5. REGIONAL SIP SUMMARIES

South Coast Air Basin

The South Coast Air Basin (South Coast) is California's largest metropolitan area. Its levels of ozone and inhalable particles under 2.5 microns (PM2.5) are among the highest in the nation despite decades of increasingly stringent state and local controls. With a population of approximately 16 million people, the South Coast is home to over 42 percent of the State's population. The South Coast is currently classified as a severe-17 nonattainment area for the federal 8-hour ozone standard, which gives it a nominal attainment date of June 15, 2021. The South Coast's ozone levels are currently 50 percent above the federal standard which make it the nation's worst ozone area. The South Coast Air Basin is also classified as nonattainment for the federal PM2.5 standard. The region is now required to attain the PM2.5 standard by 2015. The South Coast District has chosen to develop their ozone and PM2.5 attainment plans concurrently.

In designing the State Strategy, the ARB staff developed measures that would result in an aggressive reduction of precursor emissions for both ozone and PM2.5. The strategy provides substantial progress towards attainment for both pollutants. However, the state of the science for PM2.5 modeling is relatively new and very complex, with a significant level of uncertainty inherent in the results. Given the importance of developing an effective attainment demonstration and the cost of the proposed strategy, the ARB staff believes an early SIP submittal is not advisable. Taking a few additional months to address the major technical and regulatory issues involved and to ensure that the results are the best possible will not slow the pace of ARB's actions. ARB staff is recommending that we make full use of the time provided by U.S. EPA to develop the control strategy attainment demonstration for PM2.5.

Ozone air quality modeling indicates that a number of combinations of ROG and NOx emission levels, or "carrying capacities," can be expected to result in attainment of the 8-hour ozone standard throughout the South Coast Air Basin. The South Coast district chose a carrying capacity of 300 tons per day ROG and 286 ton per day NOx emissions in their draft plan. Projected 2020 ROG emissions must be reduced by 54 percent, and NOx emissions by 50 percent, to meet this carrying capacity. U.S. EPA guidance indicates that all of the emission reductions needed to demonstrate attainment of the 8-hour ozone standard by June 15, 2021 must be in place by the beginning of the ozone season in 2020.

ARB's proposed strategies, along with the existing control program and a small reduction in stationary source emissions, provide 78 percent of the emission reductions needed to demonstrate attainment of the ozone air quality standard by 2021.

The Clean Air Act allows nonattainment areas to “bump up” to a higher classification if more time is needed to attain the standard, if certain conditions are met. ARB believes that a reclassification to “extreme” is appropriate for the South Coast. An extreme classification would extend the attainment date to 2024, and acknowledges that some of the reductions needed for attainment will have to come from strategies that are outside of the scope of our currently available technologies and infrastructure. We expect that the ozone plan will be updated periodically to incorporate new controls that will allow us to achieve the remaining needed reductions.

Topography and Meteorology

The clean air challenge in the South Coast has always been formidable. Complex terrain and weather patterns make the region a natural sink for the accumulation of emissions and sustained high pollution levels. Along the coastal area, better air quality prevails because of the relatively mild climate, cooler temperatures, and a pattern of onshore airflow. However, in the inland portion of the air basin, a combination of abundant sunshine, warm temperatures, and poor vertical air mixing is conducive to the formation of ozone, commonly referred to as “smog.” The problem is further aggravated by the surrounding mountains that act together with the weather and air pollutant emissions.

The problem is further heightened by the extent of exposure to elevated pollution levels. The South Coast Air Basin is the nation’s second largest urban area and California’s largest metropolitan region. It includes the southern two-thirds of Los Angeles County, all of Orange County, and the western urbanized portions of Riverside and San Bernardino counties. The South Coast Air Basin is home to over 40 percent of the total State population, or about 16 million people, and over 10 million vehicles. Fifty thousand heavy duty diesel trucks travel nearly 10 million miles through the region annually, and well over 50,000 diesel engines are used to move goods and power construction and mining equipment.

The good news is that air quality for all pollutants in the Basin continues to improve, with recent years registering the lowest levels since measurements began over five decades ago. During the 1960s, maximum 1-hour concentrations were well above levels considered safe for public health -- more than four times the current health standard. Today, the maximum measured concentrations are less than one-third of those peak concentrations. Moreover, long-term ozone air quality trends continue to show an overall improvement. The number of days above both the one and eight-hour standards has also declined dramatically.

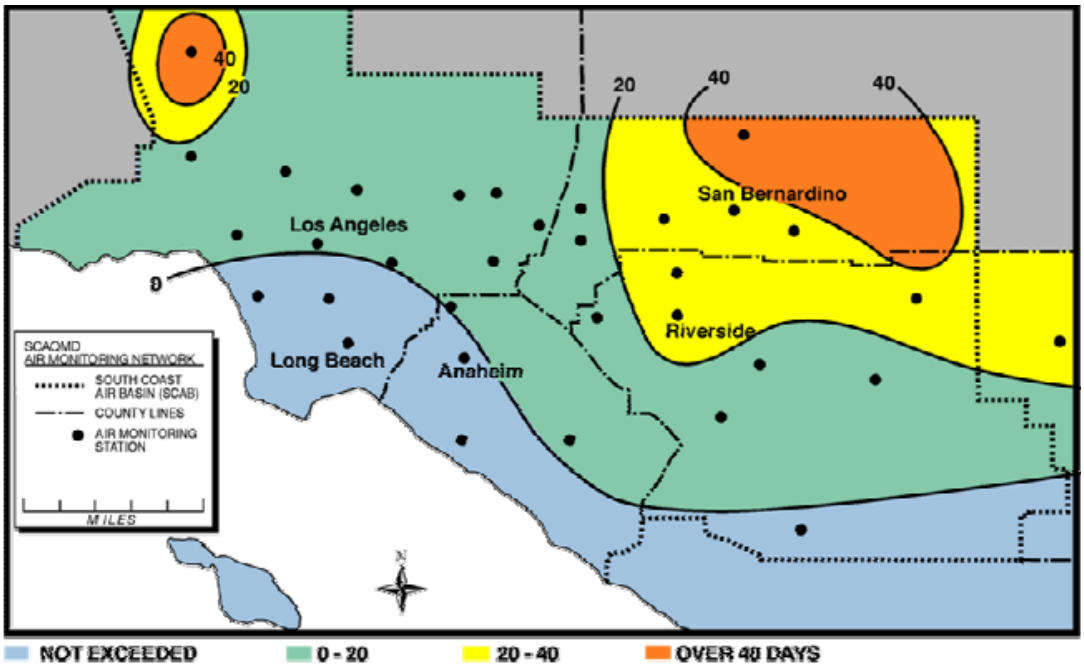
Because of weather patterns and geography, residual pollution from the South Coast Air Basin is transported to several downwind air basins -- the Mojave Desert, the Salton Sea, the South Central Coast, and San Diego. As ozone

precursor emissions in the South Coast Air Basin decrease over time, the transport impact on the downwind areas will also decline.

Current Air Quality

Ozone

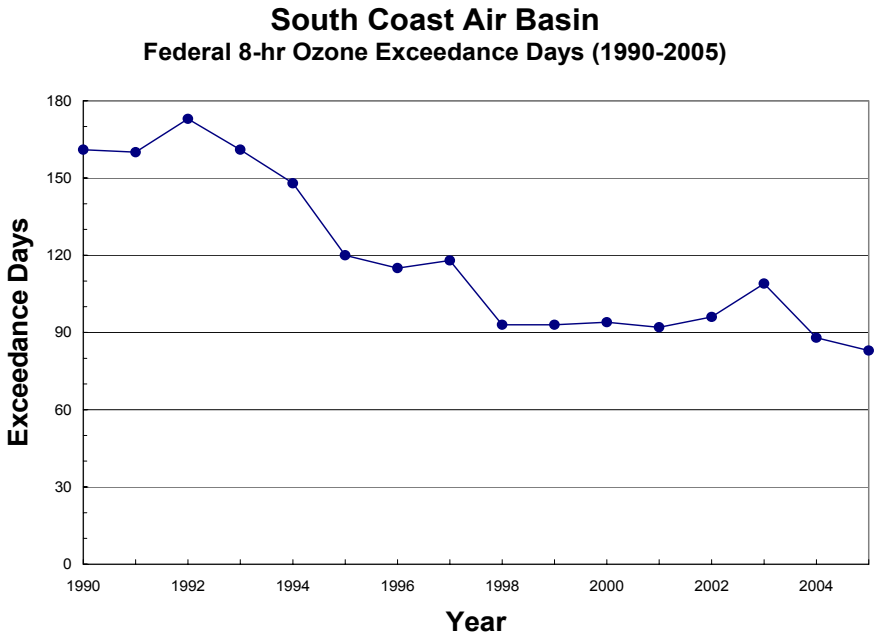
The South Coast is a severe-17 nonattainment area for the federal 8-hour standard for ozone. It has until 2021 to attain the standard although an extension to 2024 is possible if the South Coast requests a re-classification to the next most severe category (extreme).



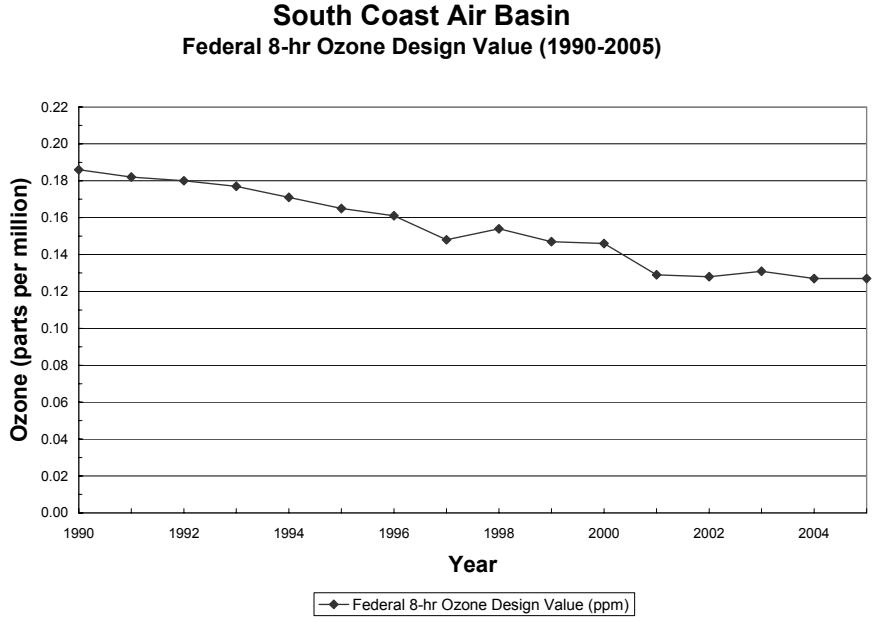
SCAQMD, Draft 2007 AQMP

Ozone - 2005
Number of Days Exceeding the Federal Standard
(8-hour average ozone > 0.08 ppm)

However, there has been significant improvement in air quality in the region over the last two decades. For instance, in 2005 the air basin exceeded the federal ozone standard on 83 days. While still unacceptably high, this constituted 48 percent fewer days than in 1990. Most areas within the region saw a decrease of 45 percent to 85 percent in the number of days over the 8-hour ozone standard between 1995 and 2005. The following figure depicts the number of days in 2005 exceeding federal standards for the federal 8-hour ozone standard. All of the exceedances occurred during the May to October “smog season.” During the peak ozone season the federal ozone standard is exceeded somewhere in the Basin one of every two days.

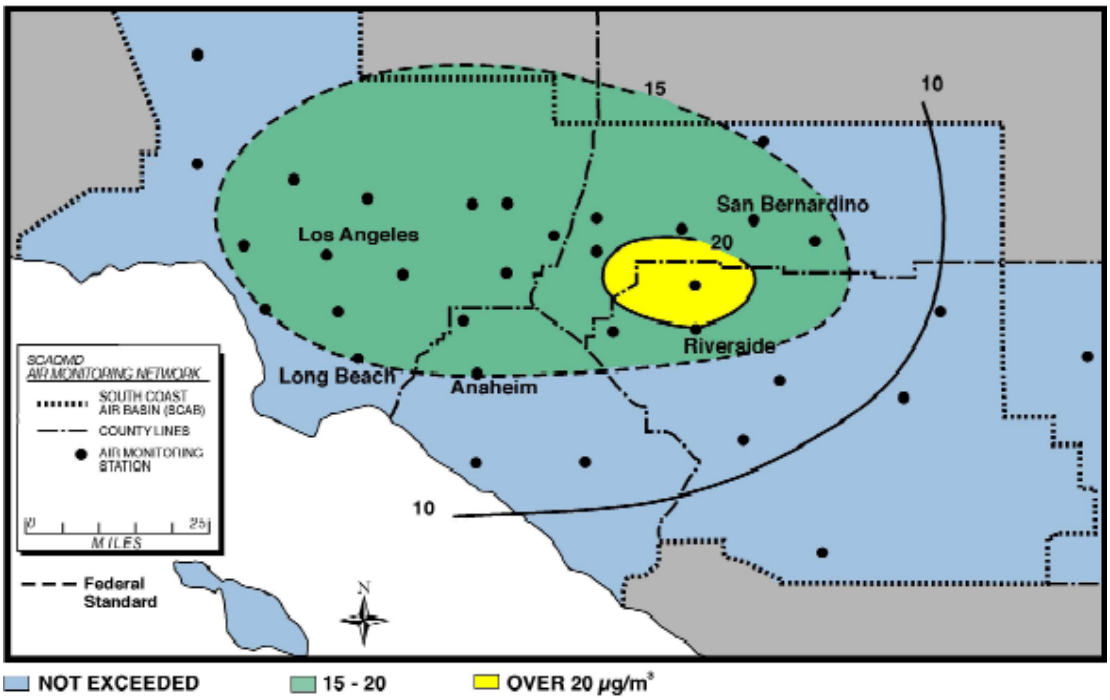


The next figure shows a commensurate decline in 8-hour ozone concentrations as expressed by the three-year design value. Despite substantial air quality improvement, inland areas (northern Los Angeles County, southwestern Riverside, and San Bernardino County) continue to experience high ozone levels. The 2005 ozone design value was 50 percent over the health-based standard.



PM2.5

The South Coast Air Basin is also classified nonattainment for the federal standard for PM2.5, and is now required to attain the PM2.5 standard by 2015. Although high PM2.5 concentrations occur throughout the year, the highest concentrations often occur during the fall. PM2.5 values are declining throughout the air basin, and the South Coast now meets the current 24-hour standard of 65 ug/m^3. However, the PM2.5 annual average standard 15 ug/m^3 continues to be exceeded throughout the basin.



SCAQMD, Draft 2007 AQMP

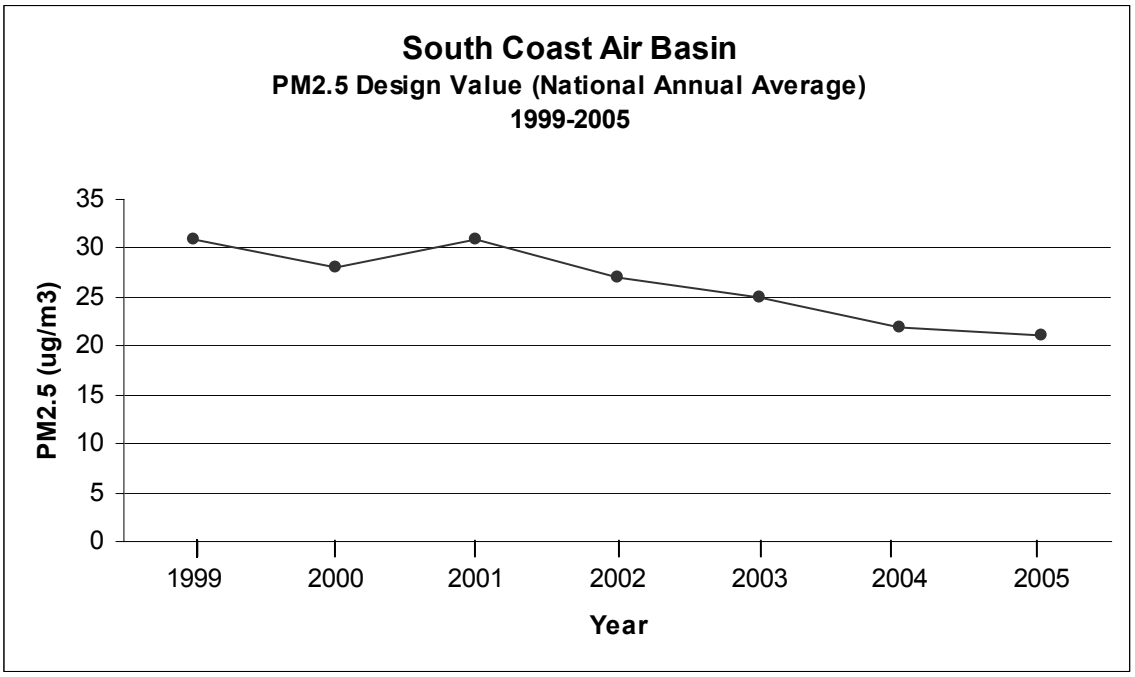
PM2.5 - 2005
Annual Average Concentration Compared
to Federal Standard
(Federal standard = 15 µg/m3, annual arithmetic mean)

PM2.5 in the South Coast Air Basin is comprised of both directly emitted particles, such as dust and soot, and "secondary" aerosol particles created when gaseous pollutants, including ROG, NOx, sulfur dioxide (SOx), and ammonia, react in the atmosphere to form PM2.5.

The following figure shows the change in 3-year average PM2.5 design values in the South Coast Air Basin from 1999 through 2005.[1] While

[1] A design value is the pollutant concentration at a particular site that must be reduced to, or maintained at or below the ambient air quality standard to assume attainment. The design value number tells us how a particular site or area compares with that standard. Is the starting point for developing attainment

PM2.5 concentrations were relatively stable from 1999 through 2001, recent years have seen a strong downward trend in both concentrations and days with high values. All South Coast air monitoring sites with complete data showed a decrease in the PM2.5 annual average design value concentrations for the years 2001 through 2005. Rubidoux, the Riverside County site that where the highest values have been recorded in recent years, saw annual design value concentrations decrease 25 percent, from 30.1 ug/m^3 to 22.7 ug/m^3. Other high monitoring sites also recorded improvements in this period: the Los Angeles, North Main Street site dropped 13 percent, and the San Bernardino site dropped 21 percent.



The region saw a corresponding decrease in the number of days with concentrations higher than the federal 24-hour standard. Rubidoux went from 17 days above the standard in 2001 to four days in 2005, and San Bernardino went from five days to one.

Emission Inventory

The growth assumptions used to estimate future emissions are critical elements in any attainment demonstration plan -- they directly impact the amount of emission reductions needed to reach the emissions target. State law requires the South Coast District to utilize population growth and economic projections developed by the Southern California Association of Governments (SCAG) in its plans and emission projections. Emission projections for stationary and

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demonstration plans. The PM2.5 annual standard is met when the 3-year average of a site's annual mean concentration is 15.0 µg/m3 (micrograms per cubic meter) or less.

areawide sources in the 2007 Plan are based on sector-specific growth forecasts that reflect the SCAG regional growth forecasts. The inventory has been adjusted to reflect emission controls adopted through December 31, 2006. Mobile source emissions were generated with ARB's latest mobile source emissions models, EMFAC2007 and OFFROAD. The EMFAC2007 activity levels (vehicle miles traveled) for the South Coast Air Basin reflect SCAG projections. The emissions and forecasts that are depicted in the State Strategy reflect summer seasonal activity, temperatures, and humidity. Normally, the inventory for an annual average standard such as PM2.5 would be calculated on an annual average basis. The summer season inventory is used for ozone because it reflects the activity levels and conditions that occur when high ozone levels occur in the South Coast. ROG estimates vary most when going from a summer to an annual average inventory because of higher evaporation rates under summer conditions. Since seasonal adjustments have negligible impacts on NOx, SOx, and PM2.5 emissions (the primary pollutant of concern for PM2.5), we have decided for the sake of consistency to use a seasonal planning inventory for both pollutants.

Mobile Source Emissions

The mobile source emission inventories used in the 2007 Plan represent many improvements in the models that are used to estimate emissions from both on-road and off-road sources. As a result, our estimates of the emissions generated by mobile sources have increased relative to those used in the 2003 SIP. These higher estimates do not indicate that actual emissions are increasing – on the contrary, actual emissions from cars and trucks have declined and will continue to decline rapidly over time. This progress comes because of State and federal requirements for cleaner engines and fuels, and despite significant growth in population and vehicle usage.

On-Road

EMFAC2007, California's new on-road motor vehicle emission factor model, was used to generate the on-road mobile source emission inventory for the 2007 Plan. EMFAC2007 represents a comprehensive review and revision of the on-road inventory when compared to EMFAC2002, which was used in the 2003 SIP. The major changes reflected in EMFAC2007 include updated information on emissions from heavy duty diesel in-use engines, smog check testing, corrections to estimated fuel emissions, and more accurate vehicle population numbers.

Off-Road

The 2007 Plan reflects improved estimates of engines and equipment population, usage, emission rates, and equipment deterioration for most categories of off-road mobile sources. The inventory also includes revised estimates of evaporative emissions. The extensively revised ship and train emission

inventories that were developed for ARB's Goods Movement Emission Reduction Plan have also been incorporated into the OFFROAD model.

Ozone and PM-related emissions in the South Coast Air Basin are generally consistent with the overall downward trend statewide. Although motor vehicle miles traveled in the basin continue to increase, on-road vehicle emissions are dropping because of more stringent vehicle emission standards and fleet turnover. This trend will be strengthened between 2000 and 2020 as newer, lower-emitting vehicles become a larger percentage of the fleet. Likewise, as new engines and equipment replace older, more polluting models, emissions will decline more steeply. The issue before us is not whether, but how quickly emissions from the mobile source fleet will be reduced dramatically as required for clean air purposes.

Ozone Emission Inventory

Mobile sources are the dominant source of air pollution in the South Coast, accounting for almost 80 percent of ozone precursor emissions in the Air Basin in 2006. Mobile sources encompass a broad variety of vehicles and equipment that are found both on-road and off-road. These sources include passenger vehicles, trucks, and buses, gasoline-fueled leaf blowers, large diesel-fueled ocean liners, commercial harborcraft, cargo handling and construction equipment, aircraft, and trains.

2007 Ozone Plan
ROG and NOx Baseline Emission Trend 2006-2020*
(South Coast Air Basin Summer Season Inventory in tons per day)**

Source Category	ROG			NOx		
	2006	2020	% Change	2006	2020	% Change
Stationary/Areawide	259	274	+6%	87	68	-22%
On-Road	264	116	-56%	526	190	-64%
Off-Road	208	147	-29%	360	272	-24%
TOTAL	**732**	**537**	**-27%**	**972**	**530**	**-46%**

*Reference: ARB
**Numbers may not add due to rounding.

Stationary sources are primarily industrial and include refineries, power plants, and smelters. Areawide sources are generally smaller, non-permitted sources or operations, and generally include gas stations, dry cleaners, paint spray booth operations, wood-burning fireplaces, residential water heaters and house paints. Responsibility for reducing emissions from these sources rests with the local air districts, except for consumer products and aerosol paints, which are under ARB jurisdiction, and gas stations where the responsibility is shared by ARB and local air districts.

The table above shows current anthropogenic (man-made) ROG and NOx emission levels from all source categories in the South Coast, and the emissions expected in the 2020 attainment year with current controls.

The next two tables show the top 25 sources of ROG and NOx emissions in the South Coast Air Basin.

ROG Emissions
South Coast Air Basin
2007 SIP Summer Season Emissions Inventory
(Prioritized by 2006)

Source Category	2006	2015	2020
PASSENGER VEHICLES	207	107	85
Passenger Cars	*114*	*49*	*36*
Light Trucks, Minivans and SUVs	*68*	*41*	*35*
Medium Duty Trucks	*24*	*17*	*15*
CONSUMER PRODUCTS	101	103	107
RECREATIONAL BOATS	64	52	50
Pleasure Boats	*50*	*39*	*36*
Personal Water Craft	*14*	*13*	*14*
OFF-ROAD EQUIPMENT (LAWN AND GARDEN)	52	40	38
Lawn & Garden Residential	*29*	*19*	*16*
Lawn & Garden Commercial	*23*	*20*	*21*
ARCHITECTURAL COATINGS (PAINTS AND THINNERS)	31	29	30
OFF-ROAD EQUIPMENT (OTHER)	28	14	12
Commercial	*14*	*8*	*6*
Industrial Equipment	*7*	*3*	*3*
Transport Refrigeration Units	*4*	*1*	*1*
Airport Ground Support Equipment	*1*	*1*	*1*
Cargo Handling Equipment	*1*	*1*	*1*
Oil Drilling and Workover	*1*	*<1*	*<1*
Other	*<1*	*<1*	*<1*
PETROLEUM MARKETING (GASOLINE EVAPORATIVE LOSSES)	27	28	30
COATINGS (PAINTS AND THINNERS - NON ARCHITECTURAL)	27	26	27
GASOLINE-FUELED COMMERCIAL TRUCKS	24	12	10
GAS CANS	21	10	8
OFF-ROAD EQUIPMENT (CONSTRUCTION AND MINING)	20	12	9
HEAVY DUTY DIESEL TRUCKS	17	10	7
MOTORCYCLES	14	12	12
CHEMICAL (PROCESS AND STORAGE LOSSES)	11	13	14
OFF-ROAD RECREATIONAL VEHICLES	9	10	12
DEGREASING	9	10	10
OTHER (INDUSTRIAL PROCESSES)	8	9	9
OTHER (WASTE DISPOSAL)	8	7	8
AIRCRAFT	8	10	12
PRINTING	4	5	5
PETROLEUM REFINING (FLARES/EVAPORATIVE LOSSES)	4	4	4
SHIPS AND COMMERCIAL BOATS	4	3	4
Commercial Harbor Craft	*2*	*<2*	*1*
Ocean Going Vessels	*1*	*<2*	*2*
LIVESTOCK WASTE (DAIRY CATTLE)	3	1	1
ADHESIVES AND SEALANTS	3	4	5
FOOD AND AGRICULTURE (CROP PROCESSING AND WINERIES)	3	3	3
LOCOMOTIVES	3	3	3
All other sources	25	23	24
Note: Due to rounding, subcategory emission sums may not match the listed total for the category			
TOTAL	**732**	**559**	**537**
Subtotal: On-Road Mobile Sources	*264*	*142*	*116*
Subtotal: Off-Road Mobile Sources	*208*	*154*	*147*

NOx Emissions
South Coast Air Basin
2007 SIP Summer Season Emissions Inventory
(Prioritized by 2006)

Source Category	2006	2015	2020
HEAVY DUTY DIESEL TRUCKS	259	129	87
PASSENGER VEHICLES	205	94	65
Passenger Cars	*83*	*33*	*22*
Light Trucks, Minivans and SUVs	*83*	*40*	*28*
Medium Duty Trucks	*38*	*20*	*14*
OFF-ROAD EQUIPMENT (CONSTRUCTION AND MINING)	120	75	51
OFF-ROAD EQUIPMENT (OTHER)	87	49	38
Industrial Equipment	*39*	*18*	*13*
Commercial	*16*	*11*	*8*
Cargo Handling Equipment	*12*	*4*	*3*
Transport Refrigeration Units	*8*	*9*	*9*
Airport Ground Support Equipment	*5*	*3*	*3*
Oil Drilling and Workover	*5*	*3*	*2*
Other	*1*	*<1*	*<1*
SHIPS AND COMMERCIAL BOATS (Includes OCS)	75	89	104
Ocean Going Vessels	*48*	*74*	*90*
Commercial Harbor Craft	*25*	*16*	*14*
GASOLINE-FUELED COMMERCIAL TRUCKS	36	23	19
LOCOMOTIVES	31	23	26
RESIDENTIAL FUEL COMBUSTION	18	14	14
Water Heating	*7*	*3*	*3*
Space Heating	*5*	*4*	*4*
Cooking	*3*	*2*	*2*
Other (Clothes Dryers, BBQs, Pool Heaters and Fireplaces)	*2*	*5*	*5*
MANUFACTURING AND INDUSTRIAL (BOILERS- IC ENGINES)	17	15	15
SERVICE AND COMMERCIAL (BOILERS- IC ENGINES)	16	11	11
RECREATIONAL BOATS	16	17	18
Pleasure Boats	*14*	*15*	*14*
Personal Water Craft	*1*	*3*	*4*
AIRCRAFT	16	23	27
PUBLIC TRANSIT BUSES	12	11	9
FARM EQUIPMENT (COMBINES AND TRACTORS)	9	5	3
ELECTRIC UTILITIES	9	7	7
PETROLEUM REFINING (COMBUSTION)	7	6	6
OFF-ROAD EQUIPMENT (LAWN AND GARDEN)	7	6	6
Lawn & Garden Commercial	*15*	*5*	*5*
Lawn & Garden Residential	*1*	*1*	*1*
OTHER (FUEL COMBUSTION)	7	5	4
PETROLEUM REFINING (FLARES)	5	4	4
SCHOOL BUSES	4	4	4
COMMERCIAL TRANSIT BUSES	4	2	1
MOTOR HOMES	3	2	1
MOTORCYCLES	3	3	3
INCINERATORS	2	2	2
OIL AND GAS PRODUCTION (COMBUSTION)	1	<1	<1
All other sources	3	4	5

Note: Due to rounding, subcategory emission sums may not match the listed total for the category

TOTAL	**972**	**622**	**530**
Subtotal: On-Road Mobile Sources	*526*	*267*	*190*
Subtotal: Off-Road Mobile Sources	*360*	*287*	*272*

The emission inventory projects that existing controls, particularly controls imposed on cars and trucks, will significantly reduce emissions between 2006

and 2020. Emissions from on-road motor vehicles are expected to decline by over 60 percent, combined ROG and NOx, while off-road vehicles and equipment will decline by 26 percent, and emissions from stationary and area sources are projected to increase slightly.

The sources of ROG emissions in the South Coast are diverse. Emissions from passenger vehicles make up over one-third of the inventory in 2006, but are projected to decline to 15 percent of the inventory by 2020. ROG emissions from stationary and area sources are projected to increase during this period. Although this slight increase is spread among categories of stationary and area sources, the most pronounced increase is expected to come from the use of consumer products.

PM2.5 Emission Inventory

The following table shows the breakdown of ROG, NOx, sulfur oxides (SOx), and PM2.5 by broad source category for 2006 and 2014. ROG, NOx , and SOx are emitted as gaseous pollutants but can contribute to the formation of ambient PM2.5 under the right atmospheric conditions. Ammonia emissions also contribute to PM2.5 formation in the eastern part of the South Coast Air Basin, but those emissions are declining with reductions in dairy operations.

On-road and off-road mobile sources accounted for about 77 percent of PM2.5 and PM2.5 precursor emissions in the South Coast Air Basin in 2006. By 2014, mobile sources will account for about 69 percent of the PM2.5 and PM2.5 precursor emissions, as shown in the following table. Among mobile sources, the largest sources of PM2.5 precursor emissions are heavy-duty trucks, construction equipment, light-duty vehicles, ships, planes, and trains. Although sulfur emissions from on-road sources have declined significantly with the implementation of ultra-low sulfur diesel fuel standards, SOx emission from ships could increase by over 80 percent by 2020 unless ships also begin to use cleaner fuels.

It is important to note that not all precursor emissions will impact PM2.5 concentrations equally. Preliminary modeling indicates that directly emitted PM2.5 (fugitive dust) and NOx reductions will have the greatest impact on reducing PM2.5 concentrations.

ROG

ROG emissions have seen a moderate decline due to ARB and district rules that require the use of environmentally-friendly consumer products and solvent cleaners, population increases can offset these benefits, and pose a continuing challenge. ROG emissions from mobile sources are declining because of better evaporative controls on both vehicles and refueling operations. ROG is considered to play a lesser role in the formation of ambient PM2.5.

South Coast Air Basin
PM2.5 and PM2.5 Precursor Emissions

	Source Category	2006	2014	% Change
ROG	**Stationary/Areawide**	259	260	0
	On-Road	264	149	-43%
	Off-Road	208	158	-24%
	TOTAL	**731**	**567**	**-22%**
NOx	**Stationary/Areawide**	87	71	-18%
	On-Road	526	287	-45%
	Off-Road	360	293	-19%
	TOTAL	**972**	**651**	**-33%**
SOx	**Stationary/Areawide**	22	17	-21%
	On-Road	4	2	-42%
	Off-Road	37	25	-31%
	TOTAL	**63**	**45**	**-28%**
PM2.5	**Stationary/Areawide**	58	63	9%
	On-Road	20	17	-15%
	Off-Road	22	18	-17%
	TOTAL	**100**	**98**	**-2%**

Reference: ARB 8-Hour Ozone SIP Emission Inventory Projections, CEFS v. 1.06 (November 15, 2006)
**Numbers may not add due to rounding

NOx

NOx plays a more significant role in the formation of secondary PM2.5. South Coast NOx emissions from stationary sources such as electric utilities and refineries have declined significantly since 1990 due to early and stringent regulatory controls, and due to the District's 1994 adoption of a cap and trade program for permitted sources.[2] The South Coast NOx inventory is currently dominated by emissions from on-road and off-road mobile sources. The emissions from on-road sources subject to California requirements are projected to decrease sharply within the next 10 years. NOx emissions from some off-road sources largely subject to federal regulation, such as construction and mining equipment, are declining while others, including ships and trains, are increasing.

[2] In 1994, RECLAIM (Regional Clean Air Incentives Market) replaced the traditional regulatory structure of command-and-control for NOx and SOx permitted stationary sources, setting emission reduction targets well below federal criteria for reasonably available control technology.

SOx

Stationary sources and off-road mobile sources that use diesel fuel emit SOx that forms secondary sulfate particles. SOx emissions from ships and commercial boats are the largest single source of SOx emissions, contributing half of the SOx emissions in 2006 and a projected 40 percent of the emission in 2014. Petroleum refining operations are the next largest source with 22 percent of the SOx emissions in 2006, and 14 percent in 2014.

Directly Emitted PM2.5

Fugitive dust emissions from areawide sources including construction and unpaved roads and are expected to increase between 2006 and 2014. Exhaust, tire wear, and re-entrained road dust from on-road sources also contribute to directly emitted PM2.5 and are also expected to increase with growth in the air basin. On an annual average basis, directly emitted PM2.5 emissions contribute approximately 30 to 40 percent of the ambient PM2.5 in the South Coast Air Basin.

Emission Reductions from Goods Movement Sources

The goods movement sector is a major economic driver in the South Coast Air Basin. The ships, trains, trucks, and related equipment that make up the goods movement sector are also a major contributor to air pollution in the South Coast.

In April, 2006, ARB adopted a comprehensive plan for reducing emissions from goods movement sources to address both community impacts and regional attainment needs. This section evaluates how well the proposed State Strategy meets that commitment with respect to the South Coast.

The proposed reductions identified in this plan cannot be compared directly to the ARB Goods Movement Plan for several reasons. The inventory in this Plan, including the estimates of emissions from goods movement sources, is more refined and current. Some of the measures identified as potential controls in the Goods Movement Plan have been adopted, and the resulting reductions are reflected in the baseline inventory used in this Plan: for example, the auxiliary engine fuel standards called for in the Goods Movement Plan are shown as adopted controls in the baseline emissions for this Plan. Without this rule, ships would emit an additional 35 tons per day SOx emissions in the South Coast Air Basin in 2020.

Some of the control options identified in the Goods Movement Plan have also changed. In the Goods Movement Plan, staff recommended that ARB seek a Sulfur Emission Control Area (SECA) designation to reduce sulfur emissions from ocean-going vessels. This measure would have reduced the content of sulfur in main engine fuel from 2.5 percent in 2001 to 1.5 percent in 2010 and

0.5 percent in 2015. However, in the proposed State Strategy staff has replaced that measure with a Main Engine Fuel control measure similar to the Auxiliary Engine Fuel control measure the Board passed in December 2005. As proposed the Main Engine Fuel control measure would establish 0.5 percent sulfur fuel in 2007 and go down to 0.1 percent sulfur fuel in 2010, producing greater and much faster reductions than would a SECA designation.

The proposed State Strategy delineates various strategies to reduce emissions from the Goods Movement sector. Staff is researching the benefits of a mandatory Vessel Speed Reduction measure for ocean-going vessels in South Coast. Along with port staff, ARB is also assessing the benefits and feasibility of cold-ironing at ports to further reduce emissions from Auxiliary engines close to communities living near the ports. The following table compares the percentage ROG and NOx reductions that the proposed State Strategy would achieve from goods movement sources to the percentage reductions needed to achieve the regional carrying capacity selected by the South Coast district. The table does not reflect the additional emission reductions that will result from long term measures yet to be identified at the local, state, and federal level.

Proposed Strategy Goods Movement Reductions for the South Coast

		Year	
		2006	**2020**
ROG	**Air Basin Baseline**	1018.8	530.2
	Percent Reduction Required for Attainment		78%
	Goods Movement Baseline	276.8	185.9
	Goods Movement Source Reductions		87
	Percent Reduction from GM Sources		47%
NOx	**Air Basin Baseline**	794.4	536.5
	Percent Reduction Required for Attainment		50%
	Goods Movement Baseline	19.9	10.4
	Goods Movement Source Reductions		4.7
	Percent Reduction from GM Sources		45.2%

The Attainment Demonstration

Past regulatory actions are just a prelude to the far-reaching actions that we will need to take over the next 15 years to attain the federal 8-hour ozone and PM2.5 air quality standards in the South Coast Air Basin. The U.S. EPA promulgated these more stringent standards in 1997, based on scientific studies that pointed to serious health consequences at concentrations lower than health-based standards that existed at the time. The new air quality standards also triggered new attainment deadlines. For the South Coast the PM2.5 standard must now be met in 2015 and the ozone standard no later than 2024. This portion of the

plan discusses the role that the State Strategy will play in achieving the new federal standards in South Coast Air Basin. U.S. EPA guidance requires that the attainment demonstration provide for the necessary emission reductions one year prior to the attainment deadline.

Since the PM2.5 standard must be met a full 6-9 years before the ozone standard, the State Strategy considers the impacts and benefits of ROG and NOx reductions on two separate timetables. Additionally, since both ozone and PM2.5 are formed through a series of complex chemical reactions, our analysis considers how the timing of PM2.5 controls could affect the mix of controls for ozone attainment nearly a decade later.

Ozone

This plan utilizes photochemical modeling conducted by the South Coast District staff in consultation with the ARB's modelers and published in the District's October draft plan. The modeling identified various combinations of ROG and NOx emission levels, or "carrying capacities," that can be expected to result in attainment of the 8-hour ozone standard throughout the South Coast Air Basin. Based on ongoing modeling refinements, it is our understanding that the District will identify a carrying capacity that relies even more heavily on NOx reductions.

Summary of Ozone Attainment Demonstration for 2021
(South Coast Air Basin, Summer Emissions, tons per day)

	ROG	**NOx**
2006 Current Emissions	732	972
2020 Baseline Inventory	537	530
2021 Carrying Capacity	**304**	**238**
Total Reductions Needed for Attainment	**233**	**292**
Target Reductions[3]	**85**	**152**
-- Proposed State Measures[4]	*67*	*138*
-- Proposed District Measures[6]	*18*	*14*
Shortfall	***148***	***140***

U.S. EPA has classified the South Coast Air Basin as a "severe-17" area for ozone. The combined strategies identify about half of the emission reductions needed to demonstrate attainment of the ozone air quality standard 2021 deadline for severe-17 areas. The District's draft plan acknowledges that the adopted measures, together with new local and State near-term measures, will not reduce emissions enough to result in attainment of the federal eight-hour

[3] Targeted reductions are in addition to reductions from adopted measures.
[4] Reductions from proposed State and District measures in the draft 2007 Plan.

ozone standard by 2021. The Clean Air Act allows nonattainment areas to "bump up" to a higher classification if more time is needed to attain the standard, if certain conditions are met. ARB believes that a reclassification to "extreme," is appropriate for the South Coast. An extreme classification would extend the attainment date to 2024, and acknowledges that some of the reductions needed for attainment will have to come from strategies that are outside of the scope of our currently available technologies and infrastructure.

The federal Clean Air Act recognizes that ozone nonattainment areas with an intractable problem, such as the South Coast, must rely on evolving technologies to meet attainment goals. The South Coast SIP consistent with the Clean Air Act (Section 182(e)(5)) will need to include a commitment to achieve additional reductions from long-term concepts.

PM2.5

Air quality data gathered over the past several years shows significant reductions in ambient PM2.5 levels throughout the region, particularly in the heavily populated western portion of the Basin. This progress appears to be independent of fluctuations in the weather. Nonetheless, high PM2.5 values are still recorded in the rapidly developing eastern portion of the District around Fontana and Rubidoux, where the PM2.5 design value still exceeds the PM2.5 standard by up to 50 percent. The South Coast's PM2.5 modeling indicates that significant reductions in ROG, NOx, SOx, and PM2.5 will be needed to attain the federal standard throughout the district, as shown in the following table.

The proposed State Strategy will achieve additional emission reductions on the order of about 20 percent for NOx, 45 percent for SOx, 10 percent for ROG, and 10 percent for diesel PM by 2015. These short term strategies are aggressive: they will strengthen and expand the motor vehicle smog check program; lead to more rapid turnover of older trucks and off-road equipment used in construction, land and water-based recreational vehicles; lower the sulfur content in fuels; modernize and clean up port-related operations; and tighten performance standards for engines and equipment that are regulated by the federal government (e.g., interstate trucks, construction and agricultural equipment, and locomotives).

Unfortunately, the State Strategy must build upon U.S. EPA's new engine standards for off-road sources for which ARB cannot establish State new engine emission standards. These standards are phasing in from 2010 to 2015 or later. This schedule provides only limited turnover and replacement of diesel engines prior to the 2015 PM2.5 attainment date. Cost is not the only issue: it is not likely that enough clean engines would be manufactured to bring emissions down to the South Coast carrying capacity even if funding were available to spur early replacement.

The result of these constraints is that it may not be possible to reduce emissions to the PM2.5 carrying capacity identified by the District by 2015. The attainment demonstration play will likely be updated at least once prior to the attainment deadline, which would allow us to incorporate new controls. ARB's analysis of historical emissions and PM2.5 air quality trends also indicates that reductions identified in the State Strategy are likely be more effective in reducing ambient PM2.5 levels that the district's modeling indicates. Future plan updates would reflect more air quality data, and possibly improved modeling.

Status for PM2.5 Model

(South Coast Air Basin, Summer Season emissions, tons per day)

	NOx	SOx	ROG	PM2.5
2006 Current Emissions	972	63	732	100
2015 Carrying Capacity	421	19	457	84
Total Reductions Needed	**551**	**44**	**275**	**16**
Reductions between 2006 and 2015 (Existing Program)	319	18	165	2
New State Measures in 2014	125	20	55	9
New District Measures in 2014	8	3	7	1
TOTAL REDUCTIONS FROM MEASURES	**452**	**41**	**227**	**12**
2014 Shortfall	***99***	***3***	***48***	***4***

In its October draft plan, the South Coast Air Quality Management District recommended a State Strategy that District staff believes would allow attainment of the PM2.5 standard by 2015. The District's proposed measures are assumed to achieve an additional 100 tons per day NOx reductions by 2015. ARB staff has met with District staff to try to understand these assumptions and determine if additional reductions are feasible in the 2015 timeframe.

Proposed State Strategy

Air quality modeling and data analysis have demonstrated NOx reductions are needed for reducing both PM2.5 and ozone concentrations in the South Coast Air Basin. By applying a NOx control focus to attain the near-term PM2.5 standard in the South Coast, we can make significant progress toward attaining the 8-hour ozone standard by 2024. ARB's mobile source NOx measures are essential to attainment of both ozone and PM2.5 standards on the South Coast.

Mobile source controls have been the bedrock of ARB's emission reduction strategy since the agency's inception in 1967. Clean vehicles, engines, and fuels have been developed to respond to California's new vehicle emission standards, which then allowed U.S. EPA and other nations to enact similar requirements. As a world leader in air pollution control, the ARB has a proven record of spurring

the continuous improvements in mobile source emission technologies and fuels. The existing vehicle control program provides a healthy down payment on the needed reductions: in 2020 combined ROG and NOx emissions from on-road cars and trucks are projected to be 60 percent lower than they are today, despite significant increases in population, and vehicle use. Overall, the existing mobile source program is expected to reduce mobile source emissions by over 40 percent in 2020 when compared to 2006 levels. Attaining the ozone standard in the South Coast will require even more reductions from all sectors – it will require us to clean up remaining higher polluting vehicles in the on-road sector, and to secure commensurate reductions from most off-road sources.

Mobile sources play such a dominant role in the South Coast Air Basin that the rate at which their emissions can be reduced is also key to determining how quickly the region can meet ambient air quality standards. In an area whose economy depends on moving and delivering products, construction, and a highly mobile workforce, the cost of reducing mobile source emissions must be considered when designing a clean air plan.

ARB's existing mobile source program has resulted in development of progressively cleaner cars and trucks (see below). More recent regulations bring cleaner forklifts and other off-road equipment to the California market. As a result, much of the remaining mobile source problem in 2023 will come from older cars, trucks, and off-road equipment. ARB's adopted SIP strategies are discussed in Section C-3, and the proposed new strategies in Section C-4.

The State Strategy lays out an aggressive program for cleaning up California's "legacy fleet" of diesel engines by requiring older equipment to be retrofitted with controls, upgraded with engines, or replaced with newer equipment. The availability of new engines and control devices places a real constraint on the speed at which we can impose clean-up requirements. The cost that individual businesses must pay to retrofit existing equipment or replace it ahead of schedule is another consideration.

The State Strategy is technologically and economically challenging. It relies in large part on replacing or retrofitting hundreds of thousands of trucks and off-road engines. The strategy must take into account the ability of manufacturers to meet the demand for new market ready, reliable, low-emitting engines and equipment. Because California shares regulatory responsibility with the federal government for the control of interstate trucks, construction equipment, trains and ships, we must also rely on our federal partners to match the State's commitment to set new technology-based standards.

Regulations have been and will continue to be ARB's primary mechanism for reducing emissions. Beginning in the 1990s, California complemented its command-and-control regulatory structure with market-based strategies. This approach has successfully incentivized the early retrofit of existing equipment,

financed the development and commercialization of new technologies, and accelerated the turnover of existing, higher polluting engines and equipment. California has invested more than 140 million dollars to date to clean up dirty trucks, buses, and agricultural equipment through the Carl Moyer Memorial Air Quality Standards Attainment Program. This investment is reducing smog-forming oxides of nitrogen emissions by approximately 7,000 tons annually, equivalent to taking more than 700,000 cars off the road. Other incentive programs have supported the purchase of low-emission vehicles and old car buy-back (light-duty scrap) programs. We expect that the South Coast will continue its incentive programs to reduce emissions in support of the SIP.

Although incentive programs are both popular and effective, they often involve the allocation of public funds that are in limited supply. An additional source of public funding involves the use of state general obligation bonds. In 2006, California voters approved the use of $1 billion in bond funding to reduce goods movement related air emissions. ARB is now developing the plans and guidelines for the distribution of these funds. On January 24, 2007, Governor Schwarzenegger issued Executive Order S-02-07 to ensure fiscal responsibility in the use of moneys generated by general obligation funds. ARB will submit an accountability structure as required by March 1, 2007, as required by the Executive Order.

Reasonable Further Progress Reductions from Existing Programs

The South Coast meets its progress targets through 2014 purely on the basis of ROG reductions from the existing control program. From 2017 forward, the South Coast will need to use both ROG and NOx reductions from the existing control program. No reductions from proposed new measures are needed for progress purposes.

	Milestone year					
	2008	**2011**	**2014**	**2017**	**2020**	**2023** (2024 attainment)
ROG or NOx percent reduction required from 2002 levels	18%	27%	36%	45%	54%	63%
ROG percent reduction projected from 2002 levels used to meet RFP	18.0%	27.0%	36.0%	39.1%	40.3%	40.6%
NOx percent reduction projected from 2002 levels used to meet RFP	0.0%	0.0%	0.0%	5.9%	13.7%	22.4%
Total ROG and/or NOx percent reductions used to meet RFP	18.0%	27.0%	36.0%	45.0%	54.0%	63.0%
RFP percent reduction requirements met?	Yes	Yes	Yes	Yes	Yes	Yes