REPORT

DATE: November 1, 2007

TO: Energy and Environment Committee

FROM: RCP Task Force
Douglas Kim, SCAG Consultant; (213) 236-1967, kimd@scag.ca.gov

SUBJECT: Draft Regional Comprehensive Plan (RCP) Chapters

EXECUTIVE DIRECTOR'S APPROVAL:

RECOMMENDED ACTION:
Approve for release the Preliminary Draft Regional Comprehensive Plan's (RCP) Energy, Air Quality, Solid Waste, Water, and Open Space chapters.

BACKGROUND:
The RCP is an advisory policy document that responds to Regional Council direction to look at long range challenges for the region and a vision for meeting those challenges. It lays out a path forward for consideration by SCAG, local governments, and other stakeholders in the region

The RCP serves as an important complement to the Regional Transportation Plan (RTP), which is scheduled for release in November 2007 and must be adopted by April 2008 to avoid a potential federal air quality conformity lapse. Although the RTP will meet all requirements for transportation planning in the region, it is constrained by available resources and regulatory requirements and will not, on its own, respond to the full range of environmental and socio-economic challenges in the region. The RCP complements the RTP by recommending how the region can better accommodate growth, protect the environment, and assure economic competitiveness.

The RCP Task Force is presenting and recommending consideration of five chapters of the Preliminary Draft RCP that have been under the purview of the EEC: Energy, Open Space, Air Quality, Water, and Solid Waste. These chapters are based on recommended Goals, Outcomes, and Action Plans that were presented to EEC on July 12, 2007 (Energy, Open Space) and August 30, 2007 (Air Quality, Water, Solid Waste). The content of these chapters is the result of extensive input and review from the RCP Task Force, Water Task Force, Energy Working Group, Open Space Working Group, Solid Waste Task Force, and other stakeholders.

FISCAL IMPACT:
Work performed for the Regional Comprehensive Plan is included in the current year SCAG Overall Work Program (08-035.SCGS1).

Reviewed by:

Division Manager

Reviewed by:

Department Director

Reviewed by:

Chief Financial Officer

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 petroleum 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 15 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.

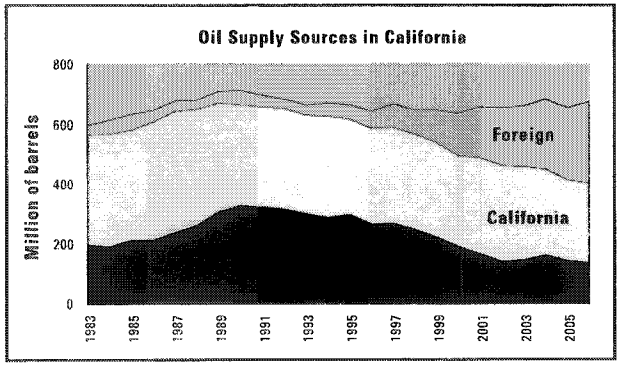
The U.S. represents 5 percent of the world's population, but consumes 25 percent of the world's oil.[5] In addition, the U.S. Department of Energy forecasts that world energy consumption is projected to increase by 57 percent from 2004 to 2035 and that U.S. consumption of liquid fuels is projected to increase by 30 percent between 2005 and 2030, from 21 million barrels per day to 27 million barrels per day.[6] Most of the U.S. increase is anticipated in the transportation sector, which is projected to account for 73 percent of total liquid fuels consumption in 2030, up from 67 percent in 2005.[7]

At the same time, U.S. currently imports 58 percent of its petroleum and California imports approximately 40 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 over 40 percent in 2006, as shown in Figure 5.1.[8] In 2005, California received 35 percent of its foreign imports from Saudi Arabia, 24 percent from Ecuador, and 12 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 largest consumer of oil in the world during 2006.[10] China is

PRELIMINARY DRAFT

the world's most populous country and the second largest energy consumer behind the United States.[11]

FIGURE 5.1



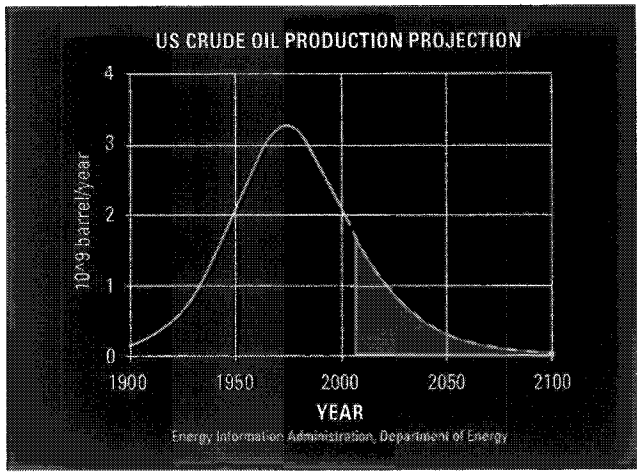
There are additional concerns that the nation's dependence on oil, especially from the Persian Gulf, requires a U.S. military presence, with all of its associated economic and social costs.[12] Oil production could be shut down by wars, strikes, and other political events in many countries with proven 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. Furthermore, 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 previous technologies used for 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 would reach a peak and begin a sharp decline.[14]

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

FIGURE 5.2



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 are spending more of their household income on gasoline than ever before, 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.[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 by comparison, 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 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]

PRELIMINARY DRAFT

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 source of greenhouse gas emissions in California, representing 41 percent of emissions. California is the second largest emitter of GHG emissions in the United States, next to Texas. Only nine nations have greater total emissions than the state of California. In 2004, California produced 492 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. The landmark legislation, AB 32 or the Global Warming Solutions Act, requires reduction of the state's greenhouse gas (GHG) emissions to 1990 levels by 2020. This emissions target is equal to a 25% reduction from current levels. Longer term targets have also been set through Executive Order S-3-05, which calls for a reduction of GHG emissions to 80% below 1990 levels by 2050.

The demand for oil must decline at a similar rate of production in order to avert 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*, 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

Strategies to reduce energy consumption include 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] Increased VMT results in additional demand for petroleum and greenhouse gas emissions. As such, transportation accounts for 41 percent of the state's greenhouse gas emissions. 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 commissioned research to identify effective strategies to reduce energy use, with an emphasis on land use. The discussion that follows is a summary of the findings.

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 could 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 on a sunny summer day as well as reduce air conditioning costs up to 20 percent. The trees absorb numerous pollutants (dust,

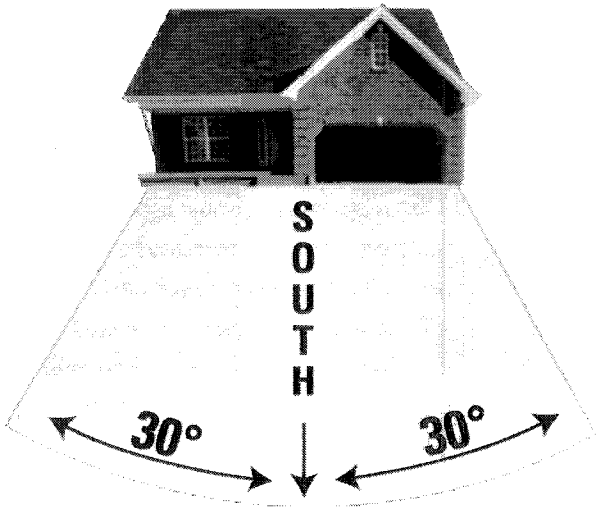
PRELIMINARY DRAFT

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 5 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

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 from energy efficiency, usage of renewable resources and reduced waste generation and water usage. For example, water-related energy use consumes 19 percent of the state's electricity.

FIGURE 5.4



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 upfront costs of about 2% to support green design would, on average, result in life cycle savings of 20% of total construction costs – more than ten times the initial investment. For example, an initial upfront 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]

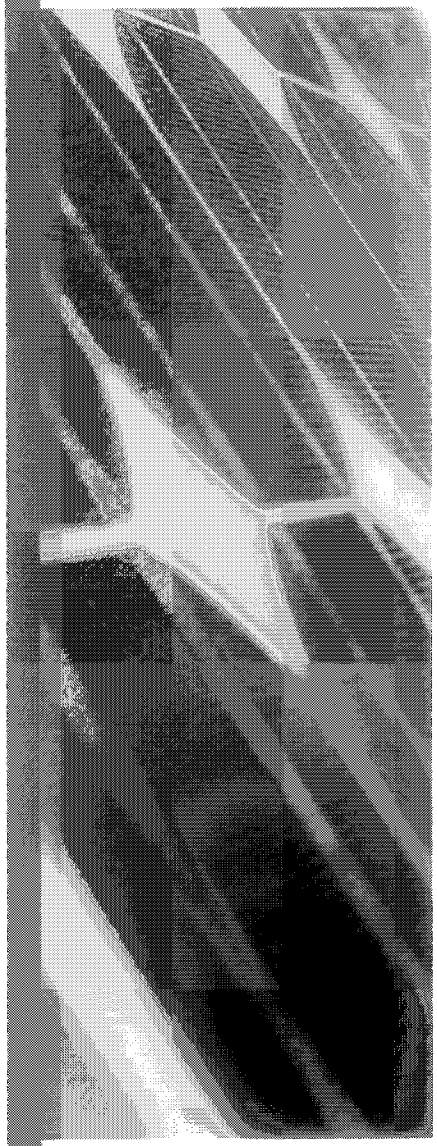
Alternative Fuels

Alternatives to petroleum and infrastructure will be needed for the SCAG region to achieve the ambitious performance outcome of reducing fossil fuel use 25% 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.

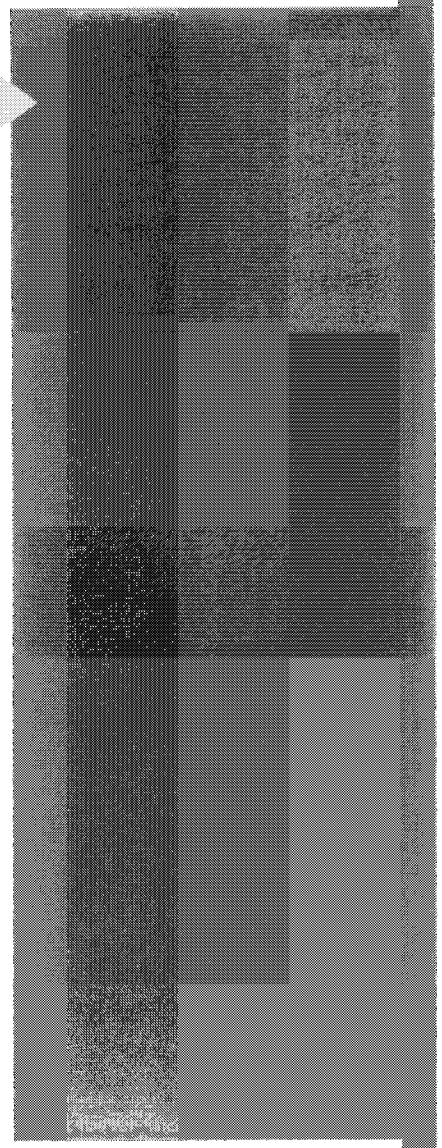
Each alternative fuel has costs, benefits and performance characteristics that will define its effectiveness as a replacement to petroleum. For example, the CEC's 2005 Integrated Energy Policy Report offers a glimpse into the challenges ahead for replacing fossil fuels with alternatives. For example, 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] 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% renewable energy supply by 2010 and its longer term goal of 30% by 2020.[33] Of the electricity consumed in the SCAG region in 2006, an average of 7 percent was generated from eligible renewables. By comparison, 10 percent of the electricity produced in California was 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 a 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 option 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 help customers become energy independent and protect them from supply outages and brownouts. SCAG will continue to monitor the development of these renewable resource opportunities as well as track their costs and benefits.



PRELIMINARY DRAFT



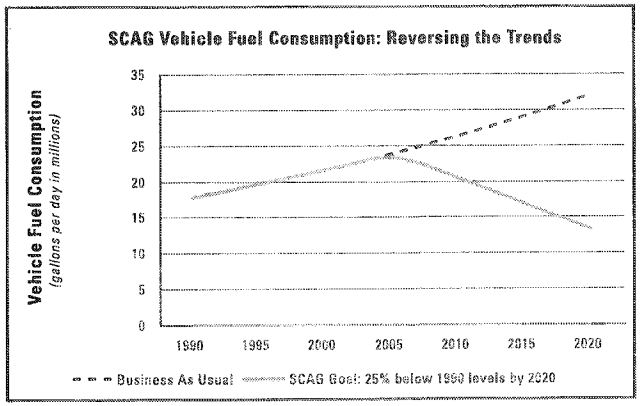
Public Transportation

As identified in the *2006 State of the Region*, total transit boardings in the region in fiscal year 2005 increased by 16 percent from 617 million to a record high of 672 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, 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 influence future fuel demand by increased funding of public transportation in the Regional Transportation Plan (RTP), which integrates the transportation plans of all of the cities and counties within the region. By prioritizing funding priorities for energy efficient transportation projects, the region can begin to reduce petroleum demand and increase air quality.

Reversing the Trend

Leadership is needed to coordinate and provide an ongoing forum for local and regional programs to address our energy challenges and reverse our unsustainable dependence on fossil fuels. As shown in the graphic below, SCAG can lead the way by establishing actions 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. The remainder of this chapter will identify how to reverse the current trends and become less dependent on fossil fuels.

FIGURE 5.4



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

PRELIMINARY DRAFT

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% from 1990 levels by 2020.
- Increase the share of renewable energy generation in the region to 20% by 2010, with additional increases to reach 30% by 2020.

PRELIMINARY DRAFT

ENERGY ACTION PLAN

BMP/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
SCAG Policies (SCAG programs shall be subject to consideration for inclusion in Overall Work Plans)														
		X	EN-1. SCAG shall 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
X			EN-2. SCAG shall 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
		X	EN-3. SCAG shall 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
		X	EN-4. SCAG shall 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
		X	EN-5. SCAG shall 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 shall 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 shall 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	X
Local Government Policies														
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

PRELIMINARY DRAFT

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct Intra-Benefits									Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
X			EN-9. 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
X			EN-10. 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	X

PRELIMINARY DRAFT

Info/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
X			EN-11. Local governments should consider various best practices and technological improvements that can reduce the consumption of fossil fuels such as: • SCAG shall encourage 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-12. 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 shall be completed according to the specifications of the energy provider.	X		X		X						X
X			EN-13. 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
X			EN-14. 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	
X			EN-15. 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
X			EN-16. Utilities and local governments should consider the most cost-effective alternative and renewable energy generation facilities.	X		X		X		X		X	X	X

PRELIMINARY DRAFT

Constrained Policies

				Potential for Direct/Indirect Benefits									Other Benefits	
BMP/Best Practices	Legislation	Coordination		Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
X			EN-17. The project implementation agency should consider increasing capacity of existing transmission lines, where feasible.	X		X		X	X			X	X	
X			EN-18. The project implementation agency should install and maintain California Best Available Control Technologies on all power plants at the US-Mexico border.			X	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				X

PRELIMINARY DRAFT

IG/Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Other Regional Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
SCAG Initiatives (SCAG initiatives shall be subject to consideration for future Overall Work Plans)														
		X	ENSI-1: SCAG shall 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
		X	ENSI-2: SCAG shall 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	X
Federal and State Government Strategies														
	X		ENSI-3: 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
	X		ENSI-4: 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
	X		ENSI-5: The Federal Government should develop a national consensus on alternative fuel research and development.		X	X		X		X	X	X	X	X
	X		ENSI-6: 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
	X		ENSI-7: 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
	X		ENSI-8: 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
	X		ENSI-9: The State and Federal governments should encourage mileage-based vehicle insurance as a voluntary program.		X	X		X		X				
Local Government Strategies														
X			ENSI-10: Local governments should alter 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	X

[i] Multiple Benefits: The understanding of land use impacts on energy demand, energy generation and transmission, and on greenhouse gas emissions are in the early stages of exploration. Further research is necessary to understand how land use patterns can help reduce future vehicle miles traveled, carbon dioxide, particulate matter and parkland and habitat loss.

[ii] Multiple Benefits: There are various land use practices and building techniques that have been shown to reduce energy consumption and greenhouse gas emissions. For example, mixed land uses (i.e., residential developments near work places, restaurants, and shopping centers) with access to transportation have 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. With this reduction, there is less overall energy consumption and less greenhouse gas emissions from personal vehicles. Encouraging the development of pedestrian corridors and bike trails that connect residents to work sites, shops, and recreational opportunities, communities can reduce personal vehicle use, fuel consumption and consequently improve air quality. Furthermore, land use patterns use resources more efficiently and reduce parkland and habitat loss.

[iii] There are various programs that promote green building such as 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. Green building standards go well beyond energy efficiency, involving usage of renewable resources and reduced waste generation and water usage. Such standards can reduce local environmental impacts, regional air pollutant emissions, and global greenhouse gas emissions.

[iv] Infill development encourages use of land in already developed areas as opposed to building new buildings on the outskirts. Infill involves the transformation of existing infrastructure to maximize their use potential. Infill development encourages building upwards instead of outwards. It takes advantages of unused areas and transforms them into, most typically, mixed use development. Most infill designs incorporate residential and commercial establishments in the same building. By using infill techniques, communities can save on the cost of new infrastructures and new roads. Infill projects give communities opportunities to expand while integrating new energy efficient standards.

Multiple Benefits: Successful infill development can offer these rewards for communities:

- provide housing (both affordable and market rate) near job centers and transit;
- increase the property-tax base;
- preserve open space at the edge of regions;
- provide new residents to support shopping districts and services;
- capitalize on community assets such as parks, infrastructure, and transit; and
- create new community assets such as child-care centers, arts districts, and shopping areas.

Resources

- Go Solar California: http://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/

[1] California Environmental Protection Agency (3 April 2006), Climate Action Team Report to Governor Schwarzenegger and the Legislature.

[2] California Department of Transportation, Division of Transportation System Information. (December 2006). California Motor Vehicle Stock, Travel and Fuel Forecast.

[3] California Energy Commission, (September 2005) California Energy Demand 2006-2016 Staff Energy Demand Forecast 2005, CEC-400-2005-034-SF-ED2

[4] Southern California Association of Governments. State of the Region 2006.

[5] United States Census Bureau and United States Energy Information Agency, Basic Petroleum Statistics, (October 2006). Retrieved June 5, 2007 from http://www.eia.doe.gov/neic/quickfacts/quickoil.html.

[6] United States Department of Energy, Energy Information Administration. International Energy Outlook 2007 (May 2007) 7 Retrieved June 5, 2007 from http://www.eia.doe.gov/oiaf/ieo/index.html

[7] United States Department of Energy. (February 2007). Annual Energy Outlook 2007 with Projections to 2030. Retrieved June 12, 2007 from http://www.eia.doe.gov/oiaf/aeo/index.html.

PRELIMINARY DRAFT

[8] California Energy Commission, Oil Supply Sources to California Refineries. Retrieved December 20, 2006 from http://www.energy.ca.gov/oil/statistics/crude_oil_receipts.html

[9] California Energy Commission, Foreign Sources of Crude Oil Imports to California 2005. Retrieved February 8, 2007 from http://www.energy.ca.gov/oil/statistics/2005_foreign_crude_sources.html

[10] United States Energy Information Agency, Country Analysis Briefs. Retrieved February 23, 2007 from http://www.eia.doe.gov/emeu/cabs/India/Background.html

[11] United States Energy Information Agency, Country Analysis Briefs. Retrieved February 23, 2007 from http://www.eia.doe.gov/emeu/cabs/China/Background.html

[12] Council on Foreign Relations, National Security Consequences of U.S. Oil Dependency. Report of an Independent Task Force (2006). Retrieved March 20, 2007 from http://www.cfr.org/content/publications/attachments/EnergyTFR.pdf

[13] United States Government Accountability Office, Crude Oil: Uncertainty about Future Oil Supply Makes It Important to Develop a Strategy for Addressing a Peak and Decline in Oil Production. (February 2007) GAO-07-283.

[14] Udall, R. and Andrews, S. (1999, January). When will the joy ride end? A petroleum primer. Hubbert Center Newsletter, 99(1), 1-8.

[15] International Energy Agency (July 2007). Medium Term Oil Market Report.

[16] Robert L. Hirsch, Roger H. Bezdek, and Robert M. Wendling, Peaking of World Oil Production: Impacts, Mitigation and Risk Management, U.S. Department of Energy, National Energy Technology Laboratory. February 2005.

[17] California Energy Commission. (November 2005). Integrated Energy Policy Report. CEC-100-2005-007CMF. Retrieved September 26, 2007 from http://www.energy.ca.gov/2005publications/CEC-100-2005-007/CEC-100-2005-007-CMF.PDF.

[18] United States Department of Energy, Energy Information Administration. International Energy Outlook 2006 (June 2006) pp. 37 – 49. Retrieved February 23, 2007 from http://www.eia.doe.gov/oiaf/ieo/pdf/0484(2006).pdf.

[19] California Energy Commission, 2006 Gross System Electricity Production. (April 2007) CEC-300-2007-007. Retrieved June 5, 2007 from http://www.energy.ca.gov/electricity/gross_system_power.html

[20] City of Portland Office of Sustainable Development, Bureau of Planning, and Department of Transportation. Peak Oil Task Force Briefing Book (July 25, 2006).

[21] Global Insight. (February 2006). The Impacts of Natural Gas Prices on the California Economy: Final Report. Retrieved September 27, 2007 from http://www.globalinsight.com/publicDownload/genericContent/natgasfullstudy.pdf.

[22] California Energy Commission, Inventory of Greenhouse Gas Emissions and Sinks: 1990-2004 Final Staff Report. (December 2006) CEC-600-2006-013-SF. Retrieved March 26, 2007 from http://www.energy.ca.gov/2006publications/CEC-600-2006-013/CEC-600-2006-013-SF.PDF.

[23] City of Portland Office of Sustainable Development, Bureau of Planning, and Department of Transportation. Peak Oil Task Force Briefing Book (July 25, 2006).

[24] Robert L. Hirsch, Roger H. Bezdek, and Robert M. Wendling, Peaking of World Oil Production: Impacts, Mitigation and Risk Management, U.S. Department of Energy, National Energy Technology Laboratory. February 2005.

[25] California Department of Finance. (December 1998) Race/Ethnic Population with Age and Sex Detail, 1970-2004 and U.S. Federal Highway Authority, (2005) Highway Statistics 1975-2004.

[26] Rong, Fang. (2006) Impact of Urban Sprawl on U.S. Residential Energy Use. University of Maryland. Retrieved from http://hdl.handle.net/1903/3848 on September 14, 2007.

[27] Transportation Demand Management Encyclopedia. "Transit Oriented Development." Victoria Transport Policy Institute.

[28] USDA Forest Service, Center for Urban Forest Research. (2001) Benefit-Cost Analysis of LADWP's "Trees for a Green LA" Shade Tree Program.

[29] California Energy Commission, (November 2005) California's Water-Energy Relationship Final Staff Report. Retrieved September 26, 2007 from http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF.

[30] Greg Kats, Capital E, The Costs and Financial Benefits of Green Buildings, A Report to California's Sustainable Building Task Force, October 2003, http://www.ciwmb.ca.gov/greenbuilding/Design/CostBenefit/Report.pdf, last accessed September 17, 2007.

[31] California Energy Commission. (November 2005). Integrated Energy Policy Report. CEC-100-2005-007CMF. Retrieved September 26, 2007 from http://www.energy.ca.gov/2005publications/CEC-100-2005-007/CEC-100-2005-007-CMF.PDF.

[32] California Energy Commission. (November 2005). Integrated Energy Policy Report. CEC-100-2005-007CMF. Retrieved September 26, 2007 from http://www.energy.ca.gov/2005publications/CEC-100-2005-007/CEC-100-2005-007-CMF.PDF.

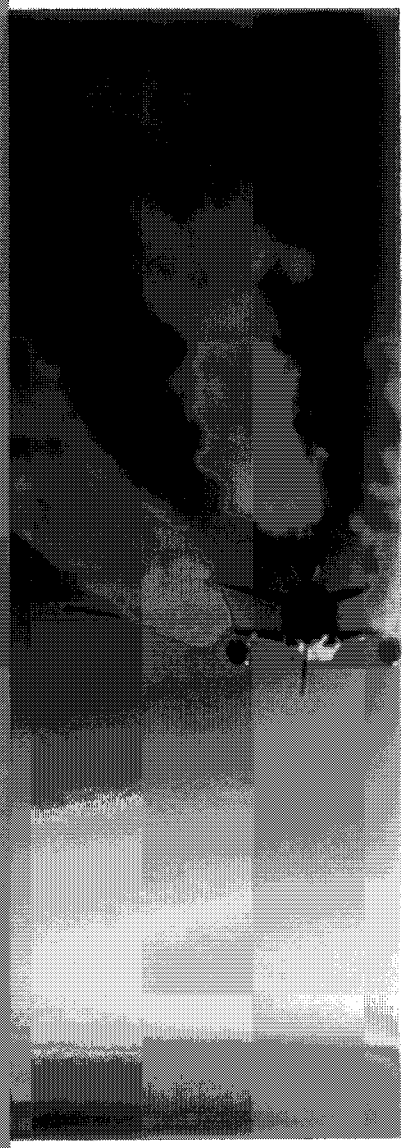
[33] Renewable is defined as solar thermal, solar PV, wind, geothermal, biomass, and small hydro (less than 30 MW).

[34] California Energy Commission, 2005 Gross System Electricity Production. Retrieved on February 7, 2007 from http://www.energy.ca.gov/electricity/gross_system_power.html.

[35] ICF International. (January 2007). Public Transportation and Petroleum Savings in the U.S.: Reducing Dependence on Oil," http://www.icfi.com/Markets/Transportation/doc_files/public-transportation.pdf.

PRELIMINARY DRAFT

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, federal, state, and regional regulations 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 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 symptom, 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, ozone causes substantial damage to crops, forests and native plants. 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 500 tons per day of ozone-forming pollution, largely from cars, buses, trucks, and other "mobile sources." Based on current technology, over 40 percent of the solution relies on new ideas that are expected soon (known as the "black box"), but difficult to define.[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 microns in diameter. Our residents make up over 50 percent of the population in the

PRELIMINARY DRAFT

nation that is exposed to $PM_{2.5}$ concentrations above the federal standard. $PM_{2.5}$ are produced any time fuels, such as coal, oil, diesel or wood, are burned. $PM_{2.5}$ 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. $PM_{2.5}$ is small enough to penetrate our lungs so deeply that they cannot be expelled by the body. Today, they contribute to over 5,400 premature deaths annually and lead to nearly one million lost work days in the South Coast Air Basin. Further, our residents make up over 50% of the population in the nation that is exposed to $PM_{2.5}$ concentrations above the federal standard. These and even smaller "ultrafine" particulates are fast becoming a major health concern that must be addressed soon. The 2007 Air Quality Management Plan (AQMP) for the South Coast Air Basin predicts a shortfall of over 70 tons per day of NO_x reductions to meet the federal $PM_{2.5}$ standard by the 2015 federal deadline.

Perhaps the most publicized air quality problem today is the phenomenon of global climate change. According to the U.S. EPA, the transportation sector directly accounted for approximately 27% of total U.S. greenhouse gas emissions in 2003.[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.[6] The 2007 AQMP reports that there are approximately 12 million vehicles in the South Coast 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.[7] 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.[8]

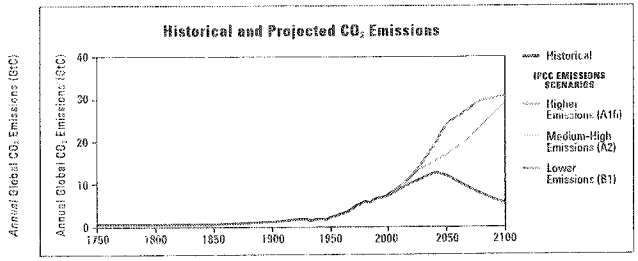
Policy makers and regulatory agencies, alike, have begun to realize the immense air quality challenges the region faces. Recognizing the need for immediate action, on May 2007,

PRELIMINARY DRAFT

SCAG's Regional Council, which is comprised of elected officials throughout region, adopted a resolution urging the federal and state governments to take emergency responses in the face of an air quality health crisis. The call to action was in response to the fact that: 1) the residents of the South Coast Air Basin experience over 5,000 premature deaths annually due to exposure to $PM_{2.5}$, 2) the residents of the South Coast Air Basin comprise over 50% of the population in the nation that is exposed to $PM_{2.5}$ concentrations above the federal standard; 3) the Draft 2007 AQMP for the South Coast Air Basin identified a shortfall of over 70 tons per day of NO_x reductions to meet the federal $PM_{2.5}$ standard by the 2015 CAA deadline; and 4) a substantial portion of the emissions come from federal and state sources.

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.

FIGURE 6.1



The Growth Conundrum

Although regulations and technological breakthroughs have generally improved air quality, our unabated 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 5.8 million people (32%), from 2003 to 2035, employment by 2.5 million jobs (32%), and the number of households by 2.0 million (35%).[9]

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, sprawling 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.

The Growth in Goods Movement

Southern California faces both an extraordinary economic opportunity and a frustrating policy dilemma. Goods move-

PRELIMINARY DRAFT

ment 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 segment 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 generally regulated by the federal government. The projected growth in truck volumes and increase 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 Air Quality Management Plan (AQMP) process that is designed to meet federal and State health-based criteria pollutant standards. First, it complements the AQMP by providing guidance and incentives for public agencies to adopt best practices that support the technology-based control measures in the AQMP. For example, the RCP's energy policies will help accelerate turnover of older, more polluting combustion engines that support the 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 the AQMP. 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 includes minimizes land use conflicts, such as encouraging residential development near freeways, industrial areas, or other sources of air pollution.

The RCP calls on SCAG and local governments throughout the region to implement policies that complement the AQMP in the following ways:

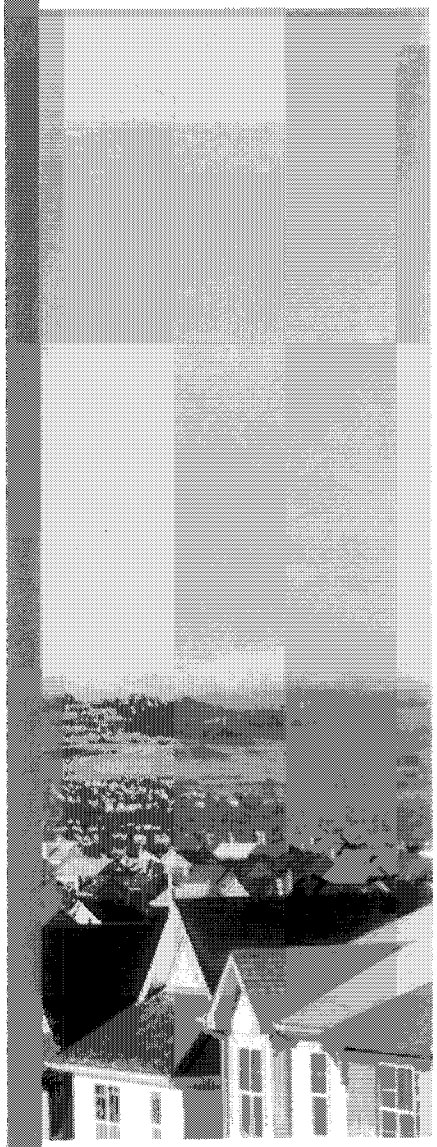
- **SCAG:** As the Metropolitan Planning Organization for Southern California, SCAG has a defined role in developing the transportation control measures (TCMs) for the AQMP. This can include new TCMs that help reduce the region's "black box" of undefined emission reductions. In its role as a Council 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. It can also prioritize funding for planning and/or transportation projects to projects that are most consistent with the RCP's policies. Finally, as the authorized regional agency for Inter-Governmental Review of Programs proposed for federal financial assistance, SCAG can be a regional clearinghouse for data, funding information, program coordination, and recommend that issues at the project or General Plan level be addressed to ensure consistency with the RCP.

- **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 new and revised proposed 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.



PRELIMINARY DRAFT

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 risk of adverse air pollution-related health impacts from exposure to toxic air contaminants, particulates (PM_{10}, $PM_{2.5}$, ultrafine), and carbon monoxide.
- 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 for the respective non-attainment areas:
    - South Coast Air Basin by 2024
    - Coachella Valley by 2019
    - Antelope Valley and Western Mojave Desert (to be determined by ARB by fall 2007)
    - Ventura County (to be determined by ARB by fall 2007)
    - Imperial County by 2007
- 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.
- 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).
- All cities in the region adopt green building standards by 2012.

AIR QUALITY ACTION PLAN

IGR/Best Practice	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
SCAG Policies (SCAG policies shall be subject to consideration for future Overall Work Plans):														
X			AQ-1 SCAG shall implement control measures from local Air Quality Management Plans (AQMPs) by:		X	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
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
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
X			AQ-2. SCAG, in conjunction with stakeholders, will pursue environmentally sustainable strategies that implement and complement climate change goals and outcomes.	X	X	X	X	X	X	X			X	X
X			AQ-2.1 SCAG, in conjunction with stakeholders, will 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
X			AQ-2.2 SCAG will 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
X			AQ-2.3 SCAG will 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
X			AQ-2.4 SCAG will 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
X			AQ-2.5 SCAG will 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
X			AQ-3 SCAG shall develop policies that discourage the location of sensitive receptors that expose humans to adverse air quality impacts by:	X		X				X			X	
X			AQ-3.1 Assisting local governments 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 yards, ports, and industrial facilities.	X		X				X			X	
X			AQ-4 SCAG shall promote sustainable building practices by:	X		X	X	X		X		X	X	X

PRELIMINARY DRAFT

IGR/Best Practice	Legislation	Coordination	Constrained Policies	Potential for Direct Emission Benefits									Other Benefits	
				Land Use	Transportation	Air Quality	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
X			AQ-4.3 Utilizing its Intergovernmental Review (IGR) process to recommend utilization of green building practices as potential mitigation measures.	X		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 program for businesses that want to reduce energy usage.			X		X		X			X	X
Local Government Policies														
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).		X	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 include an inventory of 1990 emissions of greenhouse gases and a strategy for reducing 2020 emissions to those levels..	X	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	
X			AQ-8 Local governments should practice and promote sustainable building practices by:		X	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
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
X			AQ-8.3 Adopting policies that strive for carbon neutrality for their own facilities and operations.		X	X		X		X			X	X

PRELIMINARY DRAFT

BMP/Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits									Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives (SCAG initiatives shall be subject to consideration for future Overall Work Plans)														
	X	X	AQ-SI1 Identify new SIP control strategies that reduce the amount of undefined emission reductions from the transportation system necessary to reach attainment including transformative goods movement strategies.		X	X							X	X
	X	X	AQ-SI2 SCAG, in conjunction with the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (ARB), local air districts, and other stakeholders, shall develop a white paper and build consensus on how to identify discrete control measures that replace the undefined reductions in attainment plans.		X	X							X	X

PRELIMINARY DRAFT

[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 and SCAQMD worked to find additional emission reductions from already proposed measures or new measures to help meet the PM2.5 air quality standard. In September 2007, representatives from ARB and SCAQMD, and SCAG reached an agreement on emission reduction measures needed to meet the PM2.5 deadline in 2015.

Further, the three agencies (i.e., ARB, SCAQMD, and SCAG) acknowledge that they 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. Thus, the three agencies will develop 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] U.S. Environmental Protection Agency. Available at: http://www.epa.gov/oms/greenhousegases.htm

[6] National Safety Council. Available at: http://www.nsc.org/ehc/mobile/mse_fs.htm

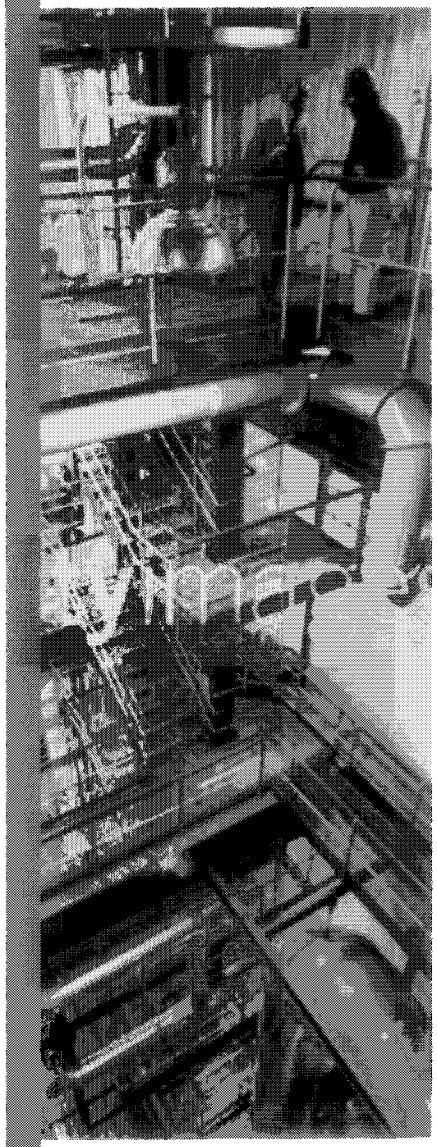
[7] California Air Resources Board. "Guidelines for the Generation of Mobile Source Emission Reduction Credits Through Purchase and Operation of New, Reduced-Emission Heavy-Duty Vehicles." September 1995. Available at: http://arb.ca.gov/msprog/mserc/hdcrguid.pdf

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

[9] http://www.aqmd.gov/aqmp/AQMPintro.htm

PRELIMINARY DRAFT

Solid Waste



This RCP chapter is meant to take a close look at some of the challenges in solid waste management that our region is facing. It will provide a framework for taking the first steps toward a solution. Because this will be an ongoing process, there are some issues – such as hazardous waste, that have not been specifically addressed. However, it is implied that many of the policies described for solid waste management will also apply to management of hazardous wastes.

THE CHALLENGE

Waste comes from homes, businesses, and industrial enterprises. Between 1995 and 2005, our region disposed of approximately 33 million tons of municipal solid waste (MSW) 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] 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 will not be enough to accommodate our ever-growing population.

Traditional solid waste management strategies have relied heavily on creating high capacity, regional landfills (megafills) and, to a lesser extent in California, incineration technologies 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. Restrictions on land use include 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 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 when landfills are being sited.[4,5]

Dwindling landfill capacity and increasing health and environmental concerns have forced both the region and the state to make concerted efforts at developing other waste management methods including reducing the amount of waste that goes into landfills. The costs for landfilling our garbage will continue to increase as landfill space decreases. These costs will ultimately be passed on to residents and businesses in the form of higher

PRELIMINARY DRAFT

VOLUNTARY EXAMPLES OF EPR IN THE U.S.

Xerox's Asset Recycling Management Program - a model EPR program which has led to extensive product redesign. The program has generated substantial profits by maximizing recovery of the residual value of office equipment, which the company takes back at the end of its useful life.

Interface, a global carpet company, has a program to lease carpet and recycle it at the end of its life. The company has reduced manufacturing waste by 70 percent since 1996. This has resulted in a cumulative savings of $336 million avoided costs from waste elimination activities.

Kodak's take-back and recycling program for single-use cameras has had marketing benefits in helping to dispel these products' image as throwaway items that quickly end up in the landfill.

disposal fees and eventually, in conspicuous impacts to public health and the environment.

Overflowing landfills are only a symptom of a bigger problem — the 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 we effortlessly replace or throw away. There is an inextricable link between our current level of resource consumption, the waste we produce, and many environmental problems. Mining leaves behind a wake of destructive impacts. From threatening local and global biological diversity through habitat destruction to increased chemical contamination, erosion, and silting of lakes and streams to toxic air pollution containing arsenic and lead emissions.[8] Our current rate of natural resource extraction has already created health and environmental impacts that will last long into future generations.

THE PLAN

We will need a combination of both short and long term solutions to effectively address our overwhelming waste problem. In the short term, we will still need to rely heavily on landfills and, when local facilities have filled to capacity, exporting our waste to other areas, leading to higher trash rates and added traffic congestion and air pollution. In the long term, we will 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. Our goal is to achieve maximum diversion from landfills through emerging technologies with diversion credit.

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. Landfill operations in Southern California have beneficial methane capture technologies that turn methane emissions into energy. Average landfill gas emissions are comprised of 50 percent methane. The Puente Hills landfill currently produces 50 MW (gross) of power from landfill capture operations which it sells to Southern California Edison.[10]

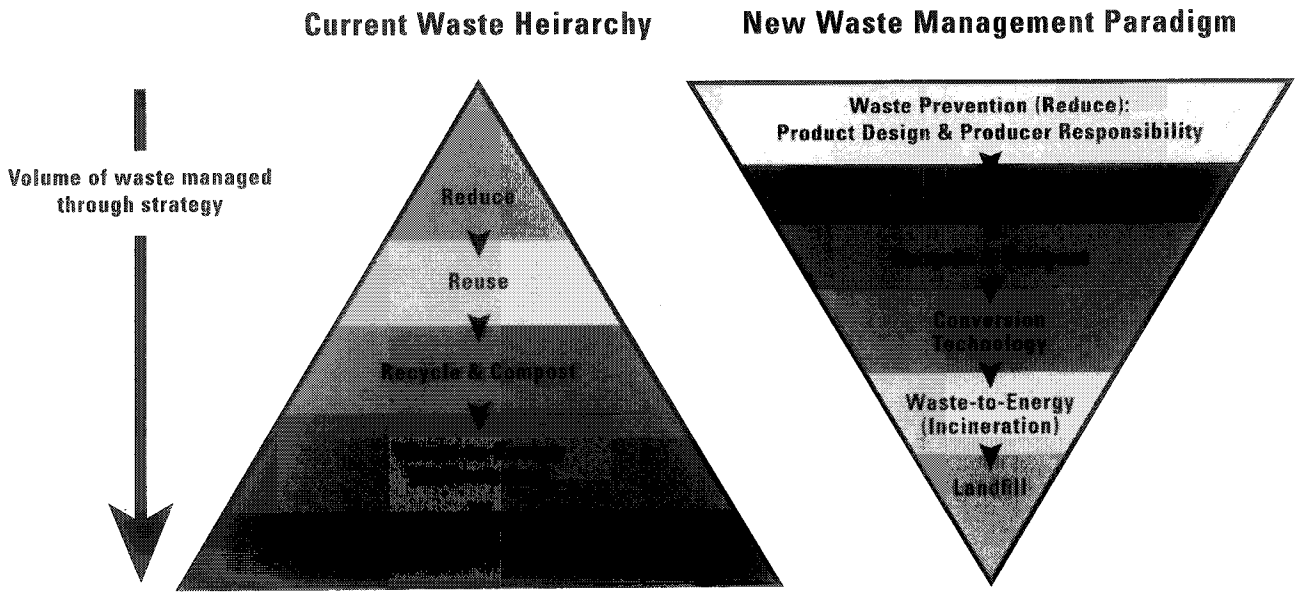
PRELIMINARY DRAFT

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 strategies, 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 waster and to begin to think of disposal to landfills as the last resort in waste management. Many of today's health and environmental concerns will become less of a problem as we reduce our garbage volume and become more selective about what we consider trash.

Our current infrastructure to manage waster focuses on disposal first, followed by recycling, reducing, and reusing. The water hierarchy envisioned for the future focuses on reducing first, then reuse, recycling, conversion technologies and finally disposal to land fill (see **Figure 7.1**).

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

FIGURE 7.1



PRELIMINARY DRAFT

WHAT ARE LOCAL COMMUNITIES DOING?

Many 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.

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 nearing the final stages of construction and is expected to be operational by 2011/2012. It is permitted to accept up to 20,000 tons of waste per day from L.A. County and 1,000 tons per day from Imperial, with 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 L.A. County waste by rail operations will be consistent with strategies developed for the Air Quality Management Plan (AQMP) and the Regional Transportation Plan (RTP).

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. Only 1 percent of waste generated in California is exported out of state. In the SCAG region, less than 1 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 a plan or funding for achieving the diversion rate.

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, all jurisdictions are making good-faith efforts to comply with the unfunded mandate. The estimated diversion rate for California in 2006 is 54 percent. This 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), recycling, reuse, 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 released by UC Berkeley stated that, "diverting solid waste has a significantly higher (positive) impact on the economy than disposing it."

Diversion also helps communities 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, whereas disposal is not; and value-adding processes support jobs and economic activity.[19]

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: 7.2).**

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 recycling market is still on shaky ground, especially because of 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 Integrated Waste Management Board 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 govern-

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

Region		Estimated Total 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 Californiaa	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.

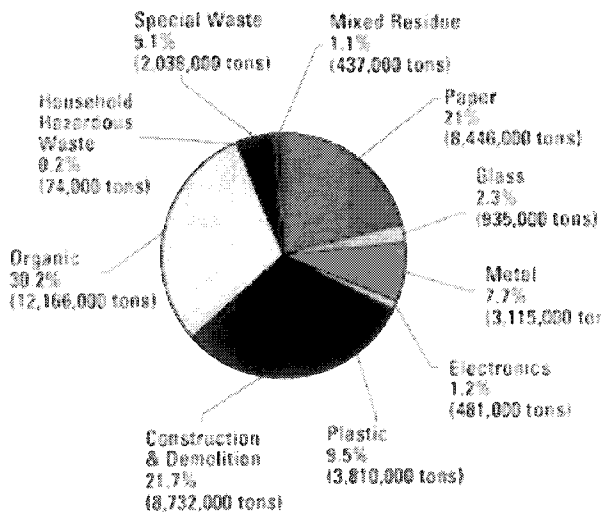
[d] Value added is the increase in the value of goods and services sold by all sectors of the economy.

PRELIMINARY DRAFT

ments 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.

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 emission of GHGs that contribute to global climate change; protects and expands U.S. manufacturing jobs; and increases U.S. competitiveness.[22]

FIGURE 7.2



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

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 for which the difference in virgin versus secondary production is 142.68 MMBtu per ton of intermediate product (i.e., it takes 142.68 MMBtu 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 researchers has shown that it takes 95 percent less energy to recycle aluminum than to create it from raw materials.[24]

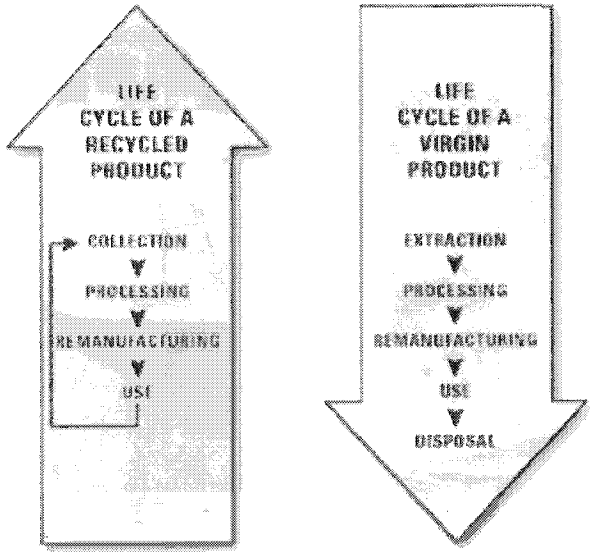
Construction and Demolition (C&D) Debris

Construction and demolition debris comprises 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



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 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 can develop its own requirements: defining the size, cost, and type of project that is subject to C&D recycling as well as the amount of material recycling required can differ a great deal from city to city.

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]

PRELIMINARY DRAFT

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 has collection of food scraps been considered. 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, composite organics, and green material like landscape and tree trimmings, grass clippings, and agricultural residues. 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 overcome 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. That is, before waste is sent to a CT facility, it is sorted to make certain recyclables are removed and collected. Many CT proponents feel CTs with recycling offer a much better alternative than incineration or disposal to landfill. In addition, CTs have the capability of recovering additional recyclable materials, especially metals and glass that might otherwise not be feasibly recoverable since it operates at an optimum level 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 opposition. 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 in Japan, Germany, and the UK.

Three main categories of conversion technologies are being developed for management of solid waste - thermal, chemical, and biological conversion – as well as systems that utilize a combination of 2 or more categories of conversion to more effectively convert the various components of the waste stream.

- Thermal (thermochemical) conversion is characterized by processes that use high temperatures to achieve high conversion rates of dry, organic material. These processes include gasification, pyrolysis, plasma arc, and catalytic cracking. *Advanced thermal conversion (advanced thermal recycling) 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 are focused 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.

PRELIMINARY DRAFT

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,[9] 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 services[10] and the loss of work-days been calculated into the costs?" Governments, private firms, consumer organizations, and environmental groups can all use LCA as a decision support tool.

- Chemical (physicochemical) conversion processes use lower temperatures than thermal conversion and have lower reaction rates. These processes rely on chemical reactions and are focused 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 recognize the link between the waste we generate and the natural resources we consume. Today's economy is based on the extraction of "cheap" resources to make products that are largely designed to end up in landfills. Waste is a reflection of our inefficient use and mismanaged consumption of finite, natural resources. The 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 distributing the responsibility for waste on both the consumer and the producer. 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 also 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 can probably 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. Included are the direct inputs to the production process, associated wastes and emissions, and the future (downstream) 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 what one business considers a byproduct or waste and provide that material to another business that can use that material as production feedstock. 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 making future waste management actions. 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]

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 (EOL) 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 HP (photocopiers) 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;

PRELIMINARY DRAFT

- Can be more easily treated/dismantled and recycled;
- 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.

The Solid Waste Action Plan

All of the strategies that have been laid out are meant to provide guidance and background for implementing the action plan that follows. The goal attempts to encapsulate the vision for solid waste and resource management that will move our region toward a more sustainable and healthier future. This will require a coordinated effort of implementing all of the short-term and long-term policies/actions that are contained within this plan. Some, of which require changing how our whole region thinks about solid waste management issues.

Recycling, composting, conversion technologies, and landfills all play a part in moving towards maximizing diversion. We will need to employ this mix of strategies to handle current waste disposal needs as we transition to a system of real natural resource management. Even if we achieve close to 100 percent materials efficiency, there will still be residual waste that will need to be disposed at landfills or managed with conversion technologies.

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 landfill 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.

GM/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct Land Use Change									Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Policies (SCAG policies shall be subject to consideration for future Overall Waste Plans)														
		X	SW-1 SCAG shall encourage all levels of government to advocate for source reduction and waste prevention.			X	X	X		X		X	X	
X		X	SW-2 SCAG shall encourage policies that: (a) promote the expansion of recycling programs and facilities that provide local recycling services to the public and private sectors and (b) encourage the development of viable, local, and sustainable markets to divert materials from landfills (e.g., recycling markets).			X	X	X		X		X		X
X			SW-3 SCAG shall 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
		X	SW-4 SCAG shall 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
	X		SW-5 SCAG shall 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
		X	SW-6 SCAG should coordinate region-wide initiatives on source reduction, reuse, recycling, composting, and conversion technology to increase economies of scale.			X	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
		X	SW-8 SCAG shall 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		X

PRELIMINARY DRAFT

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
Local Government Policies														
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
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		X
X			SW-11 Local governments should discourage exporting of locally generated waste outside of the SCAG region. Disposal within the county where the waste originates shall be encouraged as much as possible. Green technologies for long-distance transport of waste (e.g., clean engines and 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
X			SW-12 Local governments should adopt Zero Waste goals and practices and look for opportunities for voluntary actions to exceed the 50% waste diversion target.			X	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

PRELIMINARY DRAFT

GP/Best Practices	Legislation	Coordination	Constrained Policies	Potential for direct influence									Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
X	X		SW-14. 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. Construction reduction measures that should 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 the use of moveable walls, raised floors, modular furniture, moveable task lighting and other reusable building components.	X		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
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
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		X	SW-18 Developers and local governments should coordinate regional approaches and strategic siting of waste management facilities.	X		X	X	X				X		X
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
X			SW-20 Developers and local governments should prioritize siting of new solid waste management facilities including recycling, composting, and conversion technology facilities in conjunction with existing waste management or material recovery facilities.	X		X	X	X				X		X
X			SW-21 Local governments should increase programs to educate the public and increase awareness of reuse, recycling, composting, and green building benefits and raise consumer education issues at the County and City level, as well as at local school districts and education facilities.			X	X	X		X		X		X

PRELIMINARY DRAFT

IGR/Best Practices	Legislation	Continuation	Constrained Policies	Potential for Direct/Indirect Impacts: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
State and Federal Government Policies														
	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
	X		SW-23 The State and Federal 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
	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	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
	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 definition of "transformation."			X	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
		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
	X		SW-29 The Federal government should provide funding and support for continuation of public education programs on waste management issues.			X	X	X	X	X		X		X

PRELIMINARY DRAFT

IGR/Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct Impact or Benefit: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
State and Federal Government Initiatives														
	X		SWSI-1 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 (DfE) or Design for Disassembly (DfD) 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
	X		SWSI-2 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 (PAYT) solid waste disposal systems. • Require that companies take back certain types of packaging for reuse or recycling;		X	X	X	X	X	X		X	X	X

PRELIMINARY
DRAFT

[1] California Integrated Waste Management Board. Annual Summary Report: Waste Flow by Origin. Multi-year Countywide Origin Summary. Data retrieved (June 2007) from http://www.ciwmb.ca.gov/LGCentral/DRS/Reports/Orgin/WFOrginAnnual.asp .

[2] California Integrated Waste Management Board. June 2007. Estimated Residential Disposal Rates. http://www.ciwmb.ca.gov/LGCentral/Rates/Disposal/Resident.htm.

[3] California Integrated Waste Management Board. June 2007. Estimated Non-Residential Disposal Rates. http://www.ciwmb.ca.gov/LGCentral/Rates/Disposal/NonResid.htm.

[4] Environmental Protection Agency. 1995. Decision Maker's Guide to Solid Waste Management, Volume II. Washington DC.: U.S. EPA Office of Solid Waste.

[5] Walsh, P. and P. O'Leary. 2002. Evaluating a Potential Sanitary Landfill Site. Waste Age. May 2002:74-83.

[6] Fishbein, B., Ehrenfield, J. and J. Young. 2000. Extended Producer Responsibility: A Materials Policy for the 21st Century. New York: INFORM, Inc.

[7] Schandl, H. and N. Eisenmerger. 2006. Regional Patterns in Global Resource Extraction. Journal of Industrial Ecology 10(4):133-147.

[8] Ibid.

[9] Leachate is a concentrated chemical soup produced as water percolates through decomposing garbage in a landfill. Toxic chemicals are produced or leached from the decomposition of both toxic and non-toxic trash.

[10] Sanitation Districts of Los Angeles County. Puente Hills Gas-to-Energy Facility. http://www.lacsd.org/info/energyrecovery/landfillgastoenergy/puentehillsgastoenergy.asp

[11] Sanitation Districts of Los Angeles County. 2007. Waste-By-Rail. http://www.lacsd.org/info/waste_by_rail/default.asp

[12] California Integrated Waste Management Board. 1997. Waste Board Approves Permit for Regional Landfill in Imperial County. Notice 97-031. http://www.ciwmb.ca.gov/PressRoom/1997/mar/NR031.HTM

[13] Sanitation Districts of Los Angeles County. 2006. Mesquite Regional Landfill Fact Sheet. http://www.lacsd.org/info/waste_by_rail/fact_sheets.asp

[14] California Integrated Waste Management Board. 2007. County Waste Flow Information: California Counties Disposal Destination Data. http://www.ciwmb.ca.gov/LGCentral/Summaries/CountyInfo.asp

[15] Public Resources Code (PRC), Section 41780.

[16] Diversion is generally defined as the reduction or elimination of the amount of solid waste from solid waste disposal (to landfill or incineration). Source reduction (waste prevention), recycling, reuse, and composting activities are considered diversion.

[17] California Integrated Waste Management Board. 2007. Waste Stream Information Profiles http://www.ciwmb.ca.gov/Profiles/.

[18] Goldman , G and A. and Ogishi, The Economic IMpact of Waste Disposal and Diversion in California. A Report to the California Integrated Waste Management Board, 2001.

[19] National Recycling Coalition. 2001. California Recycling Economic Study. Prepared for the California Integrated Waste Management Board.

[20] Ibid.

[21] California Integrated Waste Management Board. 2007. Recycling Market Development Zones. http://www.ciwmb.ca.gov/RMDZ/.

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

[23] Tellus Institute. 1994. Energy Implications of Integrated Solid Waste Management Systems. Prepared for The New York State Energy Research and Development Authority. Energy Authority Report 94-11. Boston, MA.

[24] Martchek, K. 2006. Modelling More Sustainable Aluminum: A Case Study. International Journal of Life Cycle Assessment 11(1): 34-37.

[25] California Integrated Waste Management Board. 2004. Statewide Waste Characterization Study. (Publication # 340-04-005).

[26] Alameda County Waste Management Authority. 2006. 2006 Builders Guide to Reuse and Recycling: A Directory for Construction & Demolition Landscaping Materials. http://stopwaste.org/docs/build ersguide-05.pdf.

[27] City of Santa Monica. 2006. Santa Monica Sustainable City Program.

[28] Kats, G. , Alevantis, L., Berman, A., Mills, E. and J. Perlman. 2003. The Costs and Financial Benefits of Green Buildings: A Report to California's Sustainable Building Task Force. https://www.usgbc.org/Docs/Resources/CA_report_GBbenefits.pdf

[29] Ibid.

[30] Integrated Waste Management Board. 2007. "Food Scrap Management." http://www.ciwmb.ca.gov/FoodWaste/

[31] California Integrated Waste Management Board. 2004. Evaluation of Conversion Technology Processes and Products.

[32] California Integrated Waste Management Board. 2005. Conversion technologies report to the legislature. (Publication # 442-05-016).

[33] Defra. 2005. Advanced Thermal Treatment of Municipal Solid Waste. Waste Implementation Programme New Technologies.

PRELIMINARY DRAFT

[34] California Integrated Waste Management Board. 2004. Evaluation of Conversion Technology Processes and Products.

[35] URS. 2005. Conversion Technology Evaluation Report. Prepared for The County of Los Angeles Department of Public works.

[36] The Society for Environmental Toxicology and Chemistry (SETAC) has defined guidelines for the stages of a generic product life cycle that muse be considered in LCAs (Tan and Culaba, 2002).

[37] Tan, R. and Culaba A. (2002) Environmental Life-Cycle Assessment: A Tool for Public and Corporate Policy Development, available from The American Center for Life Cycle Assessment, available at: http://www.lcacenter.org/library/pdf/PSME2002a.pdf

[38] Zero Waste New Zealand Trust, 2003. Getting There! The Road to Zero Waste. Aukland: Envision New Zealand, Ltd.; Zero Waste International Alliance, 2007

[39] Also referred to as Life Cycle Analysis

[40] Chelsea Center for Recycling and Economic Development. N.d. Assessing the flow of materials in a region: lessons learned from three Massachusetts communities.

[41] Lindhqvist, T. Extended Producer Responsibility in Cleaner Production. Lund University. The International Institute of Environmental Economics.

[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.

PRELIMINARY DRAFT

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 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.

Currently, our region is experiencing unprecedented development and our open spaces will suffer the consequences of inaction. Already, in the most urbanized areas of the region, there is more developed land than natural lands, parks, and farmland combined. 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 extirpation 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 nonfarm uses continues to increase. For the first time in its history, it appears the region may have more developed lands than agricultural lands.

PRELIMINARY DRAFT

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.

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:

- 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 plan (NCCP) and habitat conservation plan (HCP)
- 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 overall focus 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

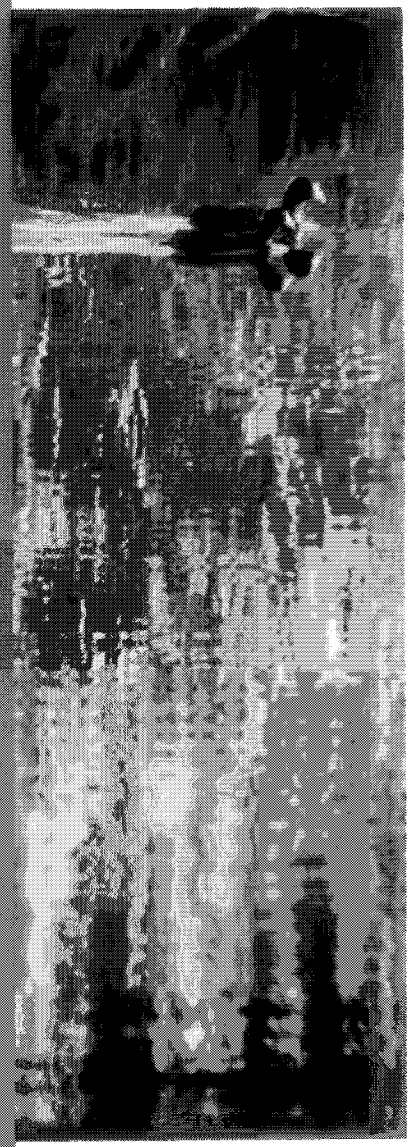
The intent is to conserve the region's open space resources in a way that will ensure sustainability over time. To help guide this effort, open space resources have been grouped into three categories: natural lands, community open space and farmlands and rangelands.

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;
- Integrate the policies and actions herein into its existing transportation planning, growth forecasting, intergovernmental review, and legislative programs, and expand 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;
- Link funding for planning and/or transportation projects to comply with SCAG's open space program
- Use the inter-governmental review process to address the open space impacts of regionally significant projects;
- 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;



PRELIMINARY DRAFT

Open Space and Water

The availability of open space in the region directly impacts the quality of our water. As a direct result of the loss of open spaces in the region due to increased urbanization (and as a result increased impervious surfaces), the natural water cycle in which most of the water soaks into the ground during and after storm events, has been replaced by a paved drainage system.

As a consequence less water enters groundwater aquifers to become the supply for drinking water wells, increased runoff threatens floods and carries trash and pollutants to the ocean, and we live in an environment that is increasingly more asphalt-black and concrete-gray than green.

- Adopt the regional open space policies presented in the program and apply those policies 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:

- 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

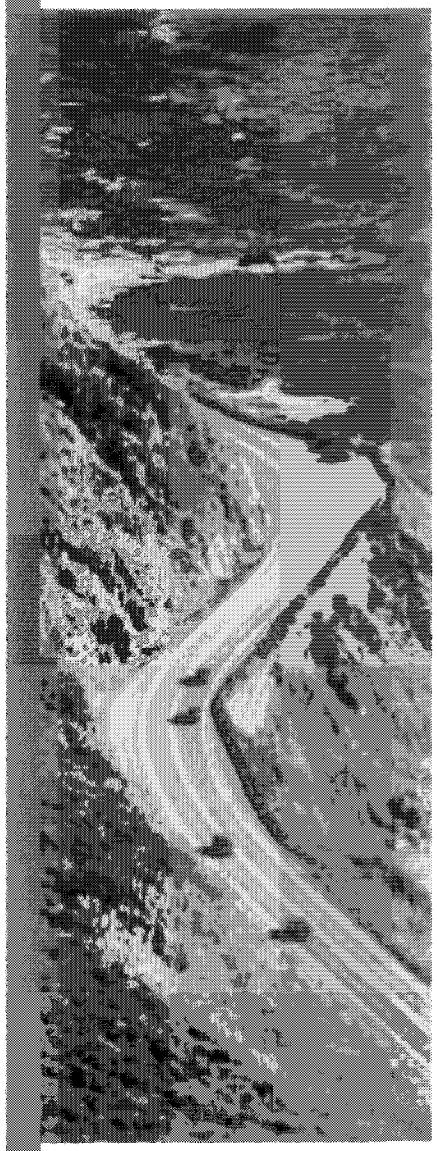
PRELIMINARY DRAFT

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.

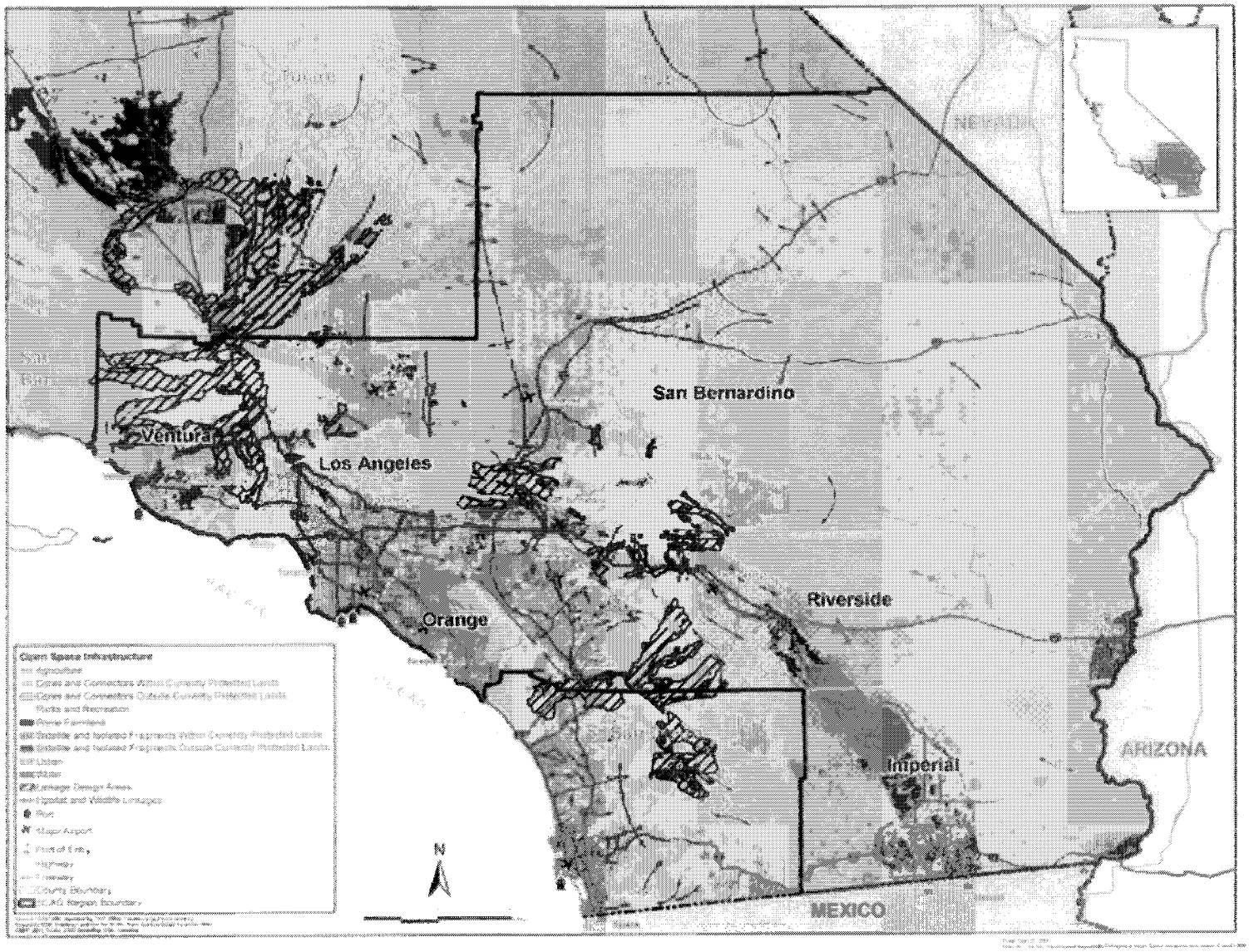
Figure 3.1 shows the distribution of many key open space resources including "protected" and "unprotected" cores, connectors and fragments within the SCAG region and its vicinity. It also shows the location of the protected and unprotected areas in relation to wildlife linkages, linkage design areas, 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.



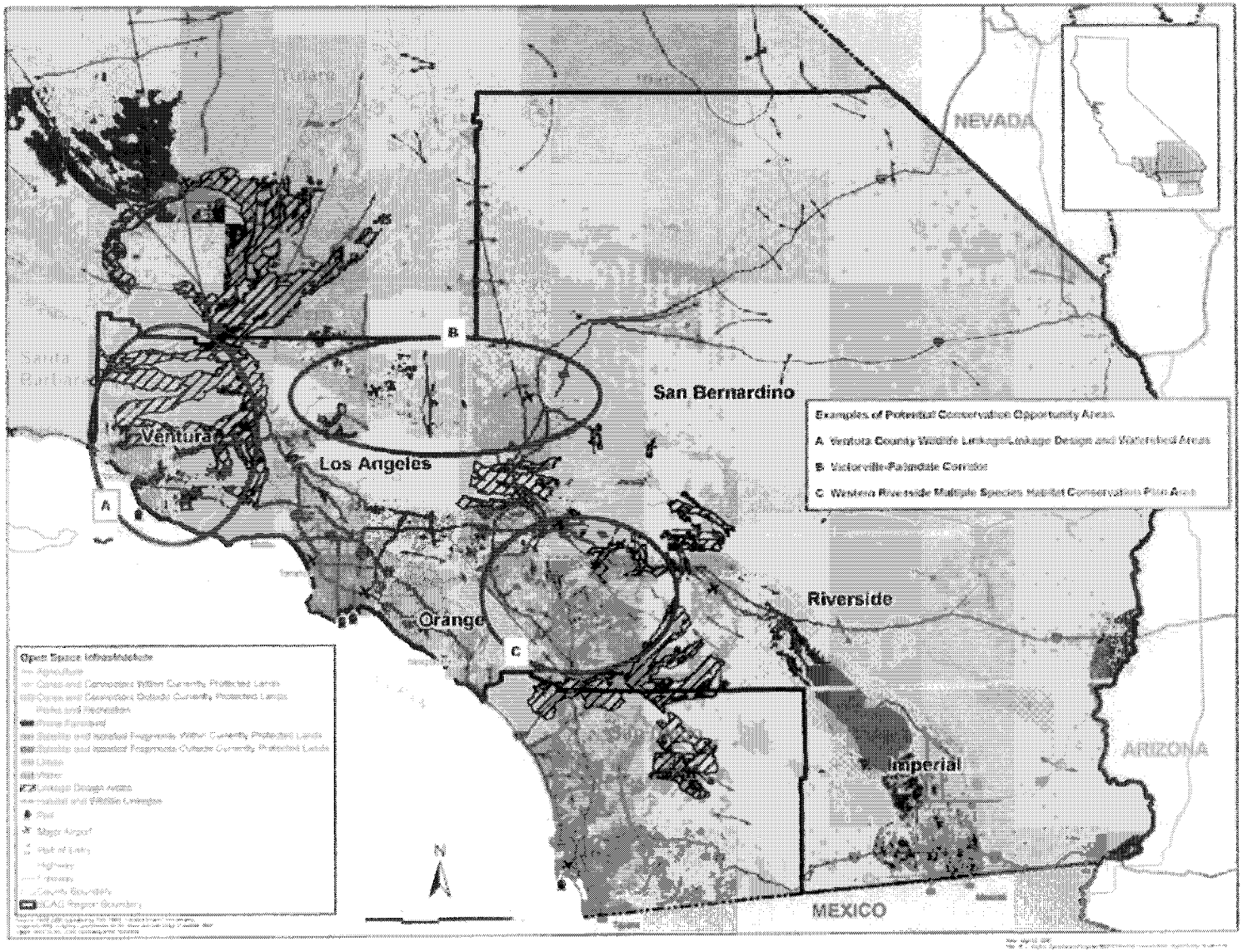
PRELIMINARY DRAFT

FIGURE 3.1: REGIONAL OPEN SPACE INFRASTRUCTURE



PRELIMINARY DRAFT

FIGURE 3.2: POTENTIAL CONSERVATION OPPORTUNITY AREAS



PRELIMINARY DRAFT

Open Space and Water

Open space and park lands have the potential to enhance groundwater water resources (by preserving or expanding the area available for natural groundwater recharge), improve surface water quality (to the extent that these open spaces filter, retain, or detain stormwater runoff), and provide opportunities to reuse treated runoff or recycled water for irrigation (thereby reducing the demand for potable water).

The loss of functional native habitat and the alteration of natural channels in urbanized areas (such as the Los Angeles River) have also reduced the extent to which natural processes can remove contaminants in urban and stormwater runoff, cycle nutrients through watersheds, and provide functional habitat for species.

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

GIS/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
SCAG Policies (SCAG policies shall be subject to consideration for future Overall Work Plans)														
			OSN-1 Track and monitor open space conservation efforts in the region. • SCAG shall set up a clearinghouse of important GIS data used for open space planning. SCAG shall 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
X			OSN-2 Use SCAG's Intergovernmental Review (IGR) process to comment on regional projects. • SCAG shall establish criteria for evaluating impacts to regionally significant open space resources, and will recommend mitigation measures for significant impacts to regional resources. These recommendations will be included in SCAG's Regional Open Space Guidance. • Priority review will 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 shall develop and implement coordinated mitigation programs for regional projects, with an emphasis on regional transportation projects. • SCAG shall 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 shall 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 shall 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 shall 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 shall 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 shall encourage the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites	X					X					
X			OSN-7 SCAG shall encourage "watershed management" programs and strategies, recognizing the primary role of local governments in such efforts	X	X	X	X	X	X				X	

PRELIMINARY DRAFT

GP/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
X			OSN-8 SCAG shall 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				X	
X			OSN-9 SCAG shall support and work with communities and research entities on developing measures of the economic value of natural lands.	X		X	X		X					
X			OSN-10 Integrate open space assumptions into the Regional Growth Forecast • SCAG shall 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
	X		OSN-11 Seek funding for conservation of natural lands • SCAG shall partner with local agencies and non-profit foundations in situations where a regional entity is necessary to secure funds. • SCAG shall seek support (financial, technical, etc) at the state and federal level for a prototype regional open space database program.				X		X					
Local Government Policies														
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 to be eligible for future funding opportunities and programs administered by SCAG.	X	X	X	X	X	X			X	X	X
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	X
Business/Other Policies														

PRELIMINARY DRAFT

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Potential For Other Indirect Benefits									Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
X			OSN-14 Developers and local governments should implement mitigation for open space impacts through the following activities: • Individual projects submitted for IGR review 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 submitted for IGR review shall 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 ensure that at least one acre of unprotected open space is permanently conserved for each acre of open space developed as a result of growth that accompanies transportation projects/improvements.	X	X		X		X			X	X	X

PRELIMINARY DRAFT

IGR/Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
SCAG Initiatives (SCAG initiatives shall be subject to consideration for Inclusion Overall Work Plan)														
		X	OSNSI-1 SCAG shall 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
	X		OSNSI-2 SCAG shall 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
	X		OSNSI-3 SCAG shall seek to create new sources of funding for open space conservation.		X		X		X					X
X			OSNSI-4 SCAG shall 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
	X		OSNSI-5 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	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 already 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 strong evidence shows 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 standards recommended for park types.[10] As measured against NRPA's overall parks to people standard (6.25-10 acres/1,000 people) three cities

PRELIMINARY DRAFT

Open Space and Water

The availability of open space in the region directly impacts the quality of our water. As a direct result of the loss of open spaces in the region due to increased urbanization (and as a result increased impervious surfaces), the natural water cycle in which most of the water seeks into the ground during and after storm events, has been replaced by a paved drainage system.

As a consequence less water enters groundwater aquifers to become the supply for drinking water wells, increased runoff threatens floods and carries trash and pollutants to the ocean, and we live in an environment that is increasingly more asphalt-black and concrete-gray than green.

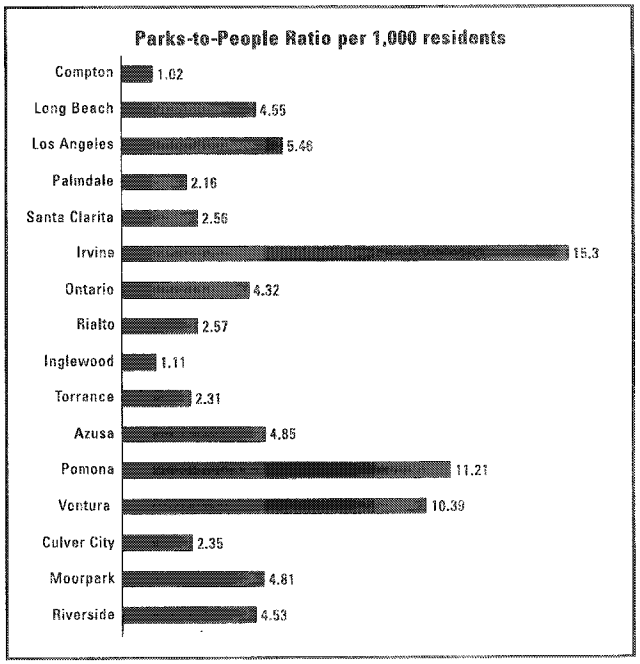
exceeded the standard (Irvine, Pomona and Ventura) while the rest of the cities fell below the standard. Table 1 shows the results for each of the cities.

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, NPRA 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, NPRA 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
- 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

FIGURE 3.3



PRELIMINARY DRAFT

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 and provides public health benefits;
  - 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.

PRELIMINARY DRAFT

OPEN SPACE AND HABITAT–COMMUNITY OPEN SPACE ACTION PLAN

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
SCAG Policies (SCAG policies shall be subject to consideration for future Overall Work Plans)														
			OSC-1 SCAG, in collaboration with its member agencies, shall work to enhance community open space and its accessibility	X	X	X	X	X	X				X	X
			OSC-2 SCAG shall 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
		X	OSC-3 SCAG and its member agencies will 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
		X	OSC-4 SCAG shall 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 shall 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	
		X	OSC-6 SCAG shall encourage member jurisdictions that have trails and trail segments determined to be regionally significant to work together to support regional trail networks. SCAG shall encourage joint use of utility, transportation and other rights-of-way, greenbelts, and biodiversity areas.	X	X	X		X	X				X	X
Local Government Policies/Project Sponsor and Developer Policies														
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
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
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

PRELIMINARY DRAFT

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct Indirect Benefits									Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
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
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
X			OSC-12 Developers and local governments should promote water-efficient land use and development.	X	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	X

PRELIMINARY DRAFT

IGR/Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct and Indirect Benefits									Other Benefits	
				Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Public Health	Climate Change
SCAG Initiatives (SCAG initiatives shall be subject to consideration for future Overall Work Plans)														
		X	OSCSI-1 SCAG will 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 will also be used as criteria for statewide bond funding	X	X	X	X	X	X			X	X	X

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 losses. An estimated 230,000 acres of farmland and grazing land were converted to non-agricultural uses and/or applied

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

PRELIMINARY DRAFT

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

The food that Southern Californians eat directly affects local and state policy and in turn, local and state policy affects the food Southern Californians eat. 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.

Organic food is produced by farmers who emphasize the use of renewable resources and the conservation 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.

PRELIMINARY DRAFT

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

Open Space and Habitat–Agricultural Lands Goals

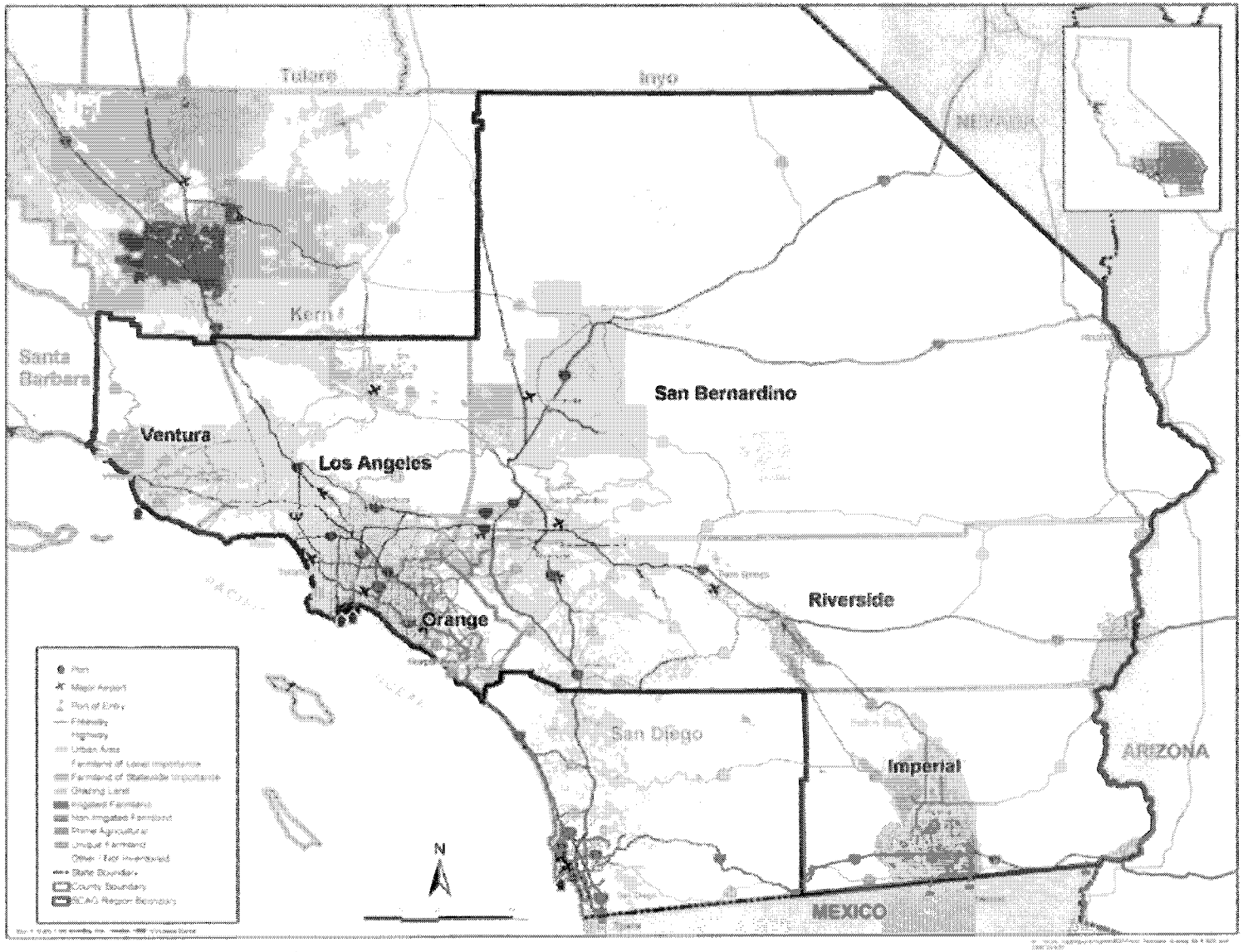
- Preserve the productivity and viability of the region's agricultural lands while supporting a sustainable economy and region by:
  - Maintaining a viable level of agriculture to support economic and food supply needs for the region while supporting sustainable energy, air quality and transportation 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.

PRELIMINARY DRAFT

FIGURE 3.3: PRIME FARMLAND GRAZING



PRELIMINARY DRAFT

OPEN SPACE AND HABITAT–AGRICULTURAL LANDS ACTION PLAN

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
SCAG Policies (SCAG policies shall be subject to consideration for future Overall Work Plans)														
		X	OSA-1 SCAG shall support policies that preserve and promote the productivity and viability of agricultural lands.	X	X	X	X	X	X		X	X	X	X
X			OSA-2 SCAG shall use its IGR process to 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		X	OSA-3 SCAG shall 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
		X	OSA-4 Promote the availability of locally grown and organic food in the region.		X	X	X	X			X		X	X
Local Government Policies														
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
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
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	X

PRELIMINARY
DRAFT

IGR/Best Practices	Legislation	Coordination	Constrained Policies	Potential for Direct/Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
Project Sponsors and Developers														
X			OSA-8 Developers and local governments should submit for IGR review projects with potentially significant impacts to important farmlands. Projects should include mitigation measures to reduce impacts and demonstrate project alternatives that avoid or lessen impacts. at a 1:1 ratio.	X	X	X	X	X	X		X	X	X	X

IGR/Best Practices	Legislation	Coordination	Strategic Initiatives	Potential for Direct/Indirect Benefits: Land Use	Transportation	Air Quality	Water	Energy	Open Space	Economy	Security	Solid Waste	Other Benefits: Public Health	Climate Change
SCAG Initiatives (SCAG initiatives shall be subject to consideration for future Overall Work Plans)														
		X	OSASI-1 SCAG shall work with the agriculture community and other interested parties to establish a regional Farmland Conservation Strategy.	X			X		X					X
	X		OSASI-2 SCAG shall 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
	X		OSASI-3 SCAG shall 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			X

[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

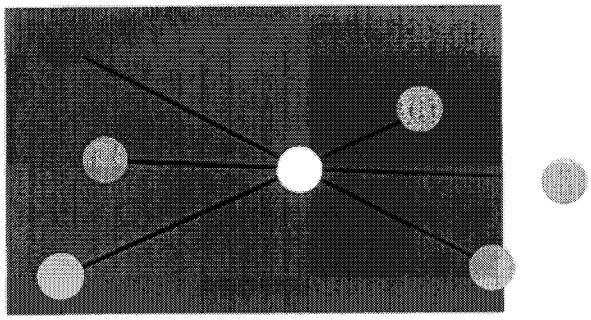
[9] CDC. Increasing Physical Activity A Report on Recommendations of the Task Fore on Community Preventive Services. Retrieved online August 23, 2007 http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5018a1.htm

[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.

REGIONAL



Comprehensive Plan

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

Helping Communities Achieve A Sustainable Future

RECOMMENDATION

- **Approve for release the Draft RCP**
  - Energy
  - Air Quality
  - Solid Waste
  - Water
  - Open Space & Habitat

Helping Communities Achieve A Sustainable Future

RCP TASK FORCE

- Met October 17
- Recommendations
  - Maintain coordinated schedule
  - Draft RCP is living document
  - Ready for public discussion and debate
  - Extended public review concurrent with RTP

Helping Communities Achieve A Sustainable Future

RCP REVIEW

- Jun 11 — RCP Task Force reviewed Energy, Open Space, and Solid Waste recommendations
- Jul 9 — RCP Task Force reviewed Water, Air Quality, and Solid Waste recommendations
- Jul 12 — EEC reviewed Energy and Open Space recommendations
- Aug 30 — EEC reviewed Water, Air Quality, and Solid Waste recommendations
- Oct 17 — RCP Task Force recommends authorize release of Draft RCP

Helping Communities Achieve A Sustainable Future

ENERGY

- Acknowledge energy uncertainty as a key issue
- Develop energy efficiency and green building guidance
- Support reductions in use of fossil fuels
- Consider energy demand analysis in environmental and general plan decisions
- Support state and federal actions that increase alternative energy sources

Helping Communities Achieve A Sustainable Future

AIR QUALITY

- Acknowledges criteria pollutant attainment plans
- Addresses other areas of concern:
  - Reduce greenhouse gases
  - Reduce exposure to pollution through land use planning
  - Promote green building practices
  - Substantially reduce VMT through transformative technologies

Helping Communities Achieve A Sustainable Future

SOLID WASTE

- Maximize waste diversion.
  - Promote product stewardship.
  - Increase recycling, reuse, and composting.
  - Support development of conversion technologies.
  - Promote green building practices.
- Build local markets for waste prevention, recycling, and reduction practices.

Helping Communities Achieve A Sustainable Future

WATER

- Develop "water wise" guidance
- Link land use decisions to water policy decisions
- Support green building
- Explore approaches to increasing existing water supply – reuse and recycling
- Measures to improve water quality

Helping Communities Achieve A Sustainable Future

OPEN SPACE

- Develop potential mitigation measures to reduce impacts to open space
- Support protection of natural open space that also services as critical habitat, watershed protection
- Increase community open space
- Support agriculture and eating locally

Helping Communities Achieve A Sustainable Future