy – Calculated by dividing the total number of travelers by the total number of vehicles.

Base Year | The year 2008, used in the RTP performance analysis as a reference point for current conditions.

Baseline | Future scenario which includes only those projects that are: existing, undergoing right-of-way acquisition or construction, come from the first year of the previous RTP or RTIP, or have completed the NEPA process. The Baseline is based upon the adopted 2011 FTIP. The Baseline functions as the "No Project" alternative used in the RTP Program EIR.

BLS | Bureau of Labor Statistics – The principal fact-finding agency for the federal government in the broad field of labor economics and statistics.

BNSF | Burlington Northern and Santa Fe Railway Company.

BRT | Bus Rapid Transit – Bus transit service that seeks to reduce travel time through measures such as traffic signal priority, automatic vehicle location, dedicated bus lanes, limited-stop service, and faster fare collection policies.

BTA | Bicycle Transportation Account – Provides state funds for city and county projects that improve safety and convenience for bicycle commuters.

CAA | Clean Air Act (CAA) – 1970 federal act that authorized EPA to establish air quality standards to limit levels of pollutants in the air. EPA has promulgated such standards (or NAAQS) for six criteria pollutants: sulfur dioxide (SO2), nitrogen dioxide (NO2), carbon monoxide (CO), ozone, lead, and particulate matter (PM10). All areas of the United States must maintain ambient levels of these pollutants below the ceilings established by the NAAQS; any area that does not meet these standards is a "non-attainment" area. States must develop SIPs to explain how they will comply with the CAA. The act was amended in 1977 and again in 1990.

CAFR | Comprehensive Annual Financial Report – Official annual financial report that encompasses all funds and financial components associated with any given organization.

Cal B/C Model | **California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C)** – Was developed for the California Department of Transportation (Caltrans) as a tool for benefit-cost analysis of highway and transit projects. It is an Excel (spreadsheet) application structured to analyze several types of transportation improvement projects in a corridor where there already exists a highway facility or a transit service (the base case).

Caltrans | **California Department of Transportation** – State agency responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as that portion of the Interstate Highway System within the state's boundaries.

CARB | **California Air Resources Board** – State agency responsible for attaining and maintaining healthy air quality through setting and enforcing emissions standards, conducting research, monitoring air quality, providing education and outreach, and overseeing/assisting local air quality districts.

Catalytic Demand | Additional aviation demand that is created by companies that locate in the proximity of expanding airports with developable land around them, to reduce airport ground access time and costs for their employees and clients. Catalytic demand is greatest for large hub airports, particularly international airports.

CEHD | **Community, Economic and Human Development Committee** – A SCAG committee that studies the problems, programs and other matters which pertain to the regional issues of community, economic and human development and growth. This committee reviews projects, plans and programs of regional significance for consistency and conformity with applicable regional plans.

CEQA | **California Environmental Quality Act** – State law providing certain environmental protections that apply to all transportation projects funded with state funds.

CETAP | **Community Environmental and Transportation Acceptability Process** – Part of the Riverside County Integrated Project that is examining where to locate possible major new multimodal transportation facilities to serve the current and future transportation needs of Western Riverside County, while minimizing impacts on communities and the environment.

CHSR | **California High-Speed Rail Authority** – Agency responsible for planning, designing, constructing and operating a state-of-the-art high-speed train system in California.

CIP | **Capital Improvement Program** – Long-range strategic plan that identifies capital projects; provides a planning schedule and financing options.

CMAQ | **Congestion Mitigation and Air Quality Program** – Federal program initiated by ISTEA to provide funding for surface transportation and other related projects that contribute to air quality improvements and reduce congestion.

CMIA | **Corridor Mobility Improvement Account** – These funds would be allocated by the California Transportation Commission to highly congested travel corridors in the state. Projects in this category must be a high priority; be able to start construction by 2012; improve mobility in a highly congested corridor by improving travel times and reducing vehicle hours of delay; connect the State Highway System; and improve access to jobs, housing, markets and commerce.

CMP | **Congestion Management Program** – Established by Proposition 111 in 1990, requires each county to develop and adopt a CMP that includes highway and roadway system monitoring, multimodal system performance analysis, transportation demand management program, land-use analysis program and local conformance.

CNSSTC | **California-Nevada Super Speed Train Commission** – Public-private Partnership developed to promote a high-speed link between California and Nevada.

CO | **Carbon monoxide** – A colorless, odorless, poisonous gas formed when carbon in fuels is not burned completely. It is a byproduct of highway vehicle exhaust, which contributes about 60 percent of all CO emissions nationwide.

COG | **Council of Governments** – Under state law, a single or multi-county council created by a joint powers agreement.

COMPASS/Growth Visioning | A planning process guided by input from the public and initiated by SCAG to develop a regional strategy for addressing future growth in Southern California.

Congestion Management Process | Systematic approach required in transportation management areas (TMAs) that provides for effective management and operation, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities eligible for funding under title 23 U.S.C. and title 49 U.S.C., through the use of operational management strategies.

Congestion Pricing | User fee imposed on vehicles during peak demand periods on congested roadways.

Constant Dollars | Dollars expended/received in a specific year adjusted for inflation/deflation relative to another time period.

Corridor | In planning, a broad geographical band that follows a general directional flow or connects major sources of trips. It may contain a number of streets and highways, and transit lines and routes.

CTC | **California Transportation Commission** – A nine-member board appointed by the governor to oversee and administer state and federal transportation funds and provide oversight on project delivery.

CTIPS | **California Transportation Improvement Program System** – A project programming database system used to efficiently and effectively develop and manage various transportation programming documents as required under state and federal law.

CTP | **California Transportation Plan** – A statewide, long-range transportation policy plan that provides for the movement of people, goods, services, and information. The CTP offers a blueprint to guide future transportation decisions and investments that will ensure California's ability to compete globally, provide safe and effective mobility for all persons, better link transportation and land-use decisions, improve air quality, and reduce petroleum energy consumption.

CVO | **Commercial Vehicle Operations** – Management of commercial vehicle activities through ITS.

Deficiency Plan | Set of provisions contained in a Congestion Management Plan to address congestion, when unacceptable levels of congestion occur. Projects implemented through the Deficiency Plan must, by statute, have both mobility and air quality benefits.

DTIM | **Direct Travel Impact Model** – A vehicle emissions forecasting model.

EDF | **Environmental Defense Fund** – A national nonprofit organization that seeks to protect the environmental rights of all people, including future generations.

EIR | **Environmental Impact Report** – An informational document, required under CEQA, which will inform public agency decision-makers and the public generally of the significant environmental effects of a project, possible ways to minimize significant effects, and reasonable alternatives to the project.

EIS | **Environmental Impact Statement (federal)** – National Environmental Policy Act (NEPA) requirement for assessing the environmental impacts of federal actions that may have a significant impact on the human environment.

EMFAC | **Emission Factor** – Model that estimates on-road motor vehicle emission rates for current year as well as backcasted and forecasted inventories.

EPA | **Environmental Protection Agency** – Federal agency established to develop and enforce regulations that implement environmental laws enacted by Congress to protect human health and safeguard the natural environment.

FAA | **Federal Aviation Administration** – Federal agency responsible for issuing and enforcing safety regulations and minimum standards, managing air space and air traffic, and building and maintaining air navigation facilities.

FHWA | **Federal Highway Administration** – Federal agency responsible for administering the Federal-Aid Highway Program, which provides federal financial assistance to the states to construct and improve the National Highway System, urban and rural roads, and bridges.

Financially Constrained | Expenditures are said to be financially constrained if they are within limits of anticipated revenues.

FRA | **Federal Railroad Administration** – Federal agency created to promulgate and enforce rail safety regulations, administer railroad assistance programs, conduct research and development in support of improved railroad safety and national rail transportation policy, and consolidate government support of rail transportation activities.

FTA | **Federal Transit Administration** – The federal agency responsible for administering federal transit funds and assisting in the planning and establishment of areawide urban mass transportation systems. As opposed to FHWA funding, most FTA funds are allocated directly to local agencies, rather than Caltrans.

FTIP | **Federal Transportation Improvement Program** – A three-year list of all transportation projects proposed for federal transportation funding within the planning area of an MPO.

FY | **Fiscal Year** – The twelve-month period on which the budget is planned. The state fiscal year begins July 1 and ends June 30 of the following year. The federal fiscal year begins October 1 and ends September 30 of the following year.

GAO | **Government Accountability Office** – Congressional agency responsible for examining matters related to the receipt and payment of public funds.

GARVEE | **Grant Anticipation Revenue Vehicles** – A debt financing instrument authorized to receive federal reimbursement of debt service and related financing costs under Section 122 of Title 23, United States Code. GARVEEs can be issued by a state, a political subdivision of a state, or a public authority.

GHG | **Greenhouse Gases** – Components of the atmosphere that contribute to the greenhouse effect. The principal greenhouse gases that enter the atmosphere because of human activities are carbon dioxide, methane, nitrous oxide, and fluorinated gases.

GIS | **Geographic Information System** – Powerful mapping software that links information about where things are with information about what things are like. GIS allows users to examine relationships between features distributed unevenly over space, seeking patterns that may not be apparent without using advanced techniques of query, selection, analysis, and display.

GNP | **Gross National Product** – An estimate of the total value of goods and services produced in any specified country in a given year. GNP can be measured as a total amount or an amount per capita.

Grade Crossing | A crossing or intersection of highways, railroad tracks, other guideways, or pedestrian walks, or combinations of these at the same level or grade.

HCP | **Habitat Conservation Plan** – Established under Section 10 of the Endangered Species Act to allow development to proceed while protecting endangered species.

HDT | **Heavy-Duty Truck** – Truck with a gross vehicle weight of 8,500 pounds or more.

HICOMP | **Highway Congestion Monitoring Program (Caltrans)** – A report that measures the congestion that occurs on urban area freeways in California.

Home-based work trips | Trips that go between home and work, either directly or with an intermediate stop. Home-based work trips include telecommuting, working at home and non-motorized transportation work trips.

HOT Lane | **High-Occupancy Toll Lane** – An HOV lane that single-occupant drivers can pay to drive in, also referred to as "Express Lanes."

HOV Lane | **High-Occupancy Vehicle Lane** – A lane restricted to vehicles with two (and in some cases three) or more occupants to encourage carpooling. Vehicles include automobiles, vans, buses and taxis.

HPMS | **Highway Performance Monitoring System** – A federally mandated program designed by FHWA to assess the performance of the nation's highway system.

HSR | **High-Speed Rail** – Intercity passenger rail service that is reasonably expected to reach speeds of at least 110 mile per hour

HUD | **U.S. Department of Housing and Urban Development** – Federal agency charged with increasing homeownership, supporting community development, and increasing access to affordable housing free from discrimination.

ICAPCD | **Imperial County Air Pollution Control District** – Local air pollution control agency mandated by state and federal regulations to implement and enforce air pollution rules and regulations.

ICTC | **Imperial County Transportation Commission** – Agency responsible for planning and funding countywide transportation improvements and administering the county's transportation sales tax revenues.

IGR | **Intergovernmental Review Process** – The review of documents by several governmental agencies to ensure consistency of regionally significant local plans, projects, and programs with SCAG's adopted regional plans.

Infrastructure | The basic facilities, equipment, services and installations needed for the growth and functioning of a community.

IOS | **Initial Operating Segment.**

ISTEA | **Intermodal Surface Transportation Efficiency Act** – Signed into federal law on December 18, 1991, it provided authorization for highways, highway safety and mass transportation for FYs 1991–1997 and served as the legislative vehicle for defining federal surface transportation policy.

ITIP | **Interregional Transportation Improvement Program** – The portion of the STIP that includes projects selected by Caltrans (25 percent of STIP funds).

ITS | **Intelligent Transportation Systems** – Systems that use modern detection, communications and computing technology to collect data on system operations and performance, communicate that information to system managers and users, and use that information to manage and adjust the transportation system to respond to changing operating conditions, congestion or accidents. ITS technology can be applied to arterials, freeways, transit, trucks and private vehicles. ITS include Advanced Traveler Information Systems (ATIS), Advanced Public Transit Systems (APTS), Advanced Traffic Management Systems (ATMS), Advanced Vehicle Control Systems (AVCS) and Commercial Vehicle Operations (CVO).

JPA | **Joint Powers Authority** – Two or more agencies that enter into a cooperative agreement to jointly wield powers that are common to them. JPAs are a vehicle for the cooperative use of existing governmental powers to finance and provide infrastructure and/or services in a cost-efficient manner.

LACMTA | **Los Angeles County Metropolitan Transportation Authority**, also referred to as "Metro" – Agency responsible for planning and funding countywide transportation improvements, administering the county's transportation sales tax revenues, and operating bus and rail transit service.

LAUPT | **Los Angeles Union Passenger Terminal**, also known as Union Station.

LAWA | **Los Angeles World Airports** – Aviation authority of the City of Los Angeles. LAWA owns and operates Los Angeles International (LAX), Ontario International, Van Nuys, and Palmdale Airports.

LCVs | **Longer-Combination Vehicles** – Includes tractor-trailer combinations with two or more trailers that weigh more than 80,000 pounds.

LEM | **Location Efficient Mortgage** – Allows people to qualify for larger loan amounts if they choose a home in a densely populated community that is well served by public transit, and where destinations are located close together so that they can also walk and bike instead of driving everywhere.

Livable Communities | Any location in which people choose may be viewed as "livable." However, communities that contain a healthy mix of homes, shops, work places, schools, parks, and civic institutions coupled with a variety of transportation choices, give residents greater access to life's daily essentials and offer higher quality of life to a wider range of residents.

LRT | **Light Rail Transit** – A mode of transit that operates on steel rails and obtains its power from overhead electrical wires. LRT may operate in single or multiple cars on separate rights-of-way or in mixed traffic.

LTF | **Local Transportation** Fund – A fund which receives TDA revenues.

MAP | **Million Annual Passengers** – Used to quantify airport activity.

Market Incentives | Measures designed to encourage certain actions or behaviors. These include inducements for the use of carpools, buses and other HOVs in place of single-occupant automobile travel. Examples include HOV lanes, preferential parking, and financial incentives.

MDAB | **Mojave Desert Air Basin** – Area defined by state law as comprising the desert portions of Los Angeles, Kern, Riverside, and San Bernardino Counties.

MDAQMD | **Mojave Desert Air Quality Management District** – Local air agency mandated by state and federal regulations to implement and enforce air pollution rules and regulations; encompasses the desert portion of San Bernardino County from the summit of the Cajon Pass north to the Inyo County line, as well as the Palo Verde Valley portion of Riverside County.

Measure A | Revenues generated from Riverside County's local half-cent sales tax.

Measure D | Revenues generated from Imperial County's local half-cent sales tax.

Measure I | Revenues generated from San Bernardino County's local half-cent sales tax.

Measure M | Revenues generated from Orange County's local half-cent sales tax.

Measure R | Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has two permanent local sales taxes (Propositions C and A) and one temporary local sales tax (Measure R).

Metrolink | Regional commuter rail system connecting Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties and operated by SCRRA.

MIS | **Major Investment Study** – The preliminary study, including preliminary environmental documentation, for choosing alternative transportation projects for federal transportation funding. An MIS is a requirement, which is conducted cooperatively by the study sponsor and the MPO.

Mixed Flow | Traffic movement having autos, trucks, buses and motorcycles sharing traffic lanes.

Mode | A particular form of travel (e.g., walking, traveling by automobile, traveling by bus or traveling by train).

Mode Split | The proportion of total person trips using various specified modes of transportation.

Model | A mathematical description of a real-life situation that uses data on past and present conditions to make a projection.

MPO | **Metropolitan Planning Organization** – A federally required planning body responsible for transportation planning and project selection in a region.

MTS | **Metropolitan Transportation System** – Regional network of roadways and transit corridors.

Multimodal | A mixture of the several modes of transportation, such as transit, highways, non-motorized, etc.

NAAQS | **National Ambient Air Quality Standards** – Targets established by the U.S. Environmental Protection Agency (EPA) for the maximum contribution of a specific pollutant in the air.

NAFTA | **North American Free Trade Agreement** – An agreement between the governments of Canada, Mexico, and the United States to eliminate barriers to trade and facilitate the cross-border movement of goods and services.

NCCP | **Natural Communities Conservation Plan** – Program under the Department of Fish and Game that uses a broad-based ecosystem approach toward planning for the protection of plants, animals and their habitats, while allowing compatible and appropriate economic activity.

NEPA | **National Environmental Protection Act** – Federal environmental law that applies to all projects funded with federal funds or requiring review by a federal agency.

NIMS | **National Incident Management System** – Nationwide template that enables all government, private-sector and non-governmental organizations to work together during a domestic incident.

Nominal dollars | Actual dollars expended/received in a specific year without adjustments for inflation/deflation.

NOx | **Nitrogen oxides** – A group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. NOx are a major component of ozone and smog, and they are one of six principal air pollutants tracked by the EPA.

NTD | **National Transit Database** – The Federal Transit Administration's (FTA) national database for transit statistics.

O&M | **Operations and Maintenance** – The range of activities and services provided by the transportation system and the upkeep and preservation of the existing system.

OCTA | **Orange County Transportation Authority** – Agency responsible for planning and funding countywide transportation improvements, administering the county's transportation sales tax revenues, and operating bus transit service.

OLDA | **Orangeline Development Authority** – Joint exercise of powers authority developed by the cities located along the Orangeline corridor.

OnTrac | **Orange-North America Trade Rail Access Corridor** – Formed in April of 2000 to build and support the Orangethorpe Avenue Grade Separation and Trade Corridor project, a 5-mile-long railroad-lowering project that will completely grade separate 11 rail crossings in the cities of Placentia and Anaheim.

OWP | **Overall Work Program** – SCAG develops an OWP annually, describing proposed transportation planning activities for the upcoming fiscal year, including those required by federal and state law.

PATH | **Partners for Advanced Transit and Highways** – Joint venture of Caltrans which includes the University of California, and other public and private academic institutions and industries.

PEIR | **Program Environmental Impact Report** – Environmental review process used to evaluate the potential environmental effects of large-scale plans or programs.

PeMS | **Freeway Performance Measurement System** – A service provided by the University of California, Berkeley, to collect historical and real-time freeway data from freeways in the state of California in order to compute freeway performance measures.

Person Trip | A trip made by a person by any mode or combination of modes for any purpose.

PM10 | **Particulate Matter** – A mixture of solid particles and liquid droplets found in the air, 10 micrometers or less in size (a micrometer is one-millionth of a meter). These coarse particles are generally emitted from sources such as vehicles traveling on unpaved roads, materials handling, and crushing and grinding operations, as well as windblown dust.

PM2.5 | **Particulate Matter** – A mixture of solid particles and liquid droplets found in the air, 2.5 micrometers or less in size (a micrometer is one-millionth of a meter). These fine particles result from fuel combustion from motor vehicles, power generation, and industrial facilities, as well as from residential fireplaces and wood stoves.

PMD | **LA/Palmdale Regional Airport** – Regional airport located in Palmdale.

PPP | **Public-Private Partnership** – Contractual agreements formed between a public agency and private sector entity that allow for greater private sector participation in the delivery of transportation projects.

PRC | **Peer Review Committee** – An "informal" committee of technical experts usually organized and invited to review and comment on various technical issues and processes used in the planning process.

Proposition 1A | Passed by voters in 2006, Proposition 1A protects transportation funding for traffic congestion relief projects, safety improvements, and local streets and roads. It also prohibits the state sales tax on motor vehicle fuels from being used for any purpose other than transportation improvements, and authorizes loans of these funds only in the case of severe state fiscal hardship.

Proposition 1B | **Highway Safety, Traffic Reduction, Air Quality, and Port Security State of California** – Passed in November 2006, Proposition 1B provides $19.9 billion to fund state and local transportation improvement projects to relieve congestion, improve movement of goods, improve air quality, and enhance safety and security of the transportation system.

Proposition A | Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has two permanent local sales taxes (Propositions C and A) and one temporary local sales tax (Measure R).

Proposition C | Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has two permanent local sales taxes (Propositions C and A) and one temporary local sales tax (Measure R).

PSR | **Project Study Report** – Defines and justifies the project's scope, cost, and schedule. PSRs are prepared for state highway projects and PSR equivalents are prepared for projects not on the State Highway System. Under state law, a PSR or PSR equivalent is required for STIP programming.

PTA | **Public Transportation Account** – The major state transportation account for mass transportation purposes. Revenues include a portion of the sales tax on gasoline and diesel fuels.

PUC | **Public Utilities Commission** – Regulates privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies.

Railroad Siding | A short stretch of railroad track used to store rolling stock or enable trains on the same line to pass; also called sidetrack.

RC | **Regional Council** – Conducts the affairs of SCAG; implements the General Assembly's policy decisions; acts upon policy recommendations from SCAG policy committees and external agencies; appoints committees to study specific problems; and amends, decreases or increases the proposed budget to be reported to the General Assembly.

RCP | **Regional Comprehensive Plan (RCP)** – Developed by SCAG, the RCP is a vision of how Southern California can balance resource conservation, economic vitality, and quality of life. It will serve as a blueprint to approach growth and infrastructure challenges in an integrated and comprehensive way.

RCTC | **Riverside County Transportation Commission** – Agency responsible for planning and funding countywide transportation improvements and administering the county's transportation sales tax revenues.

RHNA | **Regional Housing Needs Assessment** – Quantifies the need for housing within each jurisdiction of the SCAG Region based on population growth projections. Communities then address this need through the process of completing the housing elements of their general plans.

Robust Flight Portfolio | Providing a range of flight offerings in different haul length categories including short-haul, medium-haul, long-haul and international flights.

ROG | **Reactive organic gas** – Organic compounds assumed to be reactive at urban/regional scales. Those organic compounds that are regulated because they lead to ozone formation.

RSTIS | **Regionally Significant Transportation Investment Study** – Involves identifying all reasonable transportation options, their costs, and their environmental impacts. RSTIS projects are generally highway or transit improvements that have a significant impact on the capacity, traffic flow, level of service or mode share at the transportation corridor or sub-area level.

RSTP | **Regional Surface Transportation Program** – Established by the California state statute utilizing federal Surface Transportation Program funds. Approximately 76 percent of the state's RSTP funds must be obligated on projects located within the 11 urbanized areas of California with populations of 200,000 or more.

RTMS | **Regional Transportation Monitoring System** – Internet-based transportation monitoring system. The RTMS will be the source for real-time and historical transportation data collected from local, regional and private data sources.

RTP | **Regional Transportation Plan (RTP)** – Federally required 20-year plan prepared by metropolitan planning organizations and updated every four years. Includes projections of population growth and travel demand, along with a specific list of proposed projects to be funded.

RTSS | **Regional Transit Security Strategy** – Strategy for the region with specific goals and objectives related to the prevention, detection, response and recovery of transit security issues.

SAFETEA-LU | **Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users** – Signed into law by President Bush on August 10, 2005, it authorized the federal surface transportation programs for highways, highway safety, and transit for the 5-year period of 2005-2009.

SANBAG | **San Bernardino Associated Governments** – The council of governments and transportation planning agency for San Bernardino County. SANBAG is responsible for cooperative regional planning and developing an efficient multimodal transportation system countywide.

SANDAG | **San Diego Association of Governments**.

SB 45 | **Senate Bill 45 (Chapter 622, Statutes of 1997, Kopp)** – Established the current STIP process and shifted control of decision-making from the state to the regional level.

SB 375 | **Senate Bill 375 (Chapter 728, Steinberg)** – Established to implement the state's greenhouse gas emissions (GHG) reduction goals, as set forth by AB 32, in the sector of cars and light trucks. This mandate requires the California Air Resources Board to determine per-capita GHG emission reduction targets for each Metropolitan Planning Organization (MPO)

in the state at two points in the future—2020 and 2035. In turn, each MPO must prepare a Sustainable Communities Strategy (SCS) that demonstrates how the region will meet its GHG reduction target through integrated land use, housing and transportation planning.

SB 974 | **Senate Bill 974** – Introduced by Senator Alan Lowenthal, SB 974 would impose a $30 fee on each shipping container processed at the Ports of Los Angeles, Long Beach, and Oakland for congestion management and air quality improvements related to ports.

SBD | **San Bernardino International Airport** – International airport located in San Bernardino.

SCAB | **South Coast Air Basin** – Comprises the non–Antelope Valley portion of Los Angeles County, Orange County, Riverside County, and the non-desert portion of San Bernardino County.

SCAG | **Southern California Association of Governments** – The metropolitan planning organization (MPO) for six counties including Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial.

SCAQMD | **South Coast Air Quality Management District** – The air pollution control agency for Orange County and major portions of Los Angeles, San Bernardino and Riverside Counties in Southern California.

SCCAB | **South Central Coast Air Basin** – Comprises San Luis Obispo, Santa Barbara, and Ventura Counties.

SCRIFA | **Southern California Railroad Infrastructure Financing Authority.**

SED | **Socioeconomic Data** – Population, employment and housing forecast.

SHA | **State Highway Account** – The major state transportation account for highway purposes. Revenues include the state excise taxes on gasoline and diesel fuel and truck weight fees.

SHOPP | **State Highway Operation and Protection Program** – A four-year capital improvement program for rehabilitation, safety, and operational improvements on state highways.

SIP | **State Implementation Plan** – State air quality plan to ensure compliance with state and federal air quality standards. In order to be eligible for federal funding, projects must demonstrate conformity with the SIP.

SOV | **Single–Occupant Vehicle** – Privately operated vehicle that contains only one driver or occupant.

SOX | **Sulfur oxide** – Any of several compounds of sulfur and oxygen, formed from burning fuels such as coal and oil.

SSAB | **Salton Sea Air Basin** – Comprises the Coachella Valley portion of Riverside County and all of Imperial County.

STA | **State Transit Assistance** – State funding program for mass transit operations and capital projects. Current law requires that STA receive 50 percent of PTA revenues.

STIP | **State Transportation Improvement Program** – A four-year capital outlay plan that includes the cost and schedule estimates for all transportation projects funded with any amount of state funds. The STIP is approved and adopted by the CTC and is the combined result of the ITIP and the RTIP.

STP | **Surface Transportation Program** – Provides flexible funding that may be used by states and localities for projects on any federal-aid highway, bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities. A portion of funds reserved for rural areas may be spent on rural minor collectors.

TAC | **Technical Advisory Committee** – A SCAG committee that provides ideas and feedback on the technical integrity of the Regional Transportation Plan.

TANN | **Traveler Advisory News Network** – Provides real-time traffic and transportation information content to communications service providers and consumer media channels both nationally and internationally.

TAZ | **Traffic Analysis Zone** – Zone system used in travel demand forecasting.

TCC | **Transportation and Communications Committee (SCAG)** – Committee used to study problems, programs and other matters related to regional issues of mobility, air quality, transportation control measures and communications.

TCM | **Transportation Control Measure** – A project or program that is designed to reduce emissions or concentrations of air pollutants from transportation sources. TCMs are referenced in the state Implementation Plan (SIP) for the applicable air basin and have priority for programming and implementation ahead of non-TCMs.

TCWG | **Transportation Conformity Working Group** – Forum used to support interagency coordination to help improve air quality and maintain transportation conformity.

TDA | **Transportation Development Act** – State law enacted in 1971 that provided a 0.25 percent sales tax on all retail sales in each county for transit, bicycle, and pedestrian purposes. In non-urban areas, funds may be used for streets and roads under certain conditions.

TDM | **Transportation Demand Management** – Strategies that result in more efficient use of transportation resources, such as ridesharing, telecommuting, park-and-ride programs, pedestrian improvements, and alternative work schedules.

TEA-21 | **Transportation Equity Act for the 21st Century** – The predecessor to SAFETEA-LU, it was signed into federal law on June 9, 1998. TEA-21 authorized the federal surface transportation programs for highways, highway safety, and transit for the six-year period 1998–2003. TEA-21 builds upon the initiatives established in ISTEA.

TEU | **Twenty-foot Equivalent Unit**, a measure of shipping container capacity.

TIFIA | **Transportation Infrastructure Finance and Innovation Act of 1998** – Established a new federal credit program under which the US DOT may provide three forms of credit assistance—secured (direct) loans, loan guarantees, and standby lines of credit—for surface transportation projects of national or regional significance. The program's fundamental goal is to leverage federal funds by attracting substantial private and other non-federal co-investment in critical improvements to the nation's surface transportation system. Sponsors may include state departments of transportation, transit operators, special authorities, local governments, and private entities.

TOD | **Transit-Oriented Development** – A planning strategy that explicitly links land-use and transportation by focusing mixed housing, employment and commercial growth around bus and rail stations (usually within ½ mile). TODs can reduce the number and length of vehicle trips by encouraging more bicycle/pedestrian and transit use, and can support transit investments by creating the density around stations to boost ridership.

TP&D | **Transportation Planning and Development Account** – A state transit trust fund that is the funding source for the STA program.

Trantrak | **RTIP database management system.**

TSWG | **Transportation Security Working Group** – Advises the operating organizations on transportation safety matters associated with the transfer or shipment of hazardous materials.

TUMF | **Transportation Uniform Mitigation Fee** – Ordinance enacted by the Riverside County Board of Supervisors and cities to impose a fee on new development to fund related transportation improvements.

UP | **Union Pacific Railroad.**

US DOT | **U.S. Department of Transportation** – Federal agency responsible for the development of transportation policies and programs that contribute to providing fast, safe, efficient, and convenient transportation at the lowest cost consistent with those and other national objectives, including the efficient use and conservation of the resources of the United States. US DOT is comprised of ten operating administrations, including FHWA, FTA, FAA, and FRA.

VCTC | **Ventura County Transportation Commission** – Agency responsible for planning and funding countywide transportation improvements.

Vehicle Hours of Delay | The travel time spent on the highway due to congestion. Delay is estimated as the difference between vehicle hours traveled at a specified free–flow speed and vehicle hours traveled at a congested speed.

VHDD | **Vehicle Hours of Daily Delay** – Hours of delay attributed to congestion for vehicles each day.

VMT | **Vehicle Miles Traveled** – On highways, a measurement of the total miles traveled by all vehicles in the area for a specified time period. It is calculated by the number of vehicles times the miles traveled in a given area or on a given highway during the time period. In transit, the number of vehicle miles operated on a given route or line or network during a specified time period.

VOC | **Volatile Organic Compounds** – Organic gases emitted from a variety of sources, including motor vehicles, chemical plants, refineries, factories, consumer and commercial products, and other industrial sources. Ozone, the main component of smog, is formed from the reaction of VOCs and NOx in the presence of heat and sunlight.

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2012–2035
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Towards a Sustainable Future

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