

**Staff Report**  
**Proposed 2007 State Implementation Plan**  
**for the South Coast Air Basin –**  
**PM2.5 Annual Average and 8-Hour Ozone**  
**National Ambient Air Quality Standards**

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**California Environmental Protection Agency**



*Air Resources Board*

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## EXECUTIVE SUMMARY

Air Resources Board (ARB) staff is proposing Board approval of the South Coast Air Quality Management District (District) 2007 State Implementation Plan (SIP) for the federal 8-hour ozone and PM<sub>2.5</sub> standards. The local SIP elements, combined with the ARB's 2007 Statewide SIP Strategy, demonstrate attainment of the standards by applicable deadlines. The local SIP elements were approved by the District on June 15, 2007, when it adopted its comprehensive 2007 Air Quality Management Plan (AQMP). Under State law the District adopts an AQMP to address to state and federal air quality requirements. Only the portions of the AQMP intended to address federal standards are being submitted to the U.S. Environmental Protection Agency as a SIP revision. The ARB is considering approval of the 2007 Statewide Strategy concurrent with the District's SIP elements.

Some of the nation's highest concentrations of PM<sub>2.5</sub> and ozone occur in the South Coast Air Basin despite stringent State and local controls and substantial air quality progress. The South Coast Air Basin is one of two PM<sub>2.5</sub> nonattainment areas in the State, and the most serious in the nation. It is also the nation's worst area for ozone, with 8-hour ozone levels that are currently 50 percent above the federal standard. The ozone standard is exceeded somewhere in the basin on an average of 85 days per year.

This staff report summarizes a consensus agreement reached by staff of the ARB, the District, and SCAG for attaining the new national PM<sub>2.5</sub> and 8-hour ozone standards in the South Coast Air Basin. This agreement provides for achievement of the District's 2014 emission reduction target through additional actions by ARB and the District, the federal government, and local cities and counties. The agreement will require new regulations as well as new sources of public and private funding dedicated to air pollution control. A process for encouraging the development of the new technologies that will be needed to meet the 8-hour ozone standard in the South Coast by 2023 is also included.

ARB staff recommends that the Board approve the 2007 SIP for the South Coast Air Basin as modified by the consensus agreement. The new reductions from the agreement will come from accelerating the replacement or retrofit of older diesel trucks, reducing emissions from Metrolink commute trains, and targeting existing clean air incentive funds to projects that provide the greatest emission reductions. The agreement also incorporates the District's proposal to reduce emissions from fireplaces and commercial charbroiling operations, and sets a federal funding target to mitigate a portion of the 2014 emissions from sources under federal jurisdiction.

Much of California's past air pollution success came from requiring new vehicles and industrial equipment to be as clean as possible. The short timeframe for reaching the PM2.5 standard requires strategy that relies heavily on the early replacement or retrofit of the existing sources. In many cases the required level of reductions will be feasible only if the owners of the older equipment and vehicles are provided with financial assistance or incentives. Some money is available now through bonds and Carl Moyer program; more will be needed. The success of this strategy depends on the ARB, District, SCAG, and local governments working together to secure needed funding and ensure that all available funding is used in a way that maximizes cost-effective emission reductions.

The 2007 AQMP also addresses 8-hour ozone planning requirements for Riverside County's Coachella Valley, a portion of the District that lies in the Salton Sea Air Basin. Staff recommends approval of the Coachella Valley ozone attainment demonstration.

### PM2.5 Strategy

California must meet the new annual PM2.5 standard by 2014. The District has determined that emissions of nitrogen oxides (NOx) and sulfur oxides (SOx) – pollutants generated largely from mobile sources ranging from passenger cars to container ships – must be reduced by 55% and almost 70% respectively from 2006 levels to meet the 2014 deadline for attaining the PM2.5 standard. The District's plan also calls for a 30% reduction in emissions of reactive organic gasses (ROG) and a 15% reduction in directly emitted PM2.5. The District used photochemical air quality modeling to identify emission levels that that would allow the basin to attain the PM2.5 annual average standard – the carrying capacity – and the corresponding emission reduction targets. The District has since modeled the impact of the proposed strategy to verify that it will result in attainment by 2014.

The following table summarizes the PM2.5 attainment demonstration for the South Coast Air Basin.

South Coast Air Basin PM2.5  
Carrying Capacity vs. Projected 2014 Emissions  
Annual Average Emissions, Tons per Day (tpd)

	<b>NOx</b>	<b>SOx</b>	<b>PM2.5*</b>	<b>ROG</b>
	<b>2014</b>	<b>2014</b>	<b>2014</b>	<b>2014</b>
Baseline Emissions	654	43	102	528
Carrying Capacity	460	20	86	474
Reductions Needed (tons)	194	23	16	54
New AQMD Reductions	28	3	4	10
New ARB Reduction	152	20	12	43
Additional Federal Reductions	10			
Additional Local Reductions	4			
<b>Total Reductions</b>	<b>194</b>	<b>23</b>	<b>16</b>	<b>53</b>

The District's AQMP and State Strategy now achieve the reductions necessary to meet the modeled carrying capacity. ARB staff's assessment of PM2.5 precursor emissions, combined with ambient levels of PM2.5 and precursor emissions measured in the South Coast Air Basin is also provided in this staff report. This supplemental analysis indicates that a somewhat lower level of reductions than those shown above could result in attainment. Because of the uncertainties inherent in photochemical modeling, U.S. EPA's Guidance provides for the use of supplemental analyses to demonstrate attainment with a higher level of emissions than the modeled carrying capacity. Meeting the District's emission reduction target provides additional certainty to the attainment demonstration.

Ozone

The South Coast Air Basin is currently required to reach the national 8-hour ozone standard by 2020, but the Act allows states to request an extension to 2023. The District has determined that NOx emissions in the South Coast must be reduced by 76% to reach the standard. It has requested the extension to 2023, which also allows the SIP to rely in part on future technologies, not yet fully identified, in its attainment demonstration.

The measures currently identified in the proposed State Strategy, together with proposed District measures and existing controls, will provide three-quarters of the reductions needed to attain the federal 8-hour ozone standard in the South Coast Air Basin by 2023 – less than one-fourth of the reductions needed in the plan's 17-year timeframe rely on the new technology provision. The AQMP includes 22 local control options that the District has identified for further investigation that may also reduce this shortfall.

South Coast Air Basin 8-hour Ozone SIP  
Summer Planning Inventory, Tons per Day (tpd)

	<b>NOx</b>	<b>ROG</b>
	<b>2023</b>	<b>2023</b>
Baseline Emissions	506	536
Carrying Capacity	114	420
Reductions Needed from 2023 Baseline	383	116
New AQMD Measures	19	9
New ARB Measures	164	56
Total Short-and Mid-term Reductions	183	65
Long-Term Reductions	200	51

It is clear, however, that it will be a challenge to reduce emissions to 25% of current levels in the face of projected population and vehicle use increases. Because of this, ARB, the District, and SCAG have agreed to initiate a coordinated government, private, and public effort to establish emission goals for critical source categories and identify technology advancement opportunities.

The Nature of the Commitments

The AQMP commitment adopted by the District specifies an emission reduction schedule and identifies control options that the District will pursue to reduce emissions by the amounts and in the timeframes identified in the AQMP. It does not bind the District to adopt specific measures identified in the plan or to achieve the reductions the District staff has estimated for each measure. This approach allows the District to revise its strategy as it develops and learns more about specific regulations, while ensuring that the District meets its overall emission reduction schedule and commitment. ARB staff is proposing a comparable approach for the State Strategy.

ARB staff is proposing that the Board include in its Board Resolution a commitment to deliver all the 2014 emissions reduction commitments from State or District proposed measures for mobile sources, with the following exceptions:

- SIP Credit for Reductions from Local City and County DMV Registration Fees Revenues: Aside from providing needed emission reductions, this measure is intended in part to encourage cities and counties within the South Coast Air Basin to use a substantial portion of their DMV surcharge revenues to maximize emission reductions. A State commitment to achieve these reductions should local governments fail to do so would undermine that goal.
- Federal Funding to Mitigate Locomotive Emissions: The State’s ability to reduce emissions from locomotives is impacted by jurisdictional issues, the cost of controls, and the availability of clean engines to meet the lowest emission standards. U.S. EPA, by virtue of its ability to establish engine

emission standards, holds the key to the introduction of the cleanest engines needed to meet federal air quality standards in California. ARB and the District cannot make up the reductions where California is preempted by federal law. Existing agreements with the rail industry are reducing emissions in the South Coast Air Basin beyond federal requirements. However, the severity of the region's PM2.5 problem and the attainment deadline make it necessary to further mitigate locomotive emissions in 2014.

#### Coachella Valley Ozone SIP

The Coachella Valley is an area under District jurisdiction that lies outside the South Coast Air Basin. It is the portion of Riverside County that lies in the Salton Sea Air Basin, east of the South Coast Air Basin. Most of the Coachella Valley's residents live in communities along Highway 111 from Palm Springs to the town of Coachella.

The Coachella Valley has been classified as a "serious" ozone nonattainment area with an attainment date of June 15, 2013. In 2006, the Valley exceeded the standard on 26 days with an ozone design value of 0.102 parts per million (ppm), which is approximately 21 percent over the 0.085 ppm standard. Existing and proposed control programs in the South Coast Air Basin are expected to reduce the transport of ozone and ozone precursors ROG and NOx by about 29 and 46 percent, respectively, by the 2013 deadline. The District has adopted a two-pronged air quality improvement program for the Coachella Valley that consists of an aggressive control program in the upwind South Coast Air Basin, and additional control of locally generated mobile source emissions via the State Strategy. The District's analysis indicates that the anticipated reductions from these programs will not be sufficient to attain the 8-hour ozone NAAQS in 2013.

The AQMP requests a reclassification to "Severe-17", which would extend the attainment date to 2021. Subsequent modeling that reflects the consensus agreement for PM2.5 indicates that the new reductions in the South Coast Air Basin will also accelerate air quality improvement in the Coachella Valley, and may result in attainment as early as 2018.

#### Staff Recommendation:

Staff recommends that the Board approve the South Coast 8-hour ozone and PM2.5 SIPs as modified by the consensus agreement reached by the ARB, District, and SCAG staff and reflected in the ARB's 2007 Statewide SIP Strategy being considered concurrently on September 27, 2007. Staff also recommends approval of the Coachella Valley ozone SIP.



## **I. Background**

### **A. Profile of the South Coast Air Basin**

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 16 million people, about 40 percent of the State's population. The basin is also home to 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 Air Basin's complex terrain combines with its temperate climate to provide the perfect conditions for creating "smog". Ozone levels in much of the coastal area now meet federal standards, thanks to the combined impacts of local, State, and federal emission controls. However, inland portions of the air basin continue to face a challenging ozone problem. Regional PM<sub>2.5</sub> levels are also well above the federal annual standard.

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. The transport impact on the downwind areas will decline as emissions in the South Coast Air Basin decrease with the implementation of the AQMP.

Some of the nation's highest concentrations of inhalable particles under 2.5 microns (PM<sub>2.5</sub>) and ozone occur in the South Coast Air Basin despite decades of increasingly stringent air pollution controls. The South Coast Air Basin is one of two PM<sub>2.5</sub> nonattainment areas in the State, and the most serious in the nation. Its ozone levels are currently 50 percent above the federal standard, making it the nation's worst ozone area.

#### **1. PM<sub>2.5</sub>**

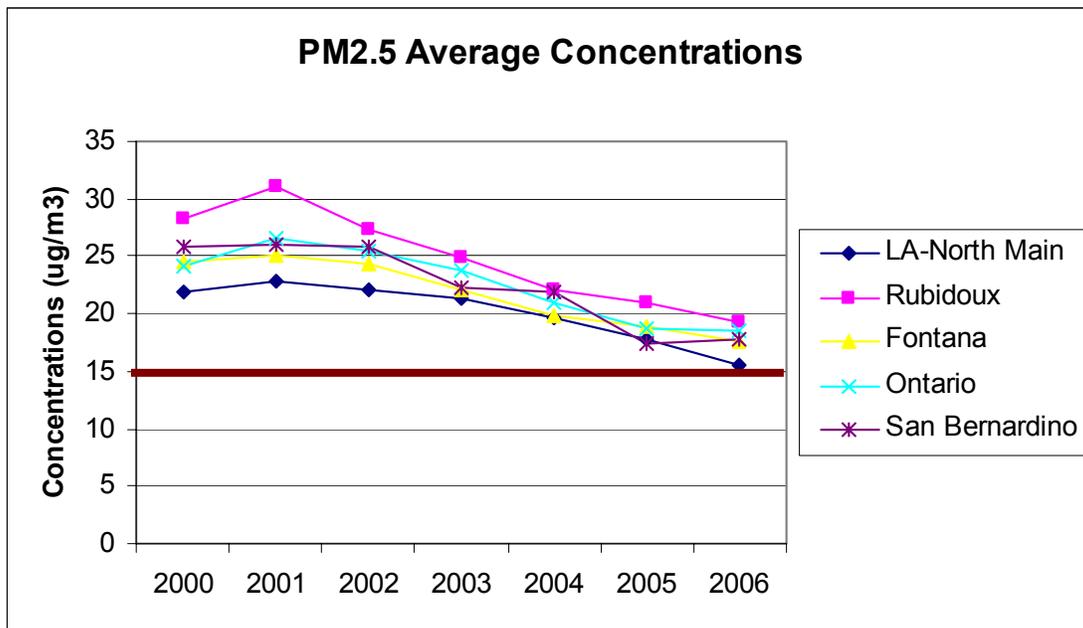
Unlike most air pollutants, PM<sub>2.5</sub> is identified its size rather than its chemical composition. PM<sub>2.5</sub> can be formed in the air through the reaction of precursor gasses, primarily NO<sub>x</sub>, SO<sub>x</sub>, ROG, and ammonia. The resulting particles are referred to as secondary PM<sub>2.5</sub>. The two main components of secondary PM<sub>2.5</sub> in the South Coast are ammonium nitrate and ammonium sulfate, which are formed when NO<sub>x</sub> and SO<sub>x</sub> interact with ammonia. The smallest particles of smoke, dust, and soot can also be in the PM<sub>2.5</sub> size range. These directly emitted particles, made up of organic and elemental carbon, come from sources like residential fireplaces, gasoline and diesel engines, and airborne soil (dust).

PM<sub>2.5</sub> concentrations are much lower today than they were when we started measuring this pollutant in 1990. Between 1990 and 1998, PM<sub>2.5</sub> annual

average concentrations dropped by 30 to 40 percent throughout the basin. In addition, the South Coast now attains the federal 24-hour standard of 65 ug/m<sup>3</sup>. Although PM<sub>2.5</sub> concentrations remain the highest in the eastern portion of the air basin, the rate of decrease in PM<sub>2.5</sub> and the response to ongoing control programs has also been the greatest in this region.

Analysis of the trends in different components of PM<sub>2.5</sub> has shown that over the last six years, decreases in ammonium nitrate have had the greatest impact on declining PM<sub>2.5</sub> levels, with ammonium nitrate concentrations at Riverside-Rubidoux dropping by 39 percent. During this same period, NO<sub>x</sub> emissions and NO<sub>x</sub> levels measured in the air also decreased. Similarly, measured ammonium nitrate and ammonium sulfate levels declined significantly, concurrent with decreases in the amounts of NO<sub>x</sub> and SO<sub>x</sub> emitted. These significant trends – reductions in ambient PM<sub>2.5</sub> concentrations corresponding to reductions in NO<sub>x</sub> and SO<sub>x</sub> emissions – suggest even greater air quality improvement resulting from this plan, which will reduce both NO<sub>x</sub> and SO<sub>x</sub> emissions at a much faster rate than we have seen in the past.

The 2006 monitoring data show the positive PM<sub>2.5</sub> trends continuing. Average PM<sub>2.5</sub> concentrations in 2006 decreased at most sites compared to 2005, and are all lower than 2004 and earlier years at all sites. The figure below illustrates that PM<sub>2.5</sub> concentrations are declining throughout the air basin.



## 2. 8-Hour Ozone

Thirty years ago, high ozone days were the norm throughout the South Coast Air Basin and throughout the year. During the mid- to late-1970s, maximum 8-hour ozone concentrations were nearly four times the level of the current national

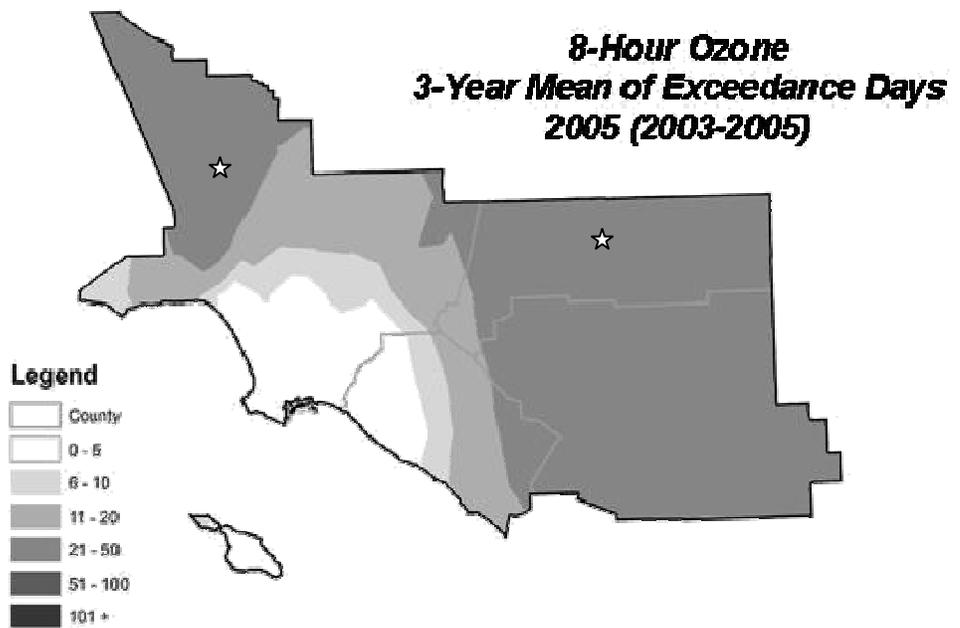
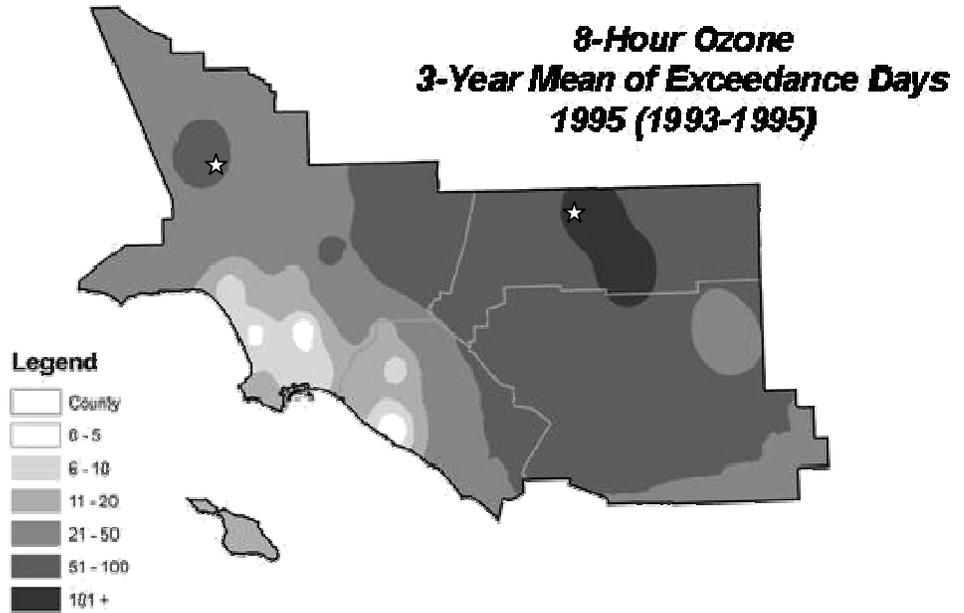
standard. Had the current 8-hour standard existed at that time, it would have been exceeded on more than 200 days each year. Since then, an emissions control strategy based on reducing both NO<sub>x</sub> and ROG has reduced both maximum concentrations and the number of exceedance days by almost 60 percent.

The South Coast Air Basin still faces one of the biggest ozone air quality challenges in the nation. While air quality has improved over the years, the 8-hour ozone standard was exceeded somewhere in the Basin on 85 days in 2006, with 53 exceedance days occurring at Crestline. The highest recorded value, 0.142 ppm, is almost 50 percent over the standard.

Despite the magnitude of the problem, basinwide measures of maximum concentration, exceedance days, and design value are all down by about 30 percent over the last decade, and more than half of the basin's residents live in areas that are now clean. The following maps show the substantial progress made in the past ten years.

Crestline in San Bernardino County and Santa Clarita in northern Los Angeles County continue to stand out as the monitoring sites that record the highest 8-hour ozone concentrations. Residents of Crestline and Santa Clarita experienced an average of 64 and 46 days per year over the standard, respectively, from 2004 through 2006.

**South Coast Air Basin  
Federal 8-Hour Ozone Exceedance Days  
1995 to 2005**



## **B. Air Quality Planning**

### **1. Federal Air Quality Planning Requirements**

The federal Clean Air Act Amendments of 1990 (CAA or Act) establish the planning requirements for those areas that routinely exceed the health-based National Ambient Air Quality Standards (NAAQS), and hold each state responsible for implementing the provisions of the Act. California law identifies air quality planning responsibilities within the State. In the South Coast, those responsibilities are shared among the South Coast District, SCAG, and ARB.

In April 2004, U.S. EPA finalized Phase 1 of its implementation rule for 8-hour ozone SIPs. This rule established the classification scheme for nonattainment areas and continuing obligations with respect to the existing 1-hour ozone requirements. The South Coast Air Basin is classified as Severe-17 with an attainment date of June 2021. On November 9, 2005, U.S. EPA supplemented its Phase 1 implementation rule with a Phase 2 rule for SIP development. On March 29, 2007, U.S. EPA released an implementation rule for PM<sub>2.5</sub>.

These federal rules outline the emission controls and planning elements that the PM<sub>2.5</sub> and 8-hour ozone SIPs must address. These include:

- base year and future year emission inventories for manmade sources of air pollution in the nonattainment area between 2006 and the respective attainment years.
- air quality modeling that demonstrates attainment of the federal standard.
- adopted control strategies capable of meeting attainment, and contingency measures in the event the controls fall short of achieving needed reductions.
- reasonable further progress plans.
- a demonstration that all reasonably available control technology (RACT) and reasonably available control measures (RACMs) have been applied to existing sources.
- transportation conformity emission budgets to ensure transportation plans and projects are consistent with the SIP, and will not hinder attainment.
- supplemental analysis of air quality and emission data and trends supporting the modeled attainment demonstration.

As part of its AQMP, the South Coast District has developed a comprehensive SIP that provides the technical foundation and control strategy for both federal standards. The draft AQMP requests an attainment extension for both PM<sub>2.5</sub> and ozone; it is designed to demonstrate attainment of the federal PM<sub>2.5</sub> ambient air quality standard by 2014 and the federal 8-hour ozone standard by 2023.

## **2. Emission Reduction Responsibilities**

ARB has primary regulatory authority over most mobile sources operated in California, and consumer products. The U.S. EPA has primary regulatory authority over large new farm and construction equipment, locomotives, ocean-going vessels, and aircraft. Air Districts such as the South Coast District primary authority over stationary emission sources, including industrial and commercial equipment. The regional association of governments or planning organization, in this case SCAG, is responsible for developing the regional transportation plans that are used to estimate mobile source emissions. These transportation plans can also impact land use patterns, and the availability and attractiveness of transit alternatives.

Unlike most other districts, the South Coast District also has a significant research and testing program for innovative motor vehicle control technologies. The District has also used Moyer funds and emission fees to provide funding assistance for replacement and retrofits for a wide variety of mobile sources.

### **II. Plan Evaluation**

#### **A. Emissions Inventories**

Emission inventories estimate the air pollutant emissions that are released into the environment, both as a result of human activities (“anthropogenic” sources) and by natural sources such as vegetation in open areas, and wildfires (“non-anthropogenic” sources). Air quality plans focus on anthropogenic sources, although emissions from non-anthropogenic sources are also estimated and these estimates are used in air quality modeling. The inventories used in the 2007 AQMP were developed using the most recent planning assumptions and the best available technical information.

The baseline inventories used in the South Coast AQMP and the proposed State Strategy reflect the emissions impact of District regulations adopted through June 30, 2006, and ARB regulations adopted through December 2006. The baseline emissions also reflect the approximately 20 increase in population growth and 11 percent increase in the miles traveled by cars and trucks, from 2006 to 2023. The inventories take into account seasonal changes in activity, temperature, and humidity. The inventories used in the air quality models reflect day-specific activity levels and climatic factors such as temperature and humidity.

The following tables summarize the largest sources of precursor emissions in the South Coast Air Basin. The future year estimates reflect the emission reduction benefits of existing rules and the impacts of projected population growth and economic activity in the region. These tables do not include potential reductions from the new District measures identified in the South Coast AQMP or ARB

staff's proposed State Strategy. Chapter 3 of the South Coast AQMP provides detailed emission inventories for ROG, NOx, SOx, and PM2.5. ARB's website also provides more information about these inventories, at <http://www.arb.ca.gov/ei/ei.htm>.

## 1. Baseline Emission Trends

The following tables show trends in PM2.5 and ozone precursor emissions from all source categories in the South Coast Air basin, from 2006 to the 2014 and 2023 attainment years. These inventories also reflect emissions from ships and harbor craft to 100 miles from the shoreline, as these emissions impact on-shore air quality. Note that in ARB's California Emission Forecasting System (CEFS) data base, the District inventory includes emissions to 100 miles offshore but includes the Coachella Valley which is in the Salton Sea Air Basin, while the Air Basin inventory reflects emissions to only three miles offshore. The inventory used in this plan was created by supplementing the CEFS South Coast Air Basin inventory with the difference between the CEFS Air Basin and District inventories for the category of Ships and Commercial Boats.

### 2007 AQMP for PM2.5 Baseline Precursor Emissions 2006-2014\* (Summer Season Inventory in tons per day)\*\*

### 2007 AQMP for PM2.5 Baseline Precursor Emissions 2006-2014\* (Summer Season Inventory in tons per day)\*\*

Source Category	ROG			NOx		
	2006	2014	Change	2006	2014	Change
Stationary/Areawide	259	260	0%	87	71	-19%
On-Road	264	149	-44%	526	287	-46%
Off-Road	208	157	-24%	360	293	-19%
<b>TOTAL</b>	<b>731</b>	<b>566</b>	<b>-23%</b>	<b>972</b>	<b>650</b>	<b>-33%</b>
Source Category	SOx			PM		
	2006	2014	Change	2006	2014	Change
Stationary/Areawide	22	17	-21%	58	63	8%
On-Road	4	2	-47%	20	17	-16%
Off-Road	37	25	-32%	22	18	-19%
<b>TOTAL</b>	<b>63</b>	<b>45</b>	<b>-29%</b>	<b>101</b>	<b>98</b>	<b>-3%</b>

**2007 AQMP for Ozone**  
**ROG and NOx Baseline Emission Trends 2006-2023\***  
(Summer Season Inventory in tons per day)\*\*

Source Category	ROG			NOx		
	2006	2023	Change	2006	2023	Change
<b>Stationary/Areawide</b>	259	281	+8%	87	68	-22%
<b>On-Road</b>	264	105	-60%	526	161	-69%
<b>Off-Road</b>	208	149	-28%	360	276	-25%
<i>Inventory Adjustment***</i>		(.2)			(9)	
<b>TOTAL</b>	<b>731</b>	<b>536</b>	<b>-27%</b>	<b>972</b>	<b>497</b>	<b>-49%</b>

\*Reference: ARB

\*\*Numbers may not add due to rounding.

\*\*\*Inventory decreases to reflect the aggregate of emission benefits and shortfalls from rules adopted after the 2006 inventory was "frozen".

## 2. Summary of Emission Sources

Mobile sources (including commercial trucks, passenger vehicles, construction equipment, ships, and locomotives) currently account for nearly 85 percent of the NOx emissions in the South Coast Air Basin, decreasing to 72 percent by 2023 as a result of existing controls. On-road sources show the greatest projected decrease in NOx emissions – approximately 70 percent between 2006 and 2023. Emissions from ships and commercial boats are projected to increase by over 50 percent during this time period.

**NOx Emissions**  
**South Coast Air Basin**  
**2007 SIP Summer Season Emissions Inventory<sup>1</sup>**  
(Prioritized by 2006 emissions)

<b>Source Category</b>	<b>2006</b>	<b>2014</b>	<b>2023</b>
HEAVY DUTY DIESEL TRUCKS	259	140	73
PASSENGER VEHICLES	205	101	53
<i>Passenger Cars</i>	83	36	18
<i>Light Trucks, Minivans and SUVs</i>	83	43	24
<i>Medium Duty Trucks</i>	38	21	12
OFF-ROAD EQUIPMENT (CONSTRUCTION AND MINING)	120	81	41
OFF-ROAD EQUIPMENT (OTHER)	87	53	35
<i>Industrial Equipment</i>	39	19	11
<i>Commercial</i>	16	12	7
<i>Cargo Handling Equipment</i>	12	5	3
<i>Transport Refrigeration Units</i>	8	9	10
<i>Airport Ground Support Equipment</i>	5	4	2
<i>Oil Drilling and Workover</i>	5	3	2
<i>Other</i>	1	1	0
SHIPS AND COMMERCIAL BOATS (to 100 miles offshore)	74	87	116
<i>Ocean Going Vessels</i>	48	71	102
<i>Commercial Harbor Craft</i>	25	16	14
GASOLINE FUELED COMMERCIAL TRUCKS	36	24	17
LOCOMOTIVES	31	23	28
RESIDENTIAL FUEL COMBUSTION	18	16	14
<i>Water Heating</i>	7	5	3
<i>Space Heating</i>	5	5	5
<i>Cooking</i>	3	4	4
<i>Other (Clothes Dryers, BBQs, Pool Heaters and Fireplaces)</i>	2	2	2
MANUFACTURING AND INDUSTRIAL (BOILERS- IC ENGINES)	17	15	15
SERVICE AND COMMERCIAL (BOILERS- IC ENGINES)	16	12	11
<b>TOTAL OF TOP 10</b>	<b>863</b>	<b>552</b>	<b>403</b>
<b>TOTAL OF SCAB</b>	<b>972</b>	<b>650</b>	<b>505</b>
<b>TOP 10 PERCENT OF TOTAL EMISSIONS</b>	<b>89%</b>	<b>85%</b>	<b>80%</b>

Sources that tend to increase with population growth dominate the South Coast Air Basin's ROG emissions inventory. Population-driven sources such as cars, recreational boats, consumer products, lawn and garden equipment, architectural coatings, and gas cans make up approximately 65 percent of the current 2023 ROG inventory.

<sup>1</sup> Derived from ARB's CEFS ROG inventory for the SCAB, v1.06 RF#980 (November 2006).

**ROG Emissions**  
**South Coast Air Basin**  
**2007 SIP Summer Season Emissions Inventory<sup>2</sup>**  
(Prioritized by 2006 emissions)

<b>Source Category</b>	<b>2006</b>	<b>2014</b>	<b>2023</b>
PASSENGER VEHICLES	207	112	76
<i>Passenger Cars</i>	114	52	31
<i>Light Trucks, Minivans and SUVs</i>	68	42	32
<i>Medium Duty Trucks</i>	24	17	13
CONSUMER PRODUCTS	101	103	110
RECREATIONAL BOATS	64	53	51
<i>Pleasure Boats</i>	50	42	38
<i>Personal Water Craft</i>	14	11	12
OFF-ROAD EQUIPMENT (LAWN AND GARDEN)	52	40	38
<i>Lawn &amp; Garden Residential</i>	29	20	16
<i>Lawn &amp; Garden Commercial</i>	23	20	22
ARCHITECTURAL COATINGS (PAINTS AND THINNERS)	31	29	31
OFF-ROAD EQUIPMENT (OTHER)	28	15	12
<i>Commercial</i>	14	8	6
<i>Industrial Equipment</i>	7	4	3
<i>Transport Refrigeration Units</i>	4	1	2
<i>Airport Ground Support Equipment</i>	1	1	1
<i>Cargo Handling Equipment</i>	1	1	1
<i>Oil Drilling and Workover</i>	1	0	0
<i>Other</i>	<1	0	0
PETROLEUM MARKETING (GASOLINE EVAPORATIVE LOSSES)	27	28	31
COATINGS (PAINTS AND THINNERS - NON ARCHITECTURAL)	27	25	28
GASOLINE FUELED COMMERCIAL TRUCKS	24	13	8
GAS CANS	21	10	7
<b>TOTAL OF TOP 10</b>	<b>581</b>	<b>428</b>	<b>392</b>
<b>TOTAL OF SCAB</b>	<b>731</b>	<b>566</b>	<b>534</b>
<b>TOP 10 PERCENT OF TOTAL EMISSIONS</b>	<b>79%</b>	<b>76%</b>	<b>73%</b>

**B. Air Quality Modeling**

**1. Overview**

Air quality modeling is used to establish a "carrying capacity" – a combination of precursor emissions that the air basin can accommodate without exceeding the health-based standard<sup>3</sup> – and to assess whether the proposed control strategy

<sup>2</sup> Derived from ARB's CEFS ROG inventory for the SCAB, v1.06 RF#980 (November 2006).

<sup>3</sup> An emissions carrying capacity is defined as the maximum level of emissions that enable the attainment and maintenance of an ambient air quality standard for a pollutant. Under State law, the South Coast District, with participation from SCAG, must establish an emissions carrying capacity with each formal plan review; it must also update the carrying capacity to reflect new data and modeling results.

will result in attainment of federal standards. The CAA requires that nonattainment areas designated as serious and above use a photochemical grid model to demonstrate attainment.

## 2. Grid-based Modeling

The 2007 AQMP attainment demonstrations for both PM2.5 and 8-hour ozone were conducted using photochemical dispersion and meteorological modeling tools developed in response to U.S EPA modeling guidelines, and recommendations from air quality modeling experts. The air quality modeling performed for the AQMP has undergone scientific peer review and was made available for public review. ARB and South Coast District staffs worked together on the modeling for this plan, including development of a gridded modeling inventory and meteorological and geological data inputs, model performance analysis, and validation of the attainment demonstrations.

The modeling platforms, chemical mechanisms, and inventories used in the photochemical modeling are summarized below and described in more detail in the AQMP's Appendix V: Modeling and Attainment Demonstrations.

### Draft 2007 AQMP Dispersion Modeling Methodology (PM2.5 and 8-Hour Ozone)

Mechanism	Model
Dispersion Platform	CAMx
Chemistry	SAPRC99 (PMCAMx for PM2.5)
Meteorology	MM5/FDDA
Mobile Emissions	EMFAC2007
Boundary	WRAP-CAMx-GEOCHEM

The District's attainment analysis uses a combination of observed pollutant concentrations and modeled relative response factors (RRF) to reconcile the model outputs with the observed concentrations at air quality monitors through the air basin; a procedure recommended in U.S. EPA modeling guidance. Each of the episodes used in the RRF calculation satisfies the U.S. EPA's model performance and threshold criteria. For the annual PM2.5 attainment demonstration, the model was run for the base and future years in their entirety. The model runs utilized speciated data collected during the District's Multiple Air Toxics Exposure Study (MATESI) monitoring program to reflect the numerous chemical species that constitute PM2.5. The modeling procedures and analyses used by the District are also described in AQMP Appendix V.

### **3. Supplemental Analyses**

Air quality modeling has inherent uncertainties since we cannot precisely measure, and models cannot precisely replicate, all of the spatial and temporal nuances in emissions, atmospheric conditions, and chemical reactions that influence air quality. U.S. EPA modeling guidance recommends the use of supplemental data analyses to help mitigate the uncertainty in air quality modeling. Such analyses include additional modeling, analyses of trends in ambient air quality and emissions, and observational models and diagnostic analyses. When a modeled design value is within 2-3 parts per billion (ppb) of the 8-hour ozone standard, or within 5 micrograms per cubic meter (ug/m<sup>3</sup>) of the PM<sub>2.5</sub> annual average standard, U.S. EPA guidance has provisions for using supplemental analyses.

#### **C. Ozone Attainment Demonstration**

##### **1. Request for Reclassification to Extreme Nonattainment for the 8-Hour Ozone Standard**

The South Coast Air Basin is currently classified as a severe nonattainment area with a 2021 attainment deadline. The Act allows states to request a voluntary reclassification to a higher classification.<sup>4</sup> The District requests and ARB staff recommends Board approval of a “bump up” to the extreme classification. If a state requests a reclassification to extreme, U.S. EPA must grant it. The extreme classification requires attainment no later than 2023, and allows the attainment demonstration to include reductions based on the anticipated development of new control technologies or improvement of existing technologies for attainment.<sup>5</sup> ARB staff agrees with the District’s assessment that we cannot demonstrate attainment without relying in part on technologies that do not exist and cannot be identified today.

With out a reclassification to extreme, the Plan would not be able to demonstrate attainment by the applicable ozone deadline and the air basin would be subject to federal sanctions on permitted industrial sources, a prohibition on federally funded road projects, and federally imposed controls on mobile and stationary sources in the region.

Staff of ARB, the District, and SCAG, have agreed to the development of a discussion paper, to be prepared within four months of the adoption of the SIP, on potential strategies for achieving the additional emission reductions needed to meet the 8-hour ozone standard. The paper will explore new or transformative strategies, such as state-of-technology zero and near-zero transportation systems, mechanisms such as fee-based incentives, and the availability of public funding assistance programs.

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<sup>4</sup> Section 181(b)(3)

<sup>5</sup> Section 182(e)(5)

Because the Basin was classified as extreme under the prior one-hour ozone standard, it has already adopted the permit and project review rules required for extreme areas and reclassification would not impose additional stationary source requirements.

## 2. Attainment Demonstration

The District's ozone photochemical modeling used five episodes from the years 2004 and 2005 that were chosen to reflect recent ozone design values, along with a 1997 episode that was used to maintain continuity with the District's 2003 AQMP. The modeling results indicate that all sites in the South Coast will reach attainment by the 2024 deadline with a 76 percent reduction in NOx emissions and a 22 percent reduction in ROG emissions. The modeling projects that this level of reductions will give Crestline, the current high site for ozone, a design value of 0.083 ppm.

For ozone, the South Coast district selected a carrying capacity of 420 tons per day ROG and 114 tons per day NOx emissions in their draft plan. ARB's proposed strategies, along with the existing control program and proposed stationary source emission controls, will provide about 80 percent of the combined ROG and NOx emission reductions needed to demonstrate attainment of the ozone air quality standard.

### South Coast Air Basin Ozone Attainment Demonstration Summary (summer season, tons per day)

	NOx	ROG
2006 Emissions Inventory	972	732
Carrying Capacity	114	420
<b>Emission Reduction Target</b>	<b>858</b>	<b>312</b>
- Emission Reductions from Adopted SIP Measures	467	199
- Emission Reductions from New Local Measures	9	19
- Emission Reductions from New State Measures	141	54
- Long-Term Measures	241	40
<b>Total Reductions</b>	<b>858</b>	<b>312</b>

*Emission Reductions from Adopted SIP Measures* = Emissions reduced from measures adopted through 2006.

*Emission Reductions from New Measures* = Emissions reduced from measures in the State Strategy or new local measures adopted after 2006.

*Long-Term Measures* = Emissions to be reduced from new or evolving technology, as allowed in section 182(e)(5) of the Clean Air Act.

### 3. Supplemental Analyses

ARB staff independently conducted supplemental analyses, and reviewed the District's modeling and supplemental analyses, using U.S. EPA modeling guidelines. ARB staff concurs with the 2023 attainment projection based on the following factors:

- Basinwide, the maximum ozone concentration, design value, and number of exceedance days declined by about 30 percent in the last ten years. The basinwide numbers reflect the "worst case" sites; the year-to-year improvement in sub-regions is even greater. More than half of the Basin population now lives in areas with design values that meet the federal 8-hour ozone standard.
- Comparisons of emissions trends and changes in ambient precursor levels to ozone trends support the premise that both ROG and NO<sub>x</sub> reductions are important for ozone improvement.
- Analyses suggest that improvements in regional ozone concentrations are primarily attributable to substantial emission reductions. The decline in the number of exceedance days between 1990 and 2000 was not a result of favorable weather, because the number of days with adverse weather conditions actually increased or remained level during this time period while the number of exceedance days decreased. Furthermore, even though ozone levels have been relatively flat during the last five to six years, analyses suggest that more adverse weather conditions are now required to produce an exceedance of the federal standard.
- Photochemical modeling shows a design value of 0.083 ppm at Crestline by the end of 2023. The design values at other sites in the Basin are predicted at or below 0.081 ppm. These values are below the level of a federal 8-hour ozone standard of 0.085 ppm.

Considered in tandem with the modeling results, these analyses indicate that the ozone carrying capacity identified in the AQMP will allow all sites in the South Coast to attain the federal 8-hour ozone standard in 2023 as is required to meet U.S. EPA's June 15, 2024, attainment date for extreme ozone nonattainment areas. ARB staff's supplemental ozone analysis is provided in Appendix A.

Because emissions from the South Coast can be transported to areas outside the Basin, emissions reductions in the South Coast area should result in ozone downwind areas such as Ventura County, Coachella Valley, and the Mojave Desert Air Basin.

#### ARB Staff Recommendation

Staff finds the air quality modeling analysis and ozone attainment demonstration satisfy U.S. EPA requirements and recommends approval for submittal as a SIP

revision. ARB staff has also conducted supplemental analyses for the ozone attainment demonstrations in the AQMP. The ozone evaluation, provided in Appendix A of this staff report, supports the District's ozone attainment demonstration.

## **D. PM2.5 SIP Attainment Demonstration**

### **1. Request for Extension of the PM2.5 Attainment Date**

Under the Clean Air Act<sup>6</sup> PM2.5 areas can apply for up to a five-year extension of the serious area attainment deadline of April 15, 2010. In order to obtain the extension, there must be a showing that: (1) the plan for the area includes the most stringent measures that are included in the SIP of any state or are achieved in practice in any state, and can feasibly be implemented in the area, (2) the state complied with all requirements and commitments pertaining to the area in the implementation plan for the area, and (3) attainment by 2010 would be impracticable.

The District is formally requesting U.S. EPA to grant the five-year extension based upon the severity of the problem the significant reductions in NOx and SOx emission levels required for attainment.

ARB staff believes that a five-year extension is justified given the severity of the PM2.5 problem in the South Coast Air Basin. The AQMD modeling indicates required levels of reductions from 2006 emissions of NOx (55 percent beyond current controls), SOx (68 percent), PM2.5 (15 percent), and ROG (30 percent) that cannot be achieved by 2010.

### **2. PM2.5 Modeling**

The District's PM2.5 model uses the same platforms as the model used for ozone planning. The District used the model to simulate PM2.5 concentrations throughout a year, and then averaged the results to develop a projected PM2.5 annual average design value. The District supplemented monitored data used from the 1997 California Ozone Study with speciated PM2.5 data collected during its Multiple Air Toxics Exposure Study (MATES) field studies. The PM2.5 modeling uses a 2005 base year.

The model was initially used to establish emission reduction targets to be used in developing the control strategy. Once the strategy was agreed to, the District used the photochemical model to verify that the projected emission reductions would result in attainment of the PM2.5 NAAQS throughout the basin by 2014.

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<sup>6</sup> Section 188(e)

The precursor reductions modeled by the District, which the District’s modeling indicated would result in attainment throughout the South Coast Air Basin in 2024, are summarized in the following table.

**South Coast AQMP  
PM2.5 Attainment Demonstration Summary**  
(annual average emissions, tpd)

	<b>NOx</b>	<b>ROG</b>	<b>SOx</b>	<b>Direct PM2.5</b>
2014 Baseline Emissions	654	528	43	102
Carrying Capacity	452	469	20	87
Emission Reduction Target	202	59	23	15
Reductions from New Measures	129	59	23	15

**3. Supplemental Analyses**

ARB staff evaluated emissions and air quality trends, and conducted enhanced rollback modeling analysis to estimate the impacts of future emission reductions on resulting air quality. Data from three Basin monitoring sites that are part of the Speciation and Trends Network (SPN) provide speciation measurements used in this analysis: Riverside County-Rubidoux, and Los Angeles County-North Main. The rollback technique estimated that the substantial additional emission reductions identified in the Proposed State Strategy as released on April 26, 2007, together with the District’s approved AQMP, are likely to be sufficient to provide for attainment at Riverside-Rubidoux as well Los Angeles-North Main. By contrast, the District’s grid-based modeling indicates that this combination of controls would result in a 2014 value of 15.7 ug/m3. The future year concentrations predicted with the rollback modeling are consistent with observed air quality trends and the response to past emission reductions, though more optimistic than the grid-based modeling results.

Both approaches indicate that substantial reductions of all PM2.5 precursors, particularly NOx and SOx, will be needed for attainment. ARB staff’s PM2.5 supplemental analysis is provided in Appendix B.

Staff’s detailed review of South Coast air quality and emissions trends concludes that the carrying capacity established by the District will result in attainment of the PM 2.5 standard by 2014. Staff recommends that the Board direct staff to submit both the South Coast District’s modeled PM2.5 carrying capacity, and the ARB staff supplemental analyses to U.S. EPA as part of the PM2.5 attainment demonstration for the South Coast Air Basin.

## E. South Coast District Control Strategy

The South Coast District is primarily responsible for controlling emissions from stationary and area-wide sources (with the exception of consumer products). The District's 2007 AQMP control measures are based on the application of available technologies and management practices as well as development and implementation of advanced technologies and control methods. Some measures, such as MCS-07 (All Feasible Measures for All Pollutants) and BCM 01 (PM Control Devices for stationary sources) are designed to bring older, more polluting equipment up-to-date. The District's control strategy is discussed in detail in Appendix IV of the 2007 AQMP. Since the adoption of the AQMP, District staff has also proposed new local actions to provide additional emission reductions by 2014 as shown below.

### Additional Actions to Meet the District's PM<sub>2.5</sub> Emission Reduction Target (NO<sub>x</sub> Emission Reductions – 2014 tpd)

Action / Measure	Responsible Agency	NO <sub>x</sub>
Enhanced Heavy-Duty Truck Measure	ARB	27
Co-Benefits from Greenhouse Gas Reduction Measures	ARB	3
SOON Program Opt-in for Construction Equipment	District	12
Residential Wood Burning and Commercial Cooking Rule	District	11
Additional Incentive Funds for Port-Related and Other Sources	District/ARB*	3
Funding for Selective Catalytic Reduction on Metrolink Trains	District/ARB*	3
DMV Registration Fees Used for SIP-Creditable Projects	Local Gov	4
Federal Funding to Mitigate Locomotive Emissions in 2014 Pending Implementation of Proposed New Locomotive Standards	Federal Gov	10
SIP Credit for Moyer Program Projects Already Funded	District	3
<b>Additional Reductions</b>		<b>76</b>

\* Joint funding commitment with ARB backstop of emission reduction commitment.

### 1. District Measures

The following table shows the new measures included in the District AQMP as approved on June 15, 2007 – additional measures agreed to after District adoption of the AQMP were discussed above. The District commitment is to

**South Coast Air Quality Management District  
Short- and Mid-Term Stationary Control Measures  
with Quantified Emission Reduction Estimates<sup>7</sup>**

Control Measure #	Title	Reduction Target <sup>8</sup> (tons/day)	
		2014	2023
<b>Remaining 2003 AQMP Revision Control Measures</b>			
FUG-02	Emission Reductions from Gasoline Transfer and Dispensing Facilities [VOC]	3.7	4.0
BCM-03	Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM2.5]	1.0	1.6
BCM-05	Emission Reductions from Under-Fired Charbroilers [PM2.5]	1.1	1.2
<b>New Control Measures</b>			
CTS-01	Emission Reductions from Lubricants [VOC]	1.9	2.0
CTS-03	Consumer Products Certification and Emission Reductions from Use of Consumer Products at Institutional and Commercial Facilities [VOC]	2.1	2.2 <sup>9</sup>
CTS-04	Emission Reductions from the Reduction of VOC Content of Consumer Products Not Regulated by the State Board [VOC]	5.8	6.0 <sup>10</sup>
CMB-01	NOx Reduction from Non-RECLAIM Ovens, Dryers and Furnaces [NOx]	3.5	4.1
CMB-02	Further SOx Reductions for RECLAIM [SOx]	3.0	3.0
CMB-03	Further NOx Reductions from Space Heaters [NOx]	0.8	1.1
MCS-01	Facility Modernization [VOC]	2.0	9.2
	[NOx]	1.6	2.2
	[PM2.5]	0.4	1.7
MCS-05	Emission Reductions from Livestock Waste [VOC]	0.8	0.6
FLX-02	Petroleum Refinery Pilot Program [VOC]	0.7	1.6
	[PM2.5]	0.4	0.4
EGM-01	Emission Reductions from New and Redevelopment Projects [NOx]	0.0	0.8
	[VOC]	0.0	0.6
	[PM2.5]	0.0	0.5
MOB-04	Emission Reductions from Carl Moyer Program <sup>3</sup> [NOx]	7.5	12.9
	[PM2.5]	0.2	0.4
MOB-05	AB923 Light-Duty Vehicle High-Emitter Identification Program [NOx]	0.4	0.4
MOB-06	[VOC]	0.8	0.7
	AB923 Medium-Duty Vehicle High-Emitter Identification Program [NOx]	0.5	0.6
	[VOC]	0.5	0.6
<b>TOTAL</b>	<b>VOC</b>	<b>10.4</b>	<b>19.3</b>
	<b>NOx</b>	<b>6.8</b>	<b>9.2</b>
	<b>SOx</b>	<b>3.0</b>	<b>3.0</b>
	<b>PM2.5</b>	<b>2.9</b>	<b>5.4</b>

<sup>7</sup> The District also identifies carbon monoxide (CO) emission reductions that will be achieved through implementation of the State's motor vehicle control program because CO emissions are to a limited extent an ozone precursor. For purposes of this staff report, ARB considers these benefits to be part of the baseline and are not included in this discussion.

<sup>8</sup> The emission reduction estimates are based on the 2014 annual average inventory and 2023 planning inventory in the proposed modifications to the Draft 2007 AQMP. The actual reductions are subject to change during rulemaking based on the latest available emission inventory data.

<sup>9</sup> Emission reductions resulting from the implementation of this control measure will be credited towards AQMD's SIP obligation provided ARB does not develop a similar regulation. Any remaining excess reductions will then contribute to fulfilling ARB's SIP commitment. Reductions for this measure are not included in total reductions in this table.

<sup>10</sup> Emission reductions from the past and future projects under the Carl Moyer Program presented under this measure are not included in total reductions in this table.

achieve the total tonnages shown; specific control measures may provide more or less reductions than the AQMP estimates. ARB staff will review and comment on proposed District rules to help ensure that each rule provides the greatest feasible reductions. The District and SCAG have also committed to use incentive funding mechanisms to enhance ARB’s mobile source controls prior to the 2014 PM2.5 attainment date.

The South Coast AQMP also identifies 22 measures for further review. The District has not estimated potential emission reductions for these measures, which are shown below.

Staff recommends that the local measures identified in the SIP be submitted as part of the attainment demonstration, with the exception of the District’s Proposed Rule Control Strategy MOB-03, Backstop Measures for Indirect Sources of Emissions from Ports and Port-Related Facilities, which is discussed later.

**South Coast 2007 AQMP  
Non-Quantified Control Approaches and Measures\***

Number	Title
<b>Energy Efficiency/Conservation</b>	
MCS-02	Urban Heat Island [All Pollutants]
MCS-03	Energy Efficiency and Conservation [All Pollutants]
<b>Good Management Practices</b>	
FUG-01	Improved Leak Detection and Repair [VOC]
FUG-04	Emission Reductions from Pipeline and Storage Tank Degassing [VOC]
BCM-01	PM Control Devices (Baghouses, Wet Scrubbers, and Other Devices) [PM2.5]
MCS-04	Emissions Reduction from Green Waste Composting [VOC, PM2.5]
MCS-06	Improved Start-up, Shut-down & Turnaround Procedures [All Pollutants]
<b>Market Incentives/Compliance Flexibility</b>	
CTS-02	Clean Coatings Certification Program [VOC]
FLX-01	Economic Incentive Programs [All Pollutants]
<b>Area Source Programs</b>	
FUG-03	Emission Reductions from Cutback Asphalt [VOC]
CMB-04	Natural Gas Fuel Specifications [All Pollutants]
BCM-02	PM Emission Hot Spots – Localized Control Program [PM2.5]
BCM-03	Emission Reductions from Wood Burning Fireplaces and Wood Stoves [PM2.5]
BCM-04	Additional PM Emission Reductions from Rule 444 – Open Burning [PM2.5]
MCS-07	Application of All Feasible Measures [All Pollutants]
MCS-08	Emission Charges of \$5,000 Per Ton for Stationary Sources with Potential to Emit Over 10 Tons per Year [VOC, NOx]

Table continued on following page.

**South Coast 2007 AQMP**  
**Non-Quantified Control Approaches and Measures\***  
continued

<b>Emission Growth Management</b>	
EGM-02	Emission Budget and Mitigation for General Conformity Projects [All Pollutants]
EGM-03	Emissions Mitigation at Federally-Permitted Projects [All Pollutants]
<b>Mobile Source Programs</b>	
MOB-01	Mitigation Fee for Federal Sources [All Pollutants]
MOB-02	Expanded Exchange Program [All Pollutants]
MOB-03	Backstop Measures for Indirect Sources Emissions from Ports and Port-Related Facilities [All Pollutants]
MOB-07	Concurrent Reductions from Global Warming Strategies [All Pollutants]

\*Draft 2007 AQMP, Chapter 4

**a. Proposed Backstop Measures for  
Indirect Sources of Emissions from Ports and  
Port-Related Facilities [NOx, SOx, PM]**

ARB staff's understanding is that AQMP measure MOB-03 is intended to ensure that the port-related emission reductions identified in the AQMP, and in the Clean Ports Plan being developed by the Ports of Los Angeles and Long Beach, are achieved in a timely manner. The measure would allow the District to impose additional controls and permit requirements on port-related sources if annual emission and risk reduction goals are not met.

In reality, ARB's emission reduction commitment covers most of the reductions that will be achieved from sources at the port and other mobile sources. The proposed State Strategy would establish a commitment to reduce emissions from a large group of source categories that is sufficient to meet the SIP carrying capacities identified by the District. ARB staff has associated emission reduction estimates with specific source categories to (1) identify the types of sources for which staff expects to develop controls; (2) ensure the Board and the public that the overall commitment is reasonable and achievable, and (3) establish goals that can be used as staff develops the specific programs. However, because the proposed commitment establishes basin-wide emission reduction goals, and is structured to allow the Board flexibility as it considers control options, it cannot be used to establish enforceable emission targets or backstop measures for a specific source such as the port complex. The remaining goals identified as targets in this measure should not be included in the SIP as they are not related to attaining to the Ozone or PM2.5 NAAQS.

Staff recommends that these targets be excluded from the SIP submittal. Such an action would not impact any authority the District may have to adopt and implement this measure as part of its AQMP.

## **b. Structure of District Commitment**

The District's SIP commitment for the 2007 AQMP is structured into two components: reductions from adopted rules and reductions from proposed new control measures. Along with the proposed ARB State Strategy, the District relies on these reductions to demonstrate expeditious progress and attainment of the federal PM2.5 and 8-hour ozone standards.

Chapter 4 of the AQMP discusses specific methodologies the District will use to track emission reductions against its SIP commitments:

- The District will continue its existing outreach efforts for rule development and improved emission calculation methodologies. Should additional technical analysis (including source testing) indicate that actual emissions are less than previously estimated, the District will credit the surplus reductions toward the SIP commitments.
- If the inventory for a source category changes as rules are developed, the District will use the updated inventory information for assessing the rule's impact, but will calculate progress against the inventory used in the SIP to ensure that the reductions can be compared against commitments made in the attainment demonstration.
- The District may have to adopt regulations to reflect reductions accounted for in the SIP even though the regulations may not provide reductions beyond what has actually occurred in practice. The AQMP provides for exceptions to this procedure where new reductions are determined to be real, quantifiable, and surplus to the 2007 AQMP baseline inventories, and enforceable through other State and/or federal regulations.
- Inventory revisions that have gone through a peer review and public review process can be counted as credit towards the District's SIP commitment.
- Credit for an additional 3 tpd of NOx reductions can also be taken for Carl Moyer Program projects already funded by the District but not previously included in ARB's or the District's SIP credit accounting.

## **c. Reductions from Adopted Rules**

Current and projected emission reductions from rules that have already been adopted or implemented become assumptions in developing the SIP's future year inventories. Continued implementation of these rules is essential to maintaining the attainment demonstration. The 2007 AQMP lists the rules adopted by the District since the adoption of the 2003 AQMP and their expected emission reductions.

**d. Reductions from the District's Proposed Stationary Source Control Measures**

The District's commitment is to adopt and implement control measures that will achieve, in aggregate, the emission reductions specified in the AQMP for short- and mid-term measures, as well as reductions from long-term measures. The AQMP includes an annualized commitment in terms of rule adoption and implementation dates. The District proposes to apply emission reductions in excess of a given year's emission reduction commitment to emission reduction commitments of subsequent years.

If the District determines that a substitute measure is needed and viable, the AQMP specifies that the District will complete rule development for the substitute measure no later than 12 months from the scheduled adoption date of the original control measure with implementation of the new measure to occur no later than two years from the final implementation date of the measure substituted. The District will annually notify the public of proposed revisions through its Rule Forecast Report, and will provide annual quantitative reports on the AQMP's implementation progress at governing board meetings.

In response to concerns raised by the regulated community that costly controls may be required to meet SIP obligations, the District has established a cost-effectiveness threshold of \$16,500 per ton of ROG reductions for tiered levels of analysis. Rules anticipated to be more costly than this would trigger a more rigorous average cost-effectiveness, incremental cost-effectiveness, and socioeconomic impact analysis, and a more extensive public review and decision-making process. This process does not change the District's SIP emission reduction commitments.

**2. Transportation and Land Use Planning**

The transportation sector, including goods movement sources, is the largest contributor to air pollution in Southern California. SCAG is responsible for designing the region's transportation system, in coordination with local agencies. SCAG, along with the South Coast District and the Mobile Source Air Pollution Reduction Review Committee, also controls extensive public funding to mitigate the air quality impact of vehicle emissions.

Federal law and regulations require transportation plans within the Basin to conform to the approved air quality plans<sup>11</sup> and demonstrate that the region's

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<sup>11</sup> 1990 Federal Clean Air Act and the Intermodal Surface Transportation and Efficiency Act (ISTEA), Transportation Equity Act for the 21st-Century (TEA-21) and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The regulations governing the implementation of transportation projects within air basins are stipulated in U.S. EPA's Transportation Conformity Rule (40 CFR Parts 51 and 93) and also the Joint Federal Highway Administration (FHWA)/Federal Transit Administration (FTA) regulations, "Planning Assistance and Standards," 23 CFR Part 450 and 49 CFR Part 613.

transportation plans and programs conform to federal clean air mandates in a timely manner.<sup>12</sup>

SCAG's Regional Transportation Plan (RTP) is developed every four years with a 20-year planning horizon and satisfies the long term planning requirements for the basin. The magnitude of long-term emission reductions needed for attainment requires not only a commitment to cleaner vehicles, but also to strategies that discourage unnecessary vehicle travel. The 2004 RTP (modified) includes draft policies, actions, and growth scenarios that control transportation-related emissions increases through strategies designed to reduce vehicle trips and trip lengths.

Short-term transportation requirements in the Basin are addressed in SCAG's biennial Regional Transportation Improvement Program (RTIP). The first two years of the RTIP are fiscally constrained and demonstrate timely implementation of air quality-related transportation projects called Transportation Control Measures (TCMs).

Pursuant to the Clean Air Act, U.S. EPA requires the SIP to identify the TCMs in the RTIP<sup>13</sup>. U.S. EPA also requires the measures to be tracked for timely implementation, and that the measures selected satisfy federal RACM requirements. The transportation strategy and related elements approved by SCAG and incorporated in the 2007 AQMP fall in the following categories:

- High Occupancy Vehicle (HOV) Measures: Construction and dedication of new high occupancy vehicle (HOV) lanes, and differential tolls for HOVs.
- Transit and Systems Management Measures: Bus, rail, and shuttle transit expansion and improvements; park and ride lots and inter-modal transfer facilities; bicycle and pedestrian facilities; railroad consolidation programs, such as grade separation projects; intersection improvements; and traffic signal synchronization.
- Information-based Transportation Strategies: Programs that promote alternatives to single occupancy vehicle commutes, and improve congestion management strategies.

The emission benefits associated with the regional transportation strategy are estimated at 1.8 tpd ROG and 0.24 tpd PM2.5 reductions in 2014, and 1.7 tpd ROG and 0.2 tpd NOx reductions in 2023. Because SCAG's 2004 RTP was used to develop motor vehicle emission inventories for the Basin, these reductions are reflected in the baseline inventories.<sup>14</sup>

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<sup>12</sup> For the discussion on transportation conformity requirements, refer to Chapter V of this report.

<sup>13</sup> Section 108 (f)(1)(A) and also by U.S. EPA's Transportation Conformity Rule (40 CFR Part 93).

<sup>14</sup> For a detailed discussion of the emission reductions associated with the regional transportation strategy, refer to Appendix IV-C (Regional Transportation Strategy and Control Measures).

## F. Proposed State Strategy

The proposed State Strategy and accompanying staff report are contained in a separate document.<sup>15</sup> The following table summarizes the emission reductions expected from the State Strategy in the South Coast Air Basin in 2014, 2020, and 2023. The consensus agreement for PM2.5 calls on ARB, the District, local agencies, and the federal government to provide 76 tpd NOx reductions by, by 2014, beyond the reductions shown in the table. ARB is responsible for 30 tpd of the new reductions in the agreement. ARB commitments for 2020 are included to ensure reductions in the South Coast Air Basin that are needed to provide for attainment by 2021 in the Coachella Valley.

### Summary of Emission Reduction Commitments – South Coast

Year	NOx	ROG	Direct PM2.5	SOx
2014	122	46	9	20
2020 <sup>1</sup>	144	52	--	--
2023	141	54	--	--
2023 CAA 182(e)(5) measures	241 <sup>2</sup>	40 <sup>2</sup>	--	--

<sup>1</sup> The 2020 commitment in the South Coast is necessary to provide for attainment in downwind nonattainment areas.

<sup>2</sup> The reductions of NOx and ROG from 182(e)(5) measures will be reassessed as new SIPs are developed and revised.

### 1. Proposed Control Measures

The following tables describe ARB staff's emission proposed emission reduction commitment for the South Coast portion of the State Strategy. The commitment includes reductions from sources traditionally under State control, such a consumer products and passenger vehicles, and reductions from sources such as ships and trains, which have traditionally been considered to be subject to federal or international control. In a separate Board item, ARB staff proposes a commitment to achieve the emission reductions set forth in these tables, by the dates indicated. The reductions may be achieved through a combination of actions, including regulations, incentives, and other enforceable mechanisms.

<sup>15</sup> The reader can review or download the proposed State Strategy and staff report at <http://www.arb.ca.gov/planning/sip/2007sip/2007sip.htm>

The 2007 AQMP identifies the relative impact of NO<sub>x</sub>, ROG, PM<sub>2.5</sub>, and SO<sub>x</sub> emissions on ambient PM<sub>2.5</sub> levels, as indicated by the District's air quality modeling. ARB's emission reduction commitment for the PM<sub>2.5</sub> SIP is predicated on the State's ability to substitute emission reductions of one pollutant for another, using ratios derived from the District's modeling. Table V-2-14 of the AQMP, replicated below, identifies the relative contribution of PM<sub>2.5</sub> precursor emissions to ambient PM<sub>2.5</sub> concentrations. Using these factors, for example, a 1-tpd SO<sub>x</sub> reduction would be equivalent to 10 tpd of ROG or 3.33 tpd of NO<sub>x</sub>.

**Relative Contributions of Precursor Emissions Reductions to Simulated Controlled Future-Year PM<sub>2.5</sub> Concentrations**

<b>Precursor (TPD)</b>	<b>PM<sub>2.5</sub> Component</b>	<b>Standardized Contribution to Mass</b>
VOC	Organic Carbon	Factor of 1
NO <sub>x</sub>	Nitrate	Factor of 3
PM <sub>2.5</sub>	Elemental Carbon & Others	Factor of 5
SO <sub>x</sub>	Sulfate	Factor of 10

**Expected Emission Reductions from Proposed State Strategy**  
**South Coast PM2.5 Attainment Demonstration**  
(2014 planning inventory, tpd)

<b>Proposed New Measures</b>	<b>NOx</b>	<b>ROG</b>	<b>Direct PM2.5</b>	<b>SOx</b>
<b>ON-ROAD SOURCES</b>				
<b>Passenger Vehicles</b>	<b>14.4</b>	<b>17.7</b>	<b>0.2</b>	<b>--</b>
Smog Check Improvements (BAR)	12.0	10.5	0.2	--
Expanded Vehicle Retirement	2.4	2.8	0.05	--
Modifications to Reformulated Gasoline Program	--	4.4	--	--
<b>Heavy-Duty Trucks</b>	<b>76</b>	<b>5.1</b>	<b>3.0</b>	<b>--</b>
Cleaner In-Use Heavy-Duty Trucks	76	5.1	3.0	--
<b>GOODS MOVEMENT SOURCES</b>				
	<b>49.4</b>	<b>0.7</b>	<b>3.6</b>	<b>20.1</b>
Ship Auxiliary Engine Cold Ironing and Clean Technology	18.5	--	0.3	0.4
Cleaner Main Ship Engines and Fuel	20.0	--	2.4	19.7
Port Truck Modernization	2.0	--	0.5	--
Accelerated Introduction of Cleaner Line-Haul Locomotives*	4.3	0.7	0.2	--
Clean Up Existing Harbor Craft	4.6	--	0.2	--
<b>OFF-ROAD EQUIPMENT</b>				
	<b>10.5</b>	<b>2.7</b>	<b>2.6</b>	
Cleaner In-Use Off-Road Equipment (over 25hp)	10.5	2.7	2.6	--
Cleaner In-Use Agricultural Equipment	NYQ	NYQ	--	--
<b>OTHER OFF-ROAD SOURCES</b>				
	<b>0.4</b>	<b>8.9</b>		
New Emission Standards for Recreational Boats	0.4	4.2	--	--
Expanded Off-Road Recreational Vehicle Emission Standards	--	2.4	--	--
Additional Evaporative Emissions Standards	--	NYQ	--	NYQ
Vapor Recovery for Above Ground Storage Tanks	--	NYQ	--	NYQ
<b>AREAWIDE SOURCES</b>				
Consumer Products Program	--	12.9	--	--
Pesticides: DPR 2008 Pesticide Plan	--	NYQ	--	--
<b>Total Emission Reductions from Proposed New Measures</b>	<b>122</b>	<b>46</b>	<b>9</b>	<b>20</b>

NYQ = Not Yet Quantified. BAR = Bureau of Automotive Repair. DPR = Department of Pesticide Regulation

\* Ship and Commercial Boats to 100 miles

\*\* Locomotive measure relies on U.S. EPA rulemaking and industry agreement to accelerate fleet turnover.

Note: Emission reductions reflect the combination impact of regulations and supportive incentive programs.

**Expected Emission Reductions from Proposed New Measures**  
**South Coast Air Basin – 2020 and 2023**  
(planning inventories, tpd)

Proposed New Measures	2020		2023	
	NOx	ROG	NOx	ROG
<b>ON-ROAD SOURCES</b>				
<b>Passenger Vehicles</b>	<b>9.6</b>	<b>12.9</b>	<b>7.1</b>	<b>10.5</b>
Smog Check Improvements (BAR)	8.3	8.7	6.9	7.5
Expanded Vehicle Retirement	1.3	1.2	0.2	0.5
Modifications to Reformulated Gasoline Program	--	3.0	--	2.5
<b>Heavy-Duty Trucks</b>	<b>26.9</b>	<b>2.6</b>	<b>18.3</b>	<b>1.7</b>
Cleaner In-Use Heavy-Duty Trucks	26.9	2.6	18.3	1.7
<b>GOODS MOVEMENT SOURCES</b>	<b>87.1</b>	<b>1.8</b>	<b>99.2</b>	<b>1.9</b>
Ship Auxiliary Engine Cold Ironing and Clean Technology	28.3	--	30.8	--
Cleaner Main Ship Engines and Fuel	32.3	--	39.9	--
Port Truck Modernization	8.0	--	7.0	--
Accelerated Introduction of Cleaner Line-Haul Locomotives**	13.4	1.8	15.6	1.9
Clean Up Existing Harbor Craft	5.1	NYQ	5.9	NYQ
<b>OFF-ROAD EQUIPMENT</b>	<b>18.7</b>	<b>2.9</b>	<b>13.9</b>	<b>1.9</b>
Cleaner In-Use Off-Road Equipment (over 25hp)	18.7	2.9	13.9	1.9
Cleaner In-Use Agricultural Equipment	NYQ	NYQ	NYQ	NYQ
<b>OTHER OFF-ROAD SOURCES</b>	<b>1.6</b>	<b>21.1</b>	<b>2.4</b>	<b>27.7</b>
New Emission Standards for Recreational Boats	1.6	12.8	--	17.6
Expanded Off-Road Recreational Vehicle Emission Standards	--	5.1	--	6.4
Additional Evaporative Emission Standards	--	NYQ	--	NYQ
Vapor Recovery for Above Ground Storage Tanks	--	NYQ	--	NYQ
<b>AREAWIDE SOURCES</b>			<b>--</b>	<b>13.7</b>
Consumer Products Program	--	13.5	--	13.7
Pesticides: DPR 2008 Pesticide Plan	--	NYQ	--	NYQ
<b>Total Emission Reductions from Proposed New Measures</b>	<b>144</b>	<b>52</b>	<b>141</b>	<b>54</b>

NYQ = Not Yet Quantified. BAR = Bureau of Automotive Repair. DPR = Department of Pesticide Regulation

\* Ship and Commercial Boats to 100 miles

\*\* Locomotive measure relies on U.S. EPA rulemaking and industry agreement to accelerate fleet turnover.

Note: Emission reductions reflect the combination impact of regulations and supportive incentive programs.

## **G. Local Government Measures**

ARB staff proposes that air quality-related motor vehicle registration fees collected in the air basin be used to achieve an additional 4 tpd of NO<sub>x</sub> reductions through the funding of SIP-creditable projects. (SIP credit is not currently taken for projects funded with these fees.) South Coast cities and counties should target their air quality funds to get the most cost-effective emission reductions. This target represents about 40 percent of the funds under city and county control used for projects achieving cost-effectiveness similar to the Carl Moyer Program. ARB would amend its guidance on the use of the fees to include new cost-effectiveness guidelines and a suggested list of SIP-creditable projects. SIP credit could also be taken for South Coast Mobile Source Air Pollution Reduction Review Committee projects that achieve surplus emission reductions.

## **H. Federal Measures**

Apart from California mobile source authority that is explicitly authorized under the Act, U.S. EPA has the authority to control emissions from mobile sources that are all or partly under exclusive federal jurisdiction (e.g., interstate trucks, some farm and construction equipment, aircraft, locomotives, and marine vessels that are US-flagged ships). International organizations develop standards for marine vessels and aircraft that operate outside U.S. territorial waters and airspace. Federal agencies have the lead role in representing the U.S. in the development of international standards. Measures in the proposed State Strategy to reduce emissions from interstate and international sources rely on the federal government to develop more stringent emissions standards and to ensure these standards go into effect as soon as possible.

ARB is proposing to reduce ship emissions through a combination of regulations, incentives, and actions by ports and the private sector. However, national and international action to clean up shipping fleets is also needed to fully realize our clean air goals. And aircraft emissions, which will become one of the South Coast's top five NO<sub>x</sub> sources by 2020, are unaddressed in the State Strategy due to the lack of effective international standards.

The consensus reached among the staff of the ARB, the District, and SCAG proposes that the federal government provide funding to mitigate the impacts of federal sources that are less well controlled than California regulated sources in order to meet the PM<sub>2.5</sub> attainment deadline. Line-haul and switcher locomotives operating in the South Coast would produce 10 tpd of excess NO<sub>x</sub> emissions in 2014 because the U.S. EPA's proposed new engine standards for NO<sub>x</sub> are not expected to be fully implemented until 2017. This 10 tpd target is equivalent to the emission reductions that would have been achieved had U.S. EPA adopted its proposed Tier 4 NO<sub>x</sub> locomotives standard in time for the State to work to convert all locomotives operating in the basin to Tier 4 by 2014.

To the extent that SCAG, through its RTP process, identifies transportation infrastructure measures (e.g., rail electrification) that will achieve quantifiable reductions, these reductions can be used to substitute for the SIP commitments.

## I. Reasonable Further Progress

The CAA requires SIPs to provide for steady progress in reducing emissions during the years leading to the attainment date<sup>16</sup>. This requirement provides a way to measure compliance prior to the attainment date. U.S. EPA requires that the RFP plan show linear progress according to emission reduction milestones the region establishes for 2009 and every three years thereafter until the attainment year.

**PM2.5.** For PM2.5, the Plan must show RFP for directly emitted PM2.5 and the precursor pollutants identified in the attainment demonstration, in this case, NOx, SOx, and ROG. Emission reductions and program milestone years used in the RFP plan must be based on the prior years' emissions. Since the District is requesting an extension for attainment of the PM2.5 standard out to 2015, the years 2009, 2012, and 2014 are used to determine RFP. U.S. EPA guidance provides two alternatives for assessing RFP for PM2.5 strategies. The first assesses progress for each precursor against the required rate of progress without considering how much each precursor contributes to ambient PM2.5 concentrations. The second uses information gained from the attainment demonstration modeling to consider how much reductions of each pollutant contribute to attainment. In essence, this equivalency approach tries to approximate the progress that will be made in improving air quality.

The 1-year window between the completion of this plan and 2009 does not much allow time to new implement programs that will provide the steep reductions needed to meet a 2009 target. Nonetheless, the proposed strategy described in this report meets the 2009 RFP goal using the more robust equivalency approach.

**Ozone.** Since U.S. EPA has already approved the District's RFP plan for the 1-hour ozone standard, the District is only required to provide for VOC and/or NOx reductions of three percent per year from the 2002 baseline year averaged over each consecutive three-year period beginning in 2008 until the Basin's attainment date (i.e., June 2023).

The AQMP meets the required rate of ozone progress for each milestone year on the basis of reductions from the existing regulatory program using a combination of ROG and NOx reductions. No new reductions from the proposed control measures in the Plan are needed for progress purposes. Up until the year 2017, projected ROG baseline emissions are sufficient to meet the CAA requirements.

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<sup>16</sup> Section 172(c)(2)

For the milestone years 2017, 2020, and 2023 the baseline ROG emission levels will be supplemented by projected NOx reductions to show compliance with the targeted thresholds.

The following tables summarize the calculations needed to demonstrate RFP for 8-hour ozone. These tables are also contained in Appendix D of the proposed State Strategy.

### Summary of Ozone RFP - ROG

<b>CALCULATION STEP <sup>a</sup></b>	<b>2008</b>	<b>2011</b>	<b>2014</b>	<b>2017</b>	<b>2020</b>	<b>2023</b>
2002 Base Year Emissions <sup>b</sup>	896.7	896.7	896.7	896.7	896.7	896.7
Required Reduction (%) <sup>c</sup>	18%	27%	36%	45%	54%	63%
Emission Reductions Needed <sup>d</sup>	161.4	242.1	322.8	403.5	484.2	564.9
Target Level <sup>e</sup>	735.3	654.6	573.9	493.2	412.5	331.8
Projected Baseline <sup>f, g</sup>	654.9	603.1	569.1	549.5	538.4	536.0
Percent Reduction Achieved (%) <sup>g, h</sup>	27%	33%	37%	39%	40%	40%

### Summary of Ozone RFP Calculations – NOx

<b>CALCULATION STEP <sup>a</sup></b>	<b>2008</b>	<b>2011</b>	<b>2014</b>	<b>2017</b>	<b>2020</b>	<b>2023</b>
2002 Base Year Emissions <sup>b</sup>	1078.5	1078.5	1078.5	1078.5	1078.5	1078.5
Required Reduction (%) <sup>c</sup>	0%	0%	0%	6%	14%	23%
Emission Reductions Needed <sup>d</sup>	0.0	0.0	0.0	64.7	151.0	248.1
Target Level <sup>e</sup>	0.0	0.0	0.0	1013.8	927.5	830.4
Projected Baseline <sup>f, g</sup>	848.2	738.5	650.3	578.4	523.9	505.6
Percent Reduction Achieved (%) <sup>g, h</sup>	21%	32%	40%	46%	51%	53%

<sup>a</sup> Units are in tons per day (summer) unless otherwise noted;

<sup>b</sup> Contains only anthropogenic emissions;

<sup>c</sup> 3% per year (total VOC reductions from 2002 baseline year);

<sup>d</sup> [(Row 1) x (Row 2)]/100;

<sup>e</sup> (Row 1) – (Row 3);

<sup>f</sup> Projected baseline emissions shown in Appendix III taking into account existing rules and projected growth.;

<sup>g</sup> The projected baseline includes the motor vehicle emissions depicted in the emission budgets showing that the motor vehicle emissions are below the RFP targets;

<sup>h</sup> [(1-(Row 5)/(Row 1))] x 100

## **J. Contingency Measures**

The Act requires that the SIP provide for contingency measures in the event of a failure to meet RFP milestones and/or failure to attain the PM2.5 or the 8-hour ozone standard by the attainment date.<sup>17</sup> These contingency measures are to take effect without further ARB or air district action, and thus must already be adopted when the SIP is submitted to U.S. EPA. Nonattainment areas classified as extreme for the 8-hour ozone standard must also adopt contingency measures to be implemented if the anticipated advanced technologies do not achieve the planned reductions.

ARB's existing mobile source program and the proposed State Strategy will achieve the bulk of emissions reductions needed to attain the federal standards. ARB has a well established history of adopting and implementing mobile source control regulations on-time or early. As a result, we expect to achieve and even exceed RFP goals without the need for contingency measures. However, the CAA requirements necessitate that we provide contingency measures regardless of our expected progress in reducing emissions toward the attainment goals. The emission reductions from adopted measures that go beyond the RFP requirements in each target year will constitute California's contingency measure commitment implemented in the unlikely event that the State does not meet the reasonable further progress goals.

ARB's contingency measure commitment is included in Appendix D of the Proposed State Strategy.

The District has supplemented ARB's proposal with four additional contingency measures. These measures include: revising stationary source NOx requirements to offset higher emission increases resulting from the use of natural gas with higher heating values, emission charges for major sources, episodic curtailments for older off-road equipment (operational requirements), and asking ARB to accelerated the development or implementation of mobile source measures if a reasonable further progress milestone is missed.

## **K. Reasonably Available Control Measures (RACM) Analysis**

Section 172(c)(1) and (c)(2) of the CAA requires each nonattainment area to demonstrate that it has adopted all reasonably available control measures (RACM) necessary to show that it will attain the applicable standard as expeditiously as practicable and to meet RFP requirements. RACM are those measures that are technologically and economically feasible within the nonattainment area.

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<sup>17</sup> Section 172(c)(9)

**District RACM.** As part of the RACM demonstration, the District must show that there are no additional, existing reasonable measures available to the District that would advance the attainment date by at least one year or contribute to RFP for the area. The District must also consider, and include where applicable, cost-effective clean-air technologies that are contained in regulatory programs for other air districts in and outside of California. Where available, the District must also provide cost-effectiveness analyses of control measures evaluated.

The District has included a RACM demonstration for the ozone precursor pollutants (i.e., ROG and NOx). This RACM demonstration identifies and evaluates all stationary source measures the District has implemented or plans to implement in the future and compares them with measures implemented by other agencies within and outside of the State. More detailed information on this analysis can be found in Appendix VI of the 2007 AQMP.

Pursuant to California Health and Safety Code Section 39614 (SB 656, 2003), the District also evaluated a statewide list of feasible and cost-effective control measures to reduce directly emitted particulate matter (PM10 and PM2.5) and PM precursor emissions (i.e., ROG, NOx, and SOx).

Based on these analyses, the District concluded that for the majority of stationary and area source categories, the District had the most stringent rules in California. However, the District identified one measure from the statewide RACM list – Wood Burning Fireplaces/Heaters – for adoption by the District and it is included in the 2007 AQMP for near-term adoption.

The ARB submitted the District's ozone Reasonably Available Control Technology (RACT) SIP to U.S. EPA on January 31, 2007, with a finding that the revision meets federal requirements by demonstrating the application of RACT on all affected stationary sources of ozone precursor emissions. RACT measures are a subset of RACM. This submittal satisfies the RACM requirements for the 8-hour ozone standard.

**SCAG RACM.** U.S. EPA's RACM guidelines also call for an analysis of transportation control measures proposed in the plan. Consequently, SCAG has completed a RACM determination for transportation control measures that can be found in Appendix IV-C of the AQMP.

**ARB RACM.** U.S. EPA has already determined that the California (i.e., ARB) control programs for mobile sources and fuels constitute BACM.<sup>18</sup> Moreover, whereas U.S. EPA deems its federal mobile source program to establish best available control measures for the nation, the California program generally goes beyond federal mobile source requirements (where not otherwise prescribed by

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<sup>18</sup>See page 5419 of the [February 4, 2004 proposed rulemaking for the San Joaquin Valley PM10 plan](#), and page 30035 of the [May 26, 2004 final rule](#).

federal law). Therefore, ARB believes that the State mobile source program exceeds federal RACM requirements.

### **III. COACHELLA VALLEY OZONE ATTAINMENT DEMONSTRATION**

#### **A. Profile of Coachella Valley**

The Coachella Valley federal nonattainment area lies in the Salton Sea Air Basin portion of Riverside County and is aligned in a northwest-southeast orientation stretching from San Geronio Pass to the Salton Sea. Geographically, the Valley is bounded by the San Jacinto Mountains to the west, the Little San Bernardino Mountains on the east, San Bernardino County to the north, and Imperial County on the south. Elevations range from approximately 500 feet above sea level in the northern part of the Valley to about 150 feet below seal level near the Salton Sea. The Valley was historically an agricultural area irrigated by water from the Colorado River, but is now experiencing significant population growth as a one of the fastest growing areas in the state. Winters are mild and summers are hot in this desert environment. Prevailing winds flow from west to east, carrying pollutants emitted in the South Coast Air Basin to the Valley.

The Valley covers about 2,500 square miles and is home to about 410,000 people. The region's population is distributed throughout the Valley floor in modest-sized communities and is expected to grow by 32% over the next ten years.

Air quality in the Coachella Valley is heavily impacted by ozone and ozone precursor emissions transported from the South Coast Air Basin. Levels of ozone precursor gasses emitted with in the Ozone Coachella Valley in 2006 – 56 tpd of NO<sub>x</sub> and 22 tpd of ROG – were less than five percent of ROG and NO<sub>x</sub> emissions generated in the South Coast Air Basin. The San Geronio Pass is one of the major outlets for air pollution from the South Coast to the Coachella Valley.

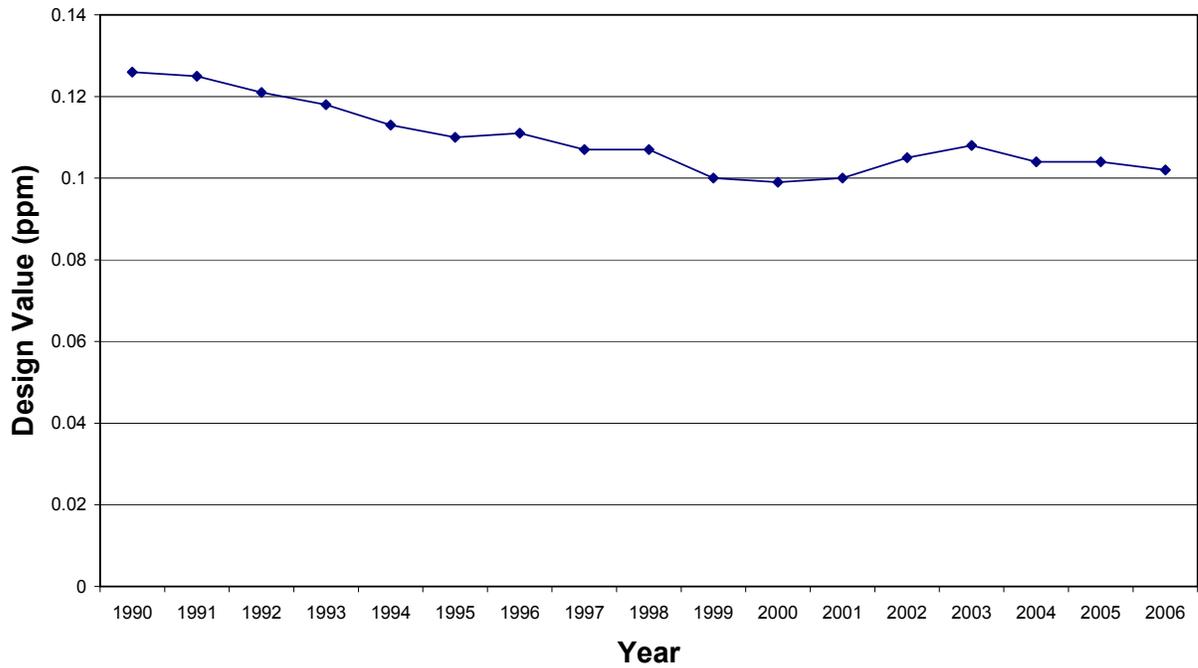
#### **B. Nature of the Problem**

Air quality in the Coachella Valley has improved over the last decade as measured by the decline in measured ozone concentrations, and in the number of days over the 8-hour standard of 0.08 parts per million (ppm).

Ozone “design values” are used to characterize a region's air quality for SIP planning purposes. The design value is a three-year average of the annual fourth highest daily maximum 8-hour average ozone concentration. The use of the 3-year average helps minimize the year-to-year influence of meteorology. The U.S. Environmental Protection Agency (U.S. EPA) designated Coachella Valley as “nonattainment” based on its 2001-2003 design value. As the following

figure shows, the Valley's design value has declined by 8 percent in the past ten years.

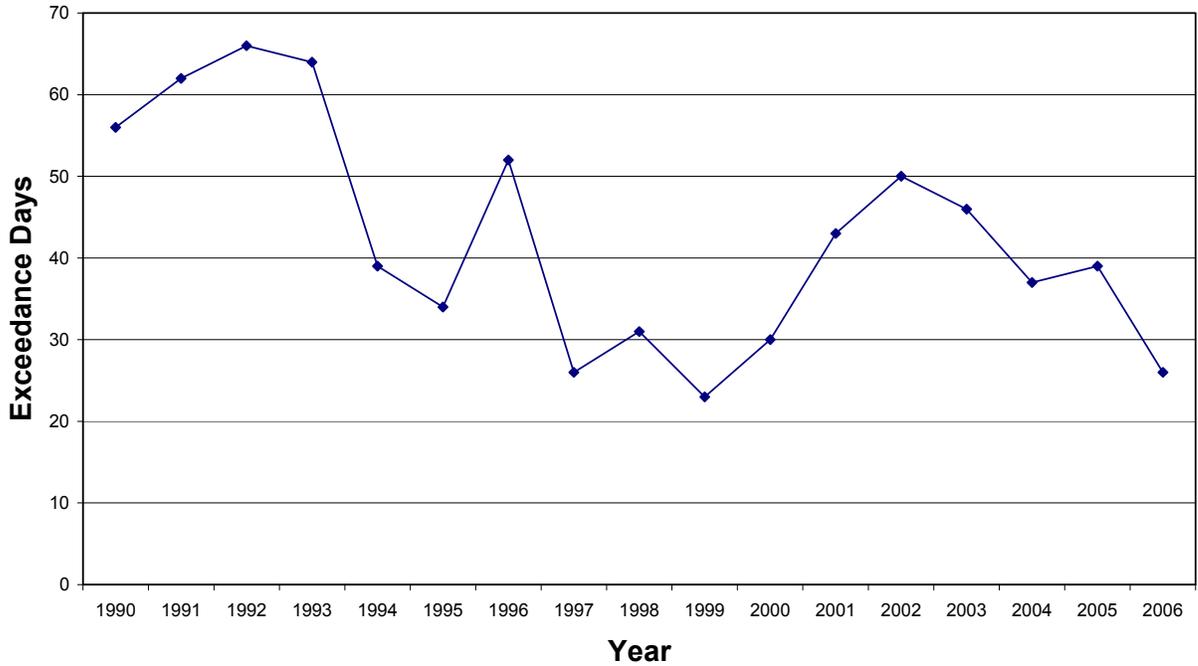
**Figure XX. Coachella Valley  
Federal 8-hr Ozone Design Value (1990-2006)**



The air quality monitor in Palm Springs has recorded the Valley's highest ozone levels in all of the last 10 years. The monitoring site is located near the center of the city, in the northern portion of the Valley, and is at an elevation of 585 feet above sea level. Due to prevailing winds from northwest to southeast, the site is impacted primarily by emissions from the South Coast Air Basin through the nearby San Geronio Pass. Coachella Valley's 2006 design value is 0.102 ppm.

The number of days over the standard (exceedance days) is an indication of how frequently the population is exposed to unhealthy air quality. The next figure illustrates the decline in number of days over the standard in Coachella Valley. In the past ten years, the number of days annually in which ozone concentrations in the Valley exceeded the national 8-hour standard has declined by 50 percent.

**Figure XX. Coachella Valley  
Federal 8-hr Ozone Exceedance Days (1990-2006)**



### **C. Emissions Inventory**

The main sources of South Coast Air Basin's and Coachella Valley's ozone precursor emissions are reasonably similar. As a result, emission reduction strategies designed to move the South Coast Air Basin toward attainment will significantly reduce locally-generated emissions in the Coachella Valley. For NO<sub>x</sub>, the major sources are on-road vehicles and off-road equipment. For ROG, the inventory is dominated by on-road vehicles, off-road equipment, and consumer products. The following tables show the top ten NO<sub>x</sub> and ROG emission sources in the Coachella Valley.

**Coachella Valley  
Top Ten NOx Emissions Sources  
2006 SIP Summer Season Emissions Inventory**

Source Category	Coachella Valley	
	Emissions (tpd)	Ranking
OFF-ROAD EQUIPMENT	4	2
HEAVY HEAVY DUTY DIESEL TRUCKS	36	1
PASSENGER VEHICLES	2	4
MEDIUM HEAVY DUTY DIESEL TRUCKS	2	5
LIGHT DUTY TRUCKS – LDT2	2	6
SHIPS AND COMMERCIAL BOATS	-	NA
MEDIUM DUTY TRUCKS	1	8
TRAINS	3	3
LIGHT HEAVY DUTY GAS TRUCKS	0.5	11
LIGHT DUTY TRUCK – LDT1	0.6	10
AIRCRAFT	1	7
FARM EQUIPMENT	1	9
SUBTOTAL OF TOP CATEGORIES	53	
<b>TOTAL OF ALL CATEGORIES</b>	<b>56</b>	

**Coachella Valley  
Top Ten ROG Emissions Sources  
2006 SIP Summer Season Emissions Inventory**

Source Category	Coachella Valley	
	Emissions (tpd)	Ranking
PASSENGER VEHICLES	3	1
CONSUMER PRODUCTS	3	3
OFF-ROAD EQUIPMENT	2	4
RECREATIONAL BOATS	1	5
LIGHT DUTY TRUCKS – LDT2	1	6
ARCHITECTURAL COATINGS	0.8	8
PETROLEUM MARKETING	0.5	13
COATINGS AND RELATED PROCESSES	0.8	9
MEDIUM DUTY TRUCKS	0.7	10
LIGHT DUTY TRUCK – LDT1	0.7	11
HEAVY HEAVY DUTY DIESEL TRUCKS	3	2
PESTICIDES/FERTILIZERS	0.8	7
SUBTOTAL OF TOP CATEGORIES	17	
<b>TOTAL OF ALL CATEGORIES</b>	<b>22</b>	

Because the ozone attainment deadline falls in the middle of the 2013 ozone season and design values are calculated for calendar years, the SIP must provide for sufficient emission reductions in 2012 in order to demonstrate attainment in 2013. The following table summarizes projected emission reductions from 2006, the base year for this plan, to 2012, the ozone season that must be modeled to demonstrate attainment by June 2013. The baseline

inventories reflected in this table reflect projected growth in the Coachella Valley, and State and local controls adopted through December, 2006.

**Coachella Valley**  
**Baseline Emission Trends with Measures Adopted as of 2006**  
 (summer planning inventory, tpd)

Source Category	ROG			NOx		
	2006	2012	% Change	2006	2012	% Change
Stationary & Area-wide	6.6	7.3	+11%	1.4	1.3	-7%
On-Road Motor Vehicles	9.4	6.4	-32%	43.6	25.5	-41%
Off-Road Vehicles and Equipment	5.5	4.8	-13%	9.1	8.3	-9%
<b>TOTAL</b>	<b>21.6</b>	<b>18.6</b>	<b>-14%</b>	<b>54.1</b>	<b>35.1</b>	<b>-35%</b>

Note: Totals may not add due to rounding.

**D. Attainment Demonstration**

Coachella Valley’s “serious” nonattainment area classification requires attainment of the 8-hour ozone NAAQS by June 15, 2013. The Valley needs to demonstrate a design value of 0.084 ppm (at most) in 2012 to attain the NAAQS. In 2006, the Valley exceeded the standard on 26 days with an ozone design value of 0.102 ppm, which is approximately 21 percent over the standard. Existing and proposed control programs in the South Coast Air Basin are expected to reduce the transport of ozone and ozone precursors ROG and NOx by about 29 and 46 percent, respectively, by the 2013 deadline. The District’s analysis indicates that these reductions will not be sufficient to attain the 8-hour ozone NAAQS in 2013. Instead, the District’s modeling analysis shows that the Coachella Valley will not attain the 8-hour ozone NAAQS until 2017.

**E. Photochemical Modeling**

The photochemical modeling used to determine the attainment date in the Coachella Valley was conducted by the District using the EPA-accepted “Comprehensive Air Quality Model with Extensions” (CAMx) modeling system to estimate the emissions reductions needed to achieve the ozone standards. A meteorological model, Mesoscale Model version 5 (MM5), was used to drive the transport and dispersion in the CAMx model.

The District’s air quality modeling concluded that attainment of the 8-hour ozone NAAQS by 2013 was not possible, but that a design value of 0.084 ppm would

be achieved by 2017. U.S. EPA's ozone modeling guidance indicates that when photochemical modeling projects attainment year concentrations of 0.082-0.087 ppm, the State may conduct further analyses of the model outcomes and consider other evidence such as emissions and air quality trends data. If the weight of this evidence supports a finding that the proposed control program will result in attainment by the statutory deadline, the State may consider this evidence in determining whether the proposed control program will result in attainment. ARB staff conducted a weight of evidence (WOE) attainment demonstration to evaluate the likelihood of attainment by 2017.

#### **F. Supplemental Analysis**

The supplemental analysis conducted for the Coachella Valley concludes, on the basis of air quality and emission trends, that the Valley will attain the 8-hour ozone NAAQS by 2015. This result is due primarily to the overwhelming influence of transport from the South Coast Air Basin on Coachella Valley ozone levels, and the massive reductions in precursor pollutant emissions planned for the South Coast Air Basin over the next eight years. Statistical analysis of ozone air quality trends in the two areas shows a very high correlation between the South Coast Air Basin and the Coachella Valley levels during the period of 1997 and 2005, and an analysis of diurnal variations shows that hourly ozone peaks occur progressively later in the day at monitoring sites at increasing distances east of the eastern boundary of the South Coast Air Basin. The ARB staff supplemental analysis concurs with the District's conclusion of attainment by 2018 or earlier.

#### **IV. ON-ROAD MOTOR VEHICLE EMISSIONS BUDGETS**

Under section 176(c) of the Act, transportation activities that receive federal funding or approval must be found to be fully consistent with the SIP.

U.S. EPA's transportation conformity rule, found in 40 CFR parts 51 and 93, details the requirements for establishing motor vehicle emissions budgets in SIPs for the purpose of ensuring the conformity of transportation plans and programs with the SIP attainment demonstration. The on-road motor vehicle emissions budgets act as a "ceiling" for future on-road mobile source emissions.

Exceedances of the budget indicate an inconsistency with the SIP, and could jeopardize the flow of federal funds for transportation improvements in the region. Projected regional on-road mobile source emissions are compared to these budgets during the periodic updates of regional transportation plans and programs.

The federal transportation conformity regulation<sup>19</sup> requires SIPs to specify the levels of on-road motor vehicle emissions that are consistent with attainment and maintenance of air quality standards. To receive federal approval and funding, transportation agencies must demonstrate that emissions from transportation plans, programs, and projects conform to these “emission budgets.”

Conformity budgets previously published in the 2007 AQMP and approved by the District board reflect the mobile source measures the District had proposed for ARB adoption. Budgets that reflect the approved SIP revision, including the approved State Strategy, will be made available for public review and comment as required by federal regulations, and for review by SCAG’s Conformity Working Group, before the budgets are adopted as separate action and submitted to U.S. EPA as a SIP revision.

### **A. Budget Approach**

The ozone emission budgets for ROG and NOx are derived from the summer planning inventory and the reductions from defined new measures in the AQMP that reduce on-road mobile source emissions. The PM2.5 emission budgets for PM2.5, and the PM2.5 precursors ROG and NOx, are derived from the annual average inventory. These budgets reflect existing control programs and new commitments for technology and transportation control measures.

For conformity budget calculation purposes, on-road emissions will be adjusted by the projected emission reductions from the proposed control measures specific to on-road sources. In the proposed Statewide Strategy, this includes the following ARB proposed control measures:

- Smog Check Improvements
- Expanded Vehicle Retirement
- Modifications to the Reformulated Gasoline Program
- Cleaner In-Use Heavy-Duty Trucks
- Truck Modernization
- Enhanced Heavy-Duty Truck Measures

Proposed measures that may address but are not limited to on-road vehicles, such as the proposals to secure additional reductions from port-related sources or to use DMV registration fees for SIP-creditable projects, will not be reflected in the conformity budgets.

The approach is consistent with U.S. EPA's transportation conformity rule, which provides that if emission budgets rely on new control measures, these measures should be specified in the SIP and the emission reductions from each control

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<sup>19</sup> U.S. EPA maintains online information on its transportation conformity program, including access to relevant rulemakings, policy guidance, and reports at: <http://www.epa.gov/otaq/transp/traqconf.htm>.

measure should be quantified and supported by agency commitments for adoption and implementation schedules. Moreover, to comply with U.S. EPA's rule, the conformity analyses by transportation agencies cannot take credit for measures which have not been implemented unless the measures are "projects, programs, or activities" in the SIP supported by written implementation commitments by the responsible agencies.<sup>20</sup>

The emission budgets for ozone and PM2.5 are provided up to the respective attainment year (i.e., 2014 and 2023). However, since transportation analyses are needed beyond the attainment dates, the carrying capacities for the ozone attainment demonstration also serve as the budgets for future years (e.g., 2030 for PM2.5 and ozone). Ozone precursor emissions from motor vehicles are projected to continue declining through these extended periods.

## **V. REVIEW OF PUBLIC PROCESS**

The District held numerous public meetings, workshops, advisory group meetings, and regional hearings throughout the two year process leading up to its public hearing to consider approval of the AQMP. The District governing board also convened a hearing on the Draft AQMP in each county within the air basin as required by State law<sup>21</sup>. The District's 2007 AQMP document the public process and demonstrates compliance with State and federal public process requirements.

The sequence of public meetings held to discuss the elements of the proposed State Strategy is described in the staff report developed for the Board's consideration of the Strategy. In addition to the general workshops, ARB staff worked extensively with South Coast District staff to refine the technical components of the plan, and to develop control options and associated emissions reduction estimates for discussion in public workshops and inclusion in the draft AQMP and State Strategies.

## **VI. POTENTIAL IMPACTS**

Potential environmental and economic impacts are addressed in the South Coast AQMP, which is available at [http://www.aqmd.gov/aqmp/07aqmp/07AQMP\\_socio.html](http://www.aqmd.gov/aqmp/07aqmp/07AQMP_socio.html), and in the ARB staff Proposed State Strategy, available at <http://www.arb.ca.gov/planning/sip/2007sip/2007sip.htm>.

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<sup>20</sup> 62 FR 43780 and 40 CFR 93, subpart A.

<sup>21</sup> California Health and Safety Code (HSC) section 40466.

The environmental, economic, environmental justice, and global warming impacts associated with specific control measures will also be addressed as those programs are adopted.



## GLOSSARY OF ACRONYMS

2007 AQMP	Proposed 2007 Air Quality Management Plan for the South Coast Air Basin
South Coast District	South Coast Air Quality Management District
ARB	California Air Resources Board
PM2.5	Federal ambient air quality standard for particulate matter concentrations under 2.5 microns in size
8-Hour Ozone	Federal ambient air quality standard for ozone concentrations averaged over 8 hours
SCAG	Southern California Association of Governments
VOC	Volatile organic compounds
ROG	Reactive organic gases
NOx	Nitrogen oxides
SOx	Sulfur oxides
TPD	Tons per day
RACMs	Reasonably Available Control Measures
RACT	Reasonable Available Control Technology
BARCT	Best Available Retrofit Control Technology
SCAB	South Coast Air Basin
CAA, or Act	Federal Clean Air Act
State Strategy	Proposed ARB control measures for the 2007 AQMP
ug/m <sup>3</sup>	Micrograms per cubic meter
ppm	Parts per million