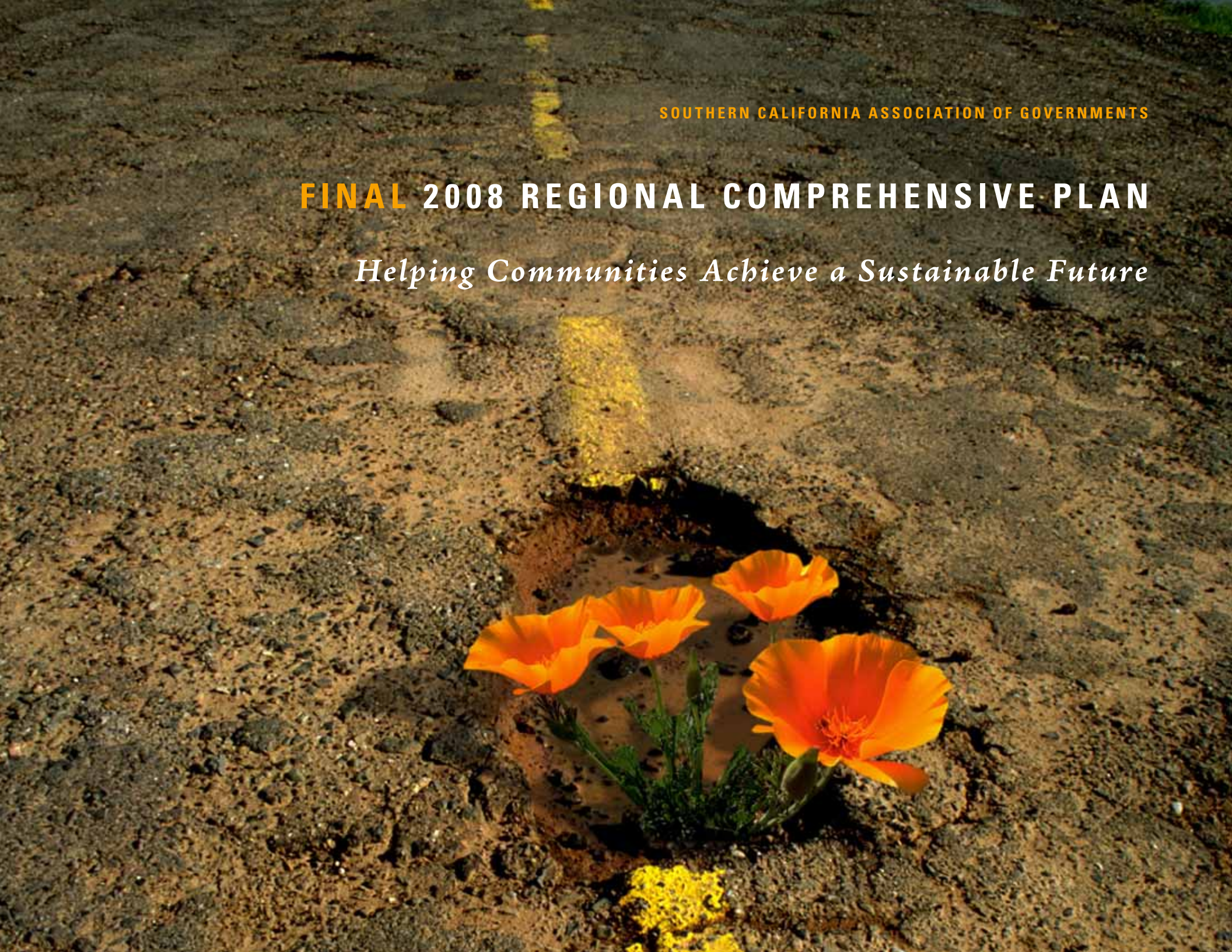
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

FINAL 2008 REGIONAL COMPREHENSIVE PLAN

Helping Communities Achieve a Sustainable Future



SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

REGIONAL COMPREHENSIVE PLAN

2008

RESOLUTION No. 08-502-1 vi

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RESOLUTION NO. 08-502-1

RESOLUTION OF THE SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS ACCEPTING THE 2008 REGIONAL COMPREHENSIVE PLAN FOR THE SCAG REGION – HELPING COMMUNITIES ACHIEVE A SUSTAINABLE FUTURE

WHEREAS, members of the Southern California Association of Governments (SCAG) have the common power under the Joint Powers Agreement "to study, discuss and recommend policies and procedures for the solution of area-wide problems";

WHEREAS, the SCAG region stands at critical crossroads where serious area-wide problems or challenges exist in the areas of growth management, land use and housing, transportation and traffic, air quality, water, energy, economy, and waste management. A new direction for addressing these challenges is essential in order to maintain a sustainable future;

WHEREAS, in 2004, SCAG's Regional Council directed the preparation of a "Regional Comprehensive Plan" ("2008 RCP" or "Plan" herein) as part of SCAG's Ten-Year Strategic Plan. Specifically, the Regional Council established the agency's goal to create a RCP to guide regional development, with the RCP representing "a comprehensive overview of the region's economic, social and environmental future with special attention being given to housing and transportation". Similar to the "Regional Comprehensive Plan and Guide" adopted by the Regional Council in 1996, the updated 2008 RCP is a long-term comprehensive plan which addresses the SCAG region's many challenges, and provides a strategic vision for handling the region's land use, housing, economic, transportation, environmental and overall quality of life needs;

WHEREAS, work related to the 2008 RCP involved four years of intensive public discussion. Building off SCAG's 2% Compass Strategy and principles (mobility, livability, sustainability and prosperity), the 2008 RCP is founded upon the ideas of hundreds of individuals, including members of the public, residents, business persons, and elected officials. The RCP was directed by the Regional Council with the Community, Economic and Human Development (CEHD) Committee serving as the lead policy committee over the Plan. Overseen by the RCP Task Force, comprising members of each of SCAG's main Policy Committees, the public participation process for the RCP included numerous public presentations and workshops throughout the region, monthly meetings of the RCP Task Force and related topic-specific subcommittees (such as the Open Space Working Group, the Energy Working Group, the Water Policy Task Force and the Solid Waste Task Force), information on the SCAG website, periodic updates to the Regional Council and Policy Committees, and substantial input from the Regional Council on the approach and structure for the 2008 RCP during the four-year period;

WHEREAS, the purpose of the 2008 RCP is to collect and disseminate regional policies. The various chapters in the 2008 RCP address each of the major elements of planning for the region: Air Quality; Economy; Energy; Finance; Land Use and Housing; Open Space and Habitat; Security and Emergency Preparedness; Solid Waste; Transportation; and Water. The RCP also includes one "special focus section" essay on Education, which does not contain any proposed policies, but rather sets forth issues for further study;

WHEREAS, each chapter of the 2008 RCP contains goals, outcomes and an action plan. The goals create a definition for sustainability, the outcomes establish what might be achieved by pursuing the action strategy, and the action plan proposes specific action steps that could be undertaken by SCAG, the State or Federal government, local government, or other entities. The action plan section in each chapter is divided into "constrained policies" or policies that can be reasonably achieved given current political will, funding and other variables, as well as "strategic initiatives" or actions that while not currently practicable, would be required to reach the chapter goals;

WHEREAS, in total, the 2008 RCP contains 206 constrained and strategic regional policies. The Plan also identifies policies which have multiple benefits, noting the inter-connections amongst resource areas and therefore producing the greatest results;

WHEREAS, the draft of the 2008 RCP was released in December 2007, with copies provided to each city and county in the SCAG region, as well as other numerous interested parties and stakeholders. The public comment period for the Draft RCP officially closed on August 11, 2008. All comments received during the public comment period have been reviewed, addressed and incorporated in the final revisions of the 2008 RCP. The Draft 2008 RCP and all final revisions thereto has also been reviewed and considered by the RCP Task Force, the CEHD Committee, and the Regional Council;

WHEREAS, the 2008 RCP shall serve as an advisory document for local agencies in the SCAG region. Upon adoption by the Regional Council, the 2008 RCP will be distributed to local governments in the region for their information and voluntary use when preparing local plans and handling local issues of regional significance;

WHEREAS, given its advisory nature, the 2008 RCP shall not be used in SCAG's Inter-Governmental Review (IGR) process;

WHEREAS, SCAG shall incorporate RCP objectives into its on-going monitoring efforts, including the State of the Region, and shall assess the region's progress in achieving performance outcomes in the RCP by providing periodic reports to the Regional Council and other stakeholders, and shall consider periodic updates and amendments to the RCP as directed by the RC; and

WHEREAS, the RCP shall not be used to distribute funds, to prioritize funding for transportation projects in the RTP, or to implement any legislative program or any future purpose not specifically authorized herein, without the subsequent action and approval of the Regional Council. Subject only to future budget processes and approval by the Regional Council may the 2008 RCP be used for future SCAG planning activities.

NOW, THEREFORE BE IT RESOLVED, by the Regional Council of the Southern California Association of Governments as follows:

1. The Regional Council accepts the "2008 Regional Comprehensive Plan – Helping Communities Achieve a Sustainable Future" (2008 RCP) for the SCAG region. In accepting the 2008 RCP, the Regional Council approves and incorporates all of the foregoing recitals.

2. A fully-executed copy of this Resolution shall be included as part of the 2008 RCP.

3. SCAG's Executive Director or his designee is authorized to disseminate the 2008 RCP to all local jurisdictions in the SCAG region for their information and voluntary use in developing local plans and addressing local issues of regional significance.

4. SCAG staff is also authorized to schedule and conduct post-adoption workshops to be held at the subregional level in order to build familiarity with the RCP and its regional policies.

APPROVED AND ADOPTED by the Regional Council of the Southern California Association of Governments at a regular meeting this 2nd day of October 2008.

Richard Dixon, President
Councilman, City of Lake Forest

Attested by:

Hasan Ikhrata, Executive Director

Approved as to Form:

Joanna Africa, Acting Chief Counsel

Executive Summary

REGIONAL COMPREHENSIVE PLAN: CHARTING A PATH FOR SOUTHERN CALIFORNIA'S FUTURE

The Regional Comprehensive Plan (RCP) is a problem-solving guidance document that directly responds to what we've learned about Southern California's challenges through the annual State of the Region report card. It responds to SCAG's Regional Council directive in the 2002 Strategic Plan to develop a holistic, strategic plan for defining and solving our inter-related housing, traffic, water, air quality, and other regional challenges. Through extensive outreach and input from the RCP Task Force, SCAG's policy committees, subregions, local governments and other key stakeholders, the RCP is a collaborative effort to address our region's challenges and set a path forward.

The RCP sets a path forward in two key ways. First, it ties together SCAG's role in transportation, land use, and air quality planning and demonstrates why we need to do more than we're doing today. For example, while the RCP is based on the growth management framework of the Compass Blueprint, the region's growth planning strategy, it further promotes environmental policies that help to "green" the region and lay the groundwork for a more robust 2012 update of the Regional Transportation Plan. Second, it recommends key roles and responsibilities for public and private sector stakeholders and invites them to implement reasonable policies that are within their control.

The result is a proactive, unconstrained, big-picture advisory plan that envisions what a livable, sustainable, successful region could look like and challenges us to tackle difficult issues. The RCP describes what could happen if current trends continue, defines a vision for a healthier region, and recommends an Action Plan that could get us there by 2035. By balancing resource conservation, economic vitality, and quality of life, it lays out a long-term planning framework that shows how we can respond to growth and infrastructure challenges in a comprehensive way.

Of course, there are many ways to address the region's challenges. As such, while the RCP recommends more integrated resource planning, *it does not mandate it*. Rather, local governments are asked to consider this Plan's recommendations in General Plan updates, municipal code amendments, design guidelines, incentive programs and other actions. The key is

RCP CHAPTERS

The RCP features nine chapters that focus on specific areas of planning or resource management:

- Land Use and Housing
- Open Space and Habitat
- Water
- Energy
- Air Quality
- Solid Waste
- Transportation
- Security and Emergency Preparedness
- Economy

The RCP is a problem-solving guidance document that

to begin talking about what the challenges are, define success, and implement solutions.

The RCP is being developed to:

- Respond to the SCAG Regional Council's direction to develop a comprehensive plan that addresses the region's economic, social and environmental future and emphasizes the interdependence of nine resource areas (see sidebar).
- Inform local, subregional, and county economic and resource plans that are often limited by geography or scope. For example, a county-wide resource plan for open space may fail to recognize the habitat value of linking to adjacent county open space plans.
- Help meet federal transportation planning requirements that call for more integrated resource planning, particularly more integration of environmental concerns into transportation plans through expanded consultation.
- Offer recommendations to local governments from a regional, comprehensive perspective for consideration into the development of local General Plans.
- Provide a regional response and strategy for meeting climate change mandates that call for reductions in greenhouse gases.
- Offer a comprehensive, integrated policy plan that helps position Southern California to get its fair share of revenue from federal and state funding programs, such as the traffic, housing, water, and park infrastructure bonds approved in 2006.
- Help stakeholders make the most of their limited resources by highlighting priority policies for future implementation that maximize benefits both locally and regionally.

Ultimately, the RCP sets the stage for regional dialogue and begins a process to measure our performance. Success depends on the region's ability to agree on our challenges, evaluate policy options, and seek consensus. As the council of governments for Southern California, SCAG is uniquely positioned to work with its subregions and local governments membership to take a leadership role in sustainability planning to meet our needs of today without undermining our ability to do so in the future. As the region's metropolitan planning organization, SCAG can advance integrated planning by working with CTCs and other partners to establish funding priorities that achieve regional benefits though this RCP does not create any specific proposal to affect the distribution of funds.

ASSESSING OUR CHALLENGES

Southern California is witnessing historic change at the global, national, and regional level. As our world continues to change

in sometimes dramatic ways, Southern California is increasingly faced with tougher policy choices that will shape our region for generations to come:

- As we add over six million more residents to our region by 2035, our ability to coordinate growth and infrastructure will determine how we consume our finite resources, whether it's open space, water, or even roadway capacity. Furthermore, policy initiatives like the Southwest Alliance can be used to coordinate growth and infrastructure planning with our partners in Kern County, San Diego County, and even Mexico.

- Making a real dent in traffic congestion is getting tougher and more expensive. Our region must explore new initiatives that can reverse decades of worsening mobility and make tomorrow's commute better than today. If we don't develop new initiatives to address how people and freight move, average freeway speeds will slow to 28 mph while the economic, environmental, and public health costs of congestion will continue to rise.

- After decades of steady progress, our air quality improvements have leveled off as growth has begun to offset the technological advancements that have served us well until now. Today, we face an air quality crisis, with more than 5,000 premature deaths from fine particulate matter. We must respond to more stringent air quality standards for $PM_{2.5}$ (particulate matter smaller than 2.5 microns in diameter) and even unregulated smaller pollutants called nanoparticles by reducing our reliance on diesel and other petroleum-based, combustion engines.

- The future of our energy supply is becoming uncertain. We are increasingly dependent on imported petroleum, natural gas, and coal, which account for 85 percent of our energy use. As we question the long term viability of a petroleum-based energy future, we must explore non-combustion-based energy sources.

- Our water supplies are increasingly threatened by pollution, and growth is often limited by whether there's adequate supply. The quality of our surface and groundwater supplies is equally important and must be protected through better management practices.

- Our economy continues to become more service- and technology-oriented, with manufacturing outsourced to other regions and other countries. Today, the freight movement and logistics industries fuel much of our local economy. Over time, our region needs to find a balance that promotes regional economic sustainability through promotion of local industries while recognizing its important link to the global economy.

- We have to rethink our current waste management approaches and realize that waste is the result of the inefficient use of our limited, natural resources. Our region generates over 80 million tons of trash each year. Burying the problem in landfills does not make it go

The RCP is a voluntary framework that links broad

THE CONSEQUENCES OF INACTION

If projected regional, national, and international changes continue to unfold, our region will go through profound changes. There are potentially troubling consequences if we fail to act now:

Land Use and Housing: Lack of new housing in existing neighborhoods could result in increased land consumption in fringe areas.

Transportation: As roadways get more congested, traffic speeds could drop to an average of 28 miles per hour during rush hour.

Solid Waste: Exporting waste to desert areas and beyond increases the economic and environmental costs of waste management.

away. We need to address this issue by reducing waste, reusing materials, recycling, and developing alternative technologies.

In addition, forces on the national and international scale are impacting our region:

- **Climate change.** The body of scientific evidence shows that our global climate is heating up at unprecedented rates that threaten life as we know it (*Source: Intergovernmental Panel on Climate Change, Climate Change 2007: Synthesis Report, November 2007*). The vast Southern California region has contributed to the highest CO_2 emissions levels in recorded history. This threatens to impact all aspects of our communities, whether it's reduced water supplies, habitat loss, increased air pollution, or public health impacts. The secondary effects of climate change are almost as troubling; for example, hotter cities need more cooling, which increases power plant usage that contributes further to the vicious cycle of greenhouse gases.

- **Energy uncertainty.** As the peak of the world's petroleum production rate is reached, there could be profound consequences to our region's economy. Southern California's transportation, agricultural and industrial systems are highly dependent on inexpensive oil. Any production decline and resulting price increases will have negative implications for the global and regional economy; the severity will depend on the rate of production decline and the linked increases in prices and our ability to find alternatives for petroleum.

- **Global economy.** If Southern California were a country, we'd be the 15th largest economy in the world. In this globalized economy, our region is increasingly susceptible to outside influences like international economic downturns that pose further challenges.

These challenges call for action, because the consequences of inaction are potentially devastating (see the "The Consequences of Inaction" sidebar). This need for action is all the more urgent because all of these issues are tightly linked. For example, failure to address land use and housing issues have direct and indirect impacts on air quality and public health.

FORMING A VISION AND IMPLEMENTING AN ACTION PLAN

The RCP is a voluntary framework that links broad principles to an action plan that moves the region towards balanced goals. The following vision statement and guiding principles are based on the region's adopted Compass Growth Vision Principles for Sustaining a Livable Region. These statements further articulate how the RCP can promote and sustain the region's mobility, livability, and prosperity for future generations.

RCP Vision

To foster a Southern California region that addresses future needs while recognizing the interrelationship between economic prosperity, natural resource sustainability, and quality of life. Through measured performance and tangible outcomes, the RCP serves as both a voluntary action plan with short-term guidance and strategic, long-term initiatives that are guided by the following Guiding Principles for sustaining a livable region.

RCP Guiding Principles

Improve mobility for all residents. Improve the efficiency of the transportation system by strategically adding new travel choices to enhance system connectivity in concert with land use decisions and environmental objectives.

Foster livability in all communities. Foster safe, healthy, walkable communities with diverse services, strong civic participation, affordable housing and equal distribution of environmental benefits.

Enable prosperity for all people. Promote economic vitality and new economies by providing housing, education, and job training opportunities for all people.

Promote sustainability for future generations. Promote a region where quality of life and economic prosperity for future generations are supported by the sustainable use of natural resources.

The RCP looks at nine key areas that are linked closely to these guiding principles. Goals, Outcomes, and Action Plans for each chapter are identified that are consistent with the RCP's Vision and Guiding Principles (see "How to Use This Document" on page 10 for more information).

SETTING PRIORITIES

Everything is connected. Our region functions as a complex interconnection of environmental, social, cultural, economic, and other systems. Ignoring problems in one area can have ripple effects in another. For example, a warming planet can have profound implications for water supply, energy, and other resource areas that depend on a stable climate. Further, problems in one city can spill over onto adjoining cities, reminding us that we are connected in visible and not-so-visible ways.

The RCP promotes voluntary policies that are win-win propositions and produce direct and indirect benefits in multiple issue areas. To that end, this document lays out what other benefits could be realized if each chapter's goals are met. Policies could provide benefits in any of the nine resource areas of the Plan, as well as address other policy objectives, like promoting environmental justice principles, improving public health, and addressing climate change.

THE CONSEQUENCES OF INACTION

Energy: Estimates indicate up to 100 more days per year with temperatures above 90 degrees Fahrenheit in Los Angeles

Higher temperatures and lower snow pack due to global warming could reduce hydropower generation, reducing California's in-state power production by 5 percent.

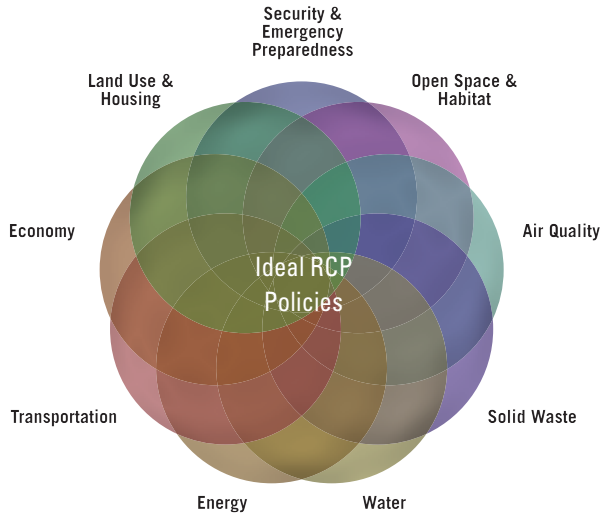
Air Quality: With a potential 3 to 10.5 degree rise in temperature due to climate change, extremely hot days could double to 72 per year.

Higher temperatures could hinder our air quality goals resulting in 85 percent more days conducive to ozone formation in the Los Angeles area.

The RCP's priority policies will have the greatest

FIGURE 1.1

RCP Promotes Multiple Benefits



Because there is no single approach that can solve our region's array of challenges, our region is faced with many policy options that should be evaluated before decisions are made. However, identifying priority policies that should be the focus of the region's short-term game plan is critical.

There are a variety of performance measures that can be used to rank policy options, such as cost-effectiveness, cost-benefit ratio, and environmental benefits. The RCP looks at the body of recommended policies and highlights those that can produce the most benefits across resource areas. In doing so, the RCP provides a framework for local decision-making that helps advance those policies that provide multiple benefits "for the price of one."

Based on the input from the public outreach on the Draft Plan, the RCP's priority policies will be those that have the greatest potential for direct and indirect benefits over multiple resource areas. In addition, priorities will also have the potential to address other policy objectives, including public health and climate change concerns.

ROLES AND RESPONSIBILITIES

As an advisory document, the RCP identifies potential policies that the public and private sector should consider in its planning and daily operations. The RCP reaffirms the institutional roles that SCAG, local governments, resource organizations, and the private sector have in resource planning and programs. To that end, the RCP recommends the following roles and responsibilities for key stakeholders:

- **SCAG.** As a council of governments, SCAG can take a leadership role by working with its member jurisdictions to promote sound planning policies through guidance, financial incentives, and other means. The RCP continues an ongoing dialogue with 188 local governments to develop consensus about how Southern California thinks globally and regionally and acts locally. In its role as a metropolitan planning organization, SCAG can

also help advance integrated policies through its funding decisions.

- **Local governments.** Local jurisdictions have the land use authority to promote balanced growth and other local initiatives that promote holistic planning. In their capacity as major employers, cities also can set an example in their communities by adopting proactive policies that reduce waste, promote energy efficiency, and address other goals.

- **State Government Agencies.** A core objective behind SCAG's planning and policy initiatives involves close collaboration with our state partners. These agencies can play an important legal and financial role in addressing the constrained policies and strategic initiatives identified in the RCP.

- **Transportation commissions.** With their role in planning and programming transportation projects, commissions can modify their criteria to help promote integrated planning objectives. For example, linking local land use decisions with transportation funding priorities is a key opportunity to increase transit ridership. Commissions can also look at other environmental and economic criteria to provide a more balanced view of the benefits of their plans, programs, and projects.

- **Resource agencies and conservation groups.** These organizations work every day to promote better resource management, economic development, and other social and environmental policies and programs. The RCP offers these organizations the opportunity to discuss challenges and opportunities through a more regional approach.

- **Private sector.** Through voluntary changes in their practices, businesses can take a proactive role in addressing the goals of the region. Whether it's reducing consumer waste associated with product packaging or promoting greener building practices in new development, the private sector has a key role in promoting programs that are consistent with the RCP.

- **The public.** The long-term well-being of our region ultimately serves the needs of all of us, our children, and future generations. Our decision-makers need to know that solving our environmental, economic, and quality of life problems is something worth working for. The public can play a key role in addressing the goals of the region through their votes and consumer habits.

RELATIONSHIP OF RCP TO COMPASS BLUEPRINT AND THE REGIONAL TRANSPORTATION PLAN

This integrated Plan is closely tied to both SCAG's Compass Blueprint and the Regional Transportation Plan (RTP). On one hand, the RCP complements the Compass Blueprint and

THE CONSEQUENCES OF INACTION

Open Space and Habitat: Invasive plants and weeds compete with native plants, potentially wiping out a number of endangered species.

60 to 80 percent of existing plant populations could be phased out, resulting in less biodiversity.

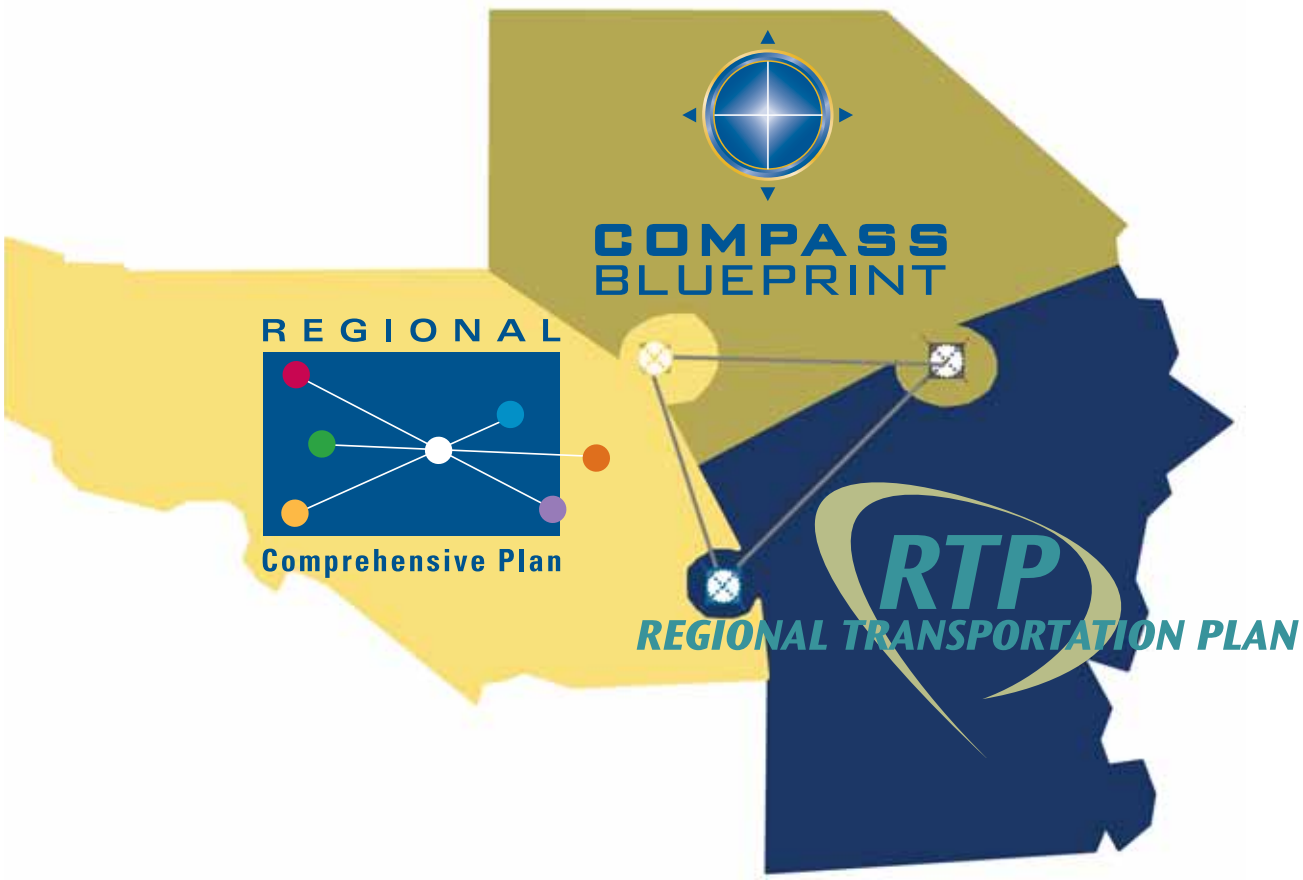
Economy: Transportation, agricultural and industrial systems depend on inexpensive oil; decline in petroleum production without alternative energy sources will result in severe price increases and impacts to our economy.

Global warming will reduce the quality and quantity of certain agricultural products that help drive the California economy.

The RCP builds on the Compass Blueprint framework

FIGURE 1.2

Three Interrelated Plans



the 2008 RTP. For example, it expands on federal SAFETEA-LU requirements (Pub. L. No. 109-59, Title VI, Section 6001(a), 119 Stat. 1839) that call for improved coordination and mitigation of transportation plans that reinforce mitigation measures needed to address the RTP's environmental impacts. However, the RCP further advocates for even bolder policies that attempt to achieve a healthier, more sustainable region.

On the other hand, the RCP sets the direction for how both programs can evolve in the future. For example, while the RCP builds on the growth management framework of the Compass Blueprint, it promotes natural resource policies that help "green" the region as we move toward more sustainable development. It also calls for improved integration of the Compass Blueprint into the RTP by suggesting that future transportation plans better promote transit projects that can serve the Compass Blueprint focus areas that have or are anticipated to see population and job growth. Similarly, the RCP incorporates the recommendations from the 2008 RTP and also clarifies the need for further action, such as refinement of the Compass Blueprint program to achieve regional consensus, to achieve this Plan's goals.

HOW TO USE THIS DOCUMENT

The RCP is laid out much like a General Plan and organizes recommended policies into nine chapters. The highlight of each chapter is the regional strategy that addresses the RCP's vision for that resource area. As such, each chapter includes three levels of recommendations for the region:

- **Goals.** Each goal will help define how sustainability is defined for that resource area.
- **Outcomes.** These focus on quantitative targets that define progress toward meeting the RCP's Goals. Where possible, they are clearly defined (e.g., a 20 percent reduction in greenhouse gas emissions from 2007 levels), capable of being monitored with existing or reasonably foreseeable resources, and have a strong link to sustainability goals.
- **Action Plan.** This critical part of the RCP lays out a comprehensive implementation strategy that recommends how the region can systematically move to meet the RCP's quantitative Outcomes and achieve its Goals, Guiding Principles, and Vision. Each Action Plan contains:
  - **Constrained Policies.** This includes a series of recommended near-term, feasible policies that stakeholders should consider for implementation. For example, the RCP calls on SCAG to adopt policies that reflect its role as a planning agency, council of governments, and metropolitan planning organization.

THE CONSEQUENCES OF INACTION

Water: Increased temperatures would result in earlier annual snow melt and increased rainfall in the mountains, leading to increased flood risks along major streams and rivers throughout the region.

Sierra Nevada spring snow pack could reduce by as much as 30 percent—a primary source of water for Southern California.

Sea levels could rise from 1 to 3 feet by 2100. The resulting influx of saltwater could threaten the quality and reliability of major fresh water supplies.

The RCP also recommends voluntary policies for consideration by local governments and other key stakeholders.

- **Strategic Initiatives.** This encompasses longer-term strategies that require significant effort to implement but are necessary to achieve the RCP's desired Goals and Outcomes. For example, identifying technological breakthroughs that can reduce air pollution from the transportation sector requires both commitment and time. Most of these initiatives are not constrained and will require political will, enabling legislation, new funding sources, and other key developments to become a reality. In most cases, this tier of strategies is the key to achieving the region's sustainability Goals and Outcomes.

As shown in the following figure, each Action Plan is presented in a tabular format that provides several pieces of information. Each table outlines policies and initiatives that are sorted by the potential implementing entity and describes:

- **Type of Policy or Initiative.** The tables organize policies and initiatives into three categories:
  - ***Best Practices*** refer to good ideas that should be considered for both General Plan updates and for inclusion in development projects.
  - ***Legislation*** refers to areas that require legislative or regulatory reform.
  - ***Coordination*** involves two or more entities working together to move ideas into action. In such cases, SCAG is often considering taking a leadership role to promote partnerships that break through historical barriers and move initiatives forward.
- **Potential for Direct and Indirect Benefits.** This summarizes whether a policy could provide direct and indirect benefits for other resources areas. For example, a policy calling for congestion pricing of roadways could produce air quality benefits as well. To reinforce the theme of multiple benefits, each chapter highlights some key ways in which its policies can benefit other resource areas.
- **Potential for Other Benefits.** The potential for benefits to public health and climate change.

FIGURE 1.3
Action Plan Layout

Identifies potential to address other policy objectives

This policy could directly or indirectly improve open space

Identifies potential benefits in the other eight resource chapters of the RCP

Indicates whether the table identifies Constrained Policies or Strategic Initiatives

ENERGY ACTION PLAN

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
		X	EN-1. SCAG should continue to work with the State to develop approaches for evaluating environmental impacts within the Compass Blueprint program, particularly energy, air quality, water, and open space and habitat.[i]	X	X	X	X	X	X			X	X
X			EN-2. SCAG should continue to develop energy efficiency and green building guidance to provide direction on specific approaches and models and to specify levels of performance for regionally significant projects to be consistent with regional plans.	X	X	X	X	X	X		X	X	X
		X	EN-3. SCAG should continue to pursue partnerships with Southern California Edison, municipal utilities, and the California Public Utilities Commission to promote energy efficiency and reduce greenhouse gas emissions in the region.			X			X			X	X
		X	EN-4. SCAG should continue to convene key decision makers to discuss energy issues and make recommendations to SCAG's Energy and Environment Committee, where appropriate.	X	X	X					X	X	X
		X	EN-5. SCAG should convene key stakeholders to evaluate and where feasible, recommend transportation measures such as congestion pricing, a transitional regional goods movement system and an environmental mitigation strategy that reduces fossil fuel consumption and uses non fuel combustion technologies.	X	X	X			X				X
		X	EN-6. SCAG should monitor and provide input towards development of state energy projections and tools, including the Integrated Energy Policy Report and similar policy documents as well as future efforts to determine the implications of energy generation and consumption for the built environment.	X	X	X						X	X
	X		EN-7. SCAG should encourage credits for clean post recycle conversion technologies to produce energy or for technologies that offset energy use or emissions.		X	X			X		X	X	X
Voluntary Local Government Best Practices													
X			EN-8. Developers should incorporate and local governments should include the following land use principles that use resources efficiently, eliminate pollution and significantly reduce waste into their projects, zoning codes and other implementation mechanisms: • Mixed-use residential and commercial development that is connected with public transportation and utilizes existing infrastructure. • Land use and planning strategies to increase biking and walking trips.[ii]	X	X	X	X	X	X		X	X	X
X			EN-9. Local governments should include energy analyses in environmental documentation and general plans with the goal of conserving energy through the wise and efficient use of energy. For any identified energy impacts, appropriate mitigation measures should be developed and monitored. SCAG recommends the use of Appendix F, Energy Conservation, of the California Environmental Quality Act.	X	X	X			X			X	X

These policies represent good ideas that should be considered for General Plan updates and development projects.

These policies or initiatives rely on changes to existing legislation or regulation.

These are potential areas for SCAG leadership that rely on partnerships with public and/or private sector stakeholders.

EN-1 stands for Energy Constrained Policy 1.
EN-1S stands for Energy Strategic Initiative 1.

RCP policies and initiatives are sorted by potential implementing entity (e.g., SCAG, local governments and/or developers, State of federal government)

2008

Land Use and Housing

THE CHALLENGE

The region's challenges related to traffic congestion, air quality, housing availability and affordability and nearly all of the other issues identified in this Plan can be traced, at least in part, to the intersection of land use decisions, transportation planning and the growth of our population and economy.

In a region where outward expansion has been the norm, there is now a perception that we are "built out," with little available land left to accommodate growth. Complaints that new development is overburdening transportation infrastructure are becoming commonplace as traffic congestion and delay worsen. Commutes in many parts of the region are long and getting longer - indicative of a jobs-housing imbalance as people live far from where they work.

California's system of municipal finance has forced local governments to make land use decisions based on revenue-generation concerns rather than sound planning practice. Housing costs have skyrocketed as the supply of housing has failed to keep pace with a growing demand (see **Figure 2.1**). In addition, impact fees may be a deterrent to the development of housing in California, particularly affordable housing.

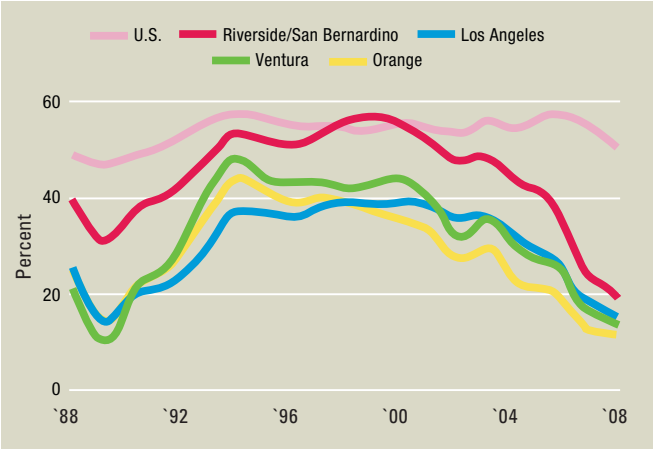
Linking Land Use and Transportation Planning

The quality of life in any region depends in large part on travel - how easy it is to get from home to work and back, the amount of time spent commuting, and the types and degree of choices available for getting around.

Closely related to that are the choices we make about how land should be used and what kinds of buildings we construct. The types and appearances of buildings, how they function in a neighborhood or business district, and where they are located all have an effect on transportation use. For example, a small

FIGURE 2.1

Housing Affordability
(Percent of Households Who Can Afford to Purchase a Median-Price Home)



Source: California Association of Realtors

The region's challenges can be traced to the intersection of

HOW LAND USE AND HOUSING POLICES PRODUCE MULTIPLE BENEFITS

Open Space and Habitat: Emphasizing infill development and focusing growth around urban centers and transportation nodes will discourage sprawling "leapfrog" development, slow the rate of land consumption and help protect important open space on our urban periphery.

Water: Greater emphases on multi-family and non-traditional housing and green building practices help reduce per-capita water consumption, particularly for residential irrigation use.

Energy: Balanced land use growth patterns will reduce VMT and the fuel demands for vehicle travel. Mixed land uses near transportation services can save consumers up to 512 gallons of gasoline per year. Households in transit-oriented developments drive 45 percent less than residents in auto-dependent neighborhoods.

FIGURE 2.2
Before and After Photo-Morph

Source: SCAG

neighborhood that combines a shopping area with nearby residences makes it easier for people to walk for some of their trips (see **Figure 2.2**). Highway-adjacent commercial development, however, tends to require auto travel for all trips.

At the same time, decisions made about transportation also affect what and where we build. Freeway interchanges usually encourage development of auto-oriented stores and services, while transit and pedestrian amenities stimulate "Main Street" business and residential development nearby.

We are still growing – the region is expected to add another seven million residents by 2035. The new arrivals are members of our own growing families and those attracted by the strong regional economy and we can expect this growth regardless of the land use decisions we make. However, by linking responsible land use and transportation planning, we can accommodate growth while maintaining the region's mobility, livability, prosperity and sustainability.

THE PLAN

Sustainably planning for land use and housing in Southern California will maximize the efficiency of the existing and planned transportation network, provide the necessary amount and mix of housing for our growing population, enable a diverse and growing economy and protect important natural resources.

We can achieve land use and housing sustainability with the Compass Blueprint planning principles developed collaboratively by SCAG and other partners since 2000. Compass Blueprint would result in significant land use changes to only 2 percent of the total land area in the region. Voluntary implementation efforts, by all levels of government and all stakeholders, are part of what is referred to as the "2% Strategy."

SCAG's transportation modeling and other analyses show that the Compass Blueprint scenario can:

- Provide adequate and affordable housing for our growing population. Production of new housing units will provide an economic stimulus to the region through direct investment and new jobs.
- Promote improved jobs-housing balance throughout the region. Locating new housing near jobs, new employment centers near housing, and both housing and jobs near transit and other transportation corridors will shorten commutes and allow commuting options other than single occupancy vehicles.
- Reduce regional vehicle miles traveled (VMT), resulting in reduced traffic congestion and delay and reduced air quality impacts. Reduced VMT will also lead to significant infrastructure cost savings.
- Improve social equity and environmental justice through revitalization of older suburban and inner-city locations, promotion of economic development in urban core areas and enhancement of local property and sales tax revenues.

Development of the Compass Blueprint

The Compass Blueprint growth vision, 2% Strategy and the Goals, Outcomes and Action Plan outlined in this chapter are the products of a proactive and integrated process that began in 2000 with direction from SCAG's Regional Council and a region-wide series of workshops involving over 1500 stakeholders.

SCAG's quantitative modeling and policy analysis techniques then determined some of the objective land use, transportation and economic implications of a range of alternative growth scenarios. By 2004, a regional consensus emerged on a growth vision/land use scenario that will enhance Southern California's livability, mobility, sustainability and prosperity.

The Compass Blueprint growth vision formed the basis for the preferred land use alternative in the 2004 Regional Transportation Plan (RTP). Continued technical analysis and a 2006 series of stakeholder workshops, at which over 90 percent of the region's jurisdictions were represented, have helped refine the vision.

HOW LAND USE AND HOUSING POLICES PRODUCE MULTIPLE BENEFITS

Air Quality: Land use decisions that reduce the number or length of vehicle trips will directly improve air quality by reducing regional VMT and associated vehicle start, running, and soak emissions.

Solid Waste: Greater emphases on infill development and green building practices will help reduce construction-related waste.

Transportation: Land use decisions may be the single most important factor in determining the performance of the transportation system and in evaluating the need for future transportation investments. Implementation of Compass Blueprint program can reduce about 8.6 million daily VMT in the region.

Economy: Providing an adequate supply of housing that is affordable and desirable will support a strong, diversified workforce and economy.

Compass Blueprint would result in significant land use

Ultimately, the region could work together toward the outcome of realizing, by 2035, development and redevelopment consistent with the Compass Blueprint growth vision and the Advisory Land Use Policies of the 2008 RTP, which together describe a potential future for the region and forecast growth in population and employment throughout the region. However, Compass Blueprint implementation will depend largely on local action.

To accurately track progress and assess consistency with the Compass Blueprint, SCAG will develop a monitoring plan and assessment methodology, as described below in the chapter's Action Plan.

LAND USE AND HOUSING GOALS

Successfully integrate land and transportation planning and achieve land use and housing sustainability by implementing Compass Blueprint and 2% Strategy:

- Focusing growth in existing and emerging centers and along major transportation corridors.
- Creating significant areas of mixed-use development and walkable, "people-scaled" communities.
- Providing new housing opportunities, with building types and locations that respond to the region's changing demographics.
- Targeting growth in housing, employment and commercial development within walking distance of existing and planned transit stations.
- Injecting new life into under-used areas by creating vibrant new business districts, redeveloping old buildings and building new businesses and housing on vacant lots.
- Preserving existing, stable, single-family neighborhoods.
- Protecting important open space, environmentally sensitive areas and agricultural lands from development.

LAND USE AND HOUSING OUTCOMES

- Significantly increase the number of city and county general plans consistent with Compass Blueprint principles by 2012 (General Plans are the local blueprints for growth and best indicate whether local governments have adopted Compass Blueprint planning principles.).
- Significantly increase the number and percentage of new housing units and jobs created within the Compass Blueprint 2% Strategy Opportunity Areas by 2012 and improve the regional jobs-housing balance (tracking the number of new units will measure the region's progress in accommodating forecast growth. Percentage of hous-

ing and jobs developed within the Opportunity Areas will indicate the locational efficiency of growth.).

- Reduce total regional vehicle miles traveled (VMT) to 1990 levels by 2020 (the Land Use and Housing Action Plan can be expected to result in a 10 percent reduction in VMT in 2035 when compared to current trends. VMT serves as a proxy for jobs/housing balance, urban design, transit accessibility, and other urban form issues. VMT per household will decrease with Compass Blueprint implementation.).
- Add one new housing unit to stock for every 3 persons in population growth and one new housing unit for every 1.5 full-time equivalent jobs, whichever is greater (housing supply measures the availability of housing in comparison to population and jobs.).
- Reduce by 20 percent the percentage of households paying more than 50 percent of their income for combined housing and transportation costs from the 2000 levels (combined housing and transportation costs as a percentage of income is an important measure of housing affordability and efficient development.).
- Increase the region's first-time home buyer affordability index so that the relationship of minimum qualifying income to entry-level home price mirrors or surpasses the national average (the first-time home buyer affordability index is another key measure of housing affordability.).
- Increase regional homeownership so that the percentage of households owning their own home mirrors or surpasses the national average. Reduce the existing disparities in homeownership by ethnic group by 50 percent (the region currently suffers from low homeownership rates, especially among certain ethnic groups.).
- Achieve a regional housing vacancy rate of 1.5 percent for owner-occupied units and 5 percent for rental units (these vacancy rates are indicators of a healthy housing market.).
- Significantly improve the efficiency of land use in the region's urbanized areas by 2035 (this measures the number of people and jobs per acre and the region's ability to accommodate growth in parts of the region that are already urbanized or that become urbanized during the planning period.).
- Significantly decrease the rate of land consumed for urbanization between 2007 and 2035 (land consumption and urbanization measures the rate at which undeveloped land is converted to urban uses, relative to population growth.).

HOW LAND USE AND HOUSING POLICES PRODUCE MULTIPLE BENEFITS

Security and Emergency Preparedness: Balanced growth minimizing greenfield development at urban fringes reduces exposure to wildfires and other natural disasters that can tax our public safety services.

Public Health: Neighborhoods that generate fewer and shorter vehicle trips and greater transit and non-motorized use mean better air quality and fewer dangerous pollutants.

Environmental Justice: By cleaning up and redeveloping brownfields and providing urban parks, cities can revitalize urban cores where residents have too often been subjected to environmental hazards.

Climate Change: Mixed land uses with access to transportation can save residents up to 512 gallons of gasoline per year and reduce over 4 metric tons of CO_2 per year.

- All cities in the region are encouraged to adopt green building standards by 2012 (green building standards as part of local planning and permitting represents a key element of the Compass Blueprint Growth Vision – sustainability. Green building will also be a key to achieving the sustainability goals identified in the Water, Solid Waste, Energy and Air Quality chapters of this RCP.).

LAND USE AND HOUSING ACTION PLAN

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
		X	LU-1. SCAG should provide technical assistance and regional leadership to integrate growth and land use planning with the existing and planned transportation network.	X	X		X	X	X			X	X
		X	LU-1.1 SCAG should provide planning services to local governments through Compass Blueprint Demonstration Projects. These projects will help local jurisdictions: • Update General Plans to reflect Compass Blueprint principles and integrate land use and transportation planning. • Develop specific plans, zoning overlays and other tools to stimulate desired land-use changes within 2% Strategy Opportunity Areas. • Complete economic analyses and community outreach to ensure that planned changes are feasible and responsive to stakeholder concerns. • Visualize potential changes, through innovative graphics and mapping technology, to inform the dialogue about growth, development and transportation at the local and regional level	X	X		X	X	X			X	X
		X	LU-1.2 SCAG should continue with a targeted public relations strategy that emphasizes regional leadership, the benefits and implications of Compass Blueprint, and builds a sense of common interests among Southern Californians.	X	X		X	X	X			X	X
		X	LU-1.3 SCAG should expand the role of the Compass Partnership, a forum convening representatives from government, civic leaders and the development community. The Partnership will advise the region on how public-private partnerships will help leverage the outcomes outlined in this chapter. SCAG should encourage cooperative land-use decision-making and planning efforts between neighboring jurisdictions.	X	X		X	X	X			X	X
		X	LU-2. SCAG should encourage leveraging federal and State and local funds to implement the Compass Blueprint.	X			X	X	X			X	X
		X	LU-2.1 All stakeholders should leverage state infrastructure bond financing, including the Department of Housing and Community Development's Transit Oriented Development program and should support legislation that will target infrastructure bond funds for regions with adopted growth visions such as the Compass Blueprint and for projects consistent with these visions.	X			X	X	X			X	X
		X	LU-3 SCAG should develop an objective monitoring system to gather data and measure regional progress toward implementing the Compass Blueprint growth scenario and achieving the outcomes outlined in this chapter.	X	X		X	X	X			X	X
		X	LU-3.1 SCAG should define a methodology for assessing local General Plans' consistency with Compass Blueprint.	X	X		X	X	X			X	X
		X	LU-3.2 SCAG should develop a data set and methodology for determining what portion of regional growth is occurring within 2% Strategy Opportunity Areas.	X	X		X	X	X			X	X
		X	LU-3.3 SCAG should further develop land use performance measures to be included in future Regional Transportation Plans.	X	X		X	X	X			X	X

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
Voluntary Local Government Best Practices													
X			LU-4 Local governments should provide for new housing, consistent with State Housing Element law, to accommodate their share of forecast regional growth.						X				
X			LU-4.1 Local governments should adopt and implement General Plan Housing Elements that accommodate housing needs identified through the Regional Housing Needs Assessment (RHNA) process. Affordable housing should be provided consistent with RHNA income category distributions adopted for each jurisdiction. To provide housing, especially affordable housing, jurisdictions should leverage existing State programs such as HCD's Workforce Incentive Program and density bonus law and create local incentives (e.g., housing trust funds, inclusionary zoning, tax-increment-financing districts in redevelopment areas and transit villages) and partnerships with non-governmental stakeholders.	X	X		X	X	X				X
X			LU-5 Local governments should leverage federal and State and local funds to implement the Compass Blueprint.	X	X		X	X	X			X	X
X			LU-5.1 All stakeholders should leverage state infrastructure bond financing, including the Department of Housing and Community Development's Transit Oriented Development program and should support legislation that will target infrastructure bond funds for regions with adopted growth visions such as the Compass Blueprint and for projects consistent with these visions.	X	X		X	X	X			X	X
X			LU-5.2 Subregional organizations should leverage the federal transportation planning funds available at the subregional level, to complete projects that integrate land use and transportation planning and implement Compass Blueprint principles.	X	X		X	X	X			X	X
X			LU-6 Local governments should consider shared regional priorities, as outlined in the Compass Blueprint, Regional Transportation Plan, and this Regional Comprehensive Plan, in determining their own development goals and drafting local plans.	X	X	X	X	X	X	X	X	X	X
X			LU-6.1 Local governments should take a comprehensive approach to updating their General Plans, keeping General Plans up-to-date and providing progress reports on updates and implementation, as required by law.	X	X	X	X	X	X	X	X	X	X
X			LU-6.2 Developers and local governments should integrate green building measures into project design and zoning such as those identified in the U.S. Green Building Council's Leadership in Energy and Environmental Design, Energy Star Homes, Green Point Rated Homes, and the California Green Builder Program.		X	X	X		X		X	X	X
X			LU-6.3 Local governments and subregional organizations should develop ordinances and other programs, particularly in the older, more urbanized parts of the region, which will enable and assist in the cleanup and redevelopment of brownfield sites.	X	X		X	X	X		X	X	X
X			LU-6.4 Local governments and subregional organizations should develop adaptive reuse ordinances and other programs that will enable the conversion of vacant or aging commercial, office, and some industrial properties to housing and mixed-use with housing.	X	X		X	X	X		X	X	X
Federal and State Government Policies													
	X		LU-7 The State should continue to support and provide funding for the statewide Blueprint Planning program.	X	X	X	X	X	X	X	X	X	X

Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits								Other Benefits	
				Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives													
	X	X	LU-1S SCAG and county transportation commissions should initiate a program to secure significant resources for implementing Compass Blueprint. The program would provide infrastructure funding for specific allowable costs of development projects that integrate land use and transportation planning and are consistent with the 2% Strategy.	X	X		X	X	X		X	X	X
	X	X	LU-2S SCAG should continue efforts, in collaboration with State agencies and local jurisdictions, to significantly reform State Housing Element law and the Regional Housing Needs Assessment process. These reforms should promote the broad goals stated by the Secretary of Business, Transportation and Housing and shared by SCAG: • Each municipality has a clear responsibility to provide housing based on the growth in population and jobs generated in the community. • Jurisdictions should be able to collaborate in meeting housing needs. • Planning for housing should be pursued over a longer time frame in line with other major growth planning efforts.						X				
Federal and State Government Strategies													
	X	X	LU-3S The State, in collaboration with SCAG, other regional organizations and local jurisdictions, should work to re-structure and re-incentivize the municipal finance system that currently challenges virtually all local governments in California and often promotes inefficient land uses. Changes should: • Ensure the reliability of revenue streams to local government such that local finances are not the first resort in difficult budget years. • Re-structure sources of municipal revenue to place less emphasis on retail development and sales tax receipts, and to incentivize housing development and other land use changes consistent with regionally shared goals.						X		X		

Open Space and Habitat

THE CHALLENGE

As the SCAG region rapidly urbanizes, open space resources that enhance quality of life and provide environmental benefit are disappearing. In the most urbanized areas of the region, there is more developed land than natural lands, parks, and farmland combined. In areas where development abuts natural lands or agricultural lands, these resources are often lost to make room for new development or to accommodate services for existing development. Many cores (large blocks of habitats) and linkages are unprotected. In urbanized areas, open space resources such as parks, trails and greenbelts are often scarce.

Although there is a seeming abundance of private vacant lands and even farmlands in the slowly urbanizing and rural areas, the actions taken in urbanized areas have already impacted open space throughout the region:

- The extinction of species in one part of the region leads to federal and/or state listings affecting areas where these species still occur. The loss and degradation of special habitats (wetlands, riparian, sage scrub, and native grasslands) from past development leads to region-wide regulations.
- Development, past and present, continues to affect water quality and watershed conditions throughout the region.
- Our transportation system created many of the development patterns that exist today. This system crosses almost all large tracts of open space outside of urban areas, impeding wildlife movement and leads to wildlife loss as road kill. In areas where development has also occurred, wildlife linkages have been narrowed or severed. Based on a statewide assessment, there are at least 72 linkages at risk of being severed by existing and projected development.
- Agricultural lands exceeded developed lands in the existing urban core and in outlying areas until relatively recently. Both the rate and amount of conversions to non-farm uses continues to increase. For the first time in its history, it appears the region may have more developed lands than agricultural lands.

Three categories of open space are addressed in this chapter, all of which have common attributes such as aesthetic, air quality, and water quality benefits. Each also offers unique benefits:

OPEN SPACE RESOURCES

Natural Lands: Undeveloped vacant land with natural vegetation, including lands used for grazing; lands with wildlife habitat.

- Cores: blocks of natural lands that are greater than 1,000 acres and have minimal edge to area ratio.
- Fragments: patches of habitat smaller than 1,000 acres located within or farther than one mile from a core.

Community Open Space: Public open space in or serving communities, such as park and recreation areas, community gardens, dedicated open space, urban forests, greenbelts, and trail systems.

Farmland: Prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance.

There are at least 72 wildlife linkages at risk of being

- **Natural Lands:** These are generally undeveloped and/or vacant lands with some natural vegetation and/or wildlife value, including lands used for grazing. These lands may include large and small blocks of habitat and the open space that links those blocks together. This includes habitat that has some level of existing protection (protected open space) or needs to be protected to preserve the ecological function and value of protected open space, especially areas that serve as wildlife linkages and areas with sensitive habitats not covered by existing conservation programs;
- **Community Open Space:** This includes areas that enhance the quality of life in urban areas and completes interconnected networks of parks, trails, greenbelts, community gardens, and urban forests serving the region's communities; and
- **Farmlands:** This category includes prime farmland, farmland of statewide importance, unique farmland and farmland of local importance as defined by the California Department of Conservation. They provide food, products and economic benefits to the region and include the region's remaining prime and other important agricultural lands, especially farmlands intertwined with unprotected natural lands and developing communities.

There are numerous plans and programs throughout Southern California that attempt to conserve open space resources. Examples include:

- An open space element in a city or county general plan
- Natural community conservation plans and habitat conservation plans
- Mandated management plans for public lands, such as the Southern California Forest Plan and California Desert Conservation Area Plan
- Integrated watershed management plans
- Open space acquisition and habitat enhancement programs implemented by the California Resource Agency, Conservancies, non-profit organizations and trusts
- Resource specific conservation strategies, such as South Coast Missing Linkages
- Open space and parkland acquisition programs implemented by public-private partnerships and individual conservancies
- Open space planning strategies and initiatives such as Green Visions

While these plans address open space issues, they do not individually fulfill the need for a more holistic regional approach, one which evaluates the collective needs of the six-county SCAG region. SCAG's approach is to create a cohesive vision and a comprehensive open space strategy by tying together

these plans and identifying additional opportunities for conservation.

THE PLAN

The intent of this chapter is to plan and provide for the conservation of the region's open space resources focusing on:

- Interconnections among resources
- Future land use decisions that will either strengthen or impair the region's ability to sustain the resources, and
- Opportunities for inter-jurisdictional planning

The intent is to conserve the region's open space resources in a way that will ensure sustainability over time. To help guide this effort, open space resources have been grouped into three categories: natural lands, community open space and farmlands and rangelands.

SCAG's role will be to:

- Maintain the regional open space database and use it to track progress in attaining regional open space conservation goals;
- Enhance its capacity to provide technical services for open space planning;
- Establish a regional forum for coordinating existing programs and initiating new cooperative efforts that emphasize opportunities for cross-county and cross-jurisdictional open space protection; and
- Work in cooperation with its member agencies and open space conservancies in the region to find ways to supplement existing funding sources for open space conservation.
- Include open space mitigation policies and/or mitigation recommendations in the RTP;
- Be a regional clearinghouse for data, funding information, program coordination; and
- Propose legislative solutions.

SCAG's member agencies will be asked to:

- Propose and participate in cooperative conservation planning efforts;
- Consider the regional open space best practices presented in the program and apply those practices in planning and reviewing projects;
- Provide updated information on local open space resources for inclusion in the regional open space database

Local conservancies and other interested parties will be invited to:

HOW OPEN SPACE POLICES PRODUCE MULTIPLE BENEFITS

Land Use and Housing: The preservation of open spaces for natural lands and community parks provides aesthetic and recreational benefits to growing communities and can increase property values.

Water: Open space and parkland can enhance groundwater water resources by preserving or expanding the area available for natural groundwater recharge. It can also improve surface water quality by filtering, retaining, or detaining stormwater runoff. Open space also provides opportunities to reuse treated runoff or recycled water for irrigation, thereby reducing the demand for potable water.

Energy: Open spaces can address climate change and mitigate the need to cool a warmer region. This will in turn reduce the need to expand the power infrastructure needed to produce electricity and other sources of energy.

Natural lands sustainability requires maintaining large

- Propose and participate in cooperative efforts with SCAG member agencies
- Provide updated information on local open space resources for inclusion in the regional open space database.

The goals and outcomes included in this chapter focus on the conservation of regionally significant open space resources. To that end, SCAG completed a comprehensive evaluation of open space resources in the region and its neighboring counties. Geographic Information System (GIS) data were collected from existing sources to assist with and inform the evaluation of open space planning issues. These data were evaluated and analyzed to show the distribution of existing open space resources, levels of existing and planning protection and areas of key habitat linkages. Where available, the SCAG data collected and presented as part of this effort was for the entire region, and includes Kern and San Diego counties.

NATURAL LANDS

The sustainability of natural lands is directly related to maintaining large blocks of habitat (also called "cores"), keeping them relatively impervious to outside disturbance and allowing wildlife linkages to function. This network of large cores and wildlife linkages are part of an ecosystem where plants and animals occur in populations large enough that natural ecological processes (predation, competitive interaction, natural disturbance and recovery) operate so that evolution is sustained. This vast connected landscape provides a sense of place and spiritual renewal that cannot be provided elsewhere. This network recharges the region's watershed and water resources by maintaining previous surfaces necessary for groundwater recharge while combating the effects of air pollution and global warming.

Except for northern Ventura County, all natural lands in the SCAG region occur within three of the nine bioregions in Southern California: South Coast, Mojave Desert and Colorado Desert. Bioregions are areas that include multiple ecological communities based on common physical (climate, geology) biological (vegetation, wildlife) and environmental conditions. Northern Ventura County is unique in that it forms the southeast tip of the Central Coast bioregion and is located where five bioregions converge.

Many of the natural lands in the Southern California bioregions are large interconnected cores. However, near developed areas and along the regional highways, connections between large tracts of natural lands have been narrowed and fragmented and in some places permanently severed. Wildlife movement corridors, or wildlife "linkages," are an important component of natural lands. Southcoast Wildlands, a nonprofit organization, evaluated and identified 70 linkages in the SCAG region as areas where natural connectivity is at risk.

One way to determine the overall need for a regional planning effort such as the one SCAG has undertaken is to evaluate the current levels of "protection" for lands in the region, particularly

natural lands.[1] This helps to provide a regional context for planning by showing the existing pattern of what is protected and what is not, thereby helping to identify those areas where open space resources are most at risk. Concurrent with this mapping effort, existing plans and programs were reviewed to identify which areas are covered by conservation strategies and which are not.

Figure 3.1 shows the distribution of many key open space resources including "protected" and "unprotected" cores, connectors and fragments within the SCAG region and its vicinity. It also shows the location of the protected and unprotected areas in relation to wildlife linkages, linkage design areas, park and recreation areas (from SCAG's 2005 land use inventory), agricultural lands, and developed lands. Together, these form the region's open space infrastructure. Linkages, cores and connectors exist intra-county and inter-county; they often cross county lines and from the SCAG region into Kern and San Diego counties.

By evaluating the open space resources identified in **Figure 3.1**, SCAG identified those areas with high potential for conservation, particularly areas where cross jurisdictional opportunities exist. Generally, these areas do not fall within the limits of any one jurisdiction, and as such provide an appropriate focus for a regional scale document. **Figure 3.2** provides examples of possible conservation opportunity areas; these are areas where mitigation for impacts of regionally significant project and/or conservation efforts by public and private entities should be directed. Although SCAG does not have the authority to purchase or manage lands, conservation of these areas will be achieved through already established programs or through compacts facilitated by SCAG. SCAG should develop Memoranda of Understanding with state and federal resource agencies as necessary to facilitate the conservation of natural lands.

FIGURE 3.1: REGIONAL OPEN SPACE INFRASTRUCTURE

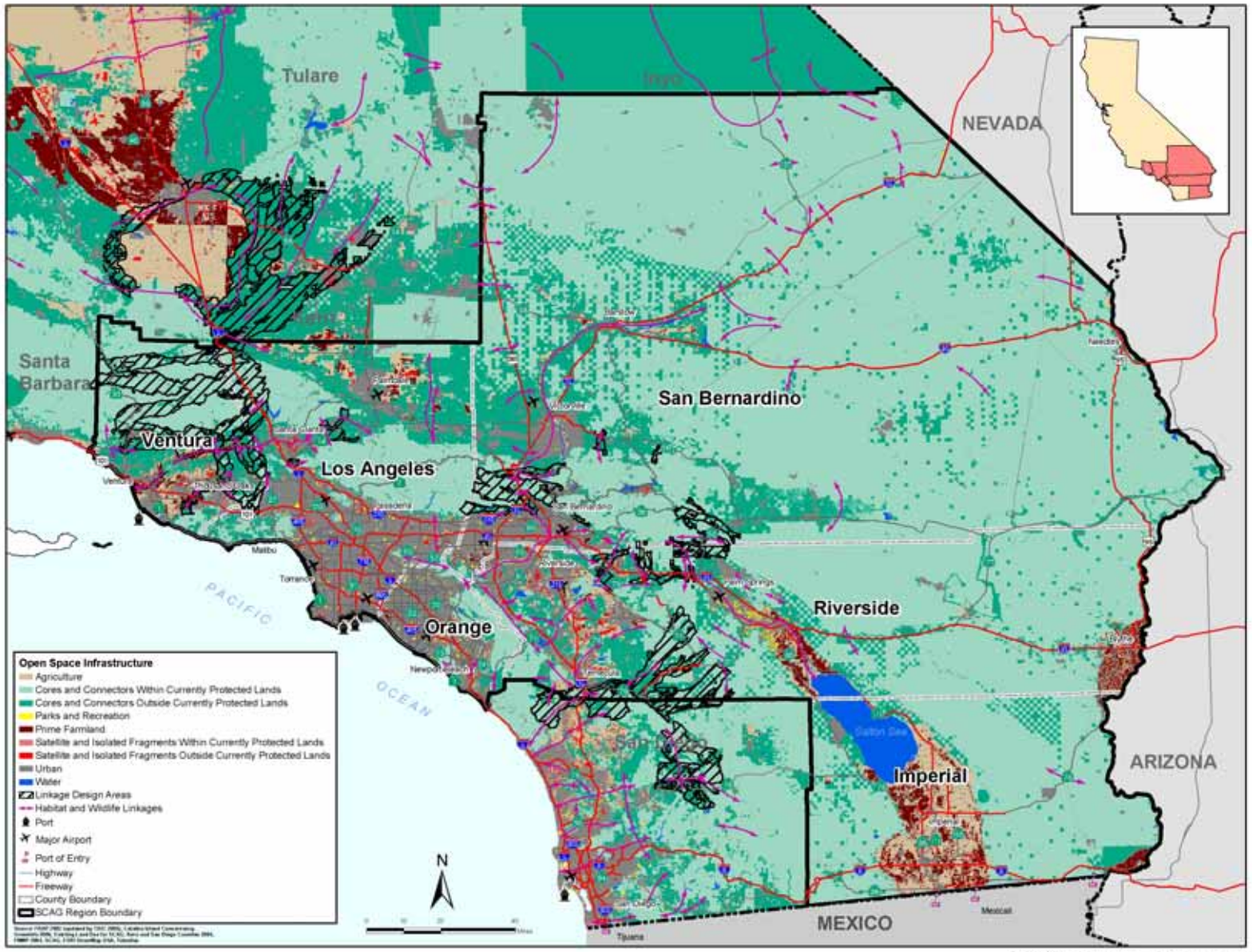
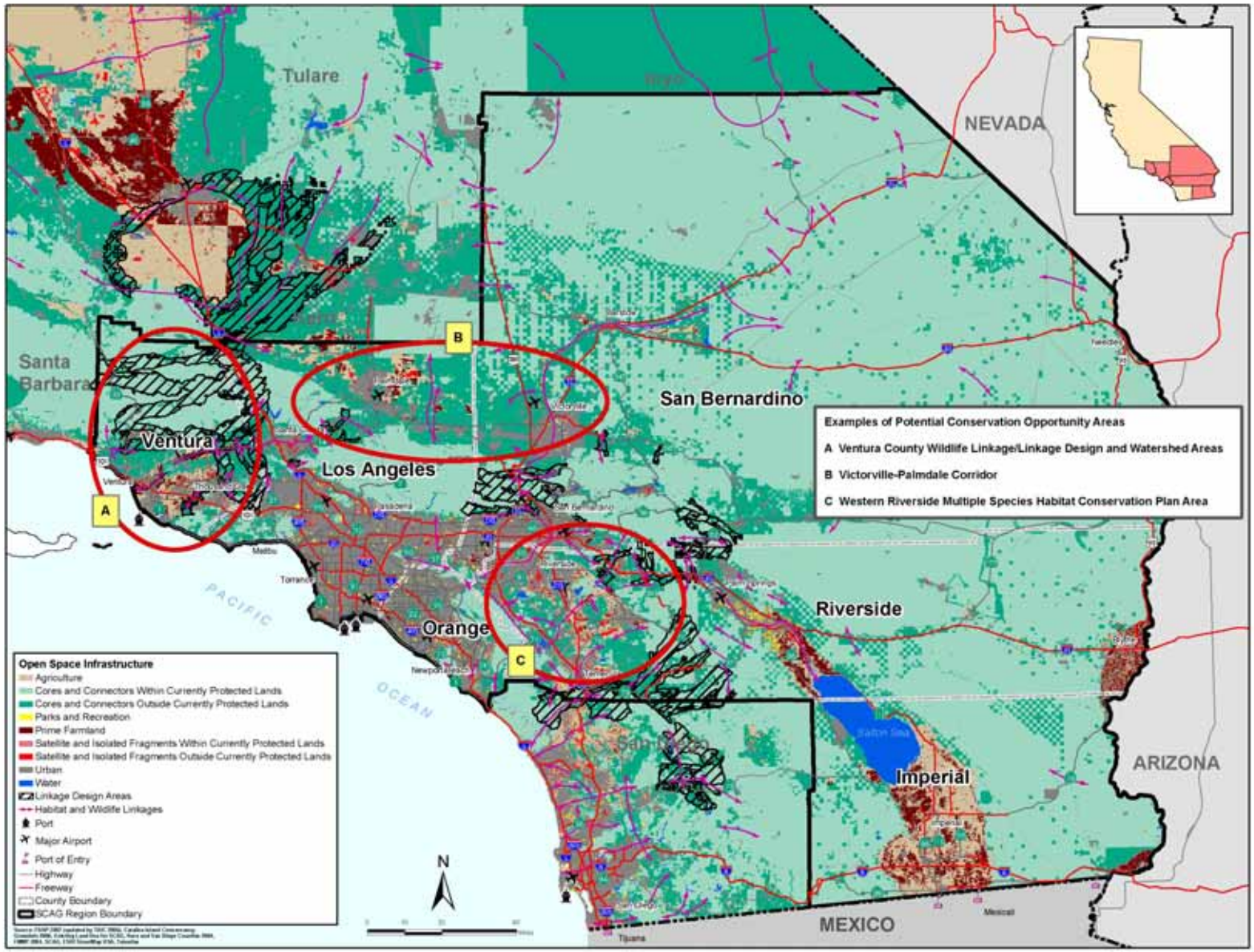


FIGURE 3.2: POTENTIAL CONSERVATION OPPORTUNITY AREAS



HOW OPEN SPACE POLICES PRODUCE MULTIPLE BENEFITS

Air Quality: The United Nations estimates that a tree uses photosynthesis to reduce about 2 tons of CO_2 in its lifetime. As such, maintaining and planting more trees can reduce greenhouse gas emissions.

Open spaces and particularly trees can provide much needed shade in urban areas, relieving the "heat island effect" that can exacerbate conditions for creating smog.

Agricultural soils help sequester about 0.8% of carbon released by combustion of fossil fuels. Methods such as no-till farming, residue mulching, and cover cropping used in organic farming can help sequester carbon emissions.

Solid Waste: Greater emphases on infill development and green building practices will help reduce construction-related waste.

Open Space and Habitat–Natural Lands Goals

- Ensure a sustainable ecology by protecting and enhancing the region's open space infrastructure and mitigate growth and transportation related impacts to natural lands by:
  - Conserving natural lands that are necessary to preserve the ecological function and value of the region's ecosystems;
  - Conserving wildlife linkages as critical components of the region's open space infrastructure;
  - Coordinating transportation and open space to reduce transportation impacts to natural lands

Open Space and Habitat–Natural Lands Outcomes

- By 2035, increase the amount of protected open space in the region by at least 700,000[2] acres of natural lands that include important core areas,[3] wildlife linkages, have special status habitats or species and/or buffer protected natural lands from development. The number of acres protected would be roughly proportionate to the urban footprint of the 2004 Regional Transportation Plan.
- By 2012, put in place approved conservation strategies for all regionally significant wildlife linkages.

OPEN SPACE AND HABITAT–NATURAL LANDS ACTION PLAN

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
		X	OSN-1 Track and monitor open space conservation efforts in the region. • SCAG should set up a clearinghouse of important GIS data used for open space planning. SCAG should maintain and update the regional open space database, track open space conservation and development (e.g. any activity that reduces the biological value of natural lands compared to baseline conditions) in the region and will commit to providing annual updates on conservation efforts.	X	X	X	X	X				X	X
X			OSN-2 SCAG should establish criteria for evaluating impacts to regionally significant open space resources, and should recommend mitigation measures for significant impacts to regional resources. • Priority review should include 1) existing and proposed General Plans and 2) any individual project that will have a significant impact on natural open space.	X	X	X	X	X				X	X
		X	OSN-3 Develop and implement guidance on mitigation options for open space impacts. • SCAG should develop and implement coordinated mitigation programs for regional projects, with an emphasis on regional transportation projects. • SCAG should produce and maintain a list/map of potential conservation opportunity areas. These conservation opportunity areas may be used by local governments and project sponsors as priority areas for mitigating impacts to open space resources. (see *Regional Open Space Guidance* for a complete description of Conservation Opportunity Areas) • SCAG should work in partnership with state and federal agencies, local conservancies and other groups to conserve natural lands in key locations through existing conservation programs, mitigation for the impacts of regional projects and conservation compacts facilitated by SCAG. • SCAG should work with County Transportation Commissions and Caltrans to refine the proposed open space consistency guidelines as necessary.	X	X	X	X					X	X
		X	OSN-4 SCAG should support policies and actions that preserve natural areas, specifically those areas identified in local, state, and federal plans.	X		X	X					X	X
		X	OSN-5 SCAG should support the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered plants and animals.	X		X	X					X	
		X	OSN-6 SCAG should encourage the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites.	X									
X			OSN-7 SCAG should encourage "watershed management" programs and strategies, recognizing the primary role of local governments in such efforts.	X	X	X	X	X				X	
X			OSN-8 SCAG should support regional efforts to identify and cooperatively plan for wetlands to facilitate both sustaining the amount and quality of wetlands in the region and expediting the process for obtaining wetlands permits.	X			X					X	

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Economy	Security	Solid Waste	Public Health	Climate Change
X			OSN-9 SCAG should support and work with communities and research entities on developing measures of the economic value of natural lands.	X		X	X						
X			OSN-10 Integrate open space assumptions into the Regional Growth Forecast. • SCAG should prepare growth forecasts for the region that are based on assumptions that accurately reflect allowed uses on 1) existing designated open space; 2) areas subject to regulations that preclude or limit uses; and 3) areas where some or all of the lands are proposed for preservation under approved conservation programs.	X	X		X						X
	X		OSN-11 Seek funding for conservation of natural lands. • SCAG should partner with local agencies and non-profit foundations in situations where a regional entity is necessary to secure funds. • SCAG should seek support (financial, technical, etc) at the state and federal level for a prototype regional open space database program.				X						
Voluntary Local Government Best Practices													
X			OSN-12 Local governments should track and Monitor Open Space Conservation by: • Considering the most recent annual report on open space conservation in planning and evaluating projects and programs in areas with regionally significant open space resources. • Ensuring consistency with the open space conservation policies and goals of the RCP.	X	X	X	X	X			X	X	X

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Economy	Security	Solid Waste	Public Health	Climate Change
X			OSN-13 Local governments should develop and implement mitigation for open space impacts by: • Promoting coordinated mitigation programs for regional projects and establish the basis for inter regional conservation strategies. • Planning development in locations least likely to cause environmental impact.	X	X		X				X	X	X
Voluntary Project Sponsor and Developer Best Practices													
X			OSN-14 Developers and local governments should implement mitigation for open space impacts through the following activities: • Individual projects should either avoid significant impacts to regionally significant open space resources or mitigate the significant impacts through measures consistent with regional open space policies for conserving natural lands, community open space and farmlands. All projects should demonstrate consideration of alternatives that would avoid or reduce impacts to open space. • Individual projects should include into project design, to the maximum extent practicable, mitigation measures and recommended best practices aimed at minimizing or avoiding impacts to natural lands, including, but not limited to FHWA's Critter Crossings, and Ventura County Mitigation Guidelines. • Project level mitigation for RTP's significant cumulative and growth-inducing impacts on open space resources will include but not be limited to the conservation of natural lands, community open space and important farmland through existing programs in the region or through multi-party conservation compacts facilitated by SCAG. • Project sponsors should ensure that transportation systems proposed in the RTP avoid or mitigate significant impacts to natural lands, community open space and important farmland, including cumulative impacts and open space impacts from the growth associated with transportation projects and improvements. • Project sponsors should fully mitigate direct and indirect impacts to open space resulting from implementation of regionally significant projects.	X	X		X				X	X	X

Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives													
		X	OSN-1S SCAG should seek to develop cooperative agreements and multi-party conservation compacts to accelerate the conservation of natural lands in the region.	X	X	X	X					X	X
	X		OSN-2S SCAG should put in place an open space funding program to demonstrate to state/federal agencies that SCAG is prepared to serve as the regional entity to distribute state/federal funds for open space conservation.	X	X		X					X	X
	X		OSN-3S SCAG should seek to create new sources of funding for open space conservation.		X		X						X
X			OSN-4S SCAG should establish decision-making tools for identifying and prioritizing open space conservation projects, such as those by the San Diego Association of Governments (SANDAG) in distributing funding through the Transnet Environmental Mitigation Program (EMP).		X	X	X					X	X
	X		OSN-5S SCAG should develop Memoranda of Understanding with state and federal resource agencies as necessary to facilitate the conservation of natural lands.	X	X		X					X	X

COMMUNITY OPEN SPACE

Community open space exists in or serves developed communities. Examples include park and recreation areas, community gardens, dedicated open space, urban forests, greenbelts and trail systems. Sustainable community open space is accessible by alternative modes of transportation, whether on foot, on bicycle, or by riding transit. It is distributed so that it serves a wide range of user groups in the region, from children to seniors and features amenities that meet the recreation and outdoor needs of its diverse users. Sustainable community open space also fulfills multiple planning and quality of life objectives contributing to watershed and water quality, air quality management and public health.

Parks and Public Health

A 1996 report by the U.S. Surgeon General found that people who engage in regular physical activity benefit from reduced risk of premature death; reduced risk of coronary heart disease, hypertension, colon cancer, and non-insulin dependent diabetes; improved physical functioning in persons suffering from poor health; and healthier cardiovascular, respiratory and endocrine systems. Physical activity also produces important psychological benefits relieving symptoms of depression and anxiety, improving mood, and enhancing psychological well being.[4]

The link between obesity and community open space is particularly relevant. Over the last decade, California has experienced one of the fastest rates of increase in adult obesity of any state in the nation.[5] More than half of California adults now are overweight or obese. Rates among African American and Latino adults, men over age 25 years, and adults with less than a high school education exceed 60 percent and there is no sign that the increases in obesity are slowing.[6]

The effects of obesity are putting a strain on the health care system and adding additional costs in loss of productivity. Estimated costs in California attributable to physical inactivity, obesity and overweight in 2005 were projected to reach $28 billion. A ten percent improvement – just one person of ten who becomes more active and maintains a healthy weight over a five-year period – could result in savings of nearly $13 billion.[7]

A report published by The Trust for Public Land concluded that when people have access to parks, they exercise more.[8] In a study published by the CDC, creation of or enhanced access to places for physical activity led to a 25.6 percent increase in the percentage of people exercising three or more days per week. The study also found that obesity is more likely in unwalkable neighborhoods, but rates of obesity go down as measures of walkability go up.[9]

SCAG evaluated the community open space availability in 16 cities in the region and compared them to the National Recreation and Parks Association (NRPA) standards recommended for park types.[10] As measured against NRPA's overall parks to people standard (6.25-10 acres/1,000 people) three

Community open space contributes to watershed, water,

HOW OPEN SPACE POLICES PRODUCE MULTIPLE BENEFITS

Transportation: As mandated by federal SAFETEA-LU legislation, open space policies can help to improve the location, design, and other features of new or expanded transportation projects.

Economy: Accessibility to parks and other open space provides major public health benefits that enhance economic productivity and minimize public health costs. Areas without parks have increased obesity, resulting in a loss of productivity (work days lost) and are a major drain on the health care system. The retention of agricultural lands helps provide regional economic diversity, as Riverside, Imperial, and Ventura counties account for over $1 billion in gross value of products sold.

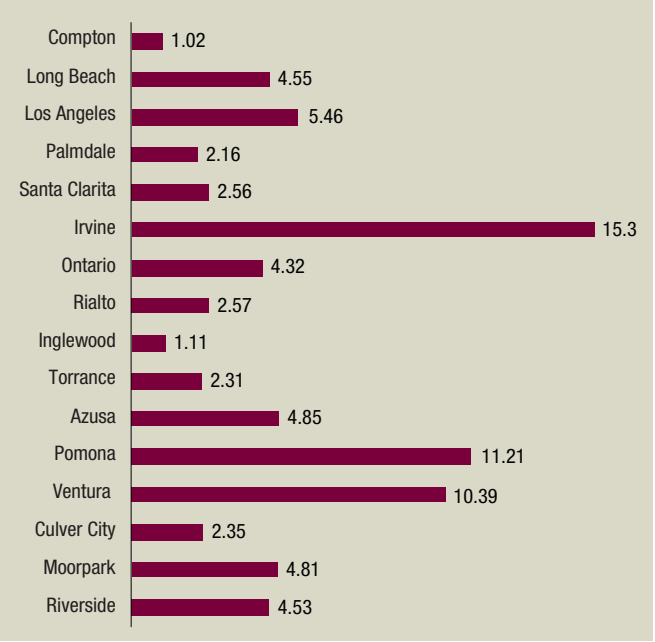
cities exceeded the standard (Irvine, Pomona and Ventura) while the rest of the cities fell below the standard. **Figure 3.3** shows the results for each of the cities.

Levels of Service

As shown in **Figure 3.3**, the range of acres of parkland per 1,000 people varies greatly throughout several cities. Although, NRPA standards may be helpful to get a general understanding of availability of parkland in a particular city, these standards were developed in the 1930s and fail to reflect the dynamic environment and variety of today's communities. For instance, NRPA standards do not address access nor do they include many types of open space common in urban environments such as urban forests, greenbelts and trails. For that reason, SCAG is encouraging communities to utilize a new paradigm such as Levels of Service (LOS) to measure park needs for their communities. Generally, the LOS paradigm takes into account the following factors:[11]

- Existing open space plans and policies (general plan open space element, parks and recreation plan, watershed management plan)
- Community preference as ascertained by survey, questionnaire and public workshop

FIGURE 3.3
Parks-to-People Ratio per 1,000 Residents



Sources: SCAG

- Accessibility by underrepresented groups and underserved populations, including low income or below poverty level communities, underrepresented ethnic groups, children, seniors, disabled individuals and those who are transit dependent
- Multi-modal transportation access within ½ mile
- Multi-purpose, multi-function open space, such as river parks

- Multi-agency initiatives that cover broad geographic areas; and
- Compass Blueprint areas

LOS can be assigned similar to the system used in traffic analysis with ranking of "A" for excellent through "E" for failing. A community with a preponderance of these types of criteria provides a higher level of service

Open Space and Habitat–Community Open Space Goals

- Enhance the region's parks, trails and community open space infrastructure to support the aesthetic, recreational and quality-of-life needs, providing the highest level of service to our growing region by:
  - Creating new community open space that is interconnected, accessible, equitably distributed, provides public health benefits, and meets the changing and diverse needs of communities;
  - Improving existing community open space through urban forestry and other programs that provide environmental benefits.

Open Space and Habitat–Community Open Space Outcomes

- By 2035, all SCAG subregions have community open space systems that have an "above average" level of service (LOS).
- An "above average" LOS for community open space, by 2012, in areas that participated in SCAG's Compass Blueprint Demonstration Projects.
- From 2007 conditions, increase the percentage of transit trips that can access community open space in one hour or less by 2012.

OPEN SPACE AND HABITAT–COMMUNITY OPEN SPACE ACTION PLAN

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
		X	OSC-1 SCAG, in collaboration with its member agencies, should work to enhance community open space and its accessibility.	X	X	X	X	X				X	X
		X	OSC-2 SCAG should continue to work with the state to develop approaches for evaluating environmental impacts within the Compass Blueprint program, particularly energy, air quality, water, and open space and habitat.	X	X	X	X	X			X	X	X
		X	OSC-3 SCAG and its member agencies should work with open space experts and community interest groups to develop a Level of Service ranking and evaluation system for community open space in the region.	X	X	X		X				X	X
		X	OSC-4 SCAG should support local jurisdictions and other service providers in their efforts to develop sustainable communities and provide, equally to all members of society, accessible and effective services such as: public education, housing, health care, social services, recreational facilities, law enforcement, and fire protection.	X	X	X		X					X
		X	OSC-5 SCAG should encourage member jurisdictions to work as partners to address regional outdoor recreation needs and to acquire the necessary funding for the implementation of their plans and programs.	X		X	X					X	
		X	OSC-6 SCAG should encourage member jurisdictions that have trails and trail segments determined to be regionally significant to work together to support regional trail networks. SCAG should encourage joint use of utility, transportation and other rights-of-way, greenbelts, and biodiversity areas.	X	X	X		X				X	X
Voluntary Local Government /Project Sponsor and Developer Best Practices													
X			OSC-7 Local governments should prepare a Needs Assessment to determine the adequate community open space level for their areas.	X	X	X	X	X			X	X	X
X			OSC-8 Local governments should encourage patterns of urban development and land use, which reduce costs on infrastructure and make better use of existing facilities.	X	X	X	X	X			X	X	X
X			OSC-9 Developers and local governments should increase the accessibility to natural areas lands for outdoor recreation.	X	X	X	X	X				X	X
X			OSC-10 Developers and local governments should promote infill development and redevelopment to revitalize existing communities.	X	X	X	X	X				X	X
X			OSC-11 Developers should incorporate and local governments should include land use principles, such as green building, that use resources efficiently, eliminate pollution and significantly reduce waste into their projects, zoning codes and other implementation mechanisms.	X	X	X	X	X			X	X	X
X			OSC-12 Developers and local governments should promote water-efficient land use and development.	X	X	X	X	X			X	X	X
X			OSC-13 Developers and local governments should encourage multiple use spaces and encourage redevelopment in areas where it will provide more opportunities for recreational uses and access to natural areas close to the urban core.	X	X	X	X	X			X	X	X

Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Economy	Security	Solid Waste	Public Health	Climate Change
		X	OSC-1S SCAG should work with all subregions, counties and cities to prepare needs assessments and develop and refine LOS criteria . The criteria established through the RCP and ancillary efforts should also be used as criteria for statewide bond funding.	X	X	X	X	X			X	X	X

Sustainable farmlands play a key role in maintaining inter-

HOW OPEN SPACE POLICES PRODUCE MULTIPLE BENEFITS

Public Health: If current trends in obesity and inactivity continue, today's youth will be the first generation in this nation's history to face a shorter life expectancy than their parents. Strong policies to provide places to play in schools, parks, and green spaces will help children become physically fit and perform better academically. Public transportation to these areas is especially vital in this region because many Southern California cities are park-poor. As a result, residents cannot simply walk to neighborhood parks like people in other cities because they often do not exist.

AGRICULTURAL LANDS

Sustainable farmlands are open spaces that maintain food production for the region and are protected from urban encroachment. Conserving sustainable farmland is essential to the overall region as these lands play a key role in maintaining the interconnections of natural lands, community open space and farmlands.

California farmers and ranchers represent a diverse group of individual businesses, with great diversity in farm size and revenue. While globally, exports of agricultural products remain a key driver of agricultural profitability, new market incentives in areas such as renewable energy for production and the development of technologies to convert raw materials into "biofuels" can expand profitability and environmental sustainability opportunities for farmers.

Table 3.1 indicates the importance of agricultural lands to the region as demonstrated by the gross value of products sold. Based on the 2002 USDA Census of Agriculture, county level data, Imperial, Ventura and Riverside Counties round out the top ten producing counties in the state, each with more than one billion in gross value of direct agricultural production.

Conversion of Farmlands

Historically development patterns in the region have been tied as much to the conversion of agricultural lands as to the consumption of natural lands for urban uses. Rapid growth in the region continues to push development outward in search of cheap land that will translate into more affordable housing. Development pressures can make the value of a farmer's land higher than the value of the crops farmed on the land. A key issue in the region today is whether the high rate of farmland conversion in recent years can be slowed to prevent irreversible

TABLE 3.1 TOTAL AGRICULTURAL VALUE BY COUNTY[a,b]

County	2005	2006	2002 State Rank[b]
Riverside	1,168,671,100	1,102,438,400	10
Orange	312,336,287	N/A	22
San Bernardino	565,101,000	435,787,200	15
Los Angeles	277,844,000	N/A	21
Ventura	1,225,109,000	1,508,174,000	9
Imperial	1,286,066,000	1,365,368,000	8

[a] Figures are based on total gross value as indicated in county agricultural reports for 2005 and 2006 (when available)

[b] based on total value of agricultural products sold

From the USDA 2002 Census of Agriculture county profiles

losses. An estimated 230,000 acres of farmland and grazing land were converted to non-agricultural uses and/or applied for development entitlements between 1996 and 2004. If this trend continues, the existing inventory of agricultural lands could be reduced by 700,000 acres before 2030.

As agriculture and suburbanization intersect, problems often arise. With so many people living close to so much commercial farming, the negative impacts flow in both directions. For suburban neighbors, there are concerns over dust, noise, odor and even the health effects of living near industrial type activities that use chemicals, heavy machinery and concentrated animal facilities. While for farmers, operating close to new neighborhoods often means reduced productivity and income, regulatory constraints, vandalism and legal liability. Often, the conflict ends in the conversion of still more farmland. **Figure 3.4** highlights those areas where farmlands and urbanization intersect.

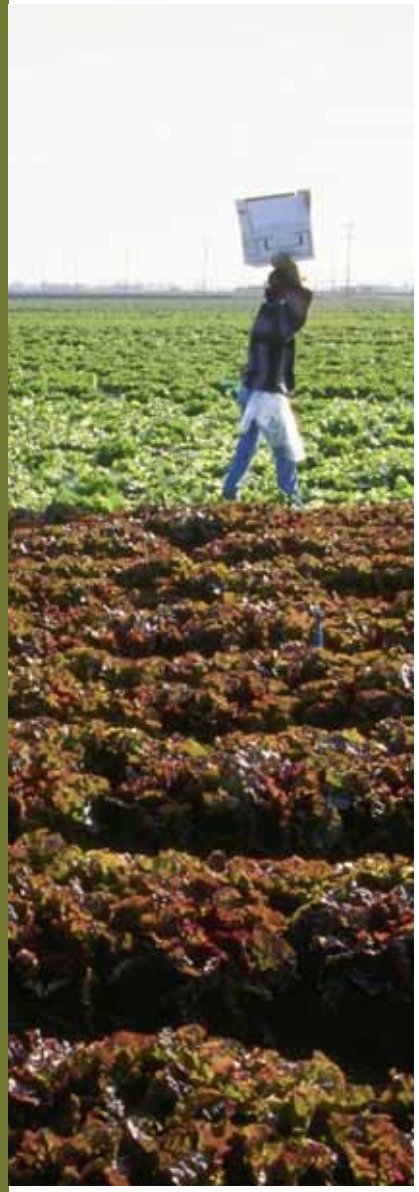
Recently, studies have looked for ways to integrate farmlands into communities that can reduce or eliminate some of the edge effects described above. New Ruralism is a framework for connecting the concepts of sustainable agriculture and New Urbanism (compact development/ smart growth). It seeks to create permanent agriculture preserves as sources of fresh food for urban regions. These preserves could take the form of green food belt perimeters, buffers between urban areas, small agricultural parks, and/or bigger preserves that include larger farms and rural settlements. The goal is to integrate small to medium scale sustainable agriculture into urban environments, these agricultural preserves can also overlap with areas for wildlife and habitat management and for passive recreation. A major focus of New Ruralism is connecting urban areas to farms through locally grown food.

Eating Locally and Sustainably

Our region can also promote local, sustainable food production that reduces environmental and economic impacts. For example, promoting local food production that serves our region's needs reinforces long-term self-sufficiency in an increasingly globalized market. There are enormous social, environmental, and economic costs involved with food production and distribution. For example, the distance and means of transport by which food is brought into the region can have visible and hidden costs that can be reduced if local agriculture is maintained to serve the food needs of the region.

The food that Southern Californians eat directly affects local and state policy and vice-versa. Currently, the federal government spends billions of dollars to subsidize grains and other crops while providing little support for fruits and vegetables. Rising health care costs and increases in diet related diseases such as diabetes and obesity indicate that healthier diets need to be a priority for the region.

A healthy, balanced region is also one that promotes sustainable farming practices. Organic food is produced by farmers who emphasize the use of renewable resources and the conservation



HOW OPEN SPACE POLICES PRODUCE MULTIPLE BENEFITS

Environmental Justice: Southern California may be regarded as the car capital of the world, but for the working poor and other people with limited or no access to a car who depend on public transit, it can be almost impossible to get to work, school, the market, parks, forests, beaches, doctors, or many other basic needs of life. Access to public transportation is also important to increase access to our natural lands and public spaces. A very good example is access to Southern California's four national forests. According to a study by USC Department of Geography, there is virtually no good way to reach the four forests of Southern California by public transportation.

TABLE 3.2 ORGANIC FARMLANDS IN THE SCAG REGION - 2005

County	Organic Acres[a]	Total Farmland[b]	Percent Share
Riverside	3,200	466,467	0.7
Orange	143	13,481	1.1
San Bernardino	244	34,673	0.07
Los Angeles	108	44,050	0.3
Ventura	4,712	297,074	1.6
Imperial	N/A	545,611	N/A

[a] Acreage based on annual Agricultural Commissioners Reports for each county

[b] Based on California Department of Conservation 2005 estimates, excludes rangelands/grazing lands

of soil and water to enhance environmental quality for future generations. Before a product can be labeled "organic," a USDA accredited certifier inspects the farm where the food is grown to make sure the farmer is following all the rules necessary to meet USDA organic standards. Companies that handle or process organic food before it gets to the local supermarket or restaurant must be certified and inspected also. **Table 3.2** shows the acres of organic farming in the region. Imperial County does not keep estimates of organic farming.

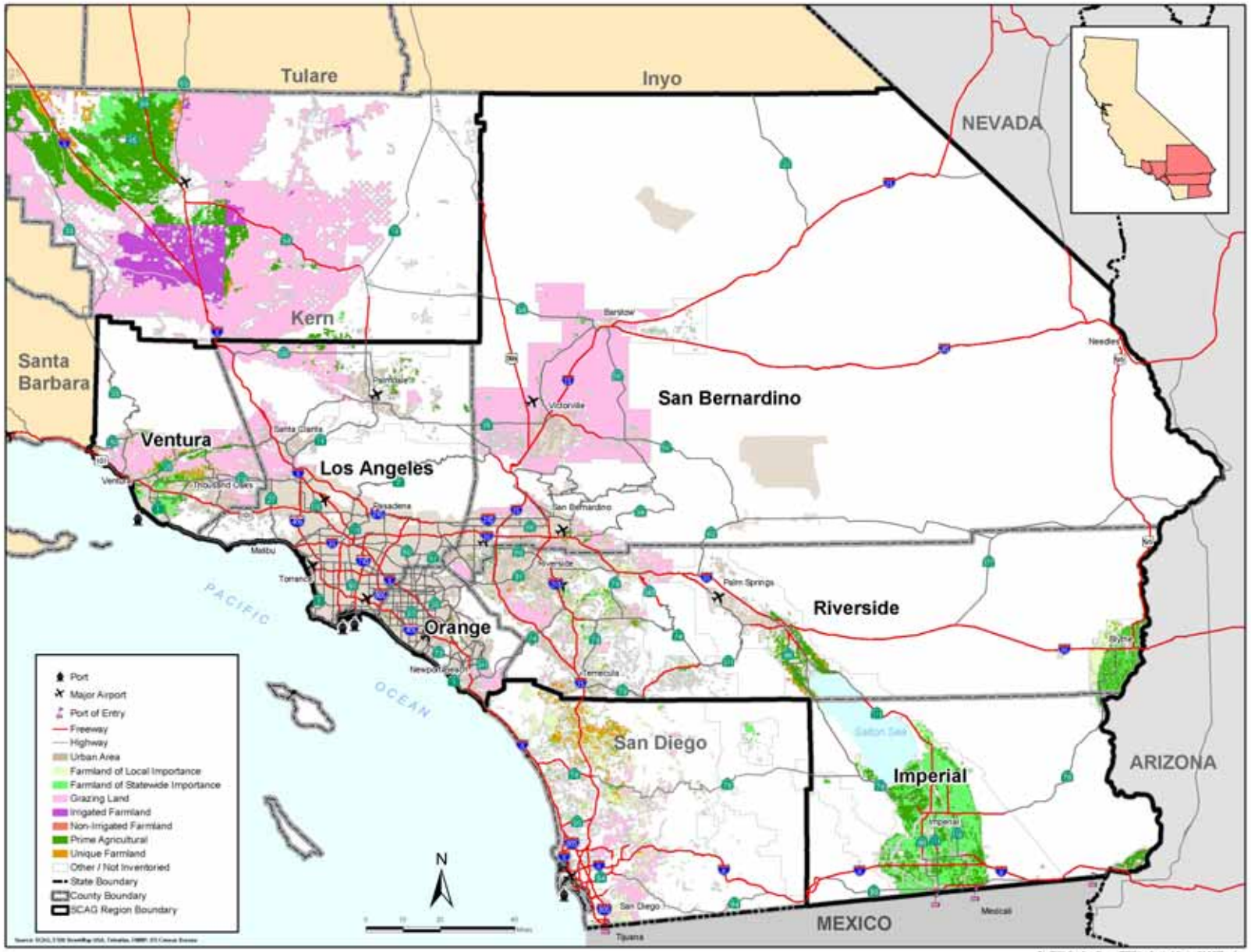
Open Space and Habitat–Agricultural Lands Goals

- Preserve the productivity and viability of the region's agricultural lands while supporting a sustainable economy and region by:
  - Maintaining a viable level of agriculture to support economic and food supply needs for the region while supporting sustainable energy, air quality and transportation policies;
  - Promote and support a strong locally-grown food system by encouraging community farming and developing cooperative farming initiates that use sustainable farming practices.

Open Space and Habitat–Agricultural Lands Outcomes

- Develop a new regional farmland conservation strategy and enroll at least 6,500[12] acres of prime farmland in the first four years.
- No net loss of farmlands enrolled in the regional program through 2035.

FIGURE 3.4: PRIME FARMLAND GRAZING



OPEN SPACE AND HABITAT–AGRICULTURAL LANDS ACTION PLAN

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
		X	OSA-1 SCAG should support policies that preserve and promote the productivity and viability of agricultural lands.	X	X	X	X	X		X	X	X	X
X			OSA-2 SCAG should review projects with potentially significant impacts to important farmlands and recommend impact avoidance and mitigation measures.	X	X	X	X	X		X	X	X	X
X		X	OSA-3 SCAG should work with its member agencies and the region's farmland interests to develop regional guidelines for buffering farmland from urban encroachment, resolving conflicts that prevent farming on hillsides and other designated areas, and closing loopholes that allow conversion to non-farm uses without a grading permit.	X	X	X	X	X		X			X
		X	OSA-4 Promote the availability of locally grown and organic food in the region.		X	X	X	X		X		X	X
Voluntary Local Government Best Practices													
X			OSA-5 Promote the availability of locally grown and organic food in the region. • Local governments should establish transfer of development rights (TDR) programs to direct growth to less agriculturally valuable lands (while considering the potential effects at the sites receiving the transfer) and ensure the continued protection of the most agriculturally valuable land within each county through the purchase of the development rights for these lands. • Local governments should consider other tools for the preservation of agricultural lands such as eliminating estates and ranchettes and clustering to retain productive agricultural land. • Local governments should ease restrictions on farmer's markets and encourage cooperative farming initiatives to increase the availability of locally grown food. • Local governments should consider partnering with school districts to develop farm-to-school programs.	X	X	X	X	X			X	X	X
X			OSA-6 Local governments are encouraged to obtain assistance from the American Farmland Trust in developing and implementing farmland conservation measures or avoid impacts to important farmlands.	X	X	X	X	X		X	X	X	X
X			OSA-7 Local governments should avoid the premature conversion of farmlands by promoting infill development and the continuation of agricultural uses until urban development is imminent; if development of agricultural lands is necessary, growth should be directed to those lands on which the continued viability of agricultural production has been compromised by surrounding urban development or the loss of local markets.	X	X	X	X	X		X	X	X	X
Voluntary Project Sponsors and Developer Best Practices													
X			OSA-8 Developers and sponsors with projects that have potentially significant impacts to important farmlands should include mitigation measures to reduce impacts and demonstrate project alternatives that avoid or lessen impacts. Mitigation at a 1:1 ratio is recommended.	X	X	X	X	X		X	X	X	X

Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives													
		X	OSA-1S SCAG should work with the agriculture community and other interested parties to establish a regional Farmland Conservation Strategy.	X			X						X
	X		OSA-2S SCAG should work with the state to ensure that changes in the Williamson Act will not result in the loss of preserved farmlands.	X			X						X
	X		OSA-3S SCAG should work with the state, local farming interests and other interested parties to develop a new alternative statewide farmland conservation strategy that provides flexibility in terms of years in preservation, combined with tiered tax benefits (i.e., the longer the land is in preservation, the greater the tax benefit).	X			X	X		X			X

Footnotes

1 To provide a "snapshot" of protected lands SCAG used a database complied by GreenInfo, a nonprofit organization specializing in GIS related services, and the Managed Lands Database complied by the Conservation Biology Institute (CBI), a nonprofit organization specializing in conservation planning.

2 From 2004 RTP PEIR p. 3.1-17 "In addition to direct impacts on land use, the urban footprint of new development supported by the 2004 RTP is expected to consume 500,000 to 700,000 acres of vacant, undeveloped land by 2030." Direct impacts include 7,700 of grazing land, 1,400 acres of open space, 6,500 acres of prime farmland and 21,300 acres of vacant lands

3 Core areas are habitat blocks, linkages, or watershed units that protect regional populations of native species, including sensitive, endemic, keystone and umbrella species, and the ecological processes that maintain them.

4 CDC. Physical Activity and Health: A Report on Recommendations of the Task Force on Community Preventive Services. Retrieved online August 23, 2007 http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5018a1.htm

5 CDC. Prevalence of Obesity Among U.S. Adults by State Behavioral Risk Factor Surveillance System (1991–2001). Retrieved online August 23, 2007, http://www.cdc.gov/nccdphp/dnpa/obesity/trend/prev_reg.htm.

6 California Department of Health Services. The Economic costs of Physical Inactivity, Obesity, and Overweight in California Adults: Health Care, Workers' Compensation, and Lost Productivity. Retrieved online August 23 2007 http://www.dhs.ca.gov/ps/cdic/cpns/press/downloads/CostofObesityToplineReport.pdf,

7 California Department of Health Services. The Economic costs of Physical Inactivity, Obesity, and Overweight in California Adults: Health Care, Workers' Compensation, and Lost Productivity. http://www.dhs.ca.gov/ps/cdic/cpns/press/downloads/CostofObesityToplineReport.pdf, 2005.

8 The Trust for Public Land. The Benefits of Parks. Retrieved online August 23, 2007 http://www.tpl.org/content_documents/parks_for_people_Jul2005.pdf

9 CDC. Increasing Physical Activity A Report on Recommendations of the Task Fore on Community Preventive Services. Retrieved online August 23, 2007 http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5018a1.htm

10 Complete results of the case studies are available in the SCAG's Regional Open Space Program, 2008

11 For a complete description of LOS and Needs Assessment see SCAG's Regional Open Space Program, 2008

12 6,500 acres identified of prime farmland is the number of acres of identified as directly impacted by projects in the 2004 RTP.

Water

THE CHALLENGE

Recent projections indicate that over 24 million people will reside in the six-County SCAG region by 2035.[1] This underscores the importance of questions about Southern California's future water supply and of reliably meeting our urban water demands in a way that is sensitive to both ecological imperatives and the evolving emphasis on sustainable development. We also face challenges in how we assure a high-quality water supply for consumption, recreational, habitat, and other needs.

Eliminating water quality impairments throughout the region's urban watersheds is a major challenge. These impairments (usually caused by "non-point" source pollution) are largely caused by urban and stormwater runoff and are required to be appropriately addressed by the Clean Water Act. As a result, water quality regulators are imposing significant and costly pollution control measures on local agencies with compliance deadlines.

Water Demand

Water demand in California can generally be divided between water used for urban and agricultural uses and water necessary for maintaining existing ecosystems. According to DWR, for the state as a whole, these three sectors accounted for 11 percent, 41 percent and 48 percent, respectively, during 2000—a year characterized by "normal" rainfall.[2] Although 48 percent of the state's water supply is allocated as environmental water, which includes instream flows, wild and scenic flows, and managed wetlands, many ecosystems are still struggling and flow regimes in riparian areas no longer resemble their natural state.

In the SCAG region, approximately three-quarters of the potable water is provided from imported sources. Annual water demand fluctuates in relation to available supplies and the rainfall in a given year.

The relationship between urban growth patterns and the demand for water poses another important challenge. Although advances in water conservation, recycling, and infrastructure improvements have made it possible to accommodate an additional 3.5 million people with the same amount of applied water today as they did in the mid-1990's, it will become increasingly difficult to provide adequate water services as new developments are built and cities in the SCAG region continue to grow.

Our water supplies come from a blend of local and

HOW WATER POLICIES PRODUCE MULTIPLE BENEFITS

Land Use and Housing: An area-wide policy of minimizing impervious surfaces reinforces policies aimed at reducing development on valuable open space and the exurban fringe. Discouraging both expensive new water infrastructure and development in water-stressed areas of the region encourages concentrated growth.

Open Space and Habitat: Protecting lands for water resources conserves and restores important habitat and open space. Green infrastructure, utilized for stormwater management during rain events, can be used as local green space during the majority of the year when there is little precipitation.

Air Quality: Air quality is improved by the creation and enhancement of urban green spaces, especially urban forests—which are also solutions to stormwater management.

Water Supplies

Water supplies within the SCAG region come from a blend of local and imported sources. Local sources—including groundwater, surface water runoff, and reclamation—comprise about one-quarter of the region's total supplies. The balance consists of water imported from Northern California via the State Water Project and from the Colorado River via the Colorado River Aqueduct. The following discussion provides information on local and imported water supplies in the SCAG region.

Local Supplies

Groundwater. Groundwater accounts for most of the region's local supply of fresh water. In California, groundwater typically provides 30 percent of the urban and agricultural water requirement. In Southern California, groundwater use tends to range between 23 percent in average years and 29 percent in dry years.[3] Groundwater basins contain a large volume of water resulting primarily from the percolation of natural runoff. It is also possible to artificially enhance groundwater basin recharge by using these basins as natural storage facilities to store imported water from other areas or excess surface water runoff.

The growing water demand in our region has resulted in the overdraft (over-pumping) of many groundwater basins. Overdraft is the condition of a groundwater basin in which the amount of water withdrawn by pumping over the long term exceeds the amount of water that recharges the basin. It is characterized by groundwater levels that decline over a period of years and never fully recover, even in wet years. According to Department of Water Resources (DWR) estimates, the state has a groundwater overdraft of between 1 and 2 million acre-feet (maf)[4] during average years.[5] Many water agencies have programs designed to address this imbalance through active groundwater recharge programs such as, diverting water to surface ponds that percolate down into the basin or through the direct injection of water into the basins during periods of surplus.

Surface Storage. Surface storage involves the use of reservoirs to collect water for later release and use. It has played an important role in California where the pattern and timing of water use does not always match the natural runoff pattern.

Our growing population, the dwindling water supply available from the Sacramento-San Joaquin River Delta (Delta), and the prospect of early snow melt under some climate change scenarios all point to the need for increased local storage capacity. However, building new storage facilities can affect a number of environmental and human conditions. It can create economic impacts for the surrounding community, such as reducing property tax revenues to local governments or, conversely, increasing values by providing a more reliable water supply. New reservoirs can impact stream flow regimes, altering designated wild and scenic rivers, causing water quality issues, changing stream geomorphology, causing the loss of fish and wildlife habitat, and increasing the risk of failure during

seismic and operational events. New projects need to address these and additional impacts under the application of various laws, regulatory processes and statutes.[6]

Recycling.[7] Recycling involves the collection of wastewater from treatment plants followed by secondary treatment to make the effluent suitable for non-potable uses. The recycled water is either discharged into oceans or streams, or is reused. Reuse includes irrigation, commercial and industrial processes, seawater intrusion barriers and groundwater recharge. In this way, reuse of water frees up imported water for consumptive use. One regional example is the Orange County Water District's Groundwater Replenishment system that recharges a significant quantity of highly treated recycled water to the Orange County Groundwater Basin.

While a large potential market exists for the use of recycled water for groundwater replenishment and seawater barriers,[8] there are a number of cost, regulation, and health barriers to be overcome. Realizing this potential will require:

- Modifying existing regulations based on future studies of the health effects of recycled water;
- Identifying funding sources to aid in the promotion and use of recycled water;
- Reviewing recycled water regulations to ensure streamlined administration, public health and environmental protection;
- Planning and cooperative partnerships at the local, regional and statewide levels; and
- Conducting additional research focusing on public perceptions and acceptance, new technologies and health effects.

Potential markets for recycled water include industrial uses (e.g., cooling tower makeup water, boiler feed water), golf courses, parks, schoolyards, cemeteries and greenbelts. Because these users tend to be high demand, continuous flow customers, they allow water utilities to base load these operations rather than contend with seasonal and diurnal flow variations, thereby reducing the need for storage and other peak demand resources.

Water Conservation. Water conservation, or urban water use efficiency, involves technological or behavioral changes in indoor and outdoor residential, commercial, industrial and institutional uses that lowers the demand for water. Once invoked primarily in response to drought or emergency water shortage situations, efficiency and conservation have become viable long-term supply options, saving considerable capital and operating costs, avoiding environmental degradation, and creating multiple benefits. Water may be saved through a mechanism called groundwater banking, where one agency with groundwater capacity "holds" water conserved by a different agency for future use. During periods of drought, water demand can be reduced significantly through conservation

HOW WATER POLICIES PRODUCE MULTIPLE BENEFITS

Energy: Transporting water requires enormous amounts of energy. It takes 8,900 kilowatt-hours to bring one million gallons (kWh/MG) of water into Southern California. Increasing local water supplies and conserving water would greatly reduce the amount of energy used in the region's water supply system.

Transportation: Policies that concentrate development in areas served by existing transportation infrastructure can reduce development of prime habitat that provides water filtration.

Security and Emergency Preparedness: A robust green infrastructure system improves protection from flooding and from corresponding safety issues. More local sources of water would decrease the exposure of our Statewide transport system to natural or man-made disasters.

Global climate change could further alter our region's water

while demands on imported supplies tend to decline significantly during years of above average rainfall.

The California Urban Water Conservation Council's Memorandum of Understanding has a list of 14 cost-effective "best management practices" for urban conservation.[9] These efforts should target water-using devices and practices involving residential dwellings; irrigation; and commercial, industrial and institutional operations. More recently, water agency initiatives have targeted irrigation and the commercial, industrial and institutional sector. Another challenge is to reduce the common practice of over-watering yards. The resulting surface water runoff is an ongoing source of non-point source pollution that causes water impairments requiring remediation.

Seawater Desalination. Recent developments in membrane technology and plant siting strategies have increased the financial appeal of this resource option. For example, MWD estimates that its local supplies could include up to 150 thousand acre-feet of desalinated water by 2050. However, several barriers must be overcome to make it a more viable water source, including high capital and operational costs for power and membrane replacement, funding, permitting requirements (from the California Coastal Commission) and significant environmental issues.

Imported Supplies

Southern California has historically depended on imported water to supplement local supplies. In 1998, the region imported more than 6 million acre-feet (maf) of water annually, accounting for nearly two-thirds of total water used in the region.[10] Water imports are conveyed by three major facilities: The State Water Project, operated by DWR; the Colorado River Aqueduct, operated by MWD; and the Los Angeles Aqueduct, operated by the Los Angeles Department of Water and Power.[11]

State Water Project. The State Water Project (SWP), managed by DWR, is the largest state-owned multi-purpose water project in the country. It delivers water from the Sacramento-San Joaquin Delta to 29 state water contractors, providing water to more than 23 million Californians, irrigation for 750,000 acres of agricultural lands, and environmental benefits to wildlife refuges and recreational facilities.[12]

Aside from hydrology, the biggest threats to the reliability of SWP supplies are environmental conditions within the Delta. For decades, the Delta has been the focus of competing economic, ecological, urban and agricultural interests. These competing demands have combined to gradually undermine the integrity of the complex system of levees that form the backbone of the Delta water conveyance system. As levees erode, saltwater from the San Francisco Bay continues to encroach on the Delta, increasing salinity and undermining water quality. The presence and decline of endangered species

in the Delta have required alterations in pumping operations. The prospect of long shutdowns presents a real threat to the supply reliability of all agencies drawing water from the Delta.[13]

A second concern involves the SWP's need to meet strict drinking water regulations. For example, following chlorination treatment, SWP water has disinfection by-products that require more advanced and costly treatment such as ozonation. Meeting these regulations and reducing treatment costs will require improving the Delta water supply by cost-effectively combining alternative sources of water, source improvement strategies, and treatment facilities.

In 2000, CALFED, a collaboration of 25 state and federal agencies, released a 30-year plan for Delta restoration and long-term management. The CALFED program, currently overseen by the Bay-Delta Authority, is tasked with addressing the complex series of issues including storage, conveyance, water quality, levee system integrity, and ecosystem restoration.[14] A more recent "Delta Vision" Task Force is charged with presenting to the Governor a set of recommended actions for long-term solutions to the problem-plagued Delta ecosystem.

Colorado River. The Colorado River represents another major source of imported supply for the SCAG region. Water is conveyed from the Colorado River to urban Southern California via the Colorado River Aqueduct, owned and operated by the Metropolitan Water District.[15] Seven states share legal rights to Colorado River Water. Institutional arrangements have varied the amount of imported water available to Southern California. The need to stabilize this supply will be a key challenge for the future.

Los Angeles Aqueduct. The City of Los Angeles imports water from the eastern Sierra Nevada through the Los Angeles Aqueduct (LAA). The original aqueduct was completed in 1913 to import water from the Owens Valley. In 1940 the aqueduct was extended to the Mono Basin. Water supplies have varied based on snowpack levels in the Eastern Sierra Nevada and court decisions restricting the amount of water that can be imported via the LAA.

Wastewater

Much of the urbanized areas of Los Angeles and Orange Counties are serviced by three large publicly owned treatment works (POTWs): the City of Los Angeles Bureau of Sanitation Hyperion Facility, the Joint Outfall System of the Los Angeles County Sanitation Districts, and the Orange County Sanitation District treatment plant. These three facilities handle more than 70 percent of all wastewater generated within the SCAG region and will be increasingly strained as the region continues to grow, unless the facilities are expanded or new facilities are constructed. In addition, medium sized POTWs (greater than 10 million gallons per day, or mgd) and small treatment plants (less than 10 mgd) service smaller communities in Ventura County.

Two-thirds of California's water bodies were threatened

HOW WATER POLICIES PRODUCE MULTIPLE BENEFITS

Public Health: Reducing pollution levels in streams, rivers and swimming beaches will reduce adverse heath impacts from exposure. Protecting groundwater sources from saltwater intrusion and man-made sources of pollution will help maintain aquifer water quality. A robust green infrastructure system also provides improved protection from flooding.

Environmental Justice: When communities manage local water quality through increased use of green space, they can help bring recreational opportunities into park-poor neighborhoods.

Climate Change: Policies that encourage water conservation help alleviate forecasted supply impacts of climate change whether due to shorter rainy seasons, lack of winter snow or degraded estuaries, wetlands, and groundwater aquifers.

Water Quality[16]

Non-Point Source Pollution. Whereas point source pollution refers to contaminants that enter a watershed, usually through a pipe (e.g., discharges from sewage treatment plants and industrial facilities), non-point source pollution, also known as urban runoff or agricultural runoff, comes from many diffuse sources and is most evident in dry weather conditions. Non-point pollution comes from runoff that has picked up pollutants such as chemicals, nutrients, or sediments, before entering surface water resources. Surface water resources in the SCAG region include creeks and rivers, lakes and reservoirs, and the inland Salton Sea.[17] Reservoirs serving flood control and water storage functions exist throughout the region.

Protecting the quality of water in these bodies will be an ongoing challenge. For example, lining the Los Angeles River and the Santa Ana River with concrete for flood control purposes have the unintended consequences of effectively concentrating and transferring urban pollutants and waste to the ocean. Estimates show that two-thirds of California's water bodies were threatened or impaired by non-point sources of pollution.

Non-point source pollution is significantly influenced by land uses and is considered one of the major water quality problems. A major challenge from non-point sources is the urbanizing of the region. Buildings, roads, sidewalks, parking lots and other impervious surfaces alter the natural hydrology and prevent the infiltration of water into the ground. As land is urbanized, more stormwater flows faster off the land, the greater volume increases the possibility of flooding, and the high flow rates do not allow for pollutants to settle out, increasing pollutant concentrations in the runoff. Generally, the higher the percentage of impervious surfaces, the greater the degradation in stream water quality.

The general quality of surface water and groundwater in the SCAG region tends to be degraded as a result of land uses and water management practices. Fertilizers and pesticides typically used on agricultural lands infiltrate and degrade both surface water and groundwater. Septic systems and leaking underground storage tanks can also impact groundwater. Groundwater recharge in urban areas is limited by a high number of impervious surfaces. In addition, water that enters the groundwater from urban areas also carries high levels of pollutants from roads, lawns, and other sources. Water quality concerns include:

Salinity. Over-pumping can result in saltwater intrusion from the ocean, further degrading groundwater quality. Wastewater discharges can result in salt buildup from fertilizer and dairy waste. Water agencies need to work with other stakeholders on researching and developing salinity management goals and action plans, which include blending low and high salinity water and the desalination of brackish water.

Perchlorate. Ammonium perchlorate is a primary ingredient of solid rocket propellant and is used in the manufacture of munitions and fireworks. It is readily soluble in water, highly

mobile in groundwater, and has significant health effects on thyroid function.[18] Small amounts have been found in the Colorado River with higher concentrations in local groundwater basins. The challenge is to find cost-effective ways to remove perchlorates using conventional water treatment, nanofiltration and reverse osmosis.

Total Organic Carbon and Bromide. When source water containing high levels of total organic carbon (TOC) and bromide is treated with disinfectants such as chlorine or ozone, disinfection byproducts are created. Studies show links between exposure to disinfection byproducts and certain cancers, as well as reproductive and developmental effects. TOCs and bromide in Delta water present challenges to monitor and maintain safe drinking water supplies. The challenge is to better protect SWP water supplies in a cost-effective manner.

Methyl Tertiary Butyl Ether and Tertiary Butanol. Until recently, MTBE was the primary oxygenate in virtually all gasoline used in California to address air pollution issues. However, MTBE has caused a serious problem, as it is very soluble in water and moves quickly into the groundwater. One gallon of MTBE alone (11 percent MTBE by volume) is enough to contaminate about 16.5 million gallons of water at 5 micrograms per Liter. We must find ways to reduce the cost of treating groundwater wells, or risk the temptation to seek increased imports at lower cost. A combination of advanced oxidation processes followed by granular activated carbon can reduce MTBE levels by up to 90 percent.

Arsenic. Arsenic, a naturally occurring substance often found in drinking water, has been identified as a risk factor for lung and urinary bladder cancer. Several local water sources contain arsenic concentrations exceeding the federal standard. It appears likely that current treatment standards will increase cost but not necessarily decrease local water supplies. However, if treatment cost increases are sufficient, some water agencies in Southern California may choose to increase their use of imported water to avoid this additional cost.

Uranium. Colorado River water has been compromised by a 10.5-million-ton pile of uranium mine tailings at Moab, Utah. Rainwater has seeped through the pile and contaminated the local groundwater, causing a flow of contaminants into the river. While the Department of Energy has agreed to move the tailings, remediating the site will require Congressional appropriations, and maintaining support for a cleanup will require close coordination and cooperation with other Colorado River users.

Climate Change[19]

Current scientific research suggests that increasing concentrations of atmospheric greenhouse gases are producing global-scale temperature and precipitation changes. Models have predicted that by the end of the century, average winter temperatures could increase by more than 7 degrees, and summer temperatures could increase by as much as 18 degrees. The results of precipitation studies have been less definitive,

We must improve comprehensive and collaborative water-

ENERGY COSTS, GREENHOUSE GASES, AND WATER

In a Los Angeles Department of Water and Power analysis, the energy costs in kilowatt hours per acre foot of water (kWh/af) and CO_2 emission in pounds per acre foot of water (lbs/af) ranged as follows:

- Tertiary Treated Recycled Water: 428 kWh/af and 558 lbs/af
- Pumped Groundwater: 519 kWh/af and 677 lbs/af
- State Project Water Imports: 2580 kWh/af and 2154 lbs/af
- Seawater Desalination: 4100 kWh/af and 5345 lbs/af

ranging broadly between models and scenarios. Predictions from these models range from slight increases in precipitation to decreases of up to 30 percent. Nevertheless, it is an issue that water agencies are increasingly accounting for as part of the standard water planning processes.

While uncertainties exist about the exact timing, magnitude and regional impacts of these temperature and precipitation changes, researchers have identified several issues of particular importance to water resource planners. These include:

- A reduction in the Sierra Nevada snowpack
- Increased intensity and frequency of extreme weather events
- Rising sea levels resulting in:
  - An increased risk of damage from storms, high-tide events and the erosion of levees.
  - Saltwater intrusion into coastal groundwater.
  - Potential pumping cutbacks on the State Water Project and the Central Valley Project.

Other important issues associated with climate change include:

- Effects on local supplies such as groundwater.
- Changes in urban and agricultural demand levels and patterns.
- Impacts to human health from water-borne pathogens and water quality degradation.
- Declines in ecosystem health and function.
- Alterations in power generation and pumping operations.

Water also contributes to the generation of greenhouse gases because of the energy requirements of transporting it (water) throughout California. The energy component in developing and managing water resources is a growing challenge for the region. Energy is involved in each stage of water's use cycle: source and conveyance, treatment, distribution, consumption and wastewater treatment. In these ways, the management of energy and water supply and water quality are closely inter-related and must be considered together when regional growth and water resource strategies are developed.

These issues present challenges to future water planning efforts. Ongoing research concerning the likelihood and potential impacts of climate change needs to be carefully monitored and explicitly addressed by agency planning documents.

THE PLAN

The RCP focuses on three strategies for addressing water supply and quality issues. First, the region needs to develop sufficient water supplies to meet the water demands created by continuing regional growth. Second, we can improve our water quality by implementing land use and transportation policies and programs that promote water stewardship and eliminate water impairments and waste. Finally, the region needs to improve comprehensive and collaborative watershed planning that yields waterwise programs and projects.

Improve Water Supply and Manage Demand

The region needs to improve its stewardship of water supplies and manage demand in order to address the anticipated substantial growth in population and economic activities. The RCP promotes strategies that encourage environmentally-sustainable water imports, local conservation and conjunctive management approaches, reclamation and reuse, and water transfers and banking.

Conjunctive Management. Conjunctive management is an integrated approach to managing existing groundwater and surface water resources. Conjunctive management efforts are planned to optimize productivity, equity, and environmental sustainability. This strategy requires coordination among water institutions and, though it can add a level of complexity, it can be important in water-scarce regions to prevent groundwater exploitation. [20]

Transfers and Water Banking. Following the basic principles of *Integrated Resource Planning*, urban water agencies within Southern California may continue to diversify their sources and reduce dependence on imported water by entering into contractual arrangements with agricultural irrigation districts. For example, irrigation agencies agree to adopt water conservation measures or to engage in land fallowing (letting agricultural lands idle) to save water.[21] Water that would otherwise be used to irrigate crops is then purchased, or transferred, to urban water agencies. Frequently, this water is stored, or *banked*, in aquifers for use during times of shortage, thus increasing the urban agencies' supply reliability. Water banking also occurs during wet years as rainwater is directed to groundwater recharge facilities and spreading basins for use during times of shortage.

Land Use and Transportation Policies

The RCP encourages development strategies that promote compact growth patterns. Concentrated or clustered development will help to reduce impervious surfaces, conserve energy used for water conveyance, and provide a greater level of overall water quality protection. Concentrated development protects the watershed by leaving a larger percentage of the watershed in its natural condition. It reduces urban and agricultural runoff that can contain significant volumes of pollutants from entering surface waters, reducing future impacts on surface and groundwater quality and supply. Compact growth also

POLLUTANTS IN URBAN RUNOFF

The California State Water Quality Control Board identified the following pollutants in urban runoff.[22]

Sediment. Excessive loads in streams interfere with photosynthesis, aquatic life respiration, growth and reproduction.

Nutrients. Nitrogen and phosphorus can result in eutrophication of receiving waters, reducing oxygen levels available for other species.

Bacteria and viruses. Pathogens introduced to receiving waters can restrict water contact activities.

Oxygen demanding substances. Lawn clippings, animal excrement and litter reduces dissolved oxygen levels as they decompose.

Oil and grease. Hydrocarbons from autos are toxic to some aquatic life.

Metals. Metals can enter waterways through storm drains along with sediment, or as atmospheric deposition.

Toxic pollutants. Pesticides, phenols and polynuclear aromatic hydrocarbons are toxic chemicals found in stormwater.

Floatables. Trash in waterways increases metals and toxic pollutant loads.

requires less water and less energy for water transport and water treatement than a diffuse, sprawling pattern.

Accommodating growth challenges us to find ways to promote compact, mixed-use development, which can reduce water demand and creates a smaller urban footprint. By reducing impervious surfaces, development generates less surface runoff, and minimizes dispersion into watersheds and groundwater recharge areas receiving this runoff.[23]

Watershed Planning

The way in which land is used—the type of use and level of intensity—has a direct effect on water supply and quality. Watershed management is the process of evaluating, planning, managing, restoring and organizing land and other resource use within an area of land that has a single common drainage point. Watershed management tries to provide for sustainable development while maintaining a sustainable ecosystem.

Our region needs to better implement collaborative watershed planning that produces waterwise programs. By promoting better designed communities and projects, we can produce multiple benefits and ecosystem protections. This can be done by integrating local government planning efforts with those of special districts, environmental advocates and other watershed stakeholders. Efforts such as the State Water Plan, are a step in the right direction towards compiling resources and informing planners and water agencies.

State Water Plan. The California Water Plan provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. The Plan, which is updated every five years, presents basic data and information on California's water resources including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The Plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the State's water needs. The goal for the California Water Plan Update is to meet Water Code requirements, receive broad support among those participating in California's water planning, and be a useful document for the public, water planners throughout the state, legislators and other decision-makers.

WATER GOALS

- Develop sufficient water supplies through environmentally sustainable imports, local conservation and conjunctive use, reclamation and reuse to meet the water demands created by continuing regional growth.
- Achieve water quality improvements through implementation of land use and transportation policies and programs that promote water stewardship and eliminate water impairments and waste in the region.

- Foster comprehensive and collaborative watershed planning within the region that produces waterwise programs and projects with multiple benefits and ecosystem protections, integrating local government planning efforts with those of special districts, environmental advocates and other watershed stakeholders.

WATER OUTCOMES

- Regional per capita water demand reduced by 25 percent by 2030 with waterwise land use and local management policies (voluntary local land use policies and water practices are established to maximize efficient use of local water resources and reduce water demand in the SCAG region).
- Regional water impairments eliminated by 2030 with the use of stormwater, urban and agricultural runoff controls and improved retention and infiltration systems (voluntary land use and transportation policies are established to minimize pollution entering water bodies and increase on-site water management).
- All member agencies included as active participants in regional watershed planning and implementation efforts, including concurrent updating of basin plans within the region (coordination and collaboration of local agencies, water districts and other watershed stakeholders to maximize all investments in water management for public benefit).

WATER ACTION PLAN

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
X			WA-1 SCAG should create a compendium of best management practices, case studies, and model ordinances that will give 'waterwise' guidance for development entitlements and growth management policymaking.										
		X	WA-2 SCAG should promote water conservation awareness throughout the region, featuring the connections between water and other resources, including energy and timing of water use.			X	X						X
	X		WA-3 SCAG should encourage water reclamation where it is cost-effective, feasible, and appropriate to reduce reliance on imported water.				X			X			X
		X	WA-4 SCAG should encourage coordinated watershed management planning at the sub-regional level by (1) providing consistent regional data; (2) serving as a forum for discussions between affected local, State, and federal watershed management agencies; and (3) ensuring that watershed planning is consistent with comprehensive regional planning objectives and challenges.				X						
		X	WA-5 SCAG should facilitate information sharing between local water agencies and local jurisdictions, in order to evaluate future water demands, prepare realistic Urban Water Management Plans, and support sustainable water and growth management policies.	X									
		X	WA-6 SCAG should encourage integration of water stewardship practices and unify investment incentives among all stakeholders, prioritizing resources for investments that optimize returns and outcomes and best meet fiscal limitations, growth realities and sustainability objectives.										
	X		WA-7 SCAG should provide, as appropriate, legislative support and advocacy for regional water conservation, supply, and water quality projects.										
	X		WA-8 SCAG should develop a policy framework for integrating water resources planning and Compass Blueprint planning strategies in order to coordinate positive interactions between local land use policies and regional water supply and water quality actions over time.	X									
Voluntary Local Government Best Practices													
X			WA-9 Developers and local governments should consider potential climate change hydrology and resultant impacts on available water supplies and reliability in the process of creating or modifying systems to manage water resources for both year-round use and ecosystem health.					X		X			X
X			WA-10 Developers and local governments should include conjunctive use as a water management strategy when feasible.										
X			WA-11 Developers and local governments should encourage urban development and land uses to make greater use of existing and upgraded facilities prior to incurring new infrastructure costs.	X					X				
X			WA-12 Developers and local governments should reduce exterior uses of water in public areas, and should promote reduced use in private homes and businesses, by shifting to drought-tolerant native landscape plants (xeriscaping), using weather-based irrigation systems, educating other public agencies about water use, and installing related water pricing incentives.				X						X

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
X			WA-13 Developers and local governments should protect and preserve vital land resources—wetlands, groundwater recharge areas, woodlands, riparian corridors, and production lands. The federal government's 'no net loss' wetlands policy should be applied to all of these land resources.					X					X
	X		WA-14 Local governments should amend building codes to require dual plumbing in new construction, and provide incentives for plumbing retrofits in existing development, to enable the safe and easy use of recycled water in toilets and for landscaping.	X									
X			WA-15 Local governments should amend ordinances as necessary to allow municipal and private outdoor use of recycled water for all parks, golf courses, and outdoor construction needs.										
	X		WA-16 Water agencies should incentivize the use of recycled water through pricing structures that make it an attractive alternative to fresh water in non-potable situations.							X			
		X	WA-17 Water agencies should reduce salinity and remove contamination in major groundwater basins to increase conjunctive use of water resources and extend groundwater storage unless specific beneficial uses for contaminated groundwater are identified.							X		X	
		X	WA-18 Local governments should create stable sources of funding for water and environmental stewardship and related infrastructure sustainability, including purchase and implementation of green infrastructure.					X					
		X	WA-19 Water purveyors should develop and implement tiered water pricing structures to discourage water waste and minimize polluting runoff.									X	
X			WA-20 Local governments should use both market and regulatory incentive mechanisms to encourage 'water wise' planning and development, including streamlining and prioritizing projects that minimize water demand and improve water use efficiencies.				X						X
		X	WA-21 Local governments should develop comprehensive partnership approaches to remove and prevent water impairments, replacing the existing regulatory command and control approach that has created delays and distrust.										
		X	WA-22 Local governments should create opportunities for pollution reduction marketing and other market-incentive water quality programs.									X	
X			WA-23 Local governments should encourage Low Impact Development and natural spaces that reduce, treat, infiltrate and manage runoff flows caused by storms and impervious surfaces.	X				X					
X			WA-24 Local governments should prevent development in flood hazard areas lacking appropriate protections, especially in alluvial fan areas.	X				X				X	
X			WA-25 Local governments should implement green infrastructure and water-related green building practices through incentives and ordinances.	X		X	X	X		X	X	X	X

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
		X	WA-26 Local governments should integrate water resources planning with existing greening and revitalization initiatives, such as street greening, tree planting, and conversion of impervious surfaces, to maximize benefits and share costs.	X		X		X				X	X
		X	WA- 27: Developers and local governments should maximize pervious surface area in existing urbanized areas to protect water quality, reduce flooding, allow for groundwater recharge, and preserve wildlife habitat. New impervious surfaces should be minimized to the greatest extent possible, including the use of in-lieu fees and off-site mitigation.										
X			WA-28 Local governments should maintain and update Best Management Practices for water resource planning and implementation.										
		X	WA-29 Local governments should coordinate with neighboring communities and watershed stakeholders to identify potential collaborative mitigation strategies at the watershed level to properly manage cumulative impacts within the watershed.										
		X	WA-30 Local governments should adopt MOUs and JPAs among local entities to establish participation in the leadership and governance of integrated watershed planning and implementation.										
		X	WA-31 Local governments should increase participation in the implementation of integrated watershed management plans, including planning effort initiated in neighboring communities that cross jurisdictional lines.										
X			WA-32 Developers and local governments should pursue water management practices that avoid energy waste and create energy savings/supplies.			X	X						X
State and Regional Agency Best Practices													
	X		WA-33 State and regional agencies should develop fair and consistent safety guidelines for use of reclaimed and recycled wastewater for non-potable uses, in order to facilitate more widespread acceptance and use.									X	
X			WA-34 State and regional agencies should design and operate regional transportation facilities so that stormwater runoff does not contaminate surrounding watershed ecosystems.		X								

Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives													
		X	WA-1S SCAG should support researching the feasibility and environmental impacts of increasing water supply through saltwater desalination.				X			X			X
		X	WA-2S SCAG should encourage streamlined water quality regulatory implementation, including identification and elimination of overlapping regulatory programs to reduce economic impacts on local businesses and governments.						X				
X			WA-3S SCAG should encourage restoring the region's watersheds to 90 percent effective pervious surface equivalent to pre-development conditions. Increases in pervious surfaces should be accomplished through new development models and materials, such as green roofs, porous pavement, natural stormwater management, increased park space, and expansion of urban forest.	X									
		X	WA-4S SCAG should support improving water quality in the region's imported water supplies.									X	
		X	WA-5S SCAG should encourage preventing non-native/invasive species from adversely affecting regional water supplies and quality.					X					
		X	WA-6S SCAG should encourage the use of stormwater permits on a watershed-wide basis.									X	
		X	WA-7S SCAG should support the development and implementation of public education and outreach efforts at the local level regarding watershed management for community leaders and educators. In addition, SCAG will encourage consideration of these policies at schools (K-12).					X				X	

Footnotes

[1] Southern California Association of Governments, *2008 Final Regional Transportation Plan*. May 2008.

[2] Department of Water Resources, *2005 Water Plan Update*, Vol. 1, Table 3-1, p. 3-9.

[3] Department of Water Resources, *California's Groundwater-Bulletin 118*. Update 2003. Located at http://www.groundwater.water.ca.gov/bulletin118/update2003/index.cfm

[4] The acre-foot is a common measure of volume in discussions of water supply. An acre-foot (af) is the amount of water required to fill an acre-size area with one foot of water.

[5] California Department of Water Resources, *Draft Bulletin 118*. Updated 2003.

[6] Excerpted from Metropolitan Water District of Southern California, *The Regional Urban Water Management Plan*, November 2005. http://www.mwdh2o.com/mwdh2o/pages/yourwater/RUWMP/RUWMP_2005.pdf

[7] One concern is that the use of recycled water for groundwater recharge could adversely impact groundwater quality due to the introduction of organic contaminants, metals and salts.

[8] Excerpted from the Department of Water Resources Water Plan, Vol2, Ch. 18. 2005.

[9] See www.cuwcc.org for more information about CUWCC and the MOU.

[10] California Department of Water Resources, *Water Plan*. 1998. This estimate includes water used for agriculture.

[11] According to the California Department of Water Resources *Management of the California State Water Project*, Bulletin 132-02, p.3, January 2004: "Although initial transportation facilities were essentially completed in 1973, other facilities have since been built, and still others are either under construction or are planned to be build as needed."

[12] California Department of Water Resources, *Management of the California State Water Project*, Bulletin 132-2, p. xxix. January 2004.

[13] In addition to saltwater intrusion from the San Francisco Bay, the Delta is also vulnerable to the collapse of aging levees. In June 2004, for example, a levee in the Jones Tract of the Delta failed, resulting in total inundation of the island and disrupting SWP operation.

[14] For additional information about the CALFED Program, see http://www.calwater.ca.gov/.

[15] The CRA has an annual capacity of 1.3 maf. The Colorado River has experienced drought conditions for eight of the last nine years. This is the longest dry period on the river in recorded history.

[16] *Ibid*., Chapter IV. 2005.

[16] The following sections are excerpted from Metropolitan Water District of Southern California, *The Regional Urban Water Management Plan*, Chapter IV. November 2005.

[17] The Salton Sea, the largest inland body of water in California, was formed around 1906 when the Colorado River was accidentally diverted from its natural course. Presently, the Sea is fed by agricultural runoff from the Imperial Valley and Mexico and by the New River and the Alamo River. Without agricultural runoff the Salton Sea would dry up entirely.

[18] Perchlorate interferes with the thyroid gland's ability to produce hormones required for normal growth and development.

[19] Excerpted from Metropolitan Water District of Southern California, *The Regional Urban Water Management Plan*, pp II-21-23. November 2005.

[20] World Bank. *Agricultural and Rural Development Notes - Conjunctive Use of Groundwater and Surface Water*. Issue 6, February 2006. Based on Investment Note 4.3 in the larger volume *Shaping the Future of Water for Agriculture: A Sourcebook for Investment in Agricultural Water Management*. www.worldbank.org/rural.

[21] Some urban agencies also have the ability to enter "spot" water markets and to purchase water on an "as needed" basis.

[22] Excerpted from the California Department of Water Resources, California Water Plan Update 2005. 2005.

[23] State Water Resources Control Board. California Water Quality Assessment. 1992.

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Energy

THE CHALLENGE

Clean, stable and sustainable sources of energy for Southern California are critical to supporting a healthy and resilient region. In developing future plans, SCAG must fully weigh and consider energy supply, efficiency, consumption, and environmental impacts such as greenhouse gas emissions. California relies on petroleum-based fuels for 96 percent of its transportation needs.[1] The SCAG region consumes over 23 million gallons of gasoline and diesel per day; roughly half of California's oil consumption[2] and vehicle fuel consumption in the region has increased 20 percent over the last ten years.[3] Furthermore, only 14 percent of the electricity consumed in the region is generated from renewable sources.[4] At the same time, SCAG forecasts significant growth in population, households, and jobs that will place new demands on energy production and increase pollution and greenhouse gases.

We live in an energy-constrained world. Both environmental and geopolitical factors call into question the long term viability of a fossil fuel-based energy future. Concerns about global climate change have motivated action to move away from fossil fuels, while continued oil price fluctuations and supply constraints have helped raise awareness about the unsustainability of our dependence on imported petroleum.

The U.S. represents 5 percent of the world's population, but consumes 25 percent of the world's oil.[5] In addition, the U.S. Department of Energy forecasts that world liquid fuels consumption is projected to increase by 35 percent from 2005 to 2030 and that U.S. consumption of liquid fuels is projected to increase by 10 percent between 2005 and 2030, from 21 million barrels per day to 23 million barrels per day.[6*] The lower projected level of consumption reflects the influence of the new corporate average fuel economy (CAFE) standard for light-duty vehicles specified in the Energy Independence and Security Act of 2007 and slower economic growth, as well as the impact of higher fuel prices.[7]

The U.S. currently imports 58 percent of its petroleum and California imports approximately 45 percent of its petroleum. In California, oil production peaked in 1985. Since then, the share of oil from foreign imports has increased rapidly, from below 10 percent in 1995 to 45 percent in 2007, as shown in **Figure 5.1**.[8] In 2007, California received 25 percent of its foreign oil imports from Saudi Arabia, 19 percent from Ecuador, and 20 percent from Iraq.[9] Globally, increasing demand from the large growth in the economies of India and China will further tighten world oil supplies. According to the U.S. Energy Information Agency, India has become the fifth larg-

HOW ENERGY POLICIES PRODUCE MULTIPLE BENEFITS

Land Use and Housing: Decreasing the region's reliance on fossil fuels will reduce the need to build or expand refinery and delivery infrastructure, thereby reducing siting pressures and potential land use conflict with residential or other incompatible land uses.

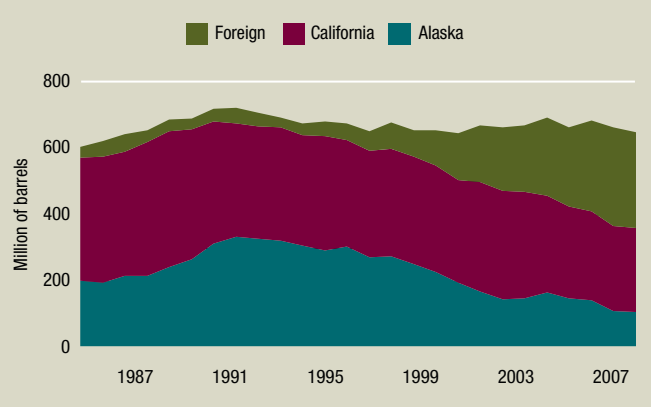
Open Space and Habitat: Energy policies encouraging mixed-use development with pedestrian corridors and bike trails can reduce fuel consumption, improve air quality, and promote an active lifestyle.

Water: In California, water related energy use consumes about 19% of the state's electricity, 30% of its natural gas, and 88 billion gallons of diesel fuel every year; and this demand is growing.

Air Quality: Energy policies that reduce our dependence on petroleum will benefit air quality. Electric vehicles produce only 6 percent of the air pollution generated by the cleanest on gas-powered cars.

Concerns about global climate change have motivated

FIGURE 5.1
Oil Supply Sources in California



Source: California Energy Commission

est consumer of oil in the world during 2006.[10] China is the world's most populous country and the second largest energy consumer behind the United States.[11]

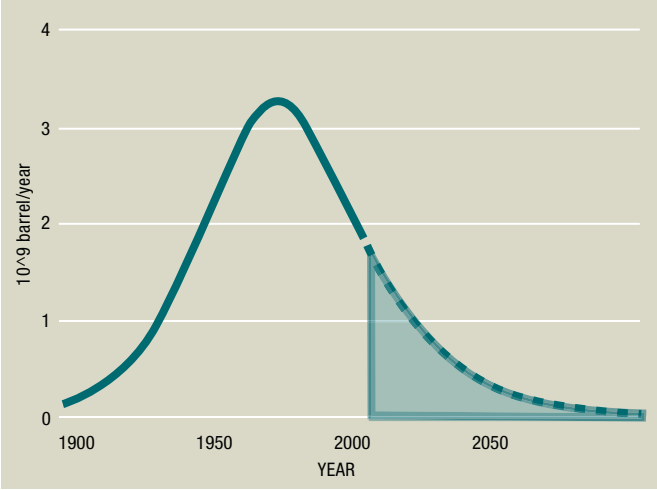
There are additional concerns that the nation's dependence on oil, especially from the Persian Gulf, requires a U.S. military presence, with all of its associated economic and social costs.[12] Oil production could be shut down by wars, strikes, and other political events in many countries with proven oil reserves. For example, the countries of Iran, Iraq, Nigeria and Venezuela contain one-third of worldwide reserves but face high levels of political risk. Additionally, countries defined as having medium to high levels of political risk held 63 percent of proven worldwide oil reserves.[13]

Furthermore, much of the oil remaining in the ground can only be accessed by using complex and costly technologies that present greater environmental challenges than technologies used to recover most of the oil produced to date. Enhanced oil recovery technologies are much costlier than conventional production methods and increase greenhouse gas emissions due to the additional energy required to perform the tasks.

Oil is a finite and non-renewable resource and it is uncertain how future energy consumption trends will be sustained with the current political, environmental and technological constraints. Our nation's reliance on petroleum for our energy needs is even more problematic because of the global trend toward an inevitable turning point–"peak oil"–the peak and then decline of global oil production. Peak oil is the point of maximum oil production whether from a single well, a country, or the planet as a whole. The maximum point of production is expected to happen when about half or slightly more of the ultimately recoverable oil has been produced. To be clear, peaking does not mean "running out." Rather, it indicates the point where global production can no longer be maintained or increased. Production will begin to decline, year after year. Geophysicist M. King Hubbert correctly predicted the 1971 peak in U.S. oil production as shown in **Figure 5.2** and further predicted that sometime between 2005 and 2025, world oil production will reach a peak and begin a sharp decline.[14] Figure 5.2 also illustrates that the U.S. is currently consuming the remaining 25 percent of our known domestic oil reserves, as indicated by the shaded area.

FIGURE 5.2

U.S. Crude Oil Production Projection



Source: Energy Information Administration, Department of Energy and Architecture 2030

A fundamental problem in predicting oil peaking is the poor quality of and possible political biases in world oil reserves data. The recent range of estimates varies from late 2005 to a belief that it will never happen. For example, the International Energy Agency reported in July 2007 that the world will face an oil supply "crunch" in the next five years.[15] Most estimates are based on different geological assumptions and investments in expanded oil production. This wide range of peak oil forecasts presents a very difficult dilemma for policy makers. On one hand, action could be delayed until there is a consensus from scientists; however that is unlikely given the strongly held divergent views. On the other hand, waiting to take action could prove costly and result in severe consequences.

Initiating a move toward conservation, efficiency, demand reduction and renewables 20 years before peaking would offer the possibility of avoiding a world liquid fuels shortfall and significant economic hardship.[16] The world supply crunch will impact the SCAG region. A fuel shortage will take a toll on California's economy as consumers spend more of their household income on gasoline, particularly with development patterns that create long commutes without access to public transportation. High fuel prices also reduce profit margins for the manufacturing and industrial sectors, which pass the higher cost of their goods and services to consumers. Since September of 2004, the monthly average price of gasoline has increased by more than 35 cents per gallon, costing consumers an additional $6.1 billion for gasoline. In addition, during the summer of 2008, California experienced gasoline prices from $3.50 to $4.50 a gallon.[17]

There is also a tightening of natural gas markets due to decreasing supplies and growing demand for natural gas, which makes up 25 percent of the nation's energy use and is a relatively clean source of electricity compared to sources such as coal. The U.S. and California will lose a major source of natural gas imports by 2010 due to the decline of Canada's largest producing basin, the Western Sedimentary Basin, coupled with an approximately 2 percent projected average annual growth in Canada's domestic consumption.[18] Although some research has shown a world peak in natural gas occurring a decade after oil, the U.S. and California could experience the effects sooner. For example, natural gas has become the preferred source of

HOW ENERGY POLICIES PRODUCE MULTIPLE BENEFITS

Solid Waste: Energy policies that promote renewable energy generation have the ability to increase the use of waste materials, such as biomass, for energy production.

Transportation: As our region becomes more energy-efficient, the transportation impacts of accommodating a growing energy infrastructure are reduced.

Security and Emergency Preparedness: Energy policies that reduce petroleum consumption could reduce our vulnerability to external disruptions and geopolitical instability.

Economy: A study found that a 35 mpg vehicle fleet would create as many as 170,800 jobs in 2020 including 22,300 in the auto industry and save consumers nearly $25 billion on gasoline with average prices at $2.55 per gallon. The increase in fuel efficiency would also decrease the demand for oil in the U.S. by close to 2.5 million barrels of oil per day.

Continued oil price fluctuations have raised awareness

electricity generation, supplying over 40 percent of California's power.[19] Also, unlike oil, it is more difficult and expensive to import replacement natural gas from overseas – as it has to be liquefied for transport and then re-gasified for distribution.[20] An increase in natural gas prices would negatively affect the economy, potentially leading to reduced sales and employment.[21]

In addition to the uncertainty regarding fossil fuels supplies, there is also uncertainty about how climate change will alter economies and ecosystems at the global, regional and local levels. Transportation is the largest single source of greenhouse gas emissions in California (38 percent). In 2004, California produced 469 million gross metric tons of carbon dioxide-equivalent GHG emissions, including imported electricity and excluding combustion of international fuels and carbon sinks or storage.[22] Climate change poses serious risks to our economy, water supply, biodiversity, and public health.

These potentially catastrophic impacts have led to new local and state efforts to reduce the amount of greenhouse gas emissions released into the atmosphere. AB 32, or the Global Warming Solutions Act, requires reducing the state's greenhouse gas (GHG) emissions to 1990 levels by 2020, equal to a 25 percent reduction from current levels. Longer term targets have also been set through Executive Order S-3-05, which calls for reducing GHG emissions to 80 percent below 1990 levels by 2050.

The demand for oil must decline at a similar rate to production in order to avert the economic and social consequences of increased prices. If oil and gas become scarce and expensive, it will have profound implications for our economy and way of life.[23] A recent study funded by the U.S. Department of Energy determined that viable mitigation options exist but must be initiated more than a decade in advance to avoid severe economic disruptions.[24]

THE PLAN

The RCP lays out a strategy to reverse the current trends and diversify our energy supplies to create clean, stable, and sustainable sources of energy that address energy uncertainty and environmental health. This plan includes strategies that the region can take to reduce fossil fuel consumption and increase the use of clean, renewable technologies. SCAG will continue to work with stakeholders at the federal, state, regional and local levels to promote these policies and encourage their implementation. However, leadership is needed to coordinate and provide an ongoing forum for local and regional programs to implement an energy savings program.

As stated in the *2006 State of the Region's* special energy essay, we can prepare for these inevitable energy challenges by encouraging community participation, reinvesting in public transportation, and revising land use, zoning and building codes to optimize the consumption of our energy resources. There are numerous strategies that the public sector can undertake to

address our energy challenges. These make up the bulk of the proposed Action Plan to promote a more sustainable energy supply.

Land Use and Building Design

Steps to reduce energy consumption are necessary both where development occurs and how it is designed. Land use patterns have shaped energy use by increasing the amount of travel necessary to reach jobs and services. This growth pattern has resulted in an increase in vehicle miles traveled (VMT) at a rate of more than 3 percent a year between 1975 and 2004.[25] Building design and housing types also have a strong relationship to energy use and are thus, a strong focus of this chapter. For example, residents of single family detached housing have been found to consume 22 percent more energy than those of multifamily housing and 9 percent more than those of single-family attached housing.[26] SCAG has proactively commissioned research to advance the understanding of effective strategies to reduce energy use, with an emphasis on land use. A summary of the findings follows.

Mixed land use (i.e., residential developments near work places, restaurants, and shopping centers) with access to public transportation has been shown to save consumers up to 512 gallons of gasoline per year. It is estimated that households in transit-oriented developments drive 45 percent less than residents in auto-dependent neighborhoods.[27] With this reduction, there is less overall energy consumption and less greenhouse gas emissions from personal vehicles. Going hand-in-hand with mixed-use development is the development of pedestrian corridors and bike trails that connect residents to work sites, shops, and recreational opportunities, which can also realize a reduction of personal vehicle use and fuel consumption.

Neighborhood energy systems allow communities to generate their own electricity and offer potential advantages such as cost reductions and energy savings up to 40 percent. Micro-grids are a subset of community-based distributed generation (DG) or combined heating and power (CHP) systems that focus on power quality and reliability. Micro-grids are used in communities (often industrial parks) that require higher electric reliability and higher power quality than can be provided by the electric utility. Rather than invest in systems for individual buildings or businesses, the community pools resources and shares the benefits of the community-based system. Generally, micro-grids include DG and power conditioning, but may also include energy storage, CHP, and/or renewables.

Orienting streets and buildings for best solar access can significantly reduce energy requirements throughout the life of a building. Streets should be designed to take advantage of passive solar heating and most buildings should be oriented such that the long axis runs east/west. The southern most face of the building should face within 30 degrees of south (See **Figure 5.3**). Also, strategically planting trees on a residential property can reduce attic temperatures up to 20 degrees Fahrenheit and wall temperatures up to 15 degrees Fahrenheit

HOW ENERGY POLICIES PRODUCE MULTIPLE BENEFITS

Public Health: A South Coast AQMD study found that diesel-based particulate emissions from trucks, ships, and locomotives account for over 80 percent of the toxic air pollution risk in Southern California.

Environmental Justice: Refineries that produce diesel and gasoline fuel from crude oil are often located in low income and minority neighborhoods. Shifting from petroleum-based energy to renewable sources can reduce the need to build or expand energy facilities.

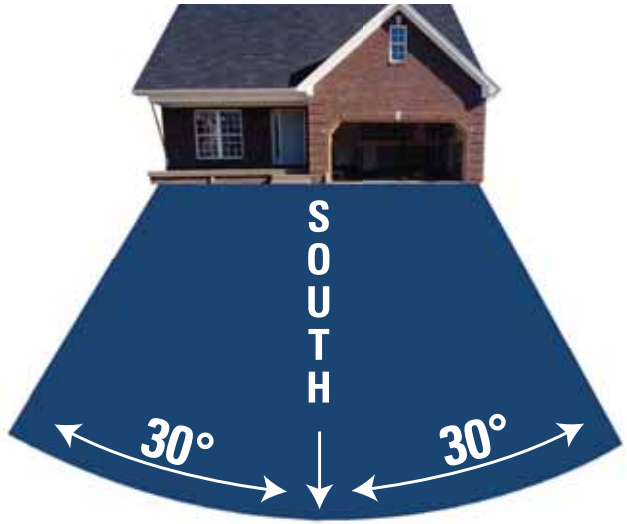
Climate Change: Reducing energy consumption will substantially reduce greenhouse gas emissions. Improving energy efficiency and using renewable energy sources can slow the rate at which we need to build power plants, which are major point sources of greenhouse gases.

The region must become more energy efficient through

on a sunny summer day as well as reduce air conditioning costs up to 20 percent. Trees absorb numerous pollutants (dust, ash, pollen, smoke), remove carbon from carbon dioxide (CO_2) and release oxygen. They also trap and hold up to 50 gallons of water (each) reducing storm water runoff, increasing water filtration in the ground, reducing soil erosion, and requiring minimal watering when mature. Total present value benefits, including energy, environmental and aesthetics are estimated at $1,399,776,270 or roughly $699.89 per tree.[28]

Green buildings can significantly reduce local environmental impacts, regional air pollutant emissions and global greenhouse gas emissions. Green building standards involve everything

FIGURE 5.3
Orienting Buildings for Best Solar Access



from energy efficiency, use of renewable resources and reduced waste generation and water usage. For example, water-related energy use consumes 19 percent of the state's electricity. Furthermore, the residential sector accounts for 48 percent of both the electricity and natural gas consumption associated with urban water use.[29] While interest in green buildings has been growing for some time, cost has been a main consideration as it may cost more up-front to provide energy-efficient building components and systems. Initial costs can be a hurdle even when the installed systems will save money over the life of the building. Energy efficiency measures can reduce initial costs, for example, by reducing the need for over-sized air conditioners to keep buildings comfortable. Undertaking a more comprehensive design approach to building sustainability can also save initial costs through reuse of building materials and other means.

A comprehensive and persuasive study of the value of green building savings is the 2003 report to California's Sustainable Building Task Force. In the words of the report:

> "While the environmental and human health benefits of green building have been widely recognized, this comprehensive report confirms that minimal increases in up-front costs of about 2 percent to support green design would, on average, result in life cycle savings of 20 percent of total construction costs – more than ten times the initial investment. For example, an initial up-front investment of up to $100,000 to incorporate green building features into a $5

million project would result in a savings of $1 million in today's dollars over the life of the building."[30]

On July 17, 2008, the California Building Standards Commission adopted a green building code to promote energy and resource efficient building practices throughout the state. The standards cover commercial and residential construction in the public and private sectors as well as schools of all levels, hospitals and other public institutions. The thresholds include a 50 percent increase in landscape water conservation and a 15 percent reduction in energy use compared to current standards. All the measures, if acted upon, would be at least comparable to the requirements of a Silver rating under the Leadership in Energy and Environmental Design (LEED) standards set by the U.S. Green Building Council.

Alternative Fuels

Alternatives to petroleum and the fueling infrastructure network will be needed for the SCAG region to achieve the ambitious performance outcome of reducing fossil fuel use 25 percent below 1990 levels by 2020. California's leadership on research and development of alternative transportation fuels will help the SCAG region meet these goals. For example, Assembly Bill 1007 provides a comprehensive framework to examine broad transportation fuel issues and effectively integrate transportation energy and air quality policies. The California Energy Commission (CEC) and California Air Resources Board (ARB) also are analyzing numerous options to reduce the use of conventional transportation, which will assist the SCAG region as it grapples with our transportation energy future.

Each alternative fuel has costs, benefits and performance characteristics that will define its effectiveness as a replacement for petroleum. The CEC's 2005 Integrated Energy Policy Report offers a glimpse into the challenges ahead for replacing fossil fuels with alternatives. For example, an increase in the amount of ethanol in gasoline would result in a loss of fuel economy and require motorists to purchase more gasoline since E-85 contains almost 30 percent less energy than gasoline.[32] In addition, the state's Alternative Fuels Plan lays out a vision for 2050, calling for 40 percent of transportation fuels coming from electricity or hydrogen and 30 percent coming from other alternative fuel sources. These energy challenges will force the region to become more energy efficient through technology enhancements, pricing mechanisms, and integrating land use and transportation decisions.

Renewable Energy

Additional efforts will be needed to reach SCAG's performance outcome of 20 percent renewable energy supply by 2010 and its longer term goal of 30 percent by 2020.[33] Of the electricity consumed in the SCAG region in 2006, an average of 14 percent was generated from eligible renewables. By comparison, 12 percent of the electricity produced in California was

Leadership is needed to address our energy challenges

ELECTRICITY AND TRANSPORTATION

The use of electricity as a transportation fuel for transit, automobiles and goods movement reduces air emissions. ARB has estimated that electric vehicles produce only about 6 percent of the air pollution of the cleanest new internal combustion cars available today. The number of electric transportation and goods movement technologies is expected to triple by 2020 to between 900,000 and 1 million units due to known regulatory requirements and financial incentive programs that encourage the use of electric technologies because of their inherent emissions benefits.[31]

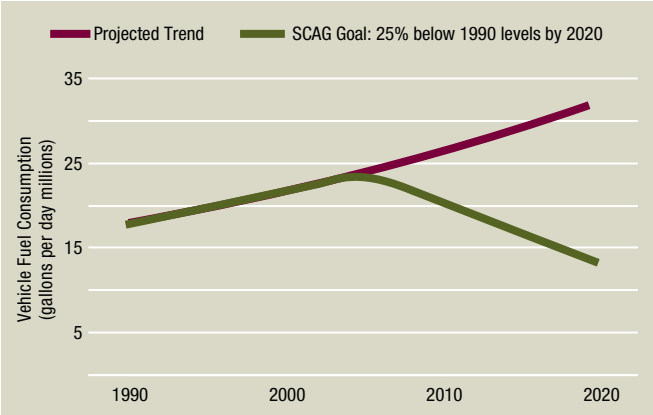
renewable.[34] The CEC recommends various opportunities to expand the renewable energy mix such as adopting clear and consistent policies for sustainable biomass development, taking advantage of California's abundant solar energy resources, and tapping into distributed generation and combined heat and power facilities. California has the potential to produce ethanol from cellulosic biomass material such as municipal, agricultural, and forestry wastes. Solar offers clean, renewable and reliable energy sources. The California Solar Initiative offers incentives and funding for solar installations in an effort to create 3,000 megawatts of new solar-produced electricity by 2017. Distributed generation also offers an alternative to central station fossil-fueled generation since it is produced on site and connected to a utility's distribution system. The most efficient and cost-effective form of distributed generation is cogeneration, or combined heat and power, which recycles waste heat. These technologies will help customers become energy independent and protect them from supply outages and brownouts.

Public Transportation

According to the *2007 State of the Region*, total transit boardings in the region in fiscal year 2006 increased by 44 million (6 percent) since 1990 to a record high of 737 million. Nationally, transit boardings also increased at a faster rate than the population. This shift is good news since increases in public transit ridership can proportionately reduce VMT, congestion, and fuel consumption and improve air quality. A recent study on public transportation found that current public transit use reduces U.S. gasoline consumption by 1.4 billion gallons each year. In a "growth scenario," the study assumed that ridership would double over current levels due to expanded transit systems, new routes, and improved land use patterns. It concluded that the total national fuel savings from public transportation would double from current savings and would equal 2.8 billion gallons per year.[35] SCAG has the opportunity to work with its partners, including transportation commissions, to increase funding of public transportation in the Regional Transportation Plan (RTP), which integrates the transportation plans of all of the cities and counties within

FIGURE 5.4

SCAG Vehicle Fuel Consumption: Reversing the Trends



Source: California Department of Transportation and SCAG

the region. By prioritizing funding priorities for energy effi-

cient transportation projects, the region can begin to reduce petroleum demand and improve air quality.

Reversing the Trend

Leadership is needed to coordinate and provide an ongoing forum for local and regional programs that address our energy challenges, reverse our unsustainable dependence on fossil fuels, and increase the use of clean, renewable technologies. As shown in **Figure 5.4**, the goals set forth in this plan are dramatic. However, SCAG can help the region reverse the trend of fossil fuel consumption by continuing to work with stakeholders at the federal, state, regional and local levels to promote these policies and encourage their realization. The remainder of this chapter will identify how to reverse the current trends and become less dependent on fossil fuels.

ENERGY GOALS

- Reduce our region's consumption of non-renewable energy by:
  - Supplying the energy needs of the region today in a way that reduces the negative environmental impacts, social inequities, and economic hardship on future generations;
  - Developing the infrastructure and social capital to adapt to a future energy economy with a constrained supply.
- Increase the share of renewable energy in the region by:
  - Ensuring the resiliency of the region's economy by encouraging and supporting renewable energy infrastructure; and
  - Developing renewable energy sources that reduce the amount of air emissions emitted through the combustion of fossil fuels

ENERGY OUTCOMES

- Decrease the region's consumption of fossil fuels 25 percent from 1990 levels by 2020.
- Increase the share of renewable energy generation in the region to 20 percent by 2010, with additional increases to reach 30 percent by 2020.

Resources

- Go Solar California: www.gosolarcalifornia.ca.gov
- Southern California Edison, Energy Efficiency Incentives: http://www.sce.com/RebatesandSavings
- Southern California Gas Company, Energy Efficiency Incentives: http://www.socalgas.com/energyefficiency/
- Federal Tax Incentives for Energy Efficiency: http://www.energystar.gov/

ENERGY ACTION PLAN

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
		X	EN-1. SCAG should continue to work with the State to develop approaches for evaluating environmental impacts within the Compass Blueprint program, particularly energy, air quality, water, and open space and habitat.[i]	X	X	X	X	X	X			X	X
X			EN-2. SCAG should continue to develop energy efficiency and green building guidance to provide direction on specific approaches and models and to specify levels of performance for regionally significant projects to be consistent with regional plans.	X	X	X	X	X	X		X	X	X
		X	EN-3. SCAG should continue to pursue partnerships with Southern California Edison, municipal utilities, and the California Public Utilities Commission to promote energy efficiency and reduce greenhouse gas emissions in the region.			X			X			X	X
		X	EN-4. SCAG should continue to convene key decision makers to discuss energy issues and make recommendations to SCAG's Energy and Environment Committee, where appropriate.	X	X	X					X	X	X
		X	EN-5. SCAG should convene key stakeholders to evaluate and where feasible, recommend transportation measures such as congestion pricing, a transitional regional goods movement system and an environmental mitigation strategy that reduces fossil fuel consumption and uses non fuel combustion technologies.	X	X	X			X				X
		X	EN-6. SCAG should monitor and provide input towards development of state energy projections and tools, including the Integrated Energy Policy Report and similar policy documents as well as future efforts to determine the implications of energy generation and consumption for the built environment.	X	X	X						X	X
	X		EN-7. SCAG should encourage credits for clean post recycle conversion technologies to produce energy or for technologies that offset energy use or emissions.		X	X			X		X	X	X
Voluntary Local Government Best Practices													
X			EN-8. Developers should incorporate and local governments should include the following land use principles that use resources efficiently, eliminate pollution and significantly reduce waste into their projects, zoning codes and other implementation mechanisms: • Mixed-use residential and commercial development that is connected with public transportation and utilizes existing infrastructure. • Land use and planning strategies to increase biking and walking trips.[ii]	X	X	X	X	X	X		X	X	X
X			EN-9. Local governments should include energy analyses in environmental documentation and general plans with the goal of conserving energy through the wise and efficient use of energy. For any identified energy impacts, appropriate mitigation measures should be developed and monitored. SCAG recommends the use of Appendix F, Energy Conservation, of the California Environmental Quality Act.	X	X	X			X			X	X

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
X			EN-10. Developers and local governments should integrate green building measures into project design and zoning such as those identified in the U.S. Green Building Council's Leadership in Energy and Environmental Design, Energy Star Homes, Green Point Rated Homes, and the California Green Builder Program. Energy saving measures that should be explored for new and remodeled buildings include: • Using energy efficient materials in building design, construction, rehabilitation, and retrofit • Encouraging new development to exceed Title 24 energy efficiency requirements. • Developing Cool Communities measures including tree planting and light-colored roofs. These measures focus on reducing ambient heat, which reduces energy consumption related to air conditioning and other cooling equipment. • Utilizing efficient commercial/residential space and water heaters: This could include the advertisement of existing and/or development of additional incentives for energy efficient appliance purchases to reduce excess energy use and save money. Federal tax incentives are provided online at http://www.energystar.gov/index.cfm?c=Products.pr_tax_credits. • Encouraging landscaping that requires no additional irrigation: utilizing native, drought tolerant plants can reduce water usage up to 60 percent compared to traditional lawns. • Encouraging combined heating and cooling (CHP), also known as cogeneration, in all buildings. • Encouraging neighborhood energy systems, which allow communities to generate their own electricity • Orienting streets and buildings for best solar access. • Encouraging buildings to obtain at least 20% of their electric load from renewable energy.[iii]	X	X	X	X	X	X		X	X	X
X			EN-11. Developers and local governments should submit projected electricity and natural gas demand calculations to the local electricity or natural gas provider, for any project anticipated to require substantial utility consumption. Any infrastructure improvements necessary for project construction should be completed according to the specifications of the energy provider.	X		X							X
X			EN-12. Developers and local governments should encourage that new buildings are able to incorporate solar panels in roofing and tap other renewable energy sources to offset new demand on conventional power sources.	X		X			X				X
X			EN-13. Local governments should support only the use of the best available technology including monitoring, air, and water impacts for locating any nuclear waste facility.			X	X			X		X	
X			EN-14. Developers and local governments should explore programs to reduce single occupancy vehicle trips such as telecommuting, ridesharing, alternative work schedules, and parking cash-outs.		X	X			X				X
X			EN-15. Utilities and local governments should consider the most cost-effective alternative and renewable energy generation facilities.	X		X			X		X	X	X

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
X			EN-16. Local governments and project implementation agencies should consider various best practices and technological improvements that can reduce the consumption of fossil fuels such as: • Encouraging investment in transit, including electrified light rail • Expanding light-duty vehicle retirement programs • Increasing commercial vehicle fleet modernization • Implementing driver training module on fuel consumption • Replacing gasoline powered mowers with electric mowers • Reducing idling from construction equipment • Incentivizing alternative fuel vehicles and equipment • Developing infrastructure for alternative fueled vehicles • Increasing use and mileage of High Occupancy Vehicle (HOV), High Occupancy Toll (HOT) and dedicated Bus Rapid Transit (BRT) lanes • Implementing truck idling rule, devices, and truck-stop electrification • Requiring electric truck refrigerator units • Reducing locomotives fuel use • Modernizing older off-road engines and equipment • Implementing cold ironing at ports • Encouraging freight mode shift • Limit use and develop fleet rules for construction equipment • Requiring zero-emission forklifts • Developing landside port strategy: alternative fuels, clean engines, electrification		X	X			X			X	X
X		X	EN-17. Utilities should consider increasing capacity of existing transmission lines, where feasible.	X		X		X			X	X	
X		X	EN-18. Utilities should install and maintain California Best Available Control Technologies on all power plants at the US-Mexico border.			X	X					X	X
		X	EN-19. Subregional and local governments should explore participation in energy efficiency programs provided by their local utility such as the Ventura Regional Energy Office, South Bay Energy Savings Center, and the San Gabriel Valley Energy Wise program. These programs can offer customized incentives and public awareness campaigns to reduce energy consumption.			X			X				X

Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives													
		X	EN-1S: SCAG should consider energy uncertainty into its future planning and programming, including the Regional Transportation Plan and the Regional Transportation Improvement Program.	X	X	X			X	X		X	X
		X	EN-2S: SCAG should continue to develop, in coordination with the California Air Resources Board, a data and information collection and analysis system that provides an understanding of the energy demand and greenhouse gas emissions in the SCAG Region.	X	X	X	X					X	X
Federal and State Government Strategies													
	X		EN-3S: The Secretary of Energy, in coordination with other relevant federal agencies, should establish a peak oil strategy to better prepare the United States for a peak and decline in oil production. Such a strategy should include efforts to reduce uncertainty about the timing of a peak in oil production and provide timely advice to Congress about cost-effective measures to mitigate the potential consequences of a peak.		X	X			X	X	X	X	X
	X		EN-4S: The Federal Government should increase Corporate Average Fuel Economy (CAFE) to a level that will reduce our dependence on foreign oil and reduce greenhouse gas emissions.	X	X	X			X	X	X	X	X
	X		EN-5S: The Federal Government should develop a national consensus on alternative fuel research and development.		X	X			X	X	X	X	X
	X		EN-6S: As recommended by the California Energy Commission, the state should continue to fund the Blueprint Planning Grant program and Blueprint Learning Network to assist regional agencies and local governments in developing regional growth plans. The grant program should include energy consumption and greenhouse gas emission reduction as primary outcomes of the blueprints developed within the program. Technical and funding assistance for local governments should be included in this.	X	X	X			X			X	X
	X		EN-7S: The Federal and State Government should promote clean, cost-effective, reliable, domestic renewable energy generation, such as solar power and wind turbines.		X	X			X	X		X	X
	X		EN-8S: State and federal lawmakers and regulatory agencies should pursue the design of programs to either require or incentivize the expanded availability and use of alternative-fuel vehicles to reduce the impact of shifts in petroleum fuel supply and price.		X	X			X	X		X	X
	X		EN-9S: The State and Federal governments should encourage mileage-based vehicle insurance as a voluntary program.		X	X			X				
Voluntary Local Government Best Practices													
X			EN-10S: Local governments should employ land use planning measures, such as zoning, to improve jobs/housing balance and creating communities where people live closer to work, bike, walk, and take transit as a substitute for personal auto travel.[iv]	X	X	X		X	X			X	X

Footnotes

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Air Quality

THE CHALLENGE

Since the U.S. Environmental Protection Agency (EPA) developed regulations targeting six "criteria" pollutants that adversely affect human health and welfare, regulations at the federal, state, and regional level have reduced hundreds of tons of air pollution each day in Southern California. Smog alerts are largely a thing of the past, as smog levels have dropped over 75 percent in the past twenty years.

Despite this progress, air pollution continually plagues Southern California. Much of the region continues to exceed National Ambient Air Quality Standards (NAAQS). The South Coast Air Basin (SCAB), one of the four basins in the SCAG region, still has the worst air quality in the nation (the other air basins in the region include the South Central Coast Air Basin (the Ventura County portion), the Mojave Desert Air Basin, and the Salton Sea Air Basin). The American Lung Association reported that, in 2007, the Los Angeles-Long Beach- Riverside region ranked number one as the most polluted area in the United States.[1]

The pollutants that pose the greatest health concern in the SCAG region are ground-level ozone (O_3) and particulate matter (PM). Ground-level ozone, a component of urban and regional smog, is a colorless and poisonous gas that forms in the atmosphere through complex reactions between chemicals directly emitted from motor vehicles, industrial plants, consumer products and many other sources. Repeated short-term exposure to ozone can damage the respiratory tract, causing inflammation and irritation, and induces symptoms, such as coughing, chest tightness, shortness of breath, and worsening of asthma symptoms.[2]

In recent years, population-based studies have revealed a strong correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality.[3] In addition, ground-level ozone causes substantial damage to crops, forests and native plants, turning leaves brown and spotty and stunting plant growth; it is particularly noxious to crops.

Major technological or political breakthroughs that identify new ways to achieve the federal 8-hour ozone standard by 2024 are imperative. However, this is not an easy task. Our region needs to reduce approximately 500 tons per day of ozone-forming pollution, about half of which is attributable to cars, buses, trucks, and other "mobile sources." While approximately 60% of the reductions are specified by stationary and

HOW AIR QUALITY POLICIES PRODUCE MULTIPLE BENEFITS

Land Use & Housing: Reducing emissions from local sources of air pollution reduces the potential for incompatible land uses. For example, reducing particulate and toxic air contaminants from manufacturing facilities can reduce conflict with nearby residential uses by reducing ambient pollutant concentrations. This can give jurisdictions more flexibility to site land uses in a region that is becoming more densely populated.

Open Space and Habitat: Achieving federal ozone standards will reduce damage to vegetation and crops, as ozone inhibits crop productivity and can reduce crop yield.

Water: Reducing airborne pollutants will reduce wet and dry deposition that directly pollutes surface water bodies. Studies also show that a substantial amount of nitrogen load to surface water bodies comes from indirect loads caused by surface water runoff.

$PM_{2.5}$ exceedances contribute to over 5,400 premature deaths and one

mobile source control measures in the 2007 South Coast Air Quality Management Plan (AQMP), approximately 40% of the solution relies on long-term measures that are undefined (the "black box").[4]

One of the most dangerous pollutants is particulate matter. Particulate matter is a complex mixture that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. Of particular concern are fine particulates, or $PM_{2.5}$, which are smaller than 2.5 micrometers in diameter (by comparison, a human hair is 70 micrometers in diameter). $PM_{2.5}$ is small enough to penetrate our lungs so deeply that they cannot be expelled by the body. $PM_{2.5}$ comes from fuel used in everything from power plants to wood stoves and motor vehicles (e.g., cars, trucks, buses and marine engines). These particulates are even produced by construction equipment, agricultural burning, and forest fires. South Coast Air Basin residents make up over 50 percent of the population in the nation that is exposed to $PM_{2.5}$ concentrations above the federal standard. It is estimated that particulates contribute to over 5,400 premature deaths annually and lead to nearly one million lost work days in the South Coast Air Basin.[5] These and even smaller "ultrafine" particulates have become a major health concern that must be addressed.

Perhaps the most publicized air quality problem today is the phenomenon of global climate change. According to the U.S. EPA, transportation activities (excluding bunker fuels) directly accounted for approximately 33 percent of CO_2 emissions from fossil fuel consumption in 2006.[5] Our planet has reached the highest emissions levels of carbon-based CO_2, the most prevalent greenhouse gas, in recorded history (see **Figure 6.1**). This unprecedented trend is increasing average global temperatures at alarming rates. A warmer climate would substantially complicate our efforts to fight our historical ozone problems. Further, the impacts of climate change are even more profound, as water supplies, flora and fauna, and nearly every aspect of life as we know it could be adversely affected by a warmer world.

Mobile source emissions, both on-road (e.g. cars, trucks, buses, etc.) and off-road sources (e.g. boats, off-road recreational vehicles, aircraft, trains, ships, industrial and construction equipment, farm equipment, etc.), are the primary culprits contributing to the region's air quality challenges and global climate change. Driving a motor vehicle is the single most polluting thing that most of us do.[7] The 2007 AQMP reports that there are approximately 12 million vehicles in the South Coast Air Basin. In 2002, these vehicles traveled more than 349 million miles per day; they are projected to travel about 407 million miles per day by the year 2020. Motor vehicles emit millions of tons of pollutants into the air each year. Mobile sources account for about 60 percent of all ozone forming emissions and for over 90 percent of all carbon monoxide (CO) emissions from all sources.[8] CARB considers diesel PM to be a potent global warming agent, as it has been responsible for more than half of black carbon emissions in the U.S. and about 30 percent globally. Diesel engine emissions are responsible

for a majority of California's estimated cancer risk attributable to air pollution.[9]

Given the challenges that lie ahead, increased public awareness and a reinvigorated collaborative effort from all agencies and stakeholders is critical to bring this region into attainment with the federal air quality standards. SCAG's contribution to this collaborative effort is essential, as emissions reductions have become front and center of the air quality challenge.

The Growth Conundrum

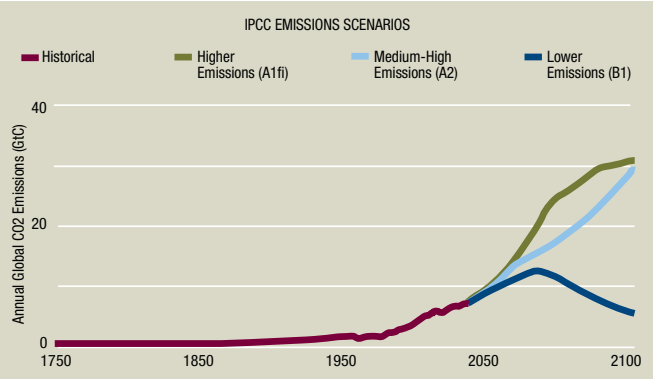
Although regulations and technological breakthroughs have generally improved air quality, our population growth threatens to overwhelm these gains in the future.

The SCAG region is the largest metropolitan planning area in the United States, encompassing 38,000 square miles and has one of the largest concentrations of population, employment, income, business, industry and finance in the world. Our region faces an exponentially growing population coupled by significant economic growth. Forecasts reveal that the region's population is projected to increase by almost 5.1 million people, from 2008 to 2035, employment by 2.2 million jobs, and the number of households by 1.8 million.[10]

These glimpses of our future underscore a key challenge for the region: How do we make historic reductions in air pollution in the face of continued population growth, increasing urbanization, increasing vehicle miles traveled, and an expanding economy? Accommodating anticipated growth in the SCAG region in a sustainable way—by taking account of ecological, economic and social factors, while enhancing quality-of-life indicators for future generations—represents a central challenge facing Southern California.

FIGURE 6.1

Historical and Projected CO_2 Emissions



Source: International Panel on Climate Change

The Growth in Goods Movement

Southern California faces both an extraordinary economic opportunity and a frustrating policy dilemma. Goods movement in the SCAG region is supported, in part, by its geographical advantage such as deep-water marine ports and highly developed network of highways and railways, availability of trans-loading facilities and its large internal market. The region is a major gateway for both international and domestic commerce, and goods movement is the fastest growing seg-

The RCP complements local air plans by emphasizing the need to reduce

HOW AIR QUALITY POLICIES PRODUCE MULTIPLE BENEFITS

Energy: Reducing climate change impacts will mitigate the need to cool a warmer region, which will reduce the need to expand the infrastructure needed to produce electricity and other sources of energy.

Economy: Attaining clean air standards can provide substantial economic benefits. In the South Coast Air Basin, attaining federal ozone standards could add $14.6 billion dollars to the economy on average per year by reducing morbidity, mortality, increasing crop yields and visibility, reducing materials expenditures, and congestion relief. In 2014, an estimated $113 million of savings on vehicle operation and maintenance is expected.

Implementing the South Coast AQMP is expected to generate more than 61,400 jobs per year.

ment of the region's transportation sector. Additionally, goods movement plays a vital role in the national, state, and regional economies with one out of every seven jobs in Southern California depending on trade.

The increasing volume of goods moving in and through the SCAG region is straining our infrastructure and exacerbating air quality challenges in three key ways. First, the sheer growth in freight movement could jeopardize current attainment plans for ozone and $PM_{2.5}$. Second, freight-related diesel particulates create toxic air contaminant hotspots that threaten local air quality near the ports and truck distribution routes. Finally, there are institutional challenges, as goods movement is primarily regulated by the federal government. The projected growth in ship traffic, truck volumes and increased demand on the existing railroad capacity will bring with it associated concerns of automobile traffic delays and safety concerns; thus, compromising the quality of life, health and safety of the residents and communities in the region.

THE PLAN

The RCP neither replaces nor modifies the air plans adopted within the region, but rather, it sets the policy context in which SCAG participates in and responds to these plans. The RCP builds off the local Air Quality Management Plan processes that are designed to meet health-based criteria pollutant standards in several ways. First, it complements AQMPs by providing guidance and incentives for public agencies to consider best practices that support the technology-based control measures in AQMPs. For example, the RCP's energy policies will help accelerate turnover of older, more polluting combustion engines that support the South Coast AQMP's control measures.

Second, the RCP emphasizes the need for local initiatives that can reduce the region's greenhouse gas emissions that contribute to climate change, an issue that is largely outside the focus of local attainment plans. Policies such as green building that reduce our "carbon footprint" can have direct impacts on energy, water supply, and other resource areas.

Third, the RCP emphasizes the need for better coordination of land use and transportation planning, which heavily influences the emissions inventory from the transportation sectors of the economy. This also minimizes land use conflicts, such as residential development near freeways, industrial areas, or other sources of air pollution.

The RCP calls on SCAG and local governments in coordination with appropriate state agencies and air districts throughout the region to implement policies that complement the AQMP in the following ways:

- **SCAG**: As the Metropolitan Planning Organization for Southern California, SCAG has a defined role in developing the transportation control measures (TCMs) for local AQMPs. This can include new TCMs that help minimize the region's "black box" of undefined emission

reductions. In its role as a Council of Governments, SCAG can influence a local jurisdiction's actions by providing guidance on policies that address criteria pollutants, greenhouse gases, and public exposure to toxics and other pollutants of concern. SCAG can also be a regional clearinghouse for data, funding information, program coordination, and repository of mitigation measure recommendations for regionally significant issues at the project or General Plan level.

- **Local Governments**: Cities and counties can amend general plans to implement land use, energy, transportation, and other policies that reduce their carbon footprint consistent with State law. In addition, local governments can use their land use authority to properly buffer residences and other sensitive land uses from freeways, industrial activity centers, and other sources of toxics or ultrafine particulates.

Continuing the trend toward attainment of clean air standards will be difficult given the pace of population growth, freight activity from our sea and airports, and increasing congestion from a transportation system with limited opportunities to expand roadway capacity and a heavily-subsidized public transit system. The voluntary actions require a collaborative effort from federal, state, and local government in order to meet the air quality targets.

Historically, there has been an inherent conflict between the objectives of economic development and environmental protection. Today, it is possible to achieve economic growth without sacrificing protection for the environment. However, much more work will be needed to achieve this equilibrium. As such, collaborative efforts undertaken by various federal, state, and local regulatory agencies are necessary in overcoming this challenge.

The goals, outcomes, and action plan of the RCP Air Quality chapter aim to coordinate these activities to help the region develop strategies that utilize the most effective technologies, transportation investments, urban design strategies, which reduce air pollution, improve air quality, and protect human health and the natural environment.

AIR QUALITY GOALS

- Reduce emissions of criteria pollutants to attain federal air quality standards by prescribed dates and state ambient air quality standards as soon as practicable.
- Reverse current trends in greenhouse gas emissions to support sustainability goals for energy, water supply, agriculture, and other resource areas.
- Minimize land uses that increase the risk of adverse air pollution-related health impacts from exposure to toxic air contaminants, particulates (PM_{10}, $PM_{2.5}$, ultrafine), and carbon monoxide.

HOW AIR QUALITY POLICIES PRODUCE MULTIPLE BENEFITS

Public Health: Reducing ozone levels can reduce permanent scarring of lung tissue and reduce respiratory irritation and discomfort. Reducing $PM_{2.5}$ could significantly reduce the estimated 5,400 premature deaths annually in the region.

Environmental Justice: Air quality policies in the RCP are intended to ensure that minority population and/or low-income populations do not bear impacts that are appreciably more severe or greater in magnitude than the adverse effects that will be suffered by non-minority populations and/or non-low-income populations.

Climate Change: Warmer weather will increase the number of days conducive to ozone formation by 25 to 85 percent. In addition, warmer temperatures could increase fire risk, which would increase potential for particulate matter emission episodes.

- Expand green building practices to reduce energy-related emissions from developments to increase economic benefits to business and residents.

AIR QUALITY OUTCOMES

- Attain the federal 8-hour ozone standard by the dates specified in the 2007 AQMPs or U.S. EPA rulemaking for the respective non-attainment areas:
  - South Coast Air Basin by 2024
  - Coachella Valley (original classification 2012; revised attainment date to be determined)
  - Antelope Valley and Western Mojave Desert (original classification 2009; revised attainment date to be determined)
  - Ventura County (original classification 2009; revised attainment to be determined)
  - Imperial County by 2010 (pending final U.S. EPA rulemaking)
- Attain the federal $PM_{2.5}$ standards in the South Coast Air Basin by 2015.
- Reduce the region's greenhouse gas emissions to 1990 levels by 2020[11].
- Amend local government General Plans to limit future growth of residences and other sensitive receptors near major sources of toxic air contaminates and other hazardous air pollutants (e.g., freeways, railyards, and industrial facilities).[12]
- All cities and counties in the region adopt green building standards by 2012.

AIR QUALITY ACTION PLAN

Best Practice	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
		X	AQ-1 SCAG should implement control measures from local Air Quality Management Plans (AQMPs) by:		X		X		X			X	X
		X	AQ-1.1 Ensuring that transportation plans, programs, and projects are consistent with State air quality plans for attaining and maintaining the health-based National Ambient Air Quality Standards (NAAQS).		X		X		X			X	X
		X	AQ-1.2 Ensuring compliance with the Transportation Conformity Rule, including the new air quality standards for fine particulate matter (PM2.5) and 8-hour Ozone.		X		X		X			X	X
		X	AQ-1.3 Ensuring that there is continued development of Transportation Control Measures (TCMs) in the South Coast Air Basin (SCAB).		X		X		X			X	X
		X	AQ-2. SCAG, in conjunction with stakeholders, should pursue environmentally sustainable strategies that implement and complement climate change goals and outcomes.	X	X	X	X	X	X			X	X
		X	AQ-2.1 SCAG, in conjunction with stakeholders, should develop policies and guidance that support the greenhouse gas goals set forth in the Global Warming Solutions Act of 2006 (AB 32), which requires a reduction in global warming emissions to 1990 levels by 2020.	X	X		X					X	X
		X	AQ-2.2 SCAG should participate in the development of rules to implement ARB's Group 1 "discrete early action greenhouse gas reduction measures." These include the proposed Low Carbon Fuel Standard, reduction of refrigerant losses from motor vehicle air conditioning maintenance, and increased methane capture from landfills.				X				X	X	X
		X	AQ-2.3 SCAG should participate in the development of ARB's Group 2 non-regulatory activities and greenhouse gas regulations that will be enforceable after January 1, 2010, including electrification, phase two vehicle standards, and more refrigerant controls.				X					X	X
		X	AQ-2.4 SCAG should participate in the development of ARB's Group 3 "traditional control measures" aimed to reduce criteria and toxic air pollutants which have concurrent climate co-benefits.				X					X	X
		X	AQ-2.5 SCAG should provide assistance to local governments on how to address climate change issues in General Plan updates.	X	X	X	X	X	X			X	X
		X	AQ-3 SCAG should develop policies that discourage the location of sensitive receptors that expose humans to adverse air quality impacts by:	X					X			X	
		X	AQ-3.1 Assisting local governments to develop policies that minimize exposure of sensitive receptors and sites (e.g. schools, hospitals, and residences) to major sources of air pollution, including diesel particulate matter emissions, such high-traffic freeways and roads, rail facilities, ports, and industrial facilities.	X					X			X	
		X	AQ-4 SCAG should promote sustainable building practices by:	X		X	X		X		X	X	X

Best Practice	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
		X	AQ-4.1 Disseminating information about energy efficiency and green building programs and energy use reduction, such as the EPA's Energy Star Program, the South Coast Air Quality Management District's (AQMD) Equipment Exchange Program, and U.S. Green Building Council's (USGBC) LEED Program through the SCAG web site, web links to other programs, and educational workshops and presentations.	X		X	X		X		X	X	X
X			AQ-4.2 Adopting a policy to strive for carbon neutrality for its own facilities and operations.		X		X		X		X	X	X
		X	AQ-4.3 Recommending utilization of green building practices as potential mitigation measures.	X		X	X		X		X	X	X
X		X	AQ-4.4 Engaging both private and public sectors to assist local government in the creation of green business certification programs for businesses that want to reduce energy usage.				X		X			X	X
Voluntary Local Government Best Practices													
X			AQ-5 Local governments should implement control measures from local Air Quality Management Plans (AQMPs) such as accelerating the turnover of older, more polluting mobile and stationary source equipment using AB 2766 funding per the State Implementation Plan (SIP).[13]		X		X		X			X	X
X			AQ-6 Local governments should support and pursue environmentally sustainable strategies that implement and complement climate change goals and outcomes such as updating their General Plans to help address the State's AB 32 mandate. This should be consistent with state guidelines and requirements.	X	X	X	X		X			X	X
X			AQ-7 Local governments should develop policies that discourage the location of sensitive receptors that expose humans to adverse air quality impacts such as amending General Plans, zoning ordinances, business licensing, and related land use permitting processes to minimize human health impacts from exposure of sensitive receptors to local sources of air pollution. Jurisdictions should consider applicable guidance documents, such as ARB's Air Quality and Land Use Handbook: A Community Health Perspective and the South Coast AQMD's Guidance Document for Addressing Air Quality Issues.	X	X				X			X	
X			AQ-8 Local governments should practice and promote sustainable building practices by:		X		X		X			X	X
X			AQ-8.1 Updating their General Plans and/or zoning ordinances to promote the use of green building practices, which include incorporating LEED design standards and utilizing energy efficient, recycled-content and locally harvested or procured materials.				X		X			X	X
X			AQ-8.2 Developing incentive programs (e.g. density bonuses) to encourage green building and resource and energy conservation in development practices.				X		X			X	X
X			AQ-8.3 Adopting policies that strive for carbon neutrality for their own facilities and operations.		X		X		X			X	X

Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives													
	X	X	AQ-1S Identify new State Implementation Plan (SIP) control strategies that reduce the amount of emissions from the transportation system necessary to reach attainment including transformative goods movement strategies.		X							X	X
	X	X	AQ-2S SCAG, in conjunction with the California Air Resources Board and the South Coast AQMD, should build consensus on how to identify discrete control measures that replace the undefined reductions in attainment plans.		X							X	X

Footnotes

1 http://lungaction.org/reports/sota07_cities.html

2 California Air Resources Board. "Recent Research Findings: Health Effects of Particulate Matter and Ozone." January 2004. Available at: http://www.arb.ca.gov/research/health/fs/pm-03fs.pdf

3 South Coast Air Quality Management District. 2007 Air Quality Management Plan. Available at: http://www.aqmd.gov/aqmp/07aqmp/aqmp/Chapter_2.pdf

4 Recognizing the need for immediate action, SCAG adopted a resolution in May 2007 urging the federal and state governments to take emergency responses in the face of an air quality health crisis. Subsequently, the ARB, SCAQMD, and SCAG worked to find additional emission reductions from already proposed measures or new measures to help meet the PM2.5 air quality standard, reaching an agreement in September 2007 on emission reduction measures needed to meet the PM2.5 deadline in 2015. Further, the three agencies (i.e., ARB, SCAQMD, and SCAG) acknowledged the need to identify new ways to achieve the 8-hour ozone standard by 2024 by tackling the "black box" emission reductions associated with long-term measures as well as a potentially more stringent federal 8-hour ozone air quality standard. Thus, the three agencies developed a discussion paper which explores potential new or transformative strategies, such as state-of-technology zero and near-zero transportation systems, other mechanisms such as fee-based incentives, and availability of public funding assistance programs.

5 Personal communication, Richard Bode, California Air Resources Board. 2007.

6 U.S Environmental Proection Agency. Inventory of Greenhouse Gas Emissions and Sinks 1990-2006. April 2008.

7 U.S. Environmental Protection Agency. Referenced on National Safety Council webpage: http://www.nsc.org/ehc/mobile/mse_fs.html

8 California Air Resources Board. "Guidelines for the Generation of Mobile Source Emission Reduction Credits Through Purchase and Operation of New, Reduced-Emission Heavy-Duty Vehicles." September 1995. Available at: http://arb.ca.gov/msprog/mserc/hdcrguid.pdf

9 California Air Resources Board. "Diesel Health Effects Fact Sheet." Available at: http://www.arb.ca.gov/research/diesel/dpm_draft_3-01-06.pdf

10 SCAG growth forecast for 2008 Regional Transportation Plan.

11 This outcome is consistent with State standards included in AB32.

12 This outcome is consistent with the guidance found in ARB's Air Quality and Land Use Handbook and the South Coast AQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning and Air Quality Issues in School Site Selection Guidance Document.

13 In September 1990, AB 2766 was signed into law which authorized a $4 per vehicle surcharge on annual registration fees to fund programs to reduce air pollution from motor vehicles. Under the AB 2766 Program, 40 cents of every dollar collected by the Department of Motor Vehicles is used by cities and counties located in the South Coast Air District to reduce motor vehicle air pollution. Currently, cities and counties receive approximately $19 million AB 2766 funds per year and have expended these funds on a wide range of projects from clean vehicle purchases to various transportation programs to relieve traffic congestion. About half of the funds have been spent on regulatory compliance, the rest on programs whose emission reductions are not directly SIP-quantifiable. ARB will amend its guidance on the use of the fees to include new cost-effectiveness guidelines and a suggested list of SIP creditable projects.

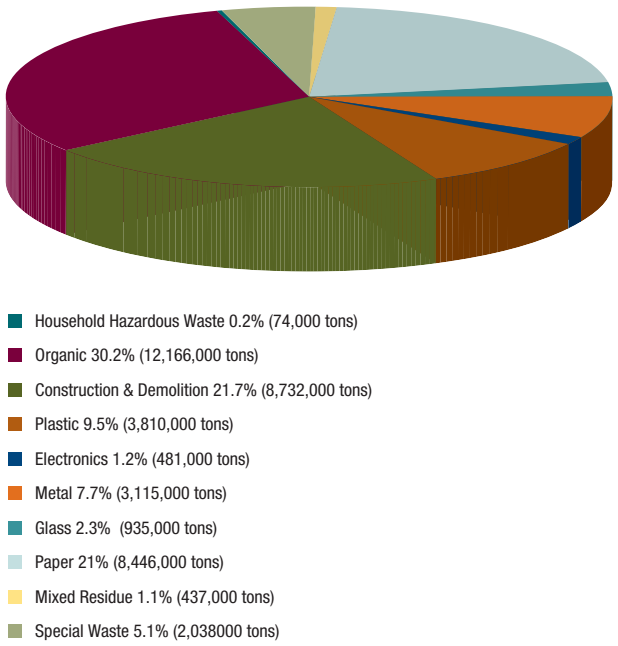
Solid Waste

THE CHALLENGE

Between 1995 and 2005, our region disposed of approximately 33 million tons of municipal solid waste (MSW) i.e., garbage, into local landfills each year.[1] The average resident disposes of approximately 2.5 pounds of trash a day[2] while non-residential disposal adds up to 1.2 pounds disposed for every $10 of sales receipts.[3] The California waste stream is primarily composed of organic (food) waste, paper products, and construction and demolition debris. Harder-to-decompose items such as plastic, glass, metal, electronic, and hazardous wastes are also present in the waste stream in significant amounts (see **Figure 7.1**). Although we have made great strides in reducing per capita generation–in 1990, residential disposal was estimated at 3.1 pounds per day, existing landfills and potentially future landfills will not be enough to accommodate our growing population and economy. Therefore, it is imperative that the region work together to develop better waste management strategies.

Traditional solid waste management has relied heavily on creating high capacity, relatively local landfills (megafills) and, to a lesser extent in California, incineration technologies (such as direct combustion or combustion with energy recovery) to address disposal issues. However, due to significant public opposition, unavailability of suitable land, environmental concerns, and the regulatory framework, it has become increasingly difficult to expand and/or site, permit, and operate new landfills and waste-to-energy (incineration) facilities. Federal, State, and local zoning regulations restrict the number of sites suitable for development. Some restrictions on land use include

FIGURE 7.1



Overflowing landfills are a symptom of a bigger

WHEN LANDFILLS CLOSE

Although landfills employ extensive environmental control systems, concerns have been raised about post-closure operations and whether landfill operators are capable of maintaining landfill facilities until the waste no longer poses a risk to public health, safety, and the environment.

Post-closure care of landfills will require decision-makers, the waste industry, environmental organizations, and other stakeholders to continue working together towards developing an adequate solution.

areas with unstable soils and terrain, landslide-susceptibility, fault areas, seismic impact zones, land near airports, and land in 100 year flood plains. Potential landfill sites must also consider migration control of leachate and methane, soil type to provide a firm foundation, hydrologic settings that will affect landfill layout and drainage characteristics, and a host of other factors. In addition, local public opinion plays a big role in landfill siting discussions.[4, 5]

Dwindling landfill capacity near urban centers, increasing health and environmental concerns, and public policy goals promoting conservation of resources have forced both the region and the state to make concerted efforts at developing other approaches to waste management, including reducing the amount of waste that goes into landfills. The costs for landfilling our garbage will continue to increase as local landfill space decreases near urban centers. These costs will eventually be passed on to residents and businesses in the form of higher disposal fees and eventually, in conspicuous impacts to public health and the environment.

Overflowing landfills are primarily a symptom of a bigger problem—mismanagement of our natural resources. The result of this mismanagement is evident in the mountains of garbage that we produce and the associated health and environmental impacts that result. For example, to obtain the resources used in the manufacturing and production of many of the goods that we use everyday, the mining industry moves an estimated 28 billion tons of soil and rocks each year (globally).[6] A 1999 study puts this figure at 48.9 billion tons when biomass extraction is included and 8.2 tons per capita average global resource consumption. When broken down by country, figures show that on a per capita level, extraction of raw materials increases with development status.[7]

The goods produced from these resources are usually single-use products that are meant to be replaced or thrown away. This leads to an inextricable link between our level of resource consumption, the waste we produce, and many environmental problems. Mining leaves behind a wake of destructive impacts including threatening local and global biological diversity through habitat destruction; increased chemical contamination, erosion, and silting of lakes and streams; and toxic air pollution containing arsenic and lead emissions.[8]

THE PLAN

This chapter identifies a combination of both short and long term solutions to effectively address our overwhelming waste problem. In the short term, we still need to rely heavily on landfills. In the long term, we need to change the way we think about trash and move towards a system of waste prevention and minimization. The move towards this system will take time and require a variety of waste management strategies, including development of conversion technology facilities capable of converting post-recycled residual waste material into useful products to help reduce our dependence on landfills. The goal is to achieve maximum waste prevention and diversion of waste

from landfills, with corresponding diversion credit, utilizing all technologically feasible and fiscally prudent means.

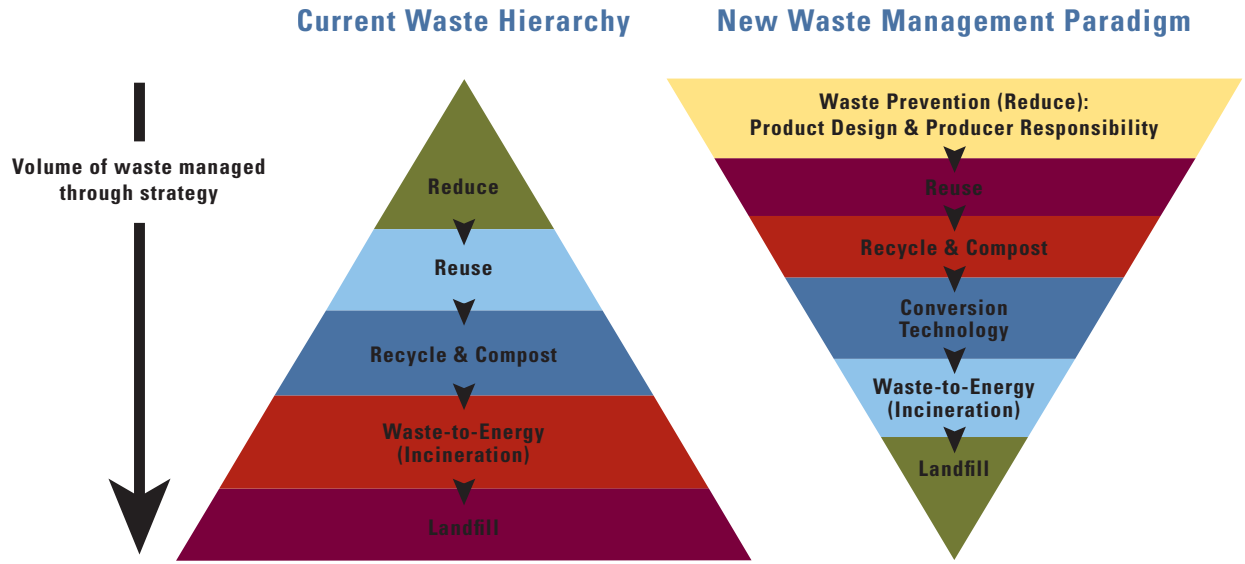
Strategies for Managing Our Waste

Landfills today are technically sophisticated, highly regulated, and closely monitored by many local and state agencies. Methane and leachate collection systems are installed in many facilities and state-of-the-art leachate[9] barriers (landfill liners) are required under current regulations. Some landfill operations in Southern California have methane capture technologies that turn methane emissions into energy. For example, the Puente Hills landfill currently produces 50 megawatts (gross) of power from landfill capture operations which it sells to Southern California Edison. One megawatt (one million watts) is enough to power up to 1000 average California households.[9b] Average landfill gas emissions are comprised of 50 percent methane (which is equivalent to about half the energy produced by combustion of natural gas). [10]

Landfills fill a critical need today and will continue to be needed well into the future. Even as we employ all waste prevention, recycling, reuse, composting, and conversion technology strate-

FIGURE 7.2

Envisioning a New Waste Management Paradigm



Source: SCAG

Despite our best efforts, there will always be inefficiencies

WHAT ARE LOCAL COMMUNITIES DOING?

Some forward thinking communities in the SCAG region are already implementing and adopting policies to increase their waste diversion goals and ensure a better quality of life for their local residents.

- City of Los Angeles: 70 percent diversion by 2020; 90 percent by 2025
- City of Santa Monica: 70 percent diversion by 2010
- City of Pasadena: No waste to landfills and incinerators by 2040
- 16 cities/townships in San Bernardino County have partnered to educate their residents and businesses on waste reduction, reuse and recycling*.

*as required by AB 939

gies, there will always be some inefficiencies in the system and therefore, waste that will need to be disposed at a landfill. The challenge will be to change our ideas of resource consumption and waste and to begin to think of disposal to landfills as the last resort in waste management. We must reduce our garbage volume and become more selective about what and how much we are willing to trash. Our current infrastructure to manage waste focuses on disposal first, followed by recycling, reducing, and reusing. The new waste hierarchy (first envisioned in 1989) focuses on reducing first, then reuse, recycling, conversion technologies and finally disposal to land fill (see **Figure 7.2**).

Shrinking local landfill capacity is also forcing us to transport waste to more distant landfills. A prime example of this is the planned waste-by-rail system being developed by the County Sanitation Districts of Los Angeles County. The system is designed to address the projected shortfall of disposal capacity in Los Angeles County by transporting post-recycled waste to an out-of-county landfill. The rail system will have multiple starting points at large-scale materials recovery facilities throughout Los Angeles County.[11] Existing rail lines will be used to transport the waste to Mesquite Regional Landfill, in Imperial County located approximately 35 miles east of Brawley. The 2,290 acre landfill is under construction and expected to be operational by 2012. It is permitted to accept up to 20,000 tons of waste per day (with up to 1,000 tons per day coming from Imperial County), and has a maximum capacity of 600 million tons of solid waste over a 100 year lifespan.[12, 13]

Due to potential air quality impact that may result from solid waste rail operations, it is expected that waste by rail operations will be consistent with strategies developed for the Air Quality Management Plan and the Regional Transportation Plan.

Although exporting waste is not a preferred waste management option, it is a necessary strategy for ensuring the County has a place to dispose of the garbage generated by County residents and businesses. Unlike other states, California does an excellent job of keeping solid waste within its borders. In the SCAG region, less than one percent of our waste is exported outside of the region.[14]

Diverting Garbage Away from Landfills

In 1989, the legislature passed the California Integrated Waste Management Act (AB 939).[15] This bill mandated a 50 percent solid waste diversion[16] rate by the year 2000 for all cities, counties, and applicable regional agencies in California, but did not include provisions for achieving the diversion rate. Under AB 939, local governments are responsible for preparing a diversion plan and instituting a financial mechanism to implement the plan.

Since then, Californians have done a great job in reducing the amount of waste sent to landfills. Although not all individual jurisdictions have managed to achieve the 50 percent diversion rate, jurisdictions are making good-faith efforts to comply with the unfunded mandate by implementing quality programs.

The estimated diversion rate for California in 2006 is 54 percent (our region's diversion rate is estimated at 50 percent). The California diversion rate translates to 50.1 million metric tons of waste (out of 92.2 million metric tons of waste generated) that avoided disposal to landfills.[17] Diversion is generally defined as the reduction or elimination of the amount of solid waste from solid waste disposal (to landfill or incineration). Thus far, only source reduction (waste prevention), reuse, recycling, and composting activities are considered diversion.

Economic Benefits of Diversion

Diversion activities create jobs, add local revenue, and help stimulate many economic sectors. Some employment opportunities created by these activities include government and private staffed collectors, recyclable material wholesalers, compost and miscellaneous organics producers, materials recovery facilities, glass container manufacturing plants, plastics converters, and retail used merchandise sales. A 2001 report from UC Berkeley stated that, "diverting solid waste has a significantly higher (positive) impact on the economy than disposing it." Diversion can help communities that do not have local landfill facilities save money by avoiding payment of tipping fees on each ton of waste disposed. The UC Berkeley study estimated that statewide economic impacts from disposal and diversion at 1999 rates were approximately 17 to 20 percent higher than the impacts if all the waste had been disposed (see **Table 7.1**).[18] This is because reuse and recycling are inherently value-adding,

TABLE 7.1 ECONOMIC IMPACTS OF 1999 WASTE GENERATION GOING TO DISPOSAL OR DISPOSAL AND DIVERSION

Region		Estimated Final Sales 1999 (billions of dollars)	Impact on Economy			
			Output[b] (billions of dollars)	Total Income[c] (billions of dollars)	Value Added[d] (billions of dollars)	Number of jobs created
All California	Disposal only	7.5	18.0	6.8	9.0	154, 000
	Disposal and Diversion	9.2	21.2	7.9	10.7	179,000
Southern California[a]	Disposal only	4.1	9.6	3.6	4.7	82,000
	Disposal and Diversion	5.1	11.3	4.2	5.6	95,000

Table adapted from Goldman, G. and A. Ogishi, 2001. The Economic Impact of Waste Disposal and Diversion in California. A Report to the California Integrated Waste Management Board.

[a] Southern California region includes all six SCAG region counties plus San Diego County.

[b] Output impact is a measure of how the disposal sectors influence total sector sales in the economy.

[c] Income impact measures income attributed to disposal-related economic sectors.

[d] Value added is the increase in the value of goods and services sold by all sectors of the economy.

HOW SOLID WASTE POLICIES IMPACT OTHER RESOURCES

Land Use and Housing: The siting of new or expanded waste management facilities are often incompatible with existing or planned land uses in a community. As our waste decreases, the need for new waste management facilities will also decrease.

Open Space and Habitat: Materials extraction activities are intensely disruptive to wildlife and their natural habitats. Changing and reducing the waste stream will significantly reduce open space impacts by reducing the need for raw materials extraction and reducing the pressure to open new landfills.

Water: Litter, especially plastics, can end up in waterways and become a significant source of pollution. With less to throw away non-point source pollution impacts can be decreased. Additionally decreased reliance on landfills will reduce future risks of groundwater contamination from landfills as they age.

whereas disposal is not; and value-adding processes support jobs and economic activity.[19]

Reuse and Recycling

California hosts approximately 5300 recycling and reuse facilities, employing 84,000 people and generating an annual payroll of $2.2 billion with $14.2 billion in annual revenues.[20] However, California's local recycling market is still unstable and extremely susceptible to competition from foreign recycling markets. Many countries will pay a premium for our recyclables because they lack their own raw materials. In an effort to support the local recycling industry, the California Integrated Waste Management Board (CIWMB) has developed the Recycling Market Development Zone (RMDZ) program. The program provides loans, technical assistance, and free product marketing to businesses that use materials from the waste stream to manufacture their products.[21] Although this market development program is important, local governments have continually stressed the need for the State to take a leadership role in developing markets since our services and products are trading and competing on a global basis, and thus are susceptible to events/market fluctuations throughout the world. Based on the economic principle of supply and demand, recyclables will end up in landfills if markets are not developed or strengthened.

Source: California Integrated Waste Management Board. 2004. Statewide Waste Characterization Study. (Publication # 340-04-005)

Reuse and recycling prevent pollution that may be caused by

There are numerous benefits to recycling and reuse programs. Reuse and recycling reduce the need for landfilling and prevent pollution that may be caused by the manufacturing, transportation, and use of products from virgin materials (see **Figure 7.3**). They help conserve natural resources (timber, water, minerals); sustain the environment for future generations; save energy and avoid fossil fuel use from extractive industries; decrease GHG emissions that contribute to global climate change; protect and expand U.S. manufacturing jobs; and increase U.S. competitiveness.[22]

A 1994 Tellus Institute study showed that with the exception of aggregate materials for road base, many materials show energy savings by using recycled materials instead of virgin materials. The range of differences in energy saved varies greatly. At the high end is aluminum -- it takes 142.68 MBtu (Million British Thermal Units)[*22b] per ton more to process aluminum from raw ore than it does to process the same product from recyclables. At the low end is molten glass for which the energy difference is only 1.54 MMBtu per ton of product.[23] A more recent life cycle assessment study from Alcoa (a leader in the production and management of primary aluminum) researchers has shown that it takes 95 percent less energy to recycle aluminum than to create it from raw materials.[24]

Construction and Demolition Debris

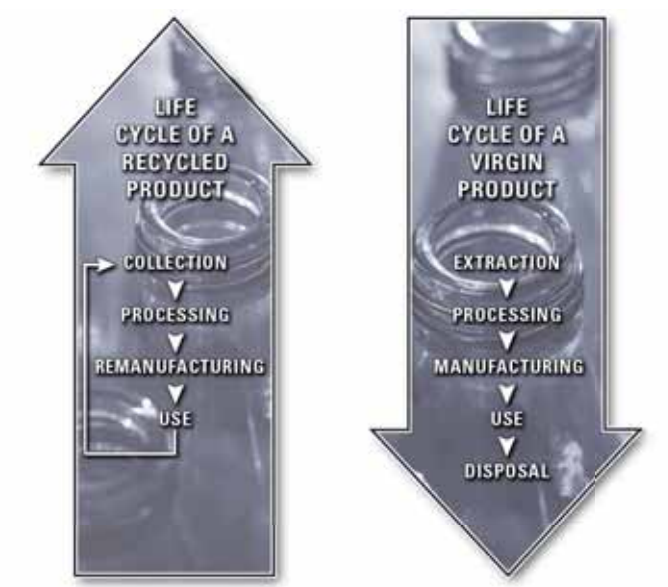
As of 2004, construction and demolition (C&D) debris comprised 21.7 percent of California's overall disposed waste

stream. This equates to approximately 8.7 million tons of C&D debris disposed to landfill. Lumber debris makes up half of that figure, followed by concrete, asphalt roofing, gypsum board, and composite/remainder C&D.[25]

Addressing C&D waste prevention can be as simple as using best management practices during construction such as advanced framing, double checking measurements to reduce sizing mistakes, and using durable materials that need less frequent replacement.[26] It also means using green building design principles to maximize the use of remanufactured, recycled, or more efficient materials or materials that are designed to be replaced in a modular manner. Unlike demolition waste, up to 80 percent of construction waste is reusable or recyclable.[27] C&D diversion rates have reached as high as 97 percent on individual State of California projects, and are typically at least 50-75 percent in green buildings.[28]

FIGURE 7.3

Comparing Life Cycles of a Recycled and Virgin Product



Source: Environmental Protection Agency. 1998. Puzzled About Recycling's Value? Look Beyond the Bin. EPA530-K-97-008. http://www.epa.gov/msw/recpubs.htm.

Cities and counties are starting to institute green building ordinances that require maximum recycling of C&D debris for many types of new construction. Uniform statewide requirements for green building or C&D recycling ordinances do not yet exist, although state legislation has been introduced to address this issue. Currently, each city or county develops its own ordinance: defining the size, cost, and type of project that is subject to C&D recycling as well as the amount of material recycling required.

The 2003 report to California's Sustainable Building Task Force provides a comprehensive and convincing study of the value of green building savings. It was found that although there were minimal increases of about 2 percent in up-front costs to add green building features, life cycle savings resulted in 20 percent of total construction costs—more than 10 times the initial investment. For example, an initial up-front investment of up to $100,000 to incorporate green building elements into a $5 million project would result in a savings of $1 million in today's dollars over the life of the building.[29]

The attraction of conversion technologies is their ability to

HOW SOLID WASTE POLICIES IMPACT OTHER RESOURCES

Energy: Recycling and waste prevention conserve energy. Making goods from recycled materials typically requires less energy than making goods from virgin materials. Waste prevention avoids energy used in the extraction, transport, and processing of raw materials to create new products.

Air Quality: Emissions from transport, manufacturing, production, and disposal and other waste management practices will be avoided through increased recycling, reuse, and waste prevention. Further, methane gas associated with new or expanded landfills can be reduced, with benefits for climate change and regional ozone planning efforts.

Transportation: As packaging waste is reduced, the need for vehicles to transport waste to disposal or recycling facilities should also be reduced.

Food Waste, Organics, and Composting

Californians throw away more than 5 million tons of food scraps each year. Food waste makes up 14 percent of California's waste stream. This includes all food being disposed by residences, businesses, schools, prisons, and other institutions. Green material collection programs have been implemented in many cities and counties, but not until recently have food scrap collection programs been more actively pursued. Management of food scraps provides additional opportunities to help meet the State's diversion goals as well as provide greater uses for this resource. The CIWMB suggests the following order for food scrap management: (1) prevent food waste, (2) feed people, (3) convert to animal feed and/or rendering, and (4) compost. Large events and venues, public facilities (e.g., public agency and school cafeterias), and private business such as restaurants and grocery stores could all be targeted for food waste diversion activities.[30]

Decomposition of food waste and other organics are a major source of greenhouse gas emissions from landfills. Organic waste comprises 30 percent of waste disposed to landfills. That figure includes food scraps, textiles, carpets, composite organics, and green material like landscape and tree trimmings, grass clippings, and agricultural residues. [30b] Diverting organic wastes to composting prevents the production of methane, which is produced during decomposition under anaerobic (oxygen-lacking) conditions such as those found in landfills. Composting has many environmental benefits. In addition to reducing landfill volume and emissions by diverting organic waste, compost can be used in the following ways: to enhance garden and agricultural soils, in wetland construction, as landfill cover, for erosion control, and in land/stream reclamation projects. Although there are environmental concerns associated with composting, primarily emissions and odor complaints, advancements in composting technologies and proper implementation of these technologies are able to help alleviate these concerns.

Conversion Technologies

Conversion technologies (CTs) refer to a diverse set of processes used to convert waste products into high-value goods such as industrial chemicals or gas, liquid, and solid fuels. Fuel products can be burned to produce energy or refined for higher quality uses to make a variety of industrial products.[31] The attraction of CTs is their ability to convert landfill waste into products that can take the place of fossil fuels mined from natural resources.

CTs target *post-recycled* municipal solid waste residuals currently destined for disposal at landfills as their feedstock (i.e., source of raw materials). That is, recyclables are removed and collected before waste is sent to a CT facility. Many CT proponents state that CTs with recycling offer a much better alternative than incineration or disposal to landfill. CTs also have the capability of recovering additional recyclable materials, especially metals and glass that might otherwise not be

feasibly recoverable since CTs operate better when recyclables are extracted prior to the conversion process.

A study conducted for CIWMB compared a life cycle analysis of landfills (with various stages of landfill gas collection), waste to energy (WTE) combustion (incineration), and hypothetical conversion technologies. It was found that the hypothetical CT scenario could potentially have a two times lower net energy consumption when compared to the incineration scenario and up to 11 times lower than landfill without energy recovery. The CT scenario included energy savings (10-20 percent of the total net energy savings) from additional materials recycling prior to conversion and the offsets associated with the prevention of extraction and production of virgin materials.[32] However, the environmental benefits of conversion technology scenarios are highly dependent on their ability to achieve high conversion efficiencies and high materials recycling rates.

At the present time, conversion technologies are considered ineligible as a diversion strategy under AB939 and the permitting and siting of CT facilities has been met with some opposition. CT opponents cite the currently impractical cost of CTs as well as the potential for CTs to compete with recycling (i.e., papers and plastics that could be recycled end up in a CT facility instead). Conversion technologies have been around for decades, but it is only recently that their applicability to solid waste management has begun to be fully developed. At this time, the successful development and use of CTs is occurring throughout Europe and Japan.

Three main categories of conversion technologies are being developed for management of solid waste - thermal, chemical, and biological conversion.

- Thermal (thermochemical) conversion is characterized by high temperatures processes to achieve high conversion rates of dry, organic material (such as plastics). These processes include gasification, pyrolysis, plasma arc, and catalytic cracking. Advanced thermal conversion primarily refer to technologies that employ only pyrolysis and/or gasification to process municipal solid waste.[33] The primary products of thermochemical conversion technologies include: fuel gas (syngas - CO_2, CO, CH_4, H_2), heat, liquid fuel, char, and ash.[34]

- Biological (biochemical) conversion processes rely on microorganisms to break down the biogenic, organic fraction of the waste stream. These processes focus on the conversion of biodegradable organics found in MSW residue into high energy products. The products of bioconversion are biogas (CH_4 and CO_2), biofuel (ethanol, biodiesel, fuel oil, etc.), and residue that can be used for compost. Biogas usually has less energy (Btu/ft^3) than syngas produced by thermal conversion systems.[35] Non-biodegradable organic feedstocks, such as most plastics, are not convertible by biochemical processes.

- Chemical (physicochemical) conversion processes use lower temperatures and reaction rates than thermal conversion. These processes rely on chemical reactions and

We need to address waste elimination at the source and let

HOW SOLID WASTE POLICIES IMPACT OTHER RESOURCES

Environmental Justice: Landfills and other solid waste management facilities tend to be built in areas that see them as a boost to their local economy. These areas tend to be in poor or minority neighborhoods. Reducing the need for new or expanded facilities could reduce their disproportionate impact on disadvantaged communities.

Climate Change: While capturing methane gas at landfills is increasingly common for conversion into valuable energy, reducing the amount of waste deposited into landfills reduces the need to build and expand landfills, which account for 1/3 of California's methane emissions. Methane is a very potent greenhouse gas that has 21 times more global warming potential than carbon dioxide.

focus on the conversion of organic wastes into high energy products. Processes, such as acid hyrolysis, thermal depolymerization, and fermentation typically focus on generating fuels such as ethanol or biodiesel.

Maximizing Diversion - A New Paradigm

In the last 10-15 years there has been a strong movement to acknowledge the link between the waste we generate and the natural resources we consume. Waste is a reflection of today's economy, based on the extraction of "cheap" resources to make products that are largely designed to end up in landfills. SCAG's 2004 Growth Vision recognized this and stated that "management of solid waste (and hazardous waste) must be sustainable in order to efficiently manage natural resources and in order to protect the environment today and in the future."

A new paradigm is taking shape that builds on all the waste diversion strategies that were previously discussed. Although the three Rs of solid waste management – Reduce, Reuse, Recycle – still hold true, a renewed emphasis on the first R is taking hold. We need to go beyond current waste diversion strategies by addressing waste elimination at the source and encouraging legislation requiring manufacturers to reduce waste. This will distribute the responsibility for waste on not just the consumer, but the producer as well. Instead of managing just the end results of our consumption-related activities (trash), we focus on resource conservation and management. The aim is to create a whole system approach to the way materials flow through society, where all discarded materials are resources for others to use and resource conservation and recovery is built into every process. It means designing and managing products and processes to reduce impacts to the environment, volume and toxicity of waste and materials, and waste of natural resources, as well as managing materials flow to prevent the creation of un-recyclable products. We may "never achieve 100 percent materials efficiency but, we can get darn close!"[38]

Strategies to maximize diversion look at the entire product life cycle to assess the true economic, environmental, and health-related costs of manufacturing products. Life cycle assessments[39] (LCAs) attempt to appraise all the inputs and outputs that are associated with the creation and disposal of a product such as, associated wastes and emissions of the manufacturing process and the future fate of the product. Using aluminum recycling and production as an example, downstream effects that should be analyzed would include the energy consumption and emissions of smelters used to melt the raw ore versus recyclable cans and the ultimate fate and use of the product. In some cases, recyclables that have been locally collected are exported for use overseas.

LCAs and similar applications can identify deficiencies in a process and help compare the benefits and costs of multiple systems. By evaluating the existing materials flowing through a community, we can identify opportunities to take one business's byproduct or waste and provide that material to another busi-

ness to uset as a source of raw material in their manufacuring process. In addition, an LCA that compares recycling systems with other waste management strategies (such as disposal at landfills or disposal at conversion technology facilities) would provide useful information for basing future waste management decisions. Such an LCA for California's waste management system would be a useful tool for local policymakers.

Promoting these types of strategies is good regional policy as existing businesses can save money by creating efficiencies in production and government agencies and other organizations have better analytical tools for making important decisions.[40] CIWMB currently runs a free materials exchange service, the California Materials Exchange (CalMAX) program, that helps businesses, organizations, and individuals find markets for materials that would otherwise be discarded.

Product Stewardship and Extended Producer Responsibility

This new paradigm requires that we change the current solid waste management hierarchy to one that focuses on product stewardship and extended producer responsibility principles because one of the most effective ways to manage waste is to prevent it from being produced in the first place.

Product stewardship is a product-centered approach to environmental protection. It extends the responsibility for a product to everyone involved in the product lifecycle. This means that manufacturers and producers design products that are recyclable, reusable, less toxic, less wasteful, and/or more durable. It also means getting rid of excessive packaging such as the cardboard box that encloses a plastic medicine bottle. Retailers and consumers are then responsible for ensuring that proper recycling and disposal of products occur.

Product stewardship is often used interchangeably with Extended Producer Responsibility (EPR). However, EPR focuses the brunt of the responsibility for creating an environmentally compatible product on the manufacturers and producers of the product. Producers retain responsibility for their end-of-life products. This provides them with incentives for designing products for recycling, reuse and easy dismantling.[41] For example, businesses making products that are leased, such as Hewlett-Packard have long known that their products will be returned so they have learned to make remanufacturing profitable. When businesses are compelled to internalize the true costs of wasteful packaging and inefficient material use, there is incentive to create more innovative and efficient waste management strategies.

EPR policies should give producers an incentive to design products that:

- Use fewer natural resources;
- Use greater amounts of recycled materials in manufacturing;
- Can be reused;

LIFE CYCLE ASSESSMENTS

Life Cycle Assessments (LCAs) need not be limited to analyzing the life cycle of a single product. LCA is a methodology that can analyze the interactions of a technological system with the environment. It can be used as a decision-making tool to help weigh environmental and health impacts between various waste management options. If used correctly,[36] LCAs can answer questions like, "Are impacts from manufacturing aluminum cans from raw material really much worse than the impacts from re-manufacturing of recycled aluminum and if so, how much worse?" and "Have the costs of environmental and health impacts, such as losing ecosystem services10 and the loss of worker days been calculated into the costs?" Governments, private firms, consumer organizations, and environmental groups can all use LCA as a decision support tool.[37]

- Can be more easily treated/dismantled and recycled; and
- Reduce or eliminate the use of hazardous substances or materials in the manufacturing of products.

The EPR approach should be seen as a system for preventive environmental policy-making. EPR promotes a sustainable approach to resource use and reduces the quantity of solid waste going to a landfill, by diverting end of life products to re-using, recycling, or other forms of recovery. Many corporations are recognizing the value of EPR and have developed voluntary EPR strategies in their organizations. However for EPR to be truly effective, legislation requiring the implementation of EPR practices will need to be instituted at the state and preferably, federal levels.

The Solid Waste Action Plan

The strategies described in this chapter are meant to provide background for implementing the action plan that follows. The goal is to create a vision for solid waste and resource management that will move our region toward a more sustainable and healthier future through a coordinated effort of implementing all of the short-term and long-term actions contained within this plan. Some of these actions will require changing the way our region thinks about solid waste management issues.

Future success in effective resource management will require a creative mix of proven, cost-effective strategies to satisfy anticipated waste disposal needs. Recycling, composting, conversion technologies, and landfills all play a part in moving towards maximizing diversion.

SOLID WASTE GOALS

- A region that conserves our natural resources, reduces our reliance on landfills, and creates new economic opportunities in the most environmentally responsible manner possible.

SOLID WASTE OUTCOMES

- All SCAG region jurisdictions should meet a 40 percent waste disposal rate[42] by 2035 to minimize disposal to landfills provided appropriate utilization of technologies are permitted and diversion credit is provided by the State for waste management strategies including, but not limited to, appropriate and environmentally sound recycling, composting, and conversion technologies with diversion credit as well as other actions and strategies contained in this chapter, such as product stewardship and extended producer responsibility.
- Conversion and other alternative technologies should be available as a diversion strategy in the next five years with one or more new conversion technology facilities sited in the SCAG region by 2020.

SOLID WASTE ACTION PLAN

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Public Health	Climate Change
SCAG Best Practices													
		X	SW-1 SCAG should encourage all levels of government to advocate for source reduction and waste prevention.			X	X	X		X		X	
X		X	SW-2 SCAG should encourage policies that: (a) promote expansion of recycling programs and facilities that provide local recycling services to public and private sectors and (b) encourage development of viable, local, and sustainable markets to divert materials from landfills.			X	X	X		X			X
X			SW-3 SCAG should adopt and implement a recycled content procurement program and participate in programs that promote the purchase of recycled content products			X	X	X		X			X
		X	SW-4 SCAG should support and encourage the CIWMB to conduct comprehensive life cycle assessments of all components of the waste management practices including but not limited to, waste disposal to landfills, composting, recycling, and conversion technologies. A comprehensive analysis must include environmental impacts, health effects, emissions, use of resources and personnel, costs of same to collect wastes and recyclables, transportation costs (local, within U.S. or international), processes to separate recyclables, and production of end products using collected recyclables and raw materials.			X	X	X					X
	X		SW-5 SCAG should continue to support and encourage legislation that advocates for the elimination of unnecessary duplication and/or restrictive regulations that hinder recycling, reuse, composting and conversion of solid waste and redefines conversion technologies as a diversion strategy to allow development of these facilities in the SCAG region.			X	X	X		X			X
		X	SW-6 SCAG should coordinate source reduction, reuse, recycling, composting, and conversion technology efforts to increase economies of scale.			X	X	X		X			X
		X	SW-7 SCAG should encourage the equal distribution of industrial impacts among all income levels from all types of solid waste management facilities including recycling, composting, and conversion technology facilities.	X		X	X	X		X			X
		X	SW-8 SCAG should support the development of public education and outreach efforts to increase awareness of the benefits of a regional policy to maximize diversion.			X	X	X		X			X
Voluntary Local Government Best Practices													
X			SW-9 Local governments should update general plans to reflect solid waste sustainability issues such as waste reduction goals and programs (1996 RCP; 135).	X		X	X	X	X				X
X			SW-10 Local governments should discourage the siting of new landfills unless all other waste reduction and prevention actions have been fully explored. If landfill siting or expansion is necessary, landfills should be sited with an adequate landfill-owned, undeveloped land buffer to minimize the potential adverse impacts of the landfill in neighboring communities.	X		X	X	X	X	X			X

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Public Health	Climate Change
X			SW-11 Local governments should discourage exporting of locally generated municipal solid waste (destined for landfills) outside of the SCAG region. Disposal within the county where the waste originates should be encouraged as much as possible, when appropriate. Green technologies for long-distance transport of waste (e.g., clean engines, clean locomotives or electric rail for waste-by-rail disposal systems) and consistency with AQMP and RTP policies should be required.	X	X	X	X	X	X	X		X	X
X			SW-12 Local governments should maximize waste diversion goals and practices and look for opportunities for voluntary actions to exceed the 50% waste diversion target.			X	X	X		X			X
X			SW-13 Local governments should build local markets for waste prevention, reduction, and recycling practices.			X	X	X		X			X
X	X		SW-14. Developers and local governments should integrate green building measures into project design and zoning including, but not limited to, those identified in the U.S. Green Building Council's Leadership in Energy and Environmental Design, Energy Star Homes, Green Point Rated Homes, and the California Green Builder Program. Construction reduction measures to be explored for new and remodeled buildings include: • Reuse and minimization of construction and demolition (C&D) debris and diversion of C&D waste from landfills to recycling facilities. • An ordinance that requires the inclusion of a waste management plan that promotes maximum C&D diversion. • Source reduction through (1) use of building materials that are more durable and easier to repair and maintain, (2) design to generate less scrap material through dimensional planning, (3) increased recycled content, (4) use of reclaimed building materials, and (5) use of structural materials in a dual role as finish material (e.g. stained concrete flooring, unfinished ceilings, etc.). • Reuse of existing building structure and shell in renovation projects. Building lifetime waste reduction measures that should be explored for new and remodeled buildings include: • Development of indoor recycling program and space. • Design for deconstruction. • Design for flexibility through use of moveable walls, raised floors, modular furniture, moveable task lighting and other reusable components.	X		X	X	X	X	X			X
X	X		SW-15 Local governments should develop ordinances that promote waste prevention and recycling such as: requiring waste prevention and recycling efforts at all large events and venues; implementing recycled content procurement programs; and instituting ordinances to divert food waste away from landfills and toward food banks and composting facilities.			X	X	X		X			X
X			SW-16 Local governments should support environmentally friendly alternative waste management strategies such as composting, recycling, and conversion technologies.			X	X	X		X			X
X			SW-17 Developers and local governments should develop and site composting, recycling, and conversion technology facilities that are environmentally friendly and have minimum environmental and health impacts.	X		X	X	X					X
X		X	SW-18 Developers and local governments should coordinate regional approaches and strategic siting of waste management facilities.	X		X	X	X					X

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Public Health	Climate Change
X			SW-19 Developers and local governments should facilitate the creation of synergistic linkages between community businesses and the development of eco-industrial parks and materials exchange centers where one entity's waste stream becomes another entity's raw material by making priority funding available for projects that involve co-location of facilities.	X		X	X	X					X
X			SW-20 Developers and local governments should prioritize siting of new solid waste management facilities including recycling, composting, and conversion technology facilities near existing waste management or material recovery facilities.	X		X	X	X					X
X			SW-21 Local governments should increase education programs to increase public awareness of reuse, recycling, composting, and green building benefits and raise consumer education issues at the County and City level and if appropriate, at local school districts and education facilities.			X	X	X		X			X
State and Federal Government Strategies													
	X		SW-22 CIWMB should create waste diversion incentives to increase waste diversion past 50% including credit for conversion technology.			X	X	X		X			X
	X		SW-23 Federal and State governments should develop and implement new and existing legislation that requires recycled content procurement programs, favoring the purchase of recycled and recyclable products or products with built-in EPR design in all state and federal agencies.			X	X	X		X			X
	X		SW-24 Federal and State governments should explore financial incentives such as tax credits, subsidies, and price supports for waste diversion activities that include waste reduction, recycling, composting, and conversion technologies.			X	X	X		X			X
	X	X	SW-25 CIWMB, Air Resources Board, and the California Water Resources Board should coordinate to address regulatory challenges and streamline the permitting process for solid waste conversion and composting technologies.			X	X	X					X
	X		SW-26 The federal government and CIWMB should establish policies that provide (a) diversion credit for beneficial use of post-recycled, solid waste residuals managed at non-burn conversion technology facilities, and (b) separate and remove conversion technologies from the "transformation" definition.			X	X	X	X			X	X
	X		SW-27 Federal, State, and local governments should support and encourage federal and state incentives for the research and development of pilot or demonstration projects for solid waste conversion technologies.			X	X	X	X				X
		X	SW-28 CIWMB should do the following to improve education and awareness of solid waste management issues: (a) actively promote education regarding reuse, recycling, composting and solid waste conversion technology programs; (b) provide information concerning the costs and benefits of these programs to local governments; and (c) facilitate state and local government coordination of consumer awareness programs to minimize unnecessary duplication of effort in solid waste outreach programs carried out by local government.			X	X	X	X	X			X
	X		SW-29 The Federal government should provide funding and support for continuation of waste management public education programs.			X	X	X	X	X			X
	X	X	SW-30 The CIWMB should take a more active leadership role in developing recycling markets since our local services and products are trading and competing on a global basis and thus are susceptible to events/market fluctuations throughout the world.			X	X	X	X	X			X

Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Public Health	Climate Change
State and Federal Government Initiatives													
	X		SW-1S Federal, State and local governments should support and implement source reduction policies which promote product stewardship through the following actions: • Create incentives for participation in Product Stewardship and Extended Producer Responsibility (EPR) initiatives such as, encouraging public-private partnerships with product stewardship goals (e.g. The European Green Dot system) and offering incentives to producers who use recycled content to encourage growth in the recycled contents market. • Create ordinances with EPR policies that require producers and manufacturers to produce "sustainable" packaging and products, develop life cycle assessments for products, as well as, support the development of infrastructure and markets for the recycling and reuse of these products. EPR principles that should be included are: increasing the useful life of products through durability and reparability; increasing production efficiency to produce less production waste and less packaging waste; increasing recyclable material content and reducing virgin material content; facilitating material or product reuse; and decreasing of the toxicity of products. Packaging should be easily recyclable or biodegradable based on any number of EPR strategies including, Design for the Environment or Design for Disassembly principles. For example, businesses such as, takeout food distributors, should utilize packaging that is compatible with recycling and composting options available.		X	X	X	X	X	X		X	X
	X		SW-2S Federal, State and local governments should create tax incentives that help companies derive profit from resource efficiency. Actions such as the following would be included: • Institute Pay As You Throw solid waste disposal systems, where customers are charged for disposal services based on the amount thrown away. • Require that companies take back certain types of packaging for reuse or recycling:		X	X	X	X	X	X		X	X

Footnotes

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[42] Waste disposal rate means the amount of waste sent to landfills. This disposal rate roughly translates to a 60% diversion rate but with the caveat that strategies not counted under the current definition of diversion (such as conversion technologies and certain types of source reduction efforts) are credited as diversion.

MID-WILSHIRE
Wilshire/ Western
Wilshire/ Normandie
Wilshire/ Vermont
Aviation/LAX
Hawthorne
Vermont
Mariposa
Crenshaw
Harbor Freeway
Douglas
Redondo Beach
SOUTH BAY
Wardlow
Willow
Pacific Coast Highway
Anaheim
Pacific
5th Street
1st Street

Transportation

THE CHALLENGE

The continuing urbanization of our Southern California region makes it more difficult to make dramatic improvements to our transportation system. Rebuilding and expanding an existing transportation facility in a built out urban environment is expensive and often unpopular. When transit projects, new roads, or other travel options are unveiled, we see temporary improvements. However, those often disappear within months, replaced by a return to traffic and congestion, which generally seem to get worse as the years go by. In 2006, the State of the Region report card gave a failing grade of "F" to Southern California, noting that we continue to rank as the most congested metropolitan region in the nation.

Our transportation challenge is shared by other metropolitan regions throughout the world. Traffic congestion is largely a symptom of the growth patterns of our region. The decentralization of our region's growth, combined with the sheer density of people, jobs, and cars makes it nearly impossible for our transportation system to keep pace. Indeed, a successful transportation plan in any growing region of the country is one that holds the line on traffic congestion. Most plans simply make future traffic "less worse" than if nothing were done altogether. However, even if we had limitless right-of-way and funds to expand our roads to relieve congestion, the short- and long-term impacts to people (and communities), traffic congestion, and the environment would be unacceptable.

Indeed, the transportation system heavily influences environmental, economic, and quality of life issues both positively and negatively. An efficient transportation system minimizes impacts to our air quality, surface and underground water supplies, and helps accommodate growth that minimizes the economic costs of living our lives. An inefficient system directly affects nearly every area of the environment and has an indirect set of impacts by inducing growth in areas where our public infrastructure is inadequate.

The Regional Transportation Plan (RTP)[1] process is legally required to be financially constrained. While the lack of adequate funding constrains our ability to do more, the RCP acknowledges that more must be done beyond the conventional transportation planning process to reduce congestion and vehicle miles traveled and increase the mobility of people and goods around the region with minimal interference.

The Transportation Chapter is founded on the premise that we need to make profound changes in the way we travel today

While the RTP is legally required to be financially constrained, more

HOW TRANSPORTATION POLICIES PRODUCE MULTIPLE BENEFITS

Land Use and Housing: Focusing transportation investments to serve critical centers for housing and jobs helps guide land use planning. In doing so, transportation investments can increase property values and demand for subsequent development, such as transit-oriented development.

Open Space and Habitat: Location choices for new or expanded transportation facilities can play a large role in the ability to maintain or limit impacts on existing natural lands.

Water: Promoting transportation projects that reduce urban sprawl can reduce surface water runoff contamination and maximize recharge of underground aquifers. Improved highway and roadway design can help mitigate transportation-related water quality problems.

and radically alter the way we plan our transportation system tomorrow.

Our challenges to developing transportation policies that can achieve ambitious mobility goals can be broadly divided into three categories:

- addressing demand on our transportation system from growth in population, employment and households,
- preserving, wisely utilizing, and, when necessary, expanding our infrastructure, and
- funding.

Demand on Our Transportation System

Each major mode in our transportation system faces challenges in meeting the growth in that is anticipated for our region. If current population and employment trends continue as projected, regional daily traffic delay is expected to more than double to 3.6 million hours of daily delay by 2030, unless travelers change their travel behavior. Travel speeds on highways will become more unpredictable and average speeds will decrease substantially. In addition to conventional passenger surface transportation, there are two other major dynamics that will continue to grow over the next 25 years and pose major challenges for the region.

Crisis in Transporting Goods. The Southern California region is facing dramatic growth in rail and truck traffic. Almost all of the short-haul and a significant share of medium- and long-haul movement of goods occur by truck. Severe congestion due to truck traffic is expected to worsen in the region's major transportation corridors like the I-710 and SR-60 freeways. The regional system is expected to see up to 216 percent more truck trips by 2035. Containerized trade volume is expected to triple to 42.5 million Twenty-Foot Equivalent Units (TEUs) [2] by 2030. These forecasts are capacity-constrained by the size of the ports and are significantly below anticipated demand, based on an increase of port terminal productivity from 4,700 TEUs per acre per year currently to over 10,000 TEUs per acre per year in the future. The ability of the ports to handle this unprecedented growth in containerized cargo volumes is critical to the continued health of the local, regional, and the national economy.

The challenge in addressing the growth of containerized cargo at the ports is compounded by traffic bottlenecks for trucks entering and leaving the port areas. Additionally, the region's intermodal rail yards are reaching capacity and causing delays in moving both international and domestic containers between rail and trucks. Our ability to accommodate the subsequent rail and truck distribution traffic will substantially influence whether we can achieve ambitious transportation goals.

Air Travel. The level of air passenger demand is forecast to double from the current regional level of 88 million annual passengers (MAP) before 2035. For every one million regional air passengers, it is estimated that there is a positive regional

economic impact of $620 million (in 1998 dollars) and 4,475 jobs. In addition, the number of jobs created by air cargo and freight movement in the region is enormous and vital to the overall health of the regional economy. However, the increased traffic that will cross our region's roads and freeways to get to our eight commercial service airports must be addressed if we are to reduce congestion beyond current levels.

Preserving and Expanding Our Infrastructure

The region must get the most out of the current system. This is especially true for the State Highway System owned by CalTrans. Small physical improvements (e.g., auxiliary lanes that extend the merging range) and technology deployments (e.g., advanced ramp metering) offer us affordable solutions to restore some of the lost productivity due to increasing congestion. These technology deployments are often referred to as Intelligent Transportation Systems or ITS. The combination of investments reduces delays and the duration of congestion, and improves the predictability of travel time.

Every investment in our transportation system creates a long-term commitment to operate and maintain that infrastructure. Current estimates show that our region needs $40 billion in order to maintain our current system. However, we have a funding shortfall of over $26 billion, meaning that as most of our transportation infrastructure ages and there is less money for preservation and maintenance, it will ultimately cost more to restore or replace it.

In light of this inability to even maintain our existing system, the region must find ways to expand travel options for passenger and freight movement. Conventional multi-modal investments must be complemented with unconventional means of addressing transportation, including land use strategies, market-based initiatives, and other major, innovative programs if we are to reverse the trends toward increasing congestion and vehicle miles traveled.

Financial Needs

The SCAG region faces significant financial challenges to meet current transportation maintenance and operational needs for the RTP horizon, not to mention what is needed to further improve mobility and air quality in the region. Historical sources of funding such as gas taxes may be a decreasing source of revenue in light of potential shifts to other fuel sources. Public-private partnerships, user fees, and other sources of revenue must be explored if we are to find new ways to address current and future congestion.

THE PLAN

While the RCP calls for unprecedented goals and action, it is primarily an advisory document. The 2008 RTP comprises the constrained, or funded, foundation of any more ambitious long-term plan. The 2008 RTP relies on a number of strategies to achieve more modest, constrained goals. These include an increased focus on operational, management and preservation

Our region needs to do more now to plan for the unprecedented growth

HOW TRANSPORTATION POLICIES PRODUCE MULTIPLE BENEFITS

Energy: The transition of the vehicle fleet to non-petroleum-based energy sources will have profound changes in overall energy demand. The impact of potential shifts to electric-powered sources of transportation on power plants must be addressed.

Air Quality: On-road mobile sources make up 40% and 57% of our region's smog-forming ROG and NO_x emissions, and 77% of carbon monoxide emissions. Transition of passenger and freight vehicle fleets to cleaner fuels is an important strategy in the region's efforts to achieve clean air standards and reduce localized hotspots of toxic air pollutants.

Economy: Improved mobility has a profound impact on the economy as traffic delays time and associated additional fuel costs are distributed throughout the economy, particularly as it impacts the movement of goods.

strategies; land-use integration with transportation investments; and strategic system expansion investments.

Preservation – Protecting our Infrastructure

The 2008 RTP proposes setting aside substantial funding for infrastructure preservation. However, there remains a substantial shortfall in funding the $40 billion in needs.

Operational Strategies – Getting the Most Out of Our Existing System

The Highways and Arterials Supplemental Report of the 2008 RTP proposes funding for operational strategies that can improve the productivity of the Regional Highway System through 2035. The total amount of funding for these improvements represents less than one percent of the overall RTP expenditures, but the benefits, when compared to the costs, are expected to be significant.

Transportation Demand Management (TDM)

The 2008 RTP includes $1.25 billion in TDM investments through 2030, with over $900 million dedicated to non-motorized transportation improvements.

Strategic System Expansion/Capital Investments

SCAGs transportation plan proposes a balanced investment in all of the Region's travel modes so that the system performs at the highest level possible.

For example, the 2008 RTP includes a Strategic Arterial Improvement concept that could involve a combination of road widening, signal prioritization and other Intelligent Transportation Systems (ITS) deployment as well as, grade separation at critically high-volume intersections to enhance the flow speed and capacity of the arterial system. In addition to the specific arterial improvements identified under the Smart Street Improvement Program, this Plan proposes a significant increase in funding for arterial improvements and capacity enhancements.

Strategic Growth Linked to Transportation

The 2008 RTP will continue to promote voluntary land use policies that are demonstrated to be both regionally beneficial relative to their performance in the regional transportation system and reflective of emerging public policy, development patterns, and community needs throughout the region.

These policies and strategies were founded on the principles developed through the regional growth visioning efforts begun in 2001. Policies/strategies will include the following [3]:

- Identify regional strategic areas for infill and investment.
- Structure the plan on a 3-tiered system of centers development.
- Develop "complete communities" through a concentration of activities with housing, employment, and a mix of retail and services, located in close proximity to each other.
- Develop nodes (that are people-scaled, walkable communities) on a corridor.
- Plan for additional housing and jobs near transit.
- Plan for a changing demand in types of housing (due to shifts in the labor force).
- Continue to protect stable existing single family areas.
- Ensure adequate access to open space and preservation of habitat.
- Integrate land use to decentralized regional aviation strategy and job creation.
- Incorporate local input and feedback on future growth.

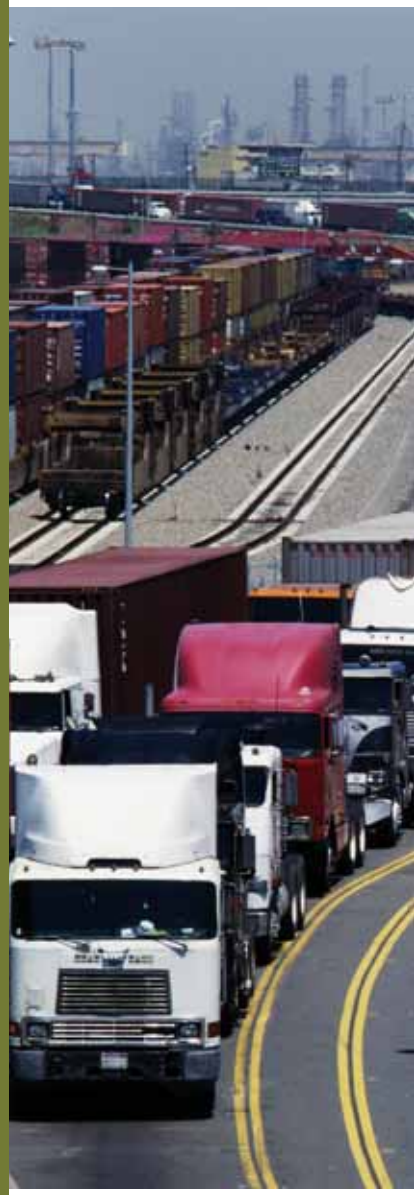
In addition, there are emerging planning practices that link transportation with efficient land use planning.

Examples of such planning practices include the twin concepts of Complete Streets and Green Streets. In conventional transportation planning, many streets are designed solely for the automobile. They lack adequate sidewalks to support wheelchairs; are not wide enough to support bicycle lanes or transit riders; and, in some cases, simply lack sidewalks. These "incomplete streets" serve as a disincentive for other modes of transportation besides the automobile. By incorporating transportation and land use improvements that provide incentives for alternatives to the automobile, the efficiency of the system can be increased. These "complete streets" are designed and operated to enable safe, attractive, and comfortable access and travel for all users, regardless of mode.

The complementary concept of Green Streets incorporates the use of trees, plantings and other "greening" techniques that can provide a sense of "public space" encouraging bicycle and pedestrian travel. Green Streets can also reduce the urban heat sink effect, help manage stormwater runoff by filtering the water through vegetation, and provide positive psychological benefits to local residents.

Goods Movement Strategies

Our region needs to do more now to plan for the unprecedented growth in future cargo volumes and their impacts on our air and surface transportation system. To that end, the San Pedro Bay ports are planning and developing programs to increase capacity and enhance operational efficiency in the handling of



The increased use of market-based incentives should be considered

HOW TRANSPORTATION POLICIES PRODUCE MULTIPLE BENEFITS

Public Health: Reducing and eliminating passenger and freight-related vehicle travel and congestion will reduce adverse health impacts from transportation-related air pollution. For example, living near heavy traffic nearly triples the chance of emergency room visits or hospitalizations for asthma sufferers.

Environmental Justice: Developing an effective long-term transportation system must avoid, minimize, or mitigate disproportionately adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations. It must also ensure full and fair participation by all affected communities in the transportation decision-making process.

Climate Change: Policies that encourage and expand public transit will reduce passenger vehicle use and subsequently reduce greenhouse gas emissions.

cargo, while minimizing the impacts of port goods movement activity on the environment and public health. Some of these strategies that will play a key role in allowing the ports to realize their full potential in supporting the growth in cargo include the following:

- On-dock Rail Capacity Enhancements,
- PierPass Off-peak Program,
- Virtual Container Yards, and
- Port Clean Air Action Plan Strategies

Looking beyond the Ports to the freight distribution network, the RTP will include strategies to facilitate truck movement including:

- Truck Climbing Lanes,
- Dedicated Truck Lanes, and
- Truck Emission Control Strategies

SCAG's 2008 RTP also proposes rail system capacity enhancements that reduce truck traffic, including, rail grade separations, and improve freight mobility, and exploring alternatives to reduce rail emissions. These strategies include:

- Near Dock Intermodal Yard Capacity Enhancements,
- Rail Mainline Capacity Improvements,
- Rail Grade Separations,
- On-dock Rail Projects,
- HSRT Freight Corridor, and
- Locomotive Engine Upgrades

Finally, Inland Ports and related initiatives have been proposed to reduce truck vehicle miles traveled (VMT), decrease congestion, and lower emissions. The broad potential benefits of an inland port include facilitating goods movement, encouraging economic development, reducing traffic congestion, and promoting the regional objectives.

High Speed Rail Transport System (HSRT)

The HSRT system comprises a long-term vision connecting the region's ports, airports, and urban activity centers. The system can be constructed in multiple stages that can each be financially viable. The financial performance will be enhanced as the system is extended in connectivity throughout the region and the volume of users increases.

Aviation

SCAG's Regional Aviation Strategy would accommodate a total regional passenger aviation demand of 170 million annual passengers (MAP). Under the Strategy, rather than relying on expanding existing urban airports, the future demand for

air travel will be largely served by using available capacity at airfields located in the Inland Empire and north Los Angeles County where projected population growth will be best served. This plan calls for constraining the LAX to its estimated existing physical capacity of 78 MAP, increasing the Ontario International Airport to 30 MAP, and the development of a new passenger airport at Palmdale that will accommodate 12.8 MAP.

Cooperation between airport authorities is necessary to ensure efficient usage of capacity. Cooperation between airports would be accomplished through the integration of airport master plans, and the development of memoranda of understanding and contractual agreements between airports. These agreements would also identify complementary roles and market niches between airports to increase synergy in the system and maximize utilization of available airport capacities throughout the region. For example, Los Angeles World Airports would play a key role in integrating master plans for the three airports it operates, namely LAX, Ontario and Palmdale.

Airport Ground Access

SCAG's Regional Aviation Strategy will have localized ground access impacts at a number of airports. Particularly, the Regional Aviation Strategy will result in dramatic increases in airport activities (people as well as cargo) at Ontario, Palmdale and a number of other airports. A number of freeway and arterial improvements and transit strategies are proposed in SCAG's 2008 RTP to address the ground access issues as part of the overall transportation investment in the region.

The Regional Aviation Strategy was developed as part of the regional transportation planning process and was adopted as part of the 2008 RTP.

Beyond the RTP

Beyond the constraints of the RTP, more should be done to reduce VMT, congestion and improve air quality. Any new strategies will likely call for collaboration and cooperation with local, state and federal governments. Public-private partnerships will also need to be explored to tap into new resources for investment.

One example of public-private partnerships may be the implementation of market-based incentives, such as (but not limited to) High Occupancy Toll Lanes or congestion pricing. These strategies offer promise in mitigating traffic volumes on existing roadways and managing future travel on new facilities. The ability of market based incentives to achieve transportation goals and improve air quality should be maximized while addressing potential economic and social concerns.

The RCP's strategic initiatives reflect broad categories of best practices that could be used to help create a more efficient transportation system. Many of these ideas can be found in the strategic plan for the 2008 RTP which was adopted on May 8, 2008.

EMERGING PLANNING PRACTICES - GREEN STREETS

The Oros Green Street Project located at the Los Angeles River in Elysian Valley is the first "Green Streets" project in Los Angeles. It is an eco-friendly and innovative model of sustainability that provides a pleasant, pedestrian pathway while managing and cleansing storm and dry weather runoff and pollutants that traditionally went directly to the stormwater system (and the Los Angeles River).

The project was designed to capture stormwater runoff from private homes and a residential street and clean it through a series of soil filtration and vegetative bioretention treatments before it ever gets into the Los Angeles River. The Oros Green Street Project simultaneously improved and beautified the neighborhood by adding both new infrastructure and greenscape.

source: northeasttrees.org

TRANSPORTATION GOALS

- A more efficient transportation system that reduces and better manages vehicle activity.
- A cleaner transportation system that minimizes air quality impacts and is energy efficient.

TRANSPORTATION OUTCOMES

- Reduce the region's vehicle miles traveled from all vehicles and from carbon-based fueled vehicles to 1990 levels by 2020.
- Reduce the region's use of gasoline and diesel fuel from on-road vehicles to 1990 levels by 2020, including accelerating the penetration of vehicles fueled by fuel cells or other non-petroleum based engine technologies.

TRANSPORTATION ACTION PLAN

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
		X	TR-1 SCAG should ensure that transportation investments are based on SCAG's adopted Regional Performance Indicators.	X	X		X		X	X		X	X
		X	TR-2 SCAG should ensure safety, adequate maintenance, and efficiency of operations on the existing multi-modal transportation system that should be RTP priorities and should be balanced against the need for system expansion investments.	X	X		X		X			X	X
		X	TR-3 SCAG should develop a collaborative implementation program that identifies required actions and policies for RTP land use and growth strategies that differ from expected trends.	X	X		X	X	X		X	X	X
		X	TR-4 SCAG should support and encourage High Occupancy Vehicle gap closures that significantly increase transit and rideshare usage.		X		X					X	X
		X	TR-5 SCAG should monitor progress of the RTP, including timely implementation of projects, programs, and strategies.									X	
		X	TR-6 SCAG should address SAFETEA-LU requirements that call for improved safety planning and consultation with environmental and natural resource stakeholders when considering transportation funding plans, programs, and projects.	X	X	X	X	X	X	X	X	X	X

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Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives													
X		X	TR-1S SCAG, transportation commissions, local governments, and other project proponents should consider using the Compass Blueprint[4] to influence the funding of future transportation planning and investments.	X	X		X	X	X			X	X
X		X	TR-2S SCAG should help coordinate regional, State, and federal consensus on how to address the additional strategic investments and technological breakthroughs necessary to meet mobility and air quality goals.	X	X		X		X		X	X	X
X	X	X	TR-3S Beyond the RTP, SCAG should study the effectiveness of market based incentives and disincentives that can be used separately or in conjunction with each other in order to reduce VMT.		X		X	X	X			X	X

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Footnotes

[1] Regional Transportation Plan (RTP) - The Southern California Association of Governments' 2008 Regional Transportation Plan (RTP) is a 30-year plan that provides a vision for transportation investments in the SCAG region using an assessment of growth and economic trends over the next two decades.

[2] Twenty-foot Equivalent Units (TEUs) - A Twenty Foot Unit is a measurement based on a 20 foot container commonly connected to a commercial vehicle. It is the standard unit for describing a ship's cargo carrying capacity, or a shipping terminal's cargo handling capacity. A standard forty-foot (40x8x8 feet) container equals two TEUs (each 20x8x8 feet).

[3] A more detailed description of these strategies and policies can be found on pages 90-92 of SCAG's 2008 Regional Transportation Plan, adopted May 2008.

[4] SCAG's Compass Blueprint are a set of advisory land use policies and strategies for future regional planning effors and seeks to integrate land use and transportation with the goal of accommodating future growth while improving mobility for all residents; fostering livability in all communities; enabling prosperity for all people; and promoting sustainability for future generations.

Security and Emergency Preparedness

THE CHALLENGE

Southern California is home to significant threats; including earthquakes, tsunamis, wildfires, flooding and mudslides. More recently, terrorism has been added to the threats that the region must prepare against. The complexity of the SCAG region, with a range of potential terrorism targets, presents significant challenges in coordinating and implementing effective homeland security programs. The unexpected and complex nature of these natural and human-caused incidents require extensive coordination, collaboration and flexibility among all of the agencies and organizations involved in planning, mitigation, response and recovery.

This chapter focuses on safety and security. Given the complexity of these issues, definitions can help frame the discussion. **Safety** is defined as the protection of persons and property from unintentional damage or destruction caused by accidental or natural events. **Security** is defined as the protection of persons or property from intentional damage or destruction caused by vandalism, criminal activity or terrorist attacks.[1] The Transportation Research Board has classified emergency events that affect transportation agencies into several categories, which is illustrated below in **Table 9.1**.

The interdependency of the jurisdictions and organizations makes regional cooperation and coordination essential to security and emergency preparedness. No significant event is truly local, as political boundaries are permeable and critical local infrastructure may serve the entire region. No jurisdiction stands alone. A high-risk, well-resourced municipality may be as dependent on a smaller jurisdiction for support in an emergency and vice-versa. Typically, no single agency is responsible for transportation security. At the local level, safety may be handled within one office, especially within transit agencies. However, the security of a surface transportation mode is often managed by more than one entity. For example, highways and transit networks traverse multiple police jurisdictions, local fire departments generally fill the incident command role after terrorist events, regional command and control centers respond to both natural and intentional disasters, and federal agencies intervene as needed and based on specific guidelines such as the crossing of state boundaries.

A proactive region that improves its homeland security programs and prepares for emergencies is better insulated against the economic, public health, transportation, and other impacts from natural and human-caused accidents. When a disaster occurs, there is a cascading effect on the transportation, utili-

When a disaster occurs, there is a cascading effect on the transportation,

HOW SECURITY AND EMERGENCY PREPAREDNESS POLICIES PRODUCE MULTIPLE BENEFITS

Land Use and Housing: Minimizing impacts related to emergencies should influence land use decisions, such as minimizing tsunami or flood-related impacts could result in rezoning low-lying land, bringing potentially high value land off of the housing market.

Open Space and Habitat: Weighing wildfire risk would likely limit development in certain high wildfire risk areas.

Water: Drinking water supply is a sensitive target for both natural and human-caused emergencies. Investments that minimize risks to drinking water will necessarily benefit our ability to ensure an adequate, safe water supply.

Energy: Minimizing our reliance on petroleum sources of energy insulates us from acute oil shortages due to terrorist or natural events (e.g., hurricanes impacting refineries).

ties, communications, fuel, and water infrastructure services and delivery systems that we depend on. When one of these critical elements in our support system breaks down, it has a domino effect on other elements. When multiple elements break down, the effect can be crippling. Some of the ways in which the infrastructure can be affected in a disaster or emergency and effects on emergency service providers are shown in **Tables 9.2** and **9.3**.

A continuing, cooperative and collective regional effort will be needed to assist the region in the planning, preparation and response to emergencies, whether caused by natural or human elements. To assist in this effort, this chapter identifies SCAG's potential role and responsibility in regards to the relationship between transportation and emergency preparedness. It describes the current programs at the federal, State and local levels; identifies security issues in the transportation infrastructure; and recommends policies for SCAG and other stakeholders.

The continued emphasis on enhancing transportation security is also reflected in the most recent transportation authorization bill, known as SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act–A Legacy for Users). SAFETEA-LU specifies that Metropolitan Planning Organizations (MPOs) such as SCAG develop a metropolitan

TABLE 9.1 EMERGENCY EVENTS IMPACTING TRANSPORTATION AGENCIES[2]

Naturally Occurring	Human Caused	
	Intentional	Non-Intentional
Droughts Dust/Wind Storms Earthquakes Electrical Storms Floods High Winds Hurricanes Ice Storms Landslides Naturally Occurring Epidemics Snowstorms and Blizzards Tornadoes Tropical Storms Tsunamis Wildfires	Bomb Threats and Other Threats of Violence Disruption of Supply Sources Fire/Arson Fraud/Embezzlement Labor Disputes/Strikes Misuse of Resources Riot/Civil Disorder Sabotage: External and Internal Actors Security Breaches Terrorist Assaults Using Chemical, Biological, Radiological, or Nuclear Agents Terrorist Assaults Using Explosives, Firearms, or Conventional Weapons Theft Vandalism War Workplace Violence Cyber Attacks	Accidental Contamination or Hazardous Materials Spills Accidental Damage to or Destruction of Physical Plant and Assets Accidents That Affect the Transportation System Gas Outages Human Errors HVAC System Failures or Malfunctions Inappropriate Training on Emergency Procedures Power Outages Software/Hardware Failures or Malfunctions Unavailability of Key Personnel Uninterruptible Power Supply (UPS) Failure or Malfunction Voice and Data Telecommunications Failures or Malfunctions Water Outages

planning process that provides consideration for projects and strategies that will "increase the security of the transportation system for motorized and non-motorized users."

THE PLAN

The RCP aims to achieve and sustain risk-based target levels of capability to prevent, protect against, respond to, and recover from major human- caused or natural events in order to minimize the threat and impact to lives, property and the regional economy. This centers around coordinating the numerous plans, programs, organizations and infrastructure in place within SCAG's purview to provide safety and security of the regional transportation system for many potential situations.

SCAG's role in homeland security is based on the potential role of a MPO in relationship to six phases of an incident/disaster:[3]

- Prevention: Stopping an attack before it occurs; improved facility design; surveillance, monitoring
- Response/Mitigation: Reducing impacts of an attack; evacuation; identifying best routes; effective communication system
- Monitoring: Monitoring and evaluating incidents; surveillance, monitoring, sensing, public information
- Recovery: Facilitating and reconstruction, restoring operation of transportation system
- Investigation: Determination of causes, and responsible parties; security/police activity
- Institutional Learning: Self-assessment of actions; feedback to prevention element

TABLE 9.2 POSSIBLE EFFECTS OF DAMAGE TO INFRASTRUCTURE[3]

Service	Effect
Transportation	Inability to get emergency service personnel into the affected area. Inability to transport victims away from the area.
Electrical	Increased risk of fire and electrical shock. Possible disruption to transportation system if downed lines are across roads.
Telephone	Lost contact between victims, service providers, and family members. System overload due to calls from or to friends or relatives.
Water	Disruption of service to homes, businesses, and medical providers. Inadequate water supply for firefighting. Increased risk to public health if there is extensive damage to the water supply or if it becomes contaminated.
Fuel Supplies	Increased risk of fire or explosion from ruptured fuel lines. Risk of asphyxiation from natural gas leaks in confined areas.

The RCP aims to prevent, protect against, respond to, and recover from

HOW SECURITY AND EMERGENCY PREPAREDNESS POLICIES PRODUCE MULTIPLE BENEFITS

Air Quality: Reducing our exposure to emergency scenarios can substantially protect short- and long-term air quality as Southern California's existing air quality challenges could be exasperated by terrorist attacks or other disasters. For example, a fire at one of the region's oil refineries would cause a significant acute increase in emissions of particulates and toxic air contaminants.

Transportation: Increasing funding for transportation system preservation and maintenance reduces the likelihood of facility failure (e.g., a bridge collapse) that can cause short-term disruptions to circulation. However, it could also reduce funding transportation system expansion.

Because of its traditional role as the MPO for the six-county Southern California region, SCAG is best suited to provide a forum where plans and data can be developed and coordinated with other regional planning efforts; and work towards developing regional consensus, but not be responsible for operation and implementation of plans and programs. SCAG should play a lead role in some areas, a minor role in others, or play no role at all. For example, SCAG has almost no role in the investigation aspect of security and only a minor role as a champion. However, SCAG could play a lead role in championing prevention and developing the institutional learning. SCAG could play a significant role in helping the region coordinate planning in preparation and anticipation of potential future incidents; and coordinate public information dissemination strategies.

A data provision role is designed to support federal, state and local security and emergency responders. The RCP proposes that SCAG support these front-line responders to ensure that planning and information are available to help the region deal with inevitable emergencies.

The recommended policies of this plan are also designed to urge transportation planning agencies to devote adequate funding to the operations and maintenance of our aging transportation system. Failing infrastructure is often the result of insufficient roadway, bridge, and transit system maintenance due to lack of funding or other resources. While not as glamorous as earmarking funding for roadway and transit system expansions, our region must improve its commitment to ensuring that the

TABLE 9.3 POSSIBLE EFFECTS OF DAMAGE ON EMERGENCY SERVICE PROVIDERS[4]

Type of Damage	Effect
Roadways, Bridges, Tunnels, Interchanges	Inability to assess damage accurately. Ambulances prevented from reaching victims and/or victims prevented from reaching emergency medical services. Police prevented from reaching areas of civil unrest. Fire departments prevented from getting to fires. Flow of needed supplies is interrupted. Inability to deploy assets as part of incident response and to manage transportation flows Inability for emergency service providers to manage an evacuation
Structural	Damaged hospitals unable to receive patients. Increased risk of damage from falling debris.
Disrupted Communication	Victims unable to call for help. Coordination of services is hampered. Inability for incident command structure to receive real time situational information, reducing its effectiveness
Fuel Line Damage	Fire and paramedic services overburdened. Inability to sustain emergency response and recovery
Disrupted Water Service	Firefighting capabilities restricted. Medical facilities hampered.

existing transportation system is safe and secure from natural and man-made incidents. To that end, the RCP recommends that SCAG work with partner agencies, federal, state and local jurisdictions to find opportunities to leverage and effectively utilize transportation and public safety/security resources in support of this effort. In the event of a natural or man-made incident, SCAG would work with the state and federal government to "fast track" the programming of transportation infrastructure repairs (i.e., accelerated contracting process or streamlined environmental review).

Table 9.4 highlights SCAG's role in responding to specific threats to the region.

Wildfires. Wildfires are the most frequent threat to the region. Depending on atmospheric conditions and location, wildfires could damage small amounts of vegetation, or they could wipe out entire communities. Homes on hillsides or canyons are especially at risk, not just during the fire, but also after the fire has passed when the hillsides and canyons are vulnerable to landslides, mudslides, and flooding. Homes in these vulnerable areas often have few evacuation route options.

TABLE 9.4 SCAG'S ROLE IN SECURITY AND EMERGENCY PREPAREDNESS

Incident Phase	Traditional	Convener	Champion	Developer	Operator
Prevention	●	☑	☑	●	☒
Response/Mitigation	●	☑	☑	●	☒
Monitoring/Information	●	☑	☑	●	☒
Recovery	●	☑	●	☒	☒
Investigation	●	☒	☒	☒	☒
Institutional Learning	☑	☑	☑	☑	☑

No Role ☒ Minor Role ● Lead Role ☑

Roles:	
Traditional	Help manage the system management and operations role in the ongoing transportation planning activities. The primary responsibility for projects rests elsewhere.
Convener	The MPO acts as a forum where operations plans can be discussed and coordinated with other plans in the region, still not responsible for operation and implementation.
Champion	The MPO works aggressively to develop regional consensus on operations planning. MPO planners develop programs and projects and the MPO takes the lead in developing regional agreements on coordinated operations.
Developer	MPO develops regional operation plans and incorporates operations strategies into the transportation plan. System-oriented performance measures would be used to identify strategic operations gaps in the transportation system.
Operator	The MPO would be responsible for implementing operations strategies that were developed as part of the MPO-led planning process.

We must increase per capita funding for transportation system

HOW SECURITY AND EMERGENCY PREPAREDNESS POLICIES PRODUCE MULTIPLE BENEFITS

Economy: Taking risk adverse positions on investments may result in overinvestment in security-related improvements to the detriment of other public needs.

Public Health: Preventing man-made events can reduce impacts to public health in a number of ways. For example, during severe wildfires, children who do not have asthma experience asthma-like symptoms, including noise, eye, and throat irritations.

Environmental Justice: Developing effective plans for ensuring public safety and emergency preparedness system must avoid, minimize, or mitigate disproportionately adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations. It must also ensure full and fair participation by all affected communities in the decision-making process.

In response, local governments have begun using innovative emergency warning systems, such as reverse 911 to warn residents when the need to evacuate arises. New Intelligent Transportation System technologies can also aid the free flow of evacuees away from a danger area by monitoring traffic to prevent congestion.

Earthquakes. The most dangerous threat to the region, the earthquake, is one that we have faced many times in varying severity. The 1971 Sylmar earthquake and the 1994 Northridge trembler caused significant transportation damages to the region. An even greater earthquake in the SCAG region is not just a statistical possibility, but a certainty.

SCAG's role in an earthquake would be based on the severity of the earthquake. For smaller earthquakes, SCAG would work with local agencies to program transportation infrastructure repairs. For moderate earthquakes, SCAG would work with the State and federal government to "fast track" the programming of transportation infrastructure repairs.

For significant earthquakes, SCAG would provide GeoData to responders to help identify transit dependent areas for rescue and evacuation, and critical transportation infrastructure that would need to be repaired to most efficiently help in the relief and recovery efforts. SCAG should maintain mutual aid agreements with other metropolitan areas in the event the organization is disabled by the event, maintaining the flow of data to responders.

There is also a danger that an earthquake or series of earthquakes may cause water retention facilities to fail. Dam owners are required by California Regulations to provide a technical study and an inundation map, showing the area downstream of a dam that would be inundated or otherwise affected by the failure of the dam and accompanying large flood flows.

Based upon a review of inundation maps or based upon information gained by an on-site inspection and consultation with the affected local jurisdiction (when the requirement for an inundation map is waived), the Office of Emergency Services shall determine and designate areas where death or personal injury would, likely result from the partial or total failure of a dam. The appropriate public safety agencies of any city, county, or city and county, the territory of which includes any of those areas, may adopt emergency procedures for the evacuation and control of populated areas below those dams.[5]

Tsunamis. Tsunamis, while less frequent than earthquakes, have happened in the past, and will likely happen in the future. An August 31, 1930 tsunami resulted in a three meter run-up (maximum vertical elevation wave reached above sea level at the time of tsunami) wave observed in Santa Monica bay. One man drowned and several swimmers required rescuing. Even small tsunamis can be dangerous, producing dangerous undertows that can drown swimmers, rip ships from their moorings and damage low lying structures.

While development along the coast would be affected, based on the size of the waves, the greatest threatened areas would be

the ports of Long Beach and Los Angeles, which have a dock height of only a few feet above the high tide line. The major sources of tsunami energy that could reach our seaports are from the northern regions offshore of Alaska and from southern regions near Chile. Tsunamis from great earthquakes in the Far East do not appear to impact the Ports as much as those from generation regions in the north and the south.[6]

Flooding. Much of the SCAG region is composed of alluvial fans, gently sloping landforms created over time from the erosion of the surrounding mountains. Flooding, even though characterized by shallow depth, can be quite destructive, traveling at relatively high speeds and carrying sediment and debris.

In 1938, after a tremendous flood that killed 113 people, the Army Corps of Engineers began channelizing the major rivers in Los Angeles County, developing six catch basins and 14 smaller mountain dams in an effort to reduce flooding. While flooding has not been eliminated, the impacts in urban areas of Los Angeles County have been reduced.

Since then, the regional population has grown significantly into the Inland Empire and North Los Angeles County. Many of the alluvial floodplains in these areas have been developed, primarily with residential housing. Droughts and wildfires increase the risk of flash floods and mudslides during rain storms. The combination of damaged hillsides, alluvial fans and inclement weather allow some degree of accuracy in predicting danger areas for flooding, allowing precautionary evacuations and road closures.

SECURITY AND EMERGENCY PREPAREDNESS 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.

SECURITY AND EMERGENCY PREPAREDNESS OUTCOMES

- Increase per capita funding by 2012 for transportation system maintenance and preservation programs over 2007 levels.
- Increase per capita funding for Intelligent Transportation Systems projects that enhance or benefit regional transportation security.
- 100 percent of government agencies and organizations involved in planning, mitigation, response and recovery involved in improving emergency preparedness coordination, collaboration and flexibility.

THE WILDLAND-URBAN INTERFACE

In recent years extensive growth in the wildland-urban interface (where man-made structures intermingle with wildland vegetation) has occurred all over the Western U.S., especially in California. It is becoming increasingly clear that building in these fire-prone areas increases both the risk of human-caused wildfire ignitions and the burden on fire-fighting resources. Therefore mitigation that focuses on fire avoidance is key. These actions include requiring ignition-resistant construction, including greenspace buffers between developments and wildlands, understanding the role of fire in California's ecosystems, and most importantly land-use planning and construction codes that anticipate the risks of building in these areas.

Footnotes

[1] National Cooperative Highway Research Program Report 525 Volume 3 "Incorporating Security into the Transportation Planning Process" McCormick Taylor Inc. 2006

[2] National Cooperative Highway Research Program Report 525 Volume 9"Guidelines for Transportation Emergency Training Exercises" McCormick Taylor Inc. 2006

[3] Michael D. Meyer, Ph.D, P.E., Georgia Institute of Technology: The Role of the Metropolitan Planning Organization (MPO) in Preparing for Security Incidents and Transportation System Response.

[4] Federal Emergency Management Agency: Community Emergency Response Team (IG-317) Student's Guide

[5] California Government Code Section 8589.5

[6] Tsunami Hazard Assessment For The Ports Of Long Beach And Los Angeles, (Moffatt and Nichol) 1997. http://www.portoflosangeles.org/DOC/REPORT_Tsunami_%20April_2007.pdf

SECURITY AND EMERGENCY PREPAREDNESS ACTION PLAN

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
		X	SE-1 SCAG should help ensure the rapid repair of transportation infrastructure in the event of an emergency.		X					X		X	
		X	SE-1.1 SCAG, in cooperation with local and state agencies, should identify critical infrastructure needs necessary for: a) emergency responders to enter the region, b) evacuation of affected facilities, and c) restoration of utilities.		X		X	X		X		X	
		X	SE-1.2 SCAG, in cooperation with county transportation commissions, California and the federal Government, should develop a transportation recovery plan for the emergency awarding of contracts to rapidly and efficiently repair damaged infrastructure.		X					X			
		X	SE-2 SCAG should continue to deploy and promote the use of intelligent transportation system (ITS) technologies that enhance transportation security and reduce air pollution.		X	X		X		X		X	
		X	SE-2.1 SCAG should work to expand the use of ITS to improve surveillance, monitoring and distress notification systems and to assist in the rapid evacuation of disaster areas.		X								
		X	SE-2.2 SCAG should incorporate security into the Regional ITS Architecture.		X								
X			SE-3 SCAG should establish transportation infrastructure practices that promote and enhance security.		X								
X			SE-3.1 SCAG should work with transportation operators to plan and coordinate transportation projects, as appropriate, with Department of Homeland Security grant projects, to enhance the regional transit security strategy (RTSS).		X							X	
X			SE-3.2 SCAG should encourage transportation infrastructure practices that identify and prioritize the design, retrofit, hardening, and stabilization of critical transportation infrastructure to prevent failure, to minimize loss of life and property, injuries, and avoid long term economic disruption.		X					X		X	
		X	SE-3.3 SCAG should establish a Transportation Security Working Group (TSWG) with goals of RTP consistency with RTSS, and to find ways SCAG programs can enhance RTSS.		X							X	
		X	SE-4 SCAG should establish a forum where policy makers can be educated and regional policy can be developed.		X								
		X	SE-4.1 SCAG should work with local officials to develop regional consensus on regional transportation safety and security policies.		X								
		X	SE-5 SCAG should help to enhance the region's ability to deter and respond to acts of terrorism, human-made or natural disasters through regionally cooperative and collaborative strategies by:		X								
		X	SE-5.1 Working with local officials to develop regional consensus on regional transportation safety, security, and safety-security policies.		X								
		X	SE-6 SCAG should help to enhance the region's ability to deter and respond to terrorist incidents, human-made or natural disasters by strengthening relationship and coordination with transportation.		X								
		X	SE-6.1 SCAG should encourage all SCAG elected officials to be educated in the National Incident Management System (NIMS) and California Standard Emergency Management System (SEMS).									X	

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Solid Waste	Public Health	Climate Change
		X	SE-6.2 SCAG should work with partner agencies, federal, state and local jurisdictions to improve communications and interoperability and to find opportunities to leverage and effectively utilize transportation and public safety/security resources in support of this effort.		X								
		X	SE-7 SCAG should work to enhance emergency preparedness awareness among public agencies and with the public at-large.		X								
		X	SE-8 SCAG should work to improve the effectiveness of regional plans by maximizing the sharing and coordination of resources that would allow for proper response by public agencies by:		X								
		X	SE-8.1 Encouraging and providing a forum for local jurisdictions to develop mutual aid agreements for essential government services during any incident recovery, particularly for those issues that are multi-county.		X								
		X	SE-9 SCAG should help to enhance the capabilities of local and regional organizations, including first responders, through provision and sharing of information by:		X							X	
		X	SE-9.1 Working with local agencies to collect regional GeoData in a common format, and provide access to the GeoData for emergency planning, training and response.	X	X	X	X	X	X	X	X	X	
		X	SE-9.2 Establishing a forum for cooperation and coordination of these plans and programs among the regional partners including first responders and operations agencies.		X								
		X	SE-9.3 Developing and establishing a regional information sharing strategy, linking SCAG and its member jurisdictions for ongoing sharing and provision of information pertaining to the region's transportation system and other critical infrastructure.	X	X	X	X	X	X	X	X	X	X
		X	SE-10 SCAG should provide the means for collaboration in planning, communication, and information-sharing before, during, or after a regional emergency by:									X	
X			SE-10.1 Developing and incorporating strategies and actions pertaining to response and prevention of security incidents and events as part of the ongoing regional planning activities.		X								
		X	SE-10.2 Offering a regional repository of GIS data for use by local agencies in emergency planning, and response, in a standardized format.	X	X	X	X	X	X	X	X	X	
		X	SE-10.3 Entering into mutual aid agreements with other MPOs to provide data sharing in the event that SCAG is no longer able to function due to an incident.									X	

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Tide
Bounce

Economy

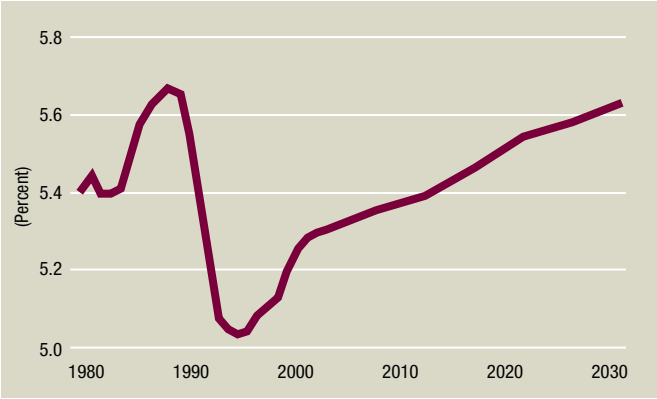
THE CHALLENGE

While the SCAG region has a strong economic base with several sectors poised for growth in jobs and wages, policy intervention can help to ensure that the regional economy grows in the quantity and quality of jobs. The region is expected to add a projected three million jobs between 2005 and 2035. The challenge is to provide a wide range of job opportunities while ensuring the appropriate training for existing residents to possess the necessary skills to perform those jobs.

Current projections indicate that the SCAG region should enjoy job growth faster than the national growth rate (**Figure 10.1**). While the region experienced a severe recession in the 1990's led by downturns in aerospace and construction jobs that dropped the region's share of U.S. jobs from 5.7 percent in 1990 to 5.0 percent in 1995, the SCAG region has outpaced the nation in job growth since 1995. By 2005, the region's share of U.S. jobs rose steadily to 5.3 percent.

FIGURE 10.1

SCAG Region Share of U.S. Jobs



Source: SCAG

Jobs in the region are projected to continue to increase faster than the national growth rate and by 2035 the SCAG region is projected to capture 5.6 percent of U.S. jobs, just slightly below the high level of 1990.

Sectors like international trade, architectural and design services, tourism and entertainment, technology and the nation's largest manufacturing complex give the region a good head start on developing a prosperous economy over the next 30 years.

However, the projected job and income growth will not come automatically. Economic growth and the chance for broadly shared prosperity depend on meeting a number of substantial economic challenges.

Improving the Economic Competitiveness of Key Sectors

In this increasingly globalized economy, regions compete to locate industries that export goods and services across not only their own country but around the world. The SCAG region

The region's challenge is to add three million jobs at all skill levels by 2035

HOW ECONOMY POLICIES PRODUCE MULTIPLE BENEFITS

Land Use and Housing: A strong and diverse economy provides for jobs and affordable housing necessary for our growing, changing population.

Open Space and Habitat: Economic policies that support agricultural would benefit the top producing counties of Riverside, Imperial and Ventura and preserve open lands.

Energy: If energy and climate change policies are designed to create direct incentives for California companies that invest in new technologies, the Gross State Product (GSP) could increase by up to $74 billion annually and create 89,000 new jobs by 2020. (Please see "The Green Economy" discussion on the next page for more information.)

faces challenges in providing the infrastructure to support local, national, and international goods movement as well as providing for the mobility needs for the rest of the economy.

The region must increase its share of employment in those industries and service sectors where wages and salaries will be higher than average and where growth, nationwide and internationally, is expected to be strong (e.g. professional, business and information services, wholesale trade and transportation services, tourism and entertainment sectors, and high technology and green technology sectors).

We should also seek industries with a defined career ladder that do not necessarily require advanced education (e.g. logistics). At the same time that we pursue growth in these sectors, the region must maintain a sufficiently diverse economic base overall and a degree of local self-reliance to protect against over-dependence upon a few industries and to help insulate the regional economy from global downturns.

Education and Workforce Challenges

A skilled workforce is fundamental for turning economic opportunities into successful outcomes for the region and our residents. Retention through educating and training a diverse, skilled labor force has become an increasingly important objective for regional economies. The ability to attract workers (and firms) is dependent upon the livability and quality of life in the region, its business climate, and working conditions. Investments in these areas are critical for the SCAG region. We are facing a dramatic shift in the labor force as the baby boomers retire and are replaced, in large part, by immigrants and their children and grandchildren, many of whom come with a relatively lower level of educational achievement. Improvement of our educational system as well as training opportunities for adult workers is critical.

Regional, State and Federal Cooperation is Necessary to Expand International Trade

International trade can create good job opportunities and raise real income levels for the SCAG region. Significant investment is necessary to improve the efficiency and capacity of the region's goods movement infrastructure if we are to benefit from the expected growth in international trade, while remaining globally competitive. Any changes must occur within a context of environmental quality, environmental justice and respect for local communities.

Improvements to the region's goods movement infrastructure depend upon cooperation between government and the private sector. Public investment and planning can play a strong role in attracting needed additional private investment. At the same time, improvements to the system should not come at the expense of other transportation system investments, nor should they be only the burden of local, regional or state governments.

Given current limits on local and state finances, innovative methods will be needed to pay for these system improvements. Both the federal and State governments must act to support innovative procurement and public-private funding mechanisms, and should take legislative action to allow the region to pursue innovative funding strategies.

The national significance of Southern California's goods movement system also points to the need for strong federal participation in assisting the region with the substantial local burdens it bears in serving nationwide role. These burdens include traffic congestion, air pollution, noise, public health impacts, visual blight, and freight-related safety incidents. These local impacts are not reflected in the costs of the goods movement industry, and are, in effect, creating a subsidy for lower-priced goods in other states. The federal government should explore ways to compensate the region for the services it provides.

Quality of Life

Quality of life is an economic competitiveness challenge, as our ability to improve mobility, air quality and housing will influence and be influenced by the economy. Recent trends in housing prices and affordability raise serious challenges for the region in attracting and retaining industries that offer good jobs. It is important to remember that housing, particularly the lack of affordability and diversified options, is a challenge to future regional prosperity.

THE GREEN ECONOMY

Environmental quality and economic growth can go hand in hand. Promoting clean energy and jobs has been found to have a positive impact on the economy and individual pocketbook.

A study by the Economic Policy Institute found that a policy package including development of new energy-efficiency and renewable energy technologies, transitional assistance to compensate any workers and communities harmed by the policies, and a modest carbon/energy tax would reduce U.S. carbon emissions by 27% in 2010 and by 50% in 2020 and increase GDP increase by a modest 0.24% in 2010 and by 0.6% in 2020, and add an additional 660,000 net jobs would be created in 2010, 1.4 million in 2020.[1]

"Economic Growth and Greenhouse Gas Mitigation in California," offered an independent assessment of the economic impacts of AB 32. This study conducted by the University of California, Berkeley, and delivered to the state legislature on August 16, 2006, found that returning California greenhouse gas emissions to 1990 levels by 2020, as identified in AB 32, can boost the annual Gross State Product (GSP) by $60 billion and create 17,000 new jobs by 2020. The study found that the gains could be up to $74 billion in annual GSP and 89,000 new jobs by 2020 - if climate policies are designed to create direct incentives for California companies to invest in new technology.[2]

RCP promotes sustained economic health that diversifies our economy

HOW ECONOMY POLICIES PRODUCE MULTIPLE BENEFITS

Air Quality: The unintended consequences of a vibrant economy could produce increased air pollution, primarily along major corridors. However, a comprehensive economic program would recognize potential environmental and social externalities and help distribute the costs and benefits in a way that reduces the negative air quality impacts of more economic activity and an expanded surface transportation system.

Solid Waste: Strong economic policies could help promote the reuse and recycling of materials through incentive programs, thereby reducing the amount of waste disposed of at landfills.

Transportation: A strong economy generally increases the need for movement of passengers and freight, which challenges the region to provide adequate capacity to provide a safe and efficient transportation system.

Strengthening Local Self-Reliance

A major challenge for the region is to maintain and strengthen local self-reliance while recognizing the need to diversify the region's economy and expand Southern California's role in the global economy. Our ability to create jobs and locally produce goods that serve the needs of our six-county region can only enhance the long-term sustainability of an economy that does not have to import all of its needs.

The environmental and economic costs of transport alone can temper the trend toward outsourcing jobs and importing goods from cheaper manufacturing centers outside the region and country. Finding a healthy balance between self-reliance and strategic participation in the global economic marketplace will be a key challenge for Southern California.

THE PLAN

The region's economic viability and attractiveness depend upon mutually supportive economic development strategies, land use decisions, transportation investments, and educational improvements. To that end, the RCP recommends the following strategies that balance economic prosperity with other quality of life goals:

- Focusing development in urban centers, existing cities and along (existing and future) transportation corridors.
- Providing housing to meet the needs of all income levels.
- Locating new housing near existing jobs and new jobs near existing housing.
- Designing and building 'green' to save resources, reduce costs and increase competitiveness.
- Identifying and addressing issues related to environmental justice in the formulation of policies and plans (as required in Title VI of the Civil Rights Act of 1964, President Clinton's 1994 Executive Order 12898, and related DOT and FHWA Orders).
- Strengthening local self-reliant industries that provide jobs and goods for our region's needs.
- Developing a well-educated work force.
- Fiscal and governmental policies that support these approaches.

This strategy prioritizes the notion that local businesses must be profitable and competitive regionally, nationally and internationally. However, it also addresses the physical, economic, environmental and human capital dimensions. For example, it recognizes the need to alleviate poverty and meet the basic needs of all who participate in our economy.

ECONOMY GOALS

- Achieve economic development while being consistent with the region's sustainability goals for land use, air quality, and other resource areas.
- Enable business to be profitable and competitive (locally, regionally, nationally, and internationally).
- Ensure that the maximum number of residents participate in the growth of prosperity in the SCAG region. (Note that the goal of broadly shared prosperity does not imply a strategy of redistributing today's income. It is based on expanding opportunity and the commitment of business and government leaders to recognize that individuals and communities left behind today must be made full partners in the growth of tomorrow's economy.)
- Promote sustained economic health through diversifying the region's economy, strengthening local self-reliance and expanding competitiveness.
- Ensure a healthy, flourishing economy that provides sufficient employment opportunities to decrease poverty and meet the basic needs of all the people who participate in our economy by promoting education and workforce training policies that give residents an opportunity to compete for the full range of jobs available with good wages and benefits.

ECONOMY OUTCOMES

- Increase job growth to add three million jobs to the regional economy by 2035.
- Reduce gaps in educational achievement between different racial and ethnic groups.
- Increase the real per capita income to restore 1997 levels of household and individual purchasing power.
- Expand green technologies and related employment in green technologies and services above and beyond what is needed to meet Title 24[3] requirements by 2035.

HOW ECONOMY POLICIES PRODUCE MULTIPLE BENEFITS

Security and Emergency Preparedness: A stronger economy can help fund the improvements to our security and preparedness plans that help secure the region.

Public Health: A strong economy supports community investments in infrastructure and programs that directly or indirectly promote public health improvements, such as community parks and after-school programs.

Environmental Justice: Effective economic policies must address environmental justice by investing in cleaner technologies that reduce exposure to harmful pollutants as well as creating sustainable employment opportunities.

Climate Change: Future economic growth must be done in ways that don't increase the region's contribution to global climate change. International accords demonstrate the win-win potential to pursue economic growth while reducing greenhouse gases.

- Increase the region's economic vitality and attractiveness by focusing housing and job additions in urban centers, employment centers, and transportation corridors, such that there will be a minimum of 35 percent of the region's household growth and 32 percent of employment growth in these areas from their levels in 2005 by 2035.
- Increase the affordability of health care by 50 percent to reduce losses in productivity resulting from inaccessible health care.
- Promote sustained economic health through diversifying the region's economy, strengthening local self-reliance and expanding global competitiveness.

ECONOMY ACTION PLAN

Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Security	Solid Waste	Public Health	Climate Change
SCAG Best Practices													
		X	EC-1 SCAG should form an active Prosperity Partnership, a coalition of public and private entities, dedicated to developing and implementing a common economic strategy for the SCAG region.										
		X	EC-2 SCAG should partner with institutions to help develop global trade logistics infrastructure needed for local businesses to remain competitive.		X								
		X	EC-3 SCAG should partner with economic development organizations to assist in attracting and retaining local and foreign investment.										
		X	EC-4 SCAG, in collaboration with local jurisdictions, should increase awareness - both private and public sectors - of efforts currently underway supporting industry cluster formation in our region.										
		X	EC-5 SCAG should encourage regional universities and business schools to explore opportunities to maximize benefits from public dollars.										
		X	EC-6 SCAG should inform stakeholders (workforce boards, community colleges and universities, and businesses) about long-term demographic and workforce trends in the SCAG regional forecast.										
		X	EC-7 SCAG in partnership with local governments should support K-12 education programs, particularly for at-risk students that help improve high school graduation rates and increase opportunities for all qualified students to attend and graduate from college.										
		X	EC-8 SCAG and local jurisdictions should partner with workforce boards, community colleges and universities in identifying specialized training courses that; 1) meet current and future job needs, 2) upgrade technological skills and open up career opportunities of adult and young workers, and 3) assist people adapting to change.										
		X	EC-9 SCAG, state agencies and local jurisdictions, should support programs that connect school district databases region-wide to track and assess student performance to better ensure a match between education and skill requirements and attainment.										
		X	EC-10 SCAG should develop partnerships that assist in creating a suite of technologies or a renewable portfolio of services that allow the SCAG region to plan for a greener, more sustainable economy.			X		X					X
		X	EC-11 SCAG should actively engage environmental stakeholders to promote efficiencies, conservation, and renewable energy resources by working with the business sector and government agencies, such as the California Center for Sustainable Energy, the state's Environmental Agency (Cal-EPA), the California Transportation Commission, air districts and others.			X		X					X
		X	EC-12 SCAG should partner with organizations that promote the creation of new advanced, environmentally friendly, sustainable technologies for all sectors in the region's economy.		X	X		X			X		X
	X		EC-13 SCAG should continue efforts to leverage state infrastructure bond financing to implement the goods movement and transit oriented development infrastructure improvements.	X	X	X							
		X	EC-14 SCAG, in collaboration with school districts, businesses, universities, State agencies and local governments, should support programs and curricula that develop a local workforce in green technology.										X
		X	EC-15 SCAG should explore means of improving housing availability and cost. The affordable housing shortage is compounding the difficulty for emerging industries to attract and retain high-demand positions, which are mostly the younger, more recently educated work force. Similarly, it also adds to the difficulties of attracting and retaining employees from other areas.	X									

Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives													
		X	EC-1S SCAG, in collaboration with State agencies and local governments, should promote the region's livability and quality of life, along with its business climate and working conditions by supporting investments in attracting, retaining, educating, and training a diverse, skilled labor force.										
		X	EC-2S SCAG, in collaboration with State agencies and local jurisdictions, should promote and support regional policies to: • Promote sustainable economic development, within an ecological context, that uses resources wisely and sustainably and builds sustained economic health. • Reward local ingenuity, initiative, enterprise and creativity. • Give local governments flexibility to attract needed businesses and jobs without compromising social or environmental standards. • Promote fiscal reform at the State, county and local level (involving sales, property and income taxes) to meet the region's capital investment needs. Reform must address increasing local control over school and transportation funds and de-emphasize local dependence on sales tax revenues. Overall, tax systems should be diverse enough to protect against over-reliance upon any small number of income streams. • Work with industries to diversify their industrial bases. • Help local firms replace jobs that cannot be retained. • Expand employment in existing high-wage service-sector firms. • Foster growth of small and medium-sized, locally-based firms	X									
		X	EC-3S SCAG and local jurisdictions should support development of workforce strategies that upgrade skills and open up career opportunities for adult workers who need to adapt to change.										
		X	EC-4S SCAG, in partnership with local jurisdictions should support an increase in opportunities for immigrants to learn English at convenient times and locations										
X		X	ECS-5S SCAG, in collaboration with State agencies and local governments, should encourage industries to incorporate more energy efficient resources into their products.					X					X
X		X	EC-6S SCAG and local jurisdictions should support efforts to increase employment in green, sustainable technologies and/or related industries.										
		X	EC-7S SCAG should promote the implementation of the Southern California Regional Strategy for Good Movement Action Plan, which is based on three principles: • International trade can create good job opportunities and raise real income levels for the SCAG region. To benefit from the growth in international trade expected, while remaining globally competitive, significant investment is necessary to improve the efficiency and expand the capacity of the region's goods movement infrastructure. Such changes must also occur within a context of environmental quality, environmental justice and respect for local communities. • Improvements to the goods movement system should not come at the expense of other transportation investments nor should improvements by only the burden of local, regional or state government. • Investments in the regional goods movement system should be made to realize regional benefits that have statewide implications		X	X						X	

Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits								Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Security	Solid Waste	Public Health	Climate Change
X		X	EC-8S SCAG, in collaboration with State agencies and local governments, should support policies such as: • Market-based emissions trading programs that use a cap with progressive reductions of the cap overtime. • Legislation that promotes "green building" through a mixture of regulation and incentives. • Clean air plans that reduce port-generated pollution from airplanes, vessels, trains, trucks and terminal operating equipment by 45% over the next five years.	X	X	X		X				X	X
X		X	EC-9S SCAG, in collaboration with state agencies and local governments, should support policies that streamline the permit process and regulatory requirements imposed upon developers so as to eliminate excessive review time, cost and inefficiency.	X									
X		X	EC-10S SCAG, state agencies, and local governments should reform the state-local government fiscal relationship to help achieve sound, sustainable development. If government is going to "incentivize" the behavior of its governmental institutions, the incentive needs to be in line with its overall goals and objectives (e.g. making affordable workforce housing available). Local jurisdictions working through their representative advocacy groups (e.g. the League of Cities) need to work with the state to balance the "fiscalizations" of the land use impacts, moving towards making cities fiscally ambivalent over using land for retail or housing purposes.	X									

Footnotes

[1] Barrett, James P. and J. Andrew Hoerner. Economic Policy Institute. Clean Energy and Jobs: A comprehensive approach to climate change and energy policy. (2002).

[2] Roland-Holst, David. Economic Growth and Greenhouse Gas Mitigation in California. August 16, 2006.

[3] Title 24, Part 6 of the California Code of Regulations sets energy efficiency standards for residential and nonresidential buildings.

Report Presented By

New Schools Better Neighborhoods

Education Essay

Creating Healthy Schools and Communities Through Joint Use Planning

The intent of this special focus essay is to begin a regional dialogue about the significance of education in the context of regional planning. It highlights the importance of re-thinking the role of schools in their communities through joint use siting and reinforces the multiple benefits themes in the RCP. This essay sets the stage for a more comprehensive discussion of education issues in the next RCP update. No policies are associated with this essay.

Note: New Schools Better Neighborhoods (NSBN) advocates for a vision of public facilities, especially schools, as vital community centers, and to assist families and neighborhoods in creating built models of community centered learning centers. They are an independent, community-led master planner, focused on leveraging billions of dollars in state and local public facility bonds for the benefit of families and children. These facilities are designed to offer an array of social services accessible to community residents and local stakeholders from dawn to dusk. NSBN's joint-use philosophy reflects the focus on ameliorating the long-term academic and facility deficits that plague low-income communities. These deficits, along with the lack of early education, recreation, and access to healthcare, contribute not just to reduced school attendance, poor academic achievement, and high dropout rates, but also to the involvement of students in gang activities that threaten safe passage to, from, and within, their schools.

Overview

By 2020, California's population of 33 million is projected to reach 45.3 million, an increase of 37 percent. At the current rate, the state is adding nearly 4 million people, or the equivalent of the population of Los Angeles, every seven years. Pressures of growth are taxing the physical infrastructure. State mandated reforms in educational practices, including bold measures like class size reduction, have created the need for more and better educational facilities. Poor planning decisions are stretching other forms of public infrastructure to the limit and draining economic vitality from our region. A new framework is needed by which current programs, procedures and policies developed at every level of state, regional and local governance can coalesce to address these challenges with smarter strategies for planning, investment and implementation.

Smarter planning for education means siting and designing schools that serve as centers of their communities, a concept endorsed by the U.S. Department of Education and leading national educational facilities planning organizations. The concept calls for gymnasiums and play fields that double as community open space and recreation centers; auditoriums that serve as community theatres and meeting venues; and incorporating centralized libraries, health information clinics and other community services into school facilities that are designed for greater parent and community access and engagement. Schools

THE LINK BETWEEN NEIGHBORHOOD AND SCHOOLS

Studies confirm that deteriorating schools and neighborhoods disproportionately affect life prospects and school readiness of poor children living in inner-city communities and in low-income suburban enclaves. Specifically, the physical and social health of neighborhoods is at risk when institutions that we expect to educate and support children are relegated to second- and third-rate status in those communities.

Schools should serve a variety of community needs in partnership with public, civic, and private organizations, including:

- Provide spaces for public meetings and activities and access to communications technology.
- Help meet leisure, recreational and wellness needs.
- Support relationships with businesses that support students and the local economy
- Provide spaces that facilitate mentorships and work-based and service learning.

designed as the vital centers of community can also leverage community resources such as museums, zoos, and other existing facilities - to create integrated learning centers.

Developing joint-use schools that serve as centers of their communities is a concept that also has implications for "smart growth" strategies. Over the past 30 years, California's growth has consumed land for sprawling low-density development, with the car and its attendant infrastructure (e.g., streets and highways, parking lots) taking up a third of all developed land. This strategy also produces more traffic congestion and loss of productivity; air pollution and its environmental and public health impacts; loss of open space; the inability to reach jobs and services; and isolation of children from the elderly.

Need for Joint-Use Community-Centered Development

Families with infants, young children and little economic means are seriously challenged in Los Angeles County. The wages and formal education of these children's parents often fall well below minimal standards required for daily living, not to mention advancing family opportunities. Public schools experience severe overcrowding and, along with their neighborhood public parks, have physically deteriorated with lack of maintenance and the impacts of gangs and crime. These low-income families have inadequate access to day care, early childhood education facilities, family resource centers and health clinics. Available housing is often in substandard condition. Compounding these community deficits, older inner-city and inner-suburban neighborhoods have little open land and, until very recently, lacked the investment capital necessary to build infill housing, preschools, day care, pocket parks, branch libraries and community amenities that revitalize neighborhoods and nurture the families who make up those neighborhoods.

Two seminal reports published in January 2007 further highlight the current pressing need for broader community development opportunities:

- The Advancement Project's "Citywide Gang Activity Reduction Strategy: Phase 3 Report" documents the impact of gang violence for the past 20 years in Los Angeles. Specifically, this report advocates that "comprehensive, neighborhood-based, school centered-strategies for effective prevention, intervention, and community development will be needed in order to pull 'sliding communities' with emerging violence back to safety and keep safe areas safe." This study concludes that the solutions to the gang crisis in Los Angeles "require cross-silo creativity, bold leadership, smart strategy, and sustained focus."
- Los Angeles Mayor Antonio Villaraigosa's report "The Schoolhouse Framework" illustrates the need for new and innovative ideas for realizing a great public education for every child in Los Angeles. Specifically, the Mayor's report calls for schools to be "neighborhood centers" with strong family and community involvement. The Mayor proposes that this "neighborhood centered" model support schools by establishing relationships with a broad range of partners including parent groups, local businesses, health care agencies, libraries, parks, and others

Failing to build our public schools, especially in poor communities, as mixed-use, family resource centers, as holistically

integrated centers of community learning, not only is fiscally inefficient, but also places the core principles of equity and justice at risk.

Challenges of Joint-Use Community-Centered Development

One of the largest statewide expenditures in public infrastructure goes to building and maintaining public schools. Public K-12 school enrollment has more than tripled in the past 50 years. The estimated growth in student enrollment is 50,000 students annually. New enrollment records will continue to be set for the next nine years, increasing to an estimated 6,180,921 students in K-12 public schools by the 2007/2008 school year. This is an increase of 547,275 students, or 10 percent between 1997 and 2007. This includes a decrease of 345,193 Anglo students and an increase of 800,000 Hispanic students, indicating the current and continuing demographic trend toward greater diversity, but, in part, also the decision of many Anglo parents to leave the public school system.

The renovation and replacement of educational facilities is currently in a state of crisis. It can take up to seven years to run the gauntlet of local and state approvals and procedures before a school is ready to serve its constituents. As a result, school boards and building officials are working hard to get facilities on line faster. Larger and larger schools are being built in an attempt to address the problem. In an attempt to save time and money, districts are sometimes forced to replicate building plans that are outdated with respect to current educational research and teaching strategies. In most cases, projects move forward without much involvement from students, parents, educators and community members, all who have a long-term stake in the outcome. The result is often community alienation, disenfranchisement or even backlash.

There is a woefully inadequate allocation of time and money for planning how schools will fit into their communities; how the efficiencies of building larger and larger schools may not be justified in light of critical social and educational consequences; how combining school and community uses could produce more efficient and community centered environments for learning; or even for adequately identifying risk factors like building on toxic waste sites and other environmental hazards that can lead to mistakes at a scale that would have once been considered unimaginable.

The need to renovate or replace educational facilities presents an opportunity for citizens, educators and planners to take a much smarter view of the design of learning environments. This "smarter" view can include everything from how learning spaces are designed to the process used to plan and design them. More traditional educational facilities were once designed to sustain a model of education characterized by large-group, teacher-centered instruction occurring in isolated classrooms. But current knowledge and research about learning calls for new models.

Smarter Design Strategies

Smart school planning and investment means replacing the current factory schools with facilities that support these and other examples of current best practices and ongoing research in the learning sciences. This means, among other things, that school populations should be significantly less than previously projected, and that large school populations may in fact be detrimental to the learning process. The development of smaller

CASE STUDY: CITY HEIGHTS, SAN DIEGO

In 1992, City Heights in San Diego's Mid-City area had no center, no focus, and little community infrastructure. In 1996, the CityLink Investment Corporation used a community-focused master planning process to propose The Urban Village.

The retail project met local needs to improve public safety by incorporating a police substation. The Urban Village also included the Rosa Parks Elementary School.

Since then, median home values have doubled and tax increment financing had tripled, which has further enhanced redevelopment efforts.

The City Heights model demonstrates that articulating a clear vision, seizing opportunities to leverage public resources, employing a collaborative land use planning strategy, and securing public sector endorsement, can lead to the restoration of healthy neighborhoods and communities.

CASE STUDY: ELIZABETH STREET LEARNING CENTER

ELC is a pre-K through 12th grade school that focuses on shared governance, innovative curriculum and instruction, and comprehensive student and family support. ELC addresses childrens' social, mental health, educational, and health needs comprehensively with public, private and civic partners by:

- Recognizing Learning Support as an integral part of the school infrastructure
- Partnering with a local medical center to provide on-site health clinic/mental health services
- Strong outreach, including parent/community volunteers
- Adult education that serves over 600 adults daily
- High school academies to provide career/college guidance
- Developing Early Literacy and other Early Childhood programs
- After-school tutoring programs

ELC is also known for its early childhood programs, and is a model School Readiness site by the California Children and Families Commission.

schools on smaller sites can also save time and money and put schools closer to parents and students.

There are also opportunities to accommodate more efficient and productive uses for educational facilities. For the most part, school facilities in California have been, and continue to be, designed and constructed to serve a specific educational purpose based on a limited educational function. Most educational facilities operate during a 7-8 hour time frame as stand alone institutions, with limited access or joint use by other community organizations. In most cases, the auditoriums, sports facilities, food service, libraries, media center, computer labs and other specialized areas of the school are available for use by the general public only on a very limited basis. Thus, local municipalities must provide duplicate facilities to serve the same functions, with separate budgets for capital improvements, staff and operating expenses.

Smarter designs for new or renovated facilities can accommodate direct community access to spaces like libraries, gymnasiums, auditoriums, performing arts, athletic and recreational spaces that can serve the broader needs of the community. Instead of being designed for a limited time frame of 7 - 8 hours every day, combining community uses can produce facilities that operate 12 - 14 hours, serving a wide range of community needs that can also include things like health clinics, counseling centers and other social services. These designs can be implemented without jeopardizing the health and safety of students, by having certain community activities take place during school hours and others limited to evenings and weekends. The result of these smarter and more efficient joint use design strategies is to reduce duplication of community infrastructure.

Today's educational facilities should also be designed to strengthen the integral relationship that exists between a school and its community in other ways. When implemented through a community-based planning process, the results can also include increased community engagement and support for a wide range of cultural, social, economic, organizational and educational needs. A national movement integrating schools more closely with the community is growing, with support from the U.S. Department of Education and other organizations.

Smarter schools should be inviting places rather than foreboding institutions. Their locations should encourage community use and their shared public spaces should be accessible - day and night, all year round - to the community. Today we know that 12 or 14 years of learning will not be enough to equip people for the rest of their lives. We can't afford to think of graduation as a finish line, and that means that one of the most important end products of schools needs to be citizens who have learned how to continue to learn. Schools should support learning for people of all ages. In short, school facilities should allow access to flexible and comprehensive programs to meet all learning needs. They should provide space and programs for everything from early learning to adult education and training.

Smarter school planning and investment can also extend the learning environment beyond the traditional school site by creating schools in non-traditional settings. When community sites become destinations for educational field trips and extended academic learning centers, the links between school and community are strengthened. But these extensions are not limited to field trips alone. Through partnerships between school boards and other community organizations, a wide variety of community resources like museums, zoos, parks, hospitals and even government buildings can be enlisted to serve as full-time

integrated learning centers. In this way, the school is not only the center of the community, but the community can also be seen as the center of the school - school as community and community as school - a learning community.

All of these examples point to ways that schools can better serve as the center of their communities, either by playing a more integral role as a community activity center or by extending the learning environment further out into the community to take better advantage of a wider range of community resources. Schools that are more integrated with their communities in these ways can strengthen a community's sense of identity, coherence and consensus. Like a new version of the old town square, they can serve as a community hub, a center for civic infrastructure, a place where students and others can learn to participate and support the common good.

Summary

The projects undertaken by third party intermediaries invariably represent a variety of community-specific situations that reflect the input of the local community in the planning and design process. The opportunity for the community to become engaged in this process provides a strong sense of ownership for the project that becomes evident in their involvement in the funding and construction phases as well as during operations where the neighborhood's sense of ownership prevents vandalism or abuse. Similarly, these exercises provide residents with opportunities for involvement and development of skills that are often manifested in other civic engagement processes that the residents become involved with including neighborhood councils, school PTAs and local community-based programs.

Now that this portfolio of models exists, we must take the joint-use concept to scale which requires legislation at the state levels to develop new rules, regulations, and funding vehicles to facilitate the easy access to existing and future joint-use funds since even when those limited funds exist the methods for accessing them are cumbersome and prevent sufficient access to them which often leads to the concerns about underutilization of existing funds in the pursuit of additional resources. The short-term availability of local, regional, and state bonds for education, libraries, healthcare, criminal justice, and other program facilities makes the immediacy of these projects that must be planned, designed, and implemented as quickly as possible or face loss of potential funding very important. As Robert Hertzberg, former speaker of the California State Assembly has frequently said "This is a once in a decade, once in a lifetime opportunity …" to access these limited funds.

Moving Forward

The RCP is a game plan for how our region can become more balanced and sustainable over time. While it describes how the region can do better to accommodate growth, protect the environment, and assure economic competitiveness in our lifetime, the RCP will not achieve desired outcomes on its own.

We need an unprecedented regional commitment to solving our collective challenges. Southern California must strengthen its efforts to overcoming historical, institutional, or other barriers that prevent us from reforming the status quo. SCAG proposes to lead this effort and promote implementation of the RCP in several ways:

- Provide regional leadership and a forum that brings stakeholders together to turn ideas into action. Through focused working groups and forums developed during the RCP public process, we can make inroads on priority policies by securing commitments, forging partnerships, and moving other initiatives forward.
- Consider integrating appropriate RCP policies into the annual Overall Work Plan budget.
- Promote near-term realization of the RCP by supporting policies that offer the most benefits for the environment, economy, and our quality-of-life.
- Provide voluntary guidance that helps local governments, state agencies, and other stakeholders accomplish the RCP's recommendations. For example, SCAG can develop guidance that helps cities implement green building policies.
- Integrate the RCP into the annual State of the Region report. Our progress toward achieving the RCP's outcomes can be used to help gauge whether we're moving in the right direction to solve our region's problems. As such, we need to bolster our monitoring programs.

Ultimately, the RCP is a living document that will challenge us to think about the big picture, understand the consequences of inaction, and make choices about whether we are going to consciously alter the course of our region toward a more sustainable future.

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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.

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