

# Chapter 1

## Introduction

South Coast Air Quality Management District  
*Cleaning the air that we breathe...™*



# **CHAPTER 1**

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## **INTRODUCTION**

**Purpose**

**Constraints in Achieving Standards**

**Control Efforts**

**Progress in Implementing the 2007 AQMP**

**Final 2012 AQMP**

**Format of This Document**

## **PURPOSE**

The purpose of the 2012 Air Quality Management Plan (AQMP or Plan) for the South Coast Air Basin (Basin) is to set forth a comprehensive and integrated program that will lead the Basin into compliance with the federal 24-hour PM<sub>2.5</sub> air quality standard, and to provide an update to the Basin's commitments towards meeting the federal 8-hour ozone standards. It will also serve to satisfy recent U.S. EPA requirements for a new attainment demonstration of the revoked 1-hour ozone standard, as well as a vehicle miles travelled (VMT) emissions offset demonstration. The Plan will be submitted to the U.S. Environmental Protection Agency (U.S. EPA) as the State Implementation Plan (SIP) once it is approved by the South Coast Air Quality Management District's (AQMD or District) Governing Board and the California Air Resources Board (CARB). Specifically, the Plan will serve as the official SIP submittal for the federal 2006 24-hour PM<sub>2.5</sub> standard, for which U.S. EPA has established a due date of December 14, 2012. In addition, the Plan will update specific new control measures and commitments for emissions reductions to implement the attainment strategy for the 8-hour ozone SIP and help reduce reliance on the Section 182(e)(5) long-term measures. The key federal and state planning requirements are summarized briefly later in this chapter. Given the challenges and complexities in demonstrating attainment with air quality standards, District staff believes it is important to initiate broad public dialogue on a broad range of air quality issues, to inform the public regarding the challenges ahead, and to solicit public input in an open and transparent process. This Final 2012 AQMP sets forth programs which require integrated planning efforts and the cooperation of all levels of government: local, regional, state, and federal.

At the federal level, U.S. EPA is charged with establishing emission standards for on-road motor vehicles; train, airplane, and ship pollutant exhaust and fuel standards; and establishing emissions standards for non-road engines less than 175 horsepower. CARB, at the state level, also establishes on-road vehicle emission standards, fuel specifications, some off-road source requirements, and most consumer product standards. CARB is also primarily responsible for the implementation of California's greenhouse gas emission reduction program as mandated by AB 32. The strategies to achieve air quality and climate goals have significant overlap in terms of sources and control measures. When also considering other regional needs and constraints, such as energy supply, mobility, goods movement, and jobs, it is clear that an integrated and coordinated planning approach is needed to efficiently achieve multiple objectives.

Since air pollution is not constrained within city and county boundaries, it is largely a regional issue. As the regional air quality agency for Orange County and portions of Los Angeles, Riverside, and San Bernardino Counties, including the Coachella Valley, the District is responsible for stationary sources with some limited mobile source and consumer product authority. The District also has the primary responsibility for the development and adoption of the AQMP. Lastly, at the local level, the cities, counties and their various departments (e.g., harbors and airports) have a dual role related to transportation and land use. Their efforts are coordinated through the regional metropolitan planning organization (MPO) for the Basin, the Southern California Association of Governments (SCAG). Along with CARB, SCAG is the District's partner in the preparation of the AQMP, providing the latest economic forecasts and developing transportation control measures. Interagency commitment and cooperation are keys to the success of the AQMP. No one agency can design or implement the Plan alone and the strategies in the Plan reflect this fact.

## **CONSTRAINTS IN ACHIEVING STANDARDS**

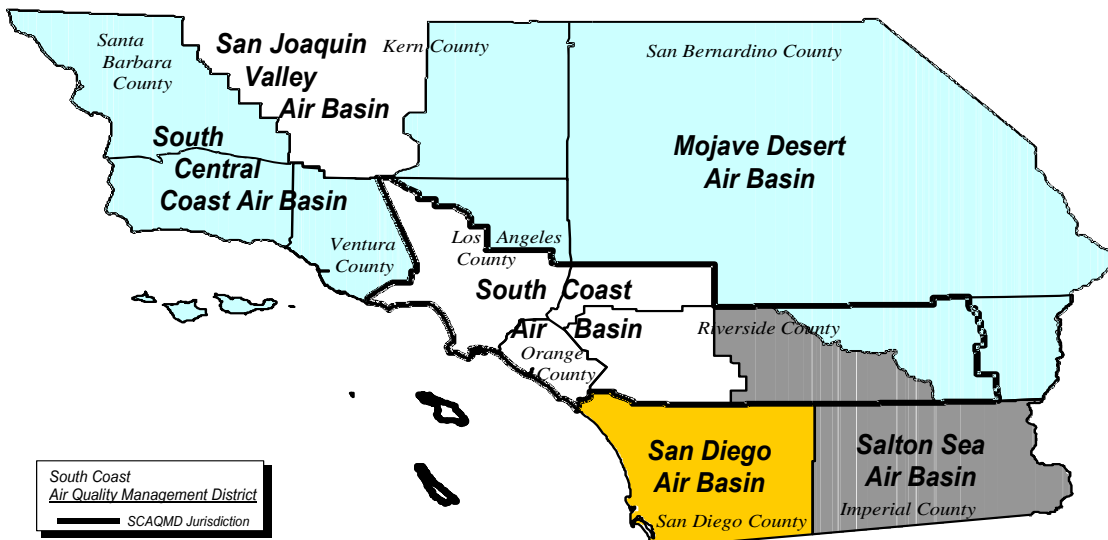
The District is faced with a number of constraints and that make achieving clean air standards a difficult challenge. These include the physical and meteorological setting, the large pollutant emissions burden of the Basin (including pollution from international goods movement), and the continued population growth of the area.

### **Setting**

The District has jurisdiction over an area of approximately 10,743 square miles, consisting of the South Coast Air Basin, and the Riverside County portions of the Salton Sea Air Basin (SSAB) and Mojave Desert Air Basin (MDAB). The Basin, which is a subregion of the District's jurisdiction, is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east. It includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The Riverside County portion of the SSAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. The federal nonattainment area (known as the Coachella Valley Planning Area) is a sub-region of Riverside County and the SSAB that is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east. The Los Angeles County portion of the MDAB (known as North County or Antelope Valley) is bounded by the San Gabriel Mountains to the south and west, the Los Angeles/Kern County border to the north,

and the Los Angeles/San Bernardino County border to the east. The SSAB and MDAB were previously included in a single large basin called the Southeast Desert Air Basin (SEDAB). On May 30, 1996, CARB replaced the SEDAB with the SSAB and MDAB. In July 1997, the Antelope Valley area of MDAB was separated from the District and incorporated into a new air district under the jurisdiction of the newly formed Antelope Valley Air Pollution Control District (AVAPCD). The entire region is shown in Figure 1-1.

The Coachella Valley Planning Area is impacted by pollutant transport from the South Coast Air Basin. In addition, pollutant transport also impacts the Antelope Valley, Mojave Desert, Ventura County, and San Diego County. As part of this AQMP, an update on the status of the Coachella Valley ozone non-attainment area is also provided.



**FIGURE 1-1**

Boundaries of the South Coast Air Quality Management District and Federal Planning Areas

The topography and climate of Southern California combine to make the Basin an area of high air pollution potential. During the summer months, a warm air mass frequently descends over the cool, moist marine layer produced by the interaction

between the ocean's surface and the lowest layer of the atmosphere. The warm upper layer forms a cap over the cooler surface layer which inhibits the pollutants from dispersing upward. Light winds during the summer further limit ventilation. Additionally, abundant sunlight triggers the photochemical reactions which produce ozone and the majority of particulate matter. The region experiences more days of sunlight than any other major urban area in the nation except Phoenix.

The Basin's economic base is diverse. Historically, the four counties of the Basin have collectively comprised one of the fastest-growing local economies in the United States. Significant changes have occurred in the composition of the industrial base of the region in the past twenty years. As in many areas of the country, a large segment of heavy manufacturing, including steel and tire manufacturing as well as automobile assembly, has been phased down. Due to growth in shipping and trade, small service industries and businesses have replaced much of the heavy industry.

### **Emission Sources**

The pollution burden of the Basin is substantial. In spite of substantial reductions already achieved through effective control strategies, additional significant reductions of volatile organic compounds (VOCs), oxides of nitrogen (NOx), sulfur oxides (SOx), and particulate matter (PM) in the Basin are needed to attain the federal and state air quality standards.

Air pollution forms either directly or indirectly from pollutants emitted from a variety of sources. These sources can be natural, such as oil seeps, vegetation, or windblown dust, but the majority of emissions are related to human activity. Emissions result from fuel combustion sources, such as cars and trucks; from the evaporation of organic liquids, such as those used in coating and cleaning processes; and through abrasion processes, such as tires on roadways. The air pollution control strategy in the Final 2012 AQMP is directed entirely at controlling man-made sources. The emission sources in the Basin are described in Chapter 3. Natural emissions are included in the air quality modeling analysis in Chapter 5.

### **Population**

Since the end of World War II, the Basin has experienced faster population growth than the rest of the nation. Although growth has slowed somewhat, the region's population is expected to increase significantly through 2023 and beyond. Table 1-1 shows the projected growth based on SCAG's regional growth forecast.

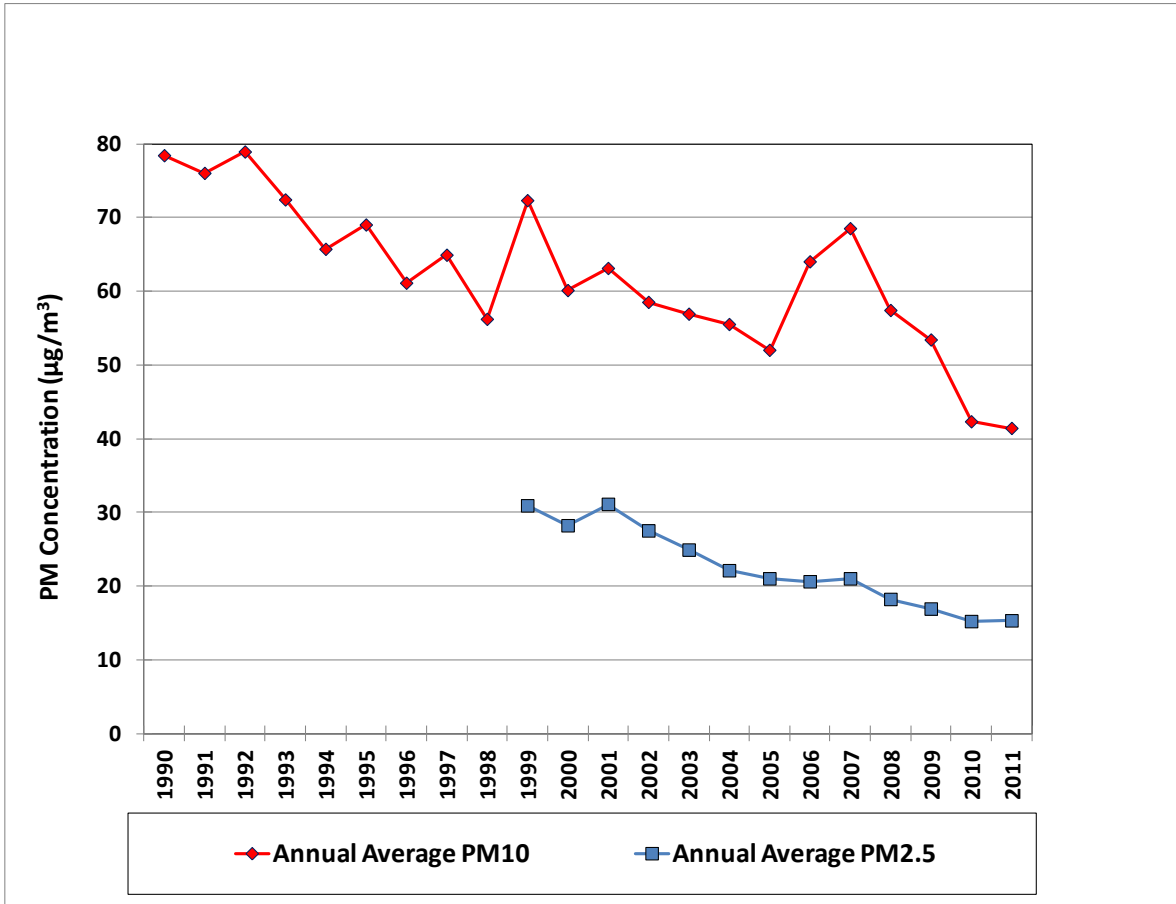
**TABLE 1-1**  
Population Growth

YEAR	POPULATION	AVERAGE PERCENT INCREASE PER YEAR OVER THE PERIOD
1990	13.0 million	--
2000	14.8 million	1.4
2008	15.6 million	0.7
2023 <sup>a</sup>	17.3 million	0.7
2030 <sup>a</sup>	18.1 million	0.7

<sup>a</sup> Based on SCAG forecasts in the 2012 Regional Transportation Plan

Despite this growth, air quality has improved significantly over the years, primarily due to the impacts of the region's air quality control program. Figure 1-2 shows the trends since 1990 in the annual average PM10 and PM2.5 concentrations. PM10 levels have declined almost 50% since 1990, and PM2.5 levels have also declined 50% since measurements began in 1999. As shown in Chapters 2 and 5, the only air monitoring station that is currently exceeding or projected to exceed the 24-hour PM2.5 standard from 2011 forward is the Mira Loma station in Western Riverside County. Figure 1-3 shows the improvements in the 1-hour ozone and 8-hour ozone levels over the same time period. Similar improvements are observed with ozone, although the rate of ozone decline has slowed in recent years.

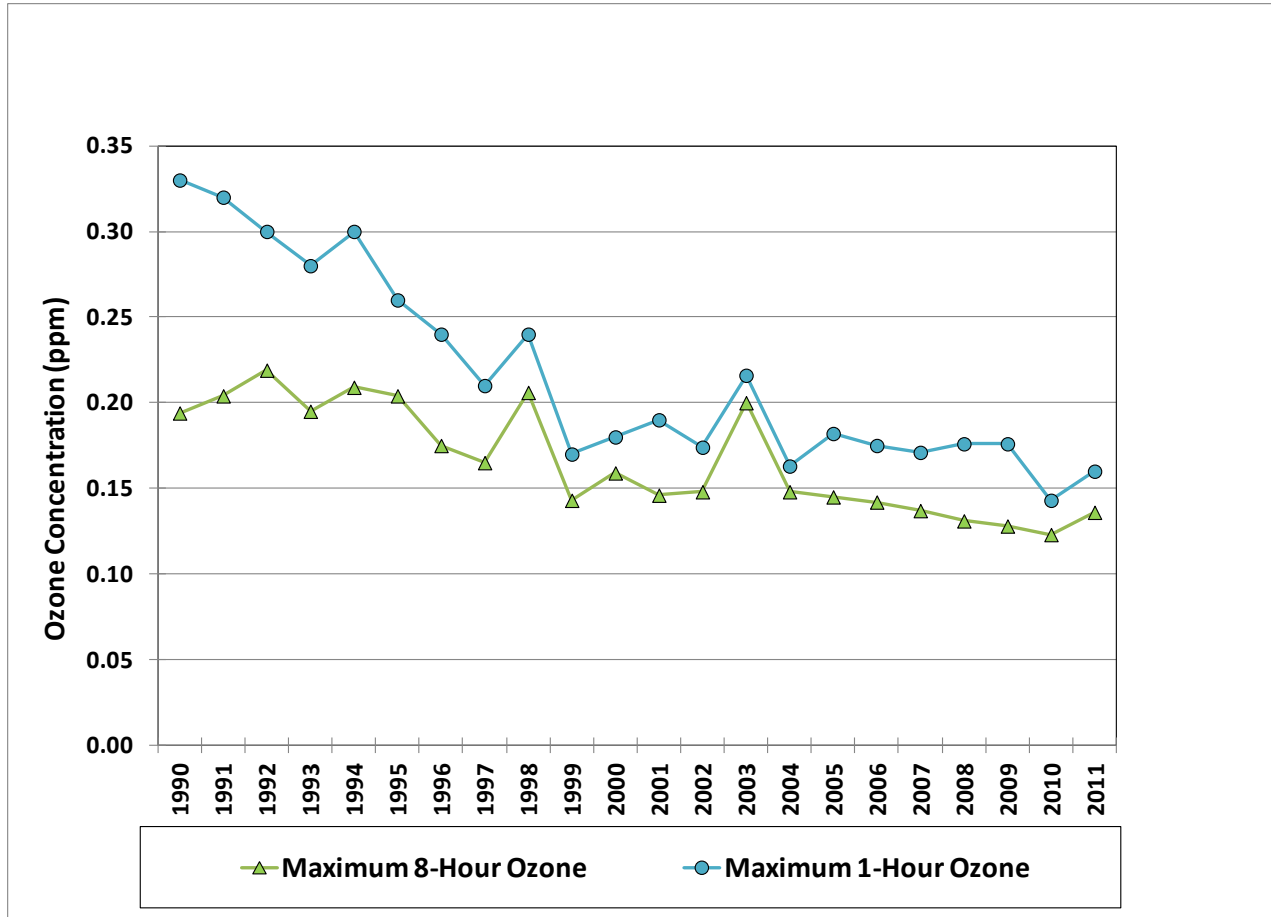
Although exposure to pollution has decreased substantially in the Basin through several decades of implementing pollution controls, increases in the population over that time have made further emission reductions more difficult. Many sources, such as automobiles and stationary sources have been significantly controlled. However, increases in the number of sources, particularly those growing proportionately to population, can offset the potential air quality benefits of past and existing regulations. The net result is that unless additional steps are taken to further control air pollution, growth itself may reverse the gains of the past decades.



**FIGURE 1-2**

Maximum Annual Average PM10, PM2.5 Trends in the Basin



**FIGURE 1-3**

Maximum 1-hour and 8-hour Average Ozone Trends in the Basin

### The Recent Recession

The collapse in the housing and financial markets precipitated the economic recession that began in the fourth quarter of 2007. By technical economic definitions, the recession ended in the second quarter of 2009, but the economy is still being affected and recovery has been slow. Certain industries, such as housing and construction, were disproportionately affected and continue to struggle to return to pre-recessionary growth levels. While unemployment has improved since the height of the recession, it still remains above historical levels. As many businesses continue to struggle under difficult and uncertain economic conditions, the District will continue to work closely with businesses and industry groups to identify the most cost-effective and efficient path to meeting clean air goals while being sensitive to their economic concerns.

## **CONTROL EFFORTS**

### **History**

The seriousness of the local air pollution problem in the Basin was recognized in the early 1940s. In 1946, the Los Angeles County Board of Supervisors established the first air pollution control district in the nation to address the problems of industrial air pollution. In the mid-1950s, California established the first state agency to control motor vehicle emissions. County or regional air pollution districts were formed in California by the 1970s. Many of the control strategies originating in California became the basis for the federal control programs which began in the 1960s.

Nearly all control programs developed to date have relied on the development and application of cleaner technologies and add-on emission control devices. Emissions from industrial and vehicular sources have been significantly cut by the use of these technologies. Only recently have preventive efforts come to the forefront of the air pollution control program, including alternative materials, waste minimization, and maintenance procedures for industrial sources.

In the 1970s, it became apparent at both the state and federal levels that local programs were not enough to solve a problem that was regional in nature and was not contained within city and county jurisdictional boundaries. Instead, air basins, defined by logical geographical boundaries, became the basis for regulatory programs.

In 1976, the California Legislature adopted the Lewis Air Quality Management Act which created the South Coast Air Quality Management District from a voluntary association of air pollution control districts in Los Angeles, Orange, Riverside, and San Bernardino Counties. The new agency was charged with developing uniform plans and programs for the region to attain federal standards by the dates specified in federal law. The agency was also mandated to meet state standards by the earliest date achievable, using reasonably available control measures.

Rule development in the 1970s through 1990s resulted in dramatic improvement in Basin air quality (see Chapter 2 and Appendix II). However, the effort to impose incremental rule changes on the thousands of stationary sources through the command-and-control regulatory process began to be challenged as less economically efficient than programs taking advantage of market incentives. The 1991 AQMP introduced the concept of a Marketable Permits Program and outlined

the framework of an idea that was the forerunner to what is now known as the Regional Clean Air Incentives Market (RECLAIM). RECLAIM, a NO<sub>x</sub> and SO<sub>x</sub> cap-and-trade program, calls for declining mass emission limits on the total emissions from all facilities within the program and achieves cost-effective emission reductions. In addition to the implementation of RECLAIM, other statewide incentive programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) and the Highway Safety, Traffic reduction, Air Quality, and Port Security Bond Act of 2006 (Proposition 1B) were implemented and provide expedited reductions through accelerated fleet turnover that would otherwise have been difficult to obtain through regulatory mandates and their associated lead time for implementation.

In summary, while the region's effort to attain applicable ambient air quality standards continues to rely on the successful command-and-control regulatory structure, the strategy is supplemented, where appropriate, with market incentive and compliance flexibility strategies.

### **Air Quality Impact of Control Efforts**

Air pollution controls have had a positive impact on the Basin's air quality relative to the now revoked 1979 federal 1-hour ozone standard. The number of days where the Basin exceeded the federal 1-hour ozone standard has continually declined over the years. However, while the number of days exceeding the federal 1-hour ozone standard has dropped since the 1990s, the rate of progress has slowed since 2000. The Basin experienced ozone levels over the revoked federal 1-hour ozone standard on 7 days in 2010, the original attainment year for the revoked 1-hour ozone standard, and the maximum recorded value exceeded the standard by nearly 20 percent.

Although past controls were primarily designed to address the federal 1-hour ozone and the PM<sub>10</sub> standards, they also benefited the more recent efforts to attain the 8-hour ozone and the PM<sub>2.5</sub> standards. The 8-hour ozone levels have been reduced by half over the past 20 years, nitrogen dioxide and sulfur dioxide standards have been met, and other criteria pollutant concentrations have significantly declined. The federal and state CO standards were also met as of the end of 2002. The Basin has met the PM<sub>10</sub> standards at all stations and has requested a redesignation to attainment status. However, the Basin still experiences substantial exceedances of the 8-hour ozone standards and nominal exceedances of the PM<sub>2.5</sub> standards. Air quality summaries and health effects in the Basin are discussed in Chapter 2;

Appendix II provides an in-depth analysis of air quality as measured within the District's jurisdiction.

## **PROGRESS IN IMPLEMENTING THE 2007 AQMP**

### **District's Actions**

The ozone portion of the 2007 AQMP has been approved by U.S. EPA into the SIP. The majority of the PM<sub>2.5</sub> portion of the 2007 AQMP has also been approved by U.S. EPA, with the only exception being the failure to meet contingency measure requirements. These approvals include SIP revisions submitted in response to U.S. EPA's initial findings. The District has also submitted a SIP revision designed to meet the contingency measure requirement for the annual PM<sub>2.5</sub> plan.

The District continues to implement the 2007 AQMP. Progress in implementing the 2007 AQMP can be measured by the number of control measures that have been adopted as rules and the resulting tons of pollutants targeted for reduction. Emission reduction commitments and reductions which will be achieved in 2014 and 2023 through already adopted measures are based on the emissions inventories from the 2007 AQMP. Between 2008 and 2011, twelve control measures or rules have been adopted or amended by the District. Table 1-2 lists the District's 2007 AQMP commitments and the control measures or rules that were adopted through 2011. The table is largely derived from the PM<sub>2.5</sub> SIP revisions submitted to U.S. EPA in 2011, and thus emissions substitutions and other factors are included in the footnotes. As shown in Table 1-2, for the control measures adopted by the District over this period, 22.5 tons per day of VOC reductions, 7.6 tons per day of NO<sub>x</sub> reductions, 4.0 tons per day of SO<sub>x</sub> reductions, and 1.0 tons per day of PM<sub>2.5</sub> reductions will be achieved by 2014. Additional reductions from these adopted rules will be achieved by 2023.

**TABLE 1-2**

2007 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	CONTROL MEASURE TITLE	Adoption Date	COMMITMENT <sup>a</sup>		ACHIEVED <sup>a</sup>	
			2014	2023	2014	2023
<b>VOC EMISSIONS</b>						
MOB-05	AB923 Light-Duty Vehicle High-Emitter Identification Program [NOx, VOC]	On-going	0.8	0.7	--	--
MOB-06	AB923 Medium-Duty Vehicle High-Emitter Identification Program [NOx, VOC]	On-going	0.5	0.6	--	--
FUG-04	Pipeline and Storage Tank Degassing[VOC]- R1149	2008	NA	NA	0.04	0.04
BCM-03	Emission Reductions from Wood Burning Fireplaces and Wood Stoves [All]	2008	NA	NA	0.44	0.70
MCS-01	Facility Modernization [NOx, VOC, PM] - R1110.2	2008+	2.0	9.2	0.3	0.3
CTS-01	Emission Reductions from Lubricants [VOC][R1144]	2009	1.9	2.0	3.9	3.2
CTS-04	Emission Reductions from the Reduction of VOC Content of Consumer Products Not Regulated by the State Board [VOC][R1143]	2009	NA	NA	9.7	10.1
MCS-04	Further Emission Reductions from Greenwaste Composting Operations [VOC][R1133.3]	2011	NA	NA	0.88	0.88
MCS-07	Application of All Feasible Measures [VOC][R1113, R1177]	2011	NA	NA	7.2	11.1
FLX-02	Petroleum Refinery Pilot Program [VOC and PM2.5]	(b)	0.7	1.6	0	0
FUG-02	Emission Reductions from Gasoline Transfer and Dispensing Facilities [VOC]	(b)	3.7	4.0	0	0
MCS-05	Emission Reductions from Livestock Waste [VOC]	(b)	0.8	0.6	0	0
EGM-01	Emission Reductions from New or Redevelopment Projects [NOx, VOC, PM2.5]	(c)	NA	0.5	NA	--
<b>TOTAL VOC REDUCTIONS (TPD)</b>			<b>10.4</b>	<b>19.2</b>	<b>22.5</b>	<b>26.4</b>

**TABLE 1-2 (continued)**

2007 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	CONTROL MEASURE TITLE	Adoption Date	COMMITMENT <sup>a</sup>		ACHIEVED <sup>a</sup>	
			2014	2023	2014	2023
<b>NO<sub>x</sub> EMISSIONS</b>						
MOB-05	AB923 Light-Duty Vehicle High-Emitter Identification Program [NO <sub>x</sub> , VOC]	On-going	0.4	0.4	--	--
MOB-06	AB923 Medium-Duty Vehicle High-Emitter Identification Program [NO <sub>x</sub> , VOC]	On-going	0.5	0.6	--	--
CMB-01	NO <sub>x</sub> Reduction from Non-RECLAIM Ovens, Dryers and Furnaces [NO <sub>x</sub> ][R1147]	2008	3.5	4.1	3.5	4.1
BCM-03	Emission Reductions from Wood Burning Fireplaces and Wood Stoves [All][R445]	2008	NA	NA	0.06	0.10
	SOON Program	2008	4-8	NA	1.8	NA
MCS-01	Facility Modernization [NO <sub>x</sub> , VOC, PM] - R1110.2, PR1146, PR1146.1	2008+	1.6	2.2	2.17	3.15
CMB-03	Further NO <sub>x</sub> Reductions from Space Heaters [NO <sub>x</sub> ]	2009	0.8	1.1	0.1	3.0
EGM-01	Emission Reductions from New or Redevelopment Projects [NO <sub>x</sub> , VOC, PM <sub>2.5</sub> ]	(c)	0	0.8	--	--
<b>TOTAL NO<sub>x</sub> REDUCTIONS <sup>(d)</sup> (TPD)</b>			<b>10.8</b>	<b>9.2</b>	<b>7.6</b>	<b>10.3</b>
<b>PM<sub>2.5</sub> EMISSIONS</b>						
BCM-03	Emission Reductions from Wood Burning Fireplaces and Wood Stoves [PM <sub>2.5</sub> ]	2008	1.0	1.6	1.0	1.6
FLX-02	Petroleum Refinery Pilot Program [VOC and PM <sub>2.5</sub> ]	(d)	0.4	0.4	--	--
EGM-01	Emission Reductions from New or Redevelopment Projects [NO <sub>x</sub> , VOC, PM <sub>2.5</sub> ]	(c)	NA	0.5	NA	--
MCS-01	Facility Modernization [NO <sub>x</sub> , VOC, PM]	(d)	0.4	1.7	0	0
BCM-05	PM Emission Reductions from Under-fired Charbroilers [PM <sub>2.5</sub> ]	(d)	1.1	1.2	--	--
<b>TOTAL PM<sub>2.5</sub> REDUCTIONS (TPD)</b>			<b>2.9</b>	<b>5.4</b>	<b>1.0</b>	<b>1.6</b>

**TABLE 1-2 (concluded)**

2007 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	CONTROL MEASURE TITLE	Adoption Date	COMMITMENT <sup>a</sup>		ACHIEVED <sup>a</sup>	
			2014	2023	2014	2023
<b>SOx EMISSIONS</b>						
CMB-02	Further SOx Reductions for RECLAIM (BARCT) [SOx]	2010	2.9	2.9	4.0	5.7
<b>TOTAL SOx REDUCTIONS (TPD)</b>			<b>2.9</b>	<b>2.9</b>	<b>4.0</b>	<b>5.7</b>

<sup>(a)</sup> 2014 reductions estimated in average annual day, 2023 in planning inventory.

<sup>(b)</sup> SIP commitment for VOC reductions in the PM2.5 Plan was met via excess reductions achieved from CTS-04 (R1143).

<sup>(c)</sup> No SIP emission reduction commitment for the PM2.5 Plan. Rulemaking is delayed due to potential co-benefits of SB375 reduction targets.

<sup>(d)</sup> Reduction commitment for NOx and PM2.5 reductions in the PM2.5 SIP was met via excess reductions achieved from the 2010 SOx RECLAIM amendments. The PM2.5 forming potential established in the 2007 AQMP is NOx: PM2.5:SOx=1:10:15.

NA: Not applicable, no SIP Reductions quantified in the 2007 AQMP

**CARB Actions**

Table 1-3 lists the 2007 AQMP’s control measure commitments that have been adopted (either entirely or partially) by CARB since the 2007 AQMP was adopted. The emissions are presented in terms of remaining emissions, rather than reductions, due to some significant changes to the inventory that preclude a direct comparison of committed emissions to those achieved. The table is based on SIP revisions submitted to U.S. EPA in 2011, and thus reflect adopted measures through specific dates in 2011 as described in the footnotes. To date, CARB has achieved more than the committed 2014 emissions reductions for all pollutants for these source categories. The same is true for VOC and NOx emissions in 2023.

**TABLE 1-3**

South Coast Air Basin Remaining Emissions Due to CARB Actions

CARB REGULATIONS	COMMITMENT		ACHIEVED	
	2014 <sup>a</sup>	2023 <sup>b</sup>	2014 <sup>a</sup>	2023 <sup>b</sup>
<b>NOx EMISSIONS (TPD)<sup>c</sup></b>				
Smog Check Improvements (BAR)	134.2	74.3	131.6	73.1
Cleaner In-Use Heavy-Duty Trucks & Buses	151.2	76.8	132.6	49.4
Cleaner In-Use Off-Road Equipment (over 25hp)	28.0	18.9	27.5	15.8
Ship Auxiliary Engine Cold Ironing & Clean Tech.	23.7	40.3	15.6	12.0
Cleaner Main Ship Engines and Fuel - Main Engines	38.5	65.8	20.9	21.3
Accelerated Intro. of Cleaner Line-Haul Locomotives	18.3	21.0	18.3	21.0
Clean Up Existing Harbor Craft	15.2	18.4	11.1	8.4
Cargo Handling Equipment	3.2	1.8	3.2	1.8
New Emission Standards for Recreational Boats	11.0	18.3	11.0	18.3
Co-Benefits from Greenhouse Gas Reduction Measures <sup>d</sup>	--	--	--	--
All other local, state, and federal emissions	166	157	159	147 <sup>e</sup>
<b>TOTAL NOx REMAINING EMISSIONS WITH RULES ADOPTED TO DATE</b>	<b>589</b>	<b>493</b>	<b>530</b>	<b>368</b>



**TABLE 1-3 (continued)**

South Coast Air Basin Remaining Emissions Due to CARB Actions

CARB REGULATIONS	COMMITMENT		ACHIEVED	
	2014 <sup>a</sup>	2023 <sup>b</sup>	2014 <sup>a</sup>	2023 <sup>b</sup>
<b>VOC EMISSIONS (TPD)<sup>c</sup></b>				
Smog Check Improvements (BAR)	132.1	97.4	123.5	92.1
Cleaner In-Use Heavy-Duty Trucks & Buses	8.7	6.6	5.4	5.3
Cleaner In-Use Off-Road Equipment (over 25hp)	2.6	2.0	2.5	1.7
Ship Auxiliary Engine Cold Ironing & Clean Tech.	0.9	1.5	0.7	0.9
Cleaner Main Ship Engines and Fuel - Main Engines	1.9	3.2	1.4	2.5
Accelerated Intro. of Cleaner Line-Haul Locomotives	2.3	2.4	2.3	2.4
Clean Up Existing Harbor Craft	1.2	1.0	1.1	0.5
Cargo Handling Equipment	0.3	0.6	0.3	0.6
New Emission Standards for Recreational Boats	37.9	50.8	37.9	50.8
Expanded Off-Road Rec. Vehicle Emission Standards	6.7	13.4	6.7	13.4
Consumer Products Program	102.6	109.5	96.7	102.4
All other local, state, and federal emissions	221	241	206	226 <sup>c</sup>
<b>TOTAL VOC REMAINING EMISSIONS WITH RULES ADOPTED TO DATE</b>	<b>518</b>	<b>529</b>	<b>485</b>	<b>498</b>
<b>PM2.5 EMISSIONS (TPD)<sup>c</sup></b>				
Smog Check Improvements (BAR)	7.8	--	7.5	--
Cleaner In-Use Heavy-Duty Trucks & Buses	6.0	--	3.4	--
Cleaner In-Use Off-Road Equipment (over 25hp)	1.3	--	1.3	--
Ship Auxiliary Engine Cold Ironing & Clean Tech.	0.5	--	0.4	--
Cleaner Main Ship Engines and Fuel - Main Engines	3.9	--	0.4	--
Accelerated Intro. of Cleaner Line-Haul Locomotives	0.7	--	0.7	--
Clean Up Existing Harbor Craft	0.6	--	0.4	--
Cargo Handling Equipment	0.1	--	0.1	--
All other local, state, and federal emissions	74	--	73	--

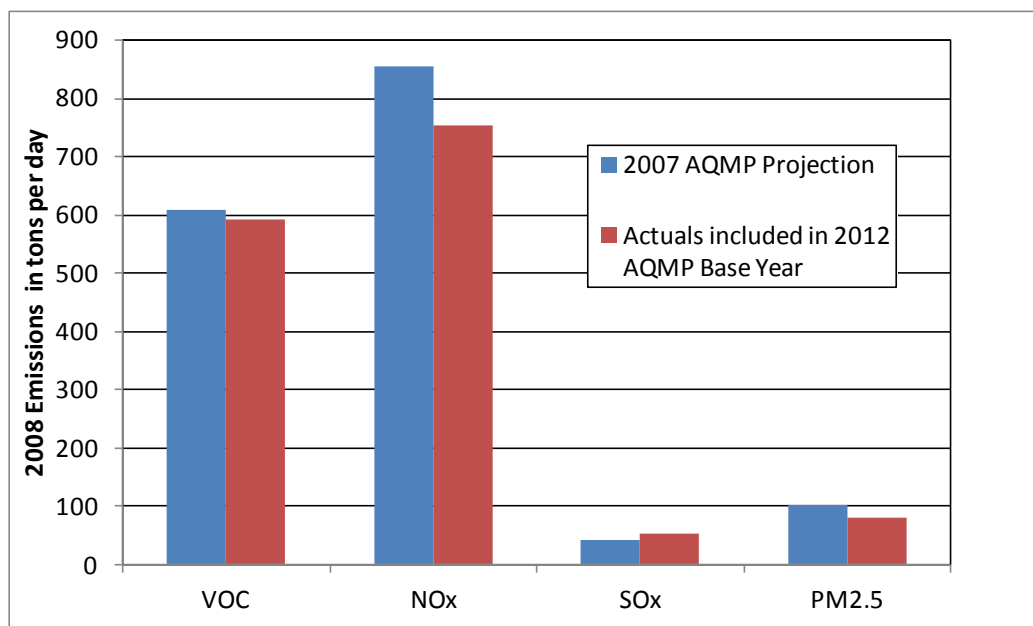
**TABLE 1-3 (concluded)**

South Coast Air Basin Remaining Emissions Due to CARB Actions

CARB REGULATIONS	COMMITMENT		ACHIEVED	
	2014 <sup>a</sup>	2023 <sup>b</sup>	2014 <sup>a</sup>	2023 <sup>b</sup>
<b>TOTAL PM2.5 REMAINING EMISSIONS WITH RULES ADOPTED TO DATE</b>	<b>95</b>	--	<b>87</b>	--
<b>SOx EMISSIONS (TPD)<sup>c</sup></b>				
Cleaner In-Use Heavy-Duty Trucks & Buses	0.3	--	0.3	--
Ship Auxiliary Engine Cold Ironing & Clean Tech.	1.1	--	0.8	--
Cleaner Main Ship Engines and Fuel - Main Engines	38.7	--	1.7	--
All other local, state, and federal emissions	21	--	17	--
<b>TOTAL SOX REMAINING EMISSIONS WITH RULES ADOPTED TO DATE</b>	<b>61</b>	--	<b>20</b>	--

- a. The 2014 emissions data reflect the 2014 Emissions Inventory that was included in the March 2011 *Progress Report on Implementation of PM2.5 State Implementation Plans*. The inventory is in the process of being updated, and may change slightly in the Final AQMP.
- b. The 2023 emissions data tables reflect the 2023 Emissions Inventory that was current as of August 2011. The inventory is in the process of being updated, and may change slightly in the Final AQMP.
- c. These are remaining emissions. If achieved emissions are lower than the committed emissions, it means the SIP targets are met.
- d. Remaining emissions are included in “other local, state, and federal emissions”
- e. Includes benefits of local emission reductions that were not reflected in the revised RFP estimates.

The actual emissions inventory in 2008, the base year of the Final 2012 AQMP, can be compared to the previous projections for 2008 in the 2007 AQMP. As shown in Figure 1-4, actual 2008 emissions were lower than 2007 AQMP projections for VOC, NOx, and direct PM2.5. The only exception, SOx, was due to a court ordered stay of a CARB marine vessel regulation that resulted in higher emissions of SOx in 2008 than what was projected. However, the regulation was reinstated in 2009 and beyond, and thus SOx emissions have been lower than projections since 2008.

**FIGURE 1-4**

Actual 2008 Emissions Compared with 2008 Projections in the 2007 AQMP (tpd)

### U.S. EPA Actions

The U.S. EPA did not commit to SIP-creditable emissions reductions in their approval of the 2007 AQMP. However, their actions will facilitate future emissions reductions, although some with implementation timelines too late for the Basin's mandated deadlines. U.S. EPA actions taken since the 2007 AQMP include the 2008 Locomotive Rule which promulgated more stringent Tier 3 and Tier 4 emission standards; the 2009 Category 3 Marine Diesel Engine regulation for U.S. flagged ocean-going ships which established more stringent emission standards and marine fuel sulfur limits; and, along with the Canadian Government, the successful proposal to the International Maritime Organization (IMO), which will amend MARPOL Annex VI to designate most North American coastal waters as an emissions control area (ECA) for the control of SO<sub>x</sub>, NO<sub>x</sub>, and PM.

## **FINAL 2012 AQMP**

### **Scope**

As mentioned earlier in this chapter, this 2012 AQMP is designed to address the federal 24-hour PM<sub>2.5</sub> air quality standards in the Basin, to satisfy the planning requirements of the federal Clean Air Act, and to provide an update on the strategy to meet the 8-hour ozone standard. Once approved by the District Governing Board and CARB, the Final 2012 AQMP will be submitted to U.S. EPA as the 24-hour PM<sub>2.5</sub> SIP addressing the 2006 PM<sub>2.5</sub> National Ambient Air Quality Standards (NAAQS) and as limited updates to the current 8-hour ozone SIP.

In addition, the 2012 AQMP includes a chapter on the emerging issues surrounding ultrafine particles and near-roadway exposures (Chapter 9). It also includes a chapter on energy issues within the Basin and their relationship to the region's climate and air quality challenges. A separate chapter reporting on the air quality status of the Salton Sea Air Basin (Coachella Valley) is also included. Two separate appendices serve to satisfy recent U.S. EPA requirements for a new attainment demonstration of the revoked 1-hour ozone standard, as well as a vehicle miles travelled (VMT) emissions offset demonstration.

### **Approach**

The U.S. EPA deadline for meeting the 24-hour PM<sub>2.5</sub> NAAQS is 2014, with a possible extension of up to five years. The extension is not automatic, and approval of an extension request is based on a demonstration that there are no additional feasible control measures available to move up the attainment date by one year. However, as demonstrated in Chapter 5, with the existing control program and the new control strategy in the Final 2012 AQMP, the Basin can attain the 24-hour PM<sub>2.5</sub> standard by 2014. Under the federal CAA, the Basin must achieve the federal NAAQS "as expeditiously as practicable." Therefore, if feasible measures are available, they must be adopted and implemented in the SIP. Chapter 4 of the Final 2012 AQMP outlines a comprehensive control strategy that meets the requirement for expeditious progress towards a 2014 attainment date for the 24-hour PM<sub>2.5</sub> NAAQS. The strategy also includes specific measures and commitments to continue implementing measures that assist in attaining the 1997 8-hour ozone (80 ppb) standard by 2023. The 2007 AQMP demonstrated attainment with the 80 ppb standard using a provision of the federal CAA Section 182(e)(5) that allows credit for emissions reductions from future improvements in control techniques and

technologies. As shown in the ozone discussion in Chapter 5, these “black box” emissions reductions are still needed to show attainment with the 1997 8-hour ozone NAAQS. Accordingly, these Section 182(e)(5) reductions still account for about 65% of the remaining NO<sub>x</sub> emissions in 2023. Given the magnitude of these needed emission reductions, it is critical that the District maintain its continuing progress and work actively towards achieving as many emissions reductions as possible, and not wait until subsequent AQMPs to begin to address this looming shortfall.

The control measures contained in the Final 2012 AQMP, described in Chapter 4, can be categorized as follows:

*Basin-wide and Episodic Short-term PM<sub>2.5</sub> Measures.* Measures that apply Basin-wide and in some cases only episodically, have been determined to be feasible, will be implemented prior to the 2014 attainment date, and are required to be implemented under state and federal law.

*Contingency Measures.* Measures to be automatically implemented if the Basin fails to achieve the 24-hour PM<sub>2.5</sub> standard by 2014.

*8-hour Ozone Implementation Measures.* Measures that provide for necessary actions to meet the 1997 8-hour ozone NAAQS, including technology assessments, key investments, incentives, and rules.

*Transportation Control Measures.* Measures generally designed to reduce vehicle miles travelled (VMT) as included in SCAG’s 2012 Regional Transportation Plan or otherwise.

Many of the control measures proposed are not based on command and control regulations, but instead focus on incentives, outreach, and education to bring about emissions reductions through voluntary participation and behavioral changes.

### **Need for Integrated and Coordinated Planning**

The Basin faces several ozone and PM<sub>2.5</sub> attainment challenges as strategies for significant emission reductions become harder to identify and the federal standards continue to become more stringent. California’s greenhouse gas reductions targets under AB 32 add new challenges and timelines that affect many of the same sources that emit criteria pollutants. In finding the most cost-effective and efficient path to meet multiple deadlines for multiple air quality and climate objectives, it is best that an integrated planning approach is developed. Responsibilities for achieving these

goals span all levels of government, and coordinated and consistent planning efforts among multiple government agencies are a key component of an integrated approach.

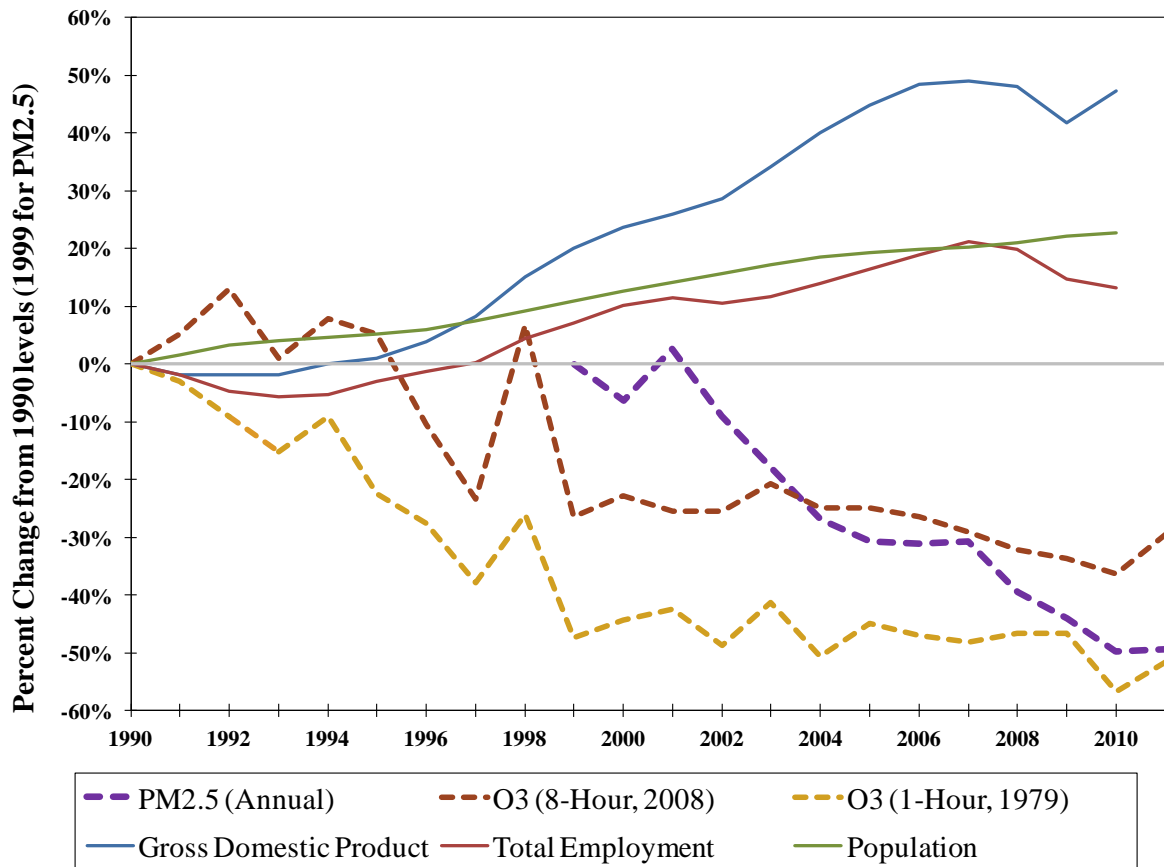
To this end and concurrent with the development of the Final 2012 AQMP, the District, CARB, and San Joaquin Valley Air Pollution Control District engaged in a joint effort to take a coordinated and integrated look at strategies needed to meet California's multiple air quality and climate goals. California's success in reducing smog has largely relied on technology and fuel advances, and as health-based air quality standards are tightened, the introduction of cleaner technologies must keep pace. More broadly, a transition to zero- and near-zero emission technologies is necessary to meet 2023 and 2032 air quality standards and 2050 climate goals. Many of the same technologies will address both air quality and climate needs. As such, strategies developed for air quality and climate change planning should be coordinated to make the most efficient use of limited resources and the time needed to develop cleaner technologies. The product of this collaborative effort, the draft *Vision for Clean Air: A Framework for Air Quality and Climate Planning*, examines how those technologies can meet both air quality and climate goals over time. A public review draft of this document is now available (<http://www.aqmd.gov/aqmp/2012aqmp/VisionDocument>), and serves as context and a resource for the Final 2012 AQMP.

### **Economic Considerations**

As the Basin slowly emerges from the recession, it remains important to be cognizant of the economic impacts of control strategies in the 2012 AQMP. However, history has shown that large improvements to air quality can be achieved concurrent with periods of healthy economic growth. As shown in Figure 1-5, approximately 50% air quality improvements were realized over a time period where the Basin's population and Gross Domestic Product (GDP, inflation adjusted) increased by approximately 22% and 42%, respectively. But as many businesses continue to struggle under difficult and uncertain economic conditions, it is imperative for the District to work closely with businesses and industry groups to identify the most cost-effective and efficient path to meeting clean air goals.

Furthermore, the effort to achieve multiple clean air goals will require significant public investments in the region. This has the potential to create new Southern California jobs in clean technology sectors such as renewable power, energy efficiency, clean products, and advanced emissions controls. Fulfilling this unique opportunity to concentrate these clean air investments and jobs in the region where

the air quality problems exist will require strong partnerships between all levels of government and business interests.



**FIGURE 1-5**

Percent Change in Air Quality Along with Demographic Data of the 4-County Region (1990-2011)

**Federal CAA Planning Requirements Addressed by the Final 2012 AQMP**

In November 1990, Congress enacted a series of amendments to the Clean Air Act intended to intensify air pollution control efforts across the nation. One of the primary goals of the 1990 CAA Amendments was an overhaul of the planning provisions for those areas not currently meeting National Ambient Air Quality Standards. The CAA identifies specific emission reduction goals, requires both a demonstration of reasonable further progress and an attainment demonstration, and

incorporates more stringent sanctions for failure to attain or to meet interim milestones.

There are several sets of general planning requirements in the federal CAA, both for nonattainment areas (Section 172(c)) and for implementation plans in general (Section 110(a) (2)). These requirements are listed and briefly described in Tables 1-4 and 1-5, respectively. The general provisions apply to all applicable pollutants unless superseded by pollutant-specific requirements. Chapter 6 of the AQMP describes how the Final 2012 AQMP satisfies these CAA requirements.

**TABLE 1-4**

Nonattainment Plan Provisions  
[CAA Section 172(c)]

REQUIREMENT	DESCRIPTION
Reasonably available control measures	Implementation of all reasonably available control measures as expeditiously as practicable.
Reasonable further progress	Provision for reasonable further progress which is defined as “such annual incremental reductions in emissions of the relevant air pollutant as are required for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date.”
Inventory	Development and periodic revision of a comprehensive, accurate, current inventory of actual emissions from all sources.
Allowable emission levels	Identification and quantification of allowable emission levels for major new or modified stationary sources.
Permits for new and modified stationary sources	Permit requirements for the construction and operation of new or modified major stationary sources.
Other measures	Inclusion of all enforceable emission limitations and control measures as may be necessary to attain the standard by the applicable attainment deadline.
Contingency measures	Implementation of contingency measures to be undertaken in the event of failure to make reasonable further progress or to attain the NAAQS.



**TABLE 1-5**  
 General CAA Requirements for Implementation Plans  
 [CAA Section 110(a)]

REQUIREMENT	DESCRIPTION
Ambient monitoring	An ambient air quality monitoring program. [Section 110(a)(2)(B)]
Enforceable emission limitations	Enforceable emission limitations or other control measures as needed to meet the requirements of the CAA. [Section 110(a)(2)(A)]
Enforcement and regulation	A program for the enforcement of adopted control measures and emission limitations and regulation of the modification and construction of any stationary source to assure that the NAAQS are achieved. [Section 110(a)(2)(C)]
Interstate transport	Adequate provisions to inhibit emissions that will contribute to nonattainment or interfere with maintenance of NAAQS or interfere with measures required to prevent significant deterioration of air quality or to protect visibility in any other state. [Section 110(a)(2)(D)]
Adequate resources	Assurances that adequate personnel, funding, and authority are available to carry out the plan. [Section 110(a)(2)(E)]
Source testing and monitoring	Requirements for emission monitoring and reporting by the source operators. [Section 110(a)(2)(F)]
Emergency authority	Ability to bring suit to enforce against source presenting imminent and substantial endangerment to public health or environment. [Section 110(a)(2)(G)]
Plan revisions	Provisions for revising the air quality plan to incorporate changes in the standards or in the availability of improved control methods. [Section 110(a)(2)(H)]
Other CAA requirements	Adequate provisions to meet applicable requirements relating to new source review, consultation, notification, and prevention of significant deterioration and visibility protection contained in other sections of the CAA. [Section 110(a)(2)(I),(J)]
Impact assessment	Appropriate air quality modeling to predict the effect of new source emissions on ambient air quality. [Section 110(a)(2)(K)]
Permit fees	Provisions requiring major stationary sources to pay fees to cover reasonable costs for reviewing and acting on permit applications and for implementing and enforcing the permit conditions. [Section 110(a)(2)(L)]
Local government participation	Provisions for consultation and participation by local political subdivisions affected by the plan. [Sections 110(a)(2)(M) & 121]

The CAA requires that most submitted plans include information on tracking plan implementation and milestone compliance. Requirements for these elements are described in Section 182(g). Chapter 4 addresses these issues.

The U.S. EPA also requires a public hearing on many of the required elements in SIP submittals before considering them officially submitted. The District's AQMP public process includes multiple public workshops and public hearings on all of the required elements prior to submittal. Chapter 11 describes the comprehensive outreach program for the Final 2012 AQMP.

### **State Law Requirements addressed by the Final 2012 AQMP**

The California Clean Air Act (CCAA) was signed into law on September 30, 1988, became effective on January 1, 1989, and was amended in 1992. Also known as the Sher Bill (AB 2595), the CCAA established a legal mandate to achieve health-based state air quality standards at the earliest practicable date. The Lewis Presley Act provides that the District's plan must also contain deadlines for compliance with all state ambient air quality standards and the federally mandated primary ambient air quality standards (Health and Safety Code (H&SC) 40462(a)). In September 1996, AB 3048 (Olberg) amended Sections 40716, 40717.5, 40914, 40916, 40918, 40919, 40920, 40920.5, and 44241, and repealed Sections 40457, 40717.1, 40925, and 44246 of the Health and Safety Code relating to air pollution. The amendments to the Health and Safety Code became effective January 1, 1997. Chapter 6 describes how the Final 2012 AQMP meets the state planning requirements under the CCAA, including plan effectiveness, emissions reductions of 5% per year or adoption of all feasible measures, reducing population exposure, and control measure ranking by cost-effectiveness. While these requirements do not specifically apply to PM<sub>2.5</sub>, they provide useful benchmarks.

## **FORMAT OF THIS DOCUMENT**

This document is organized into eleven chapters, each addressing a specific topic. Each of the remaining chapters is summarized below.

Chapter 2, "Air Quality and Health Effects," discusses the Basin's current air quality in comparison with federal and state air pollution standards.

Chapter 3, "Base Year and Future Emissions," summarizes recent updates to the emissions inventories, estimates current emissions by source and pollutant, and projects future emissions with and without growth.

Chapter 4, "Control Strategy and Implementation," presents the control strategy, specific measures, and implementation schedules to attain the air quality standards by the specified attainment dates.

Chapter 5, “Future Air Quality,” describes the modeling approach used in the AQMP and summarizes the Basin’s future air quality projections with and without controls.

Chapter 6, “Federal and State Clean Air Act Requirements,” discusses specific federal and state requirements as they pertain to the Final 2012 AQMP.

Chapter 7, “Current and Future Air Quality – Desert Nonattainment Areas,” describes the air quality status of the Coachella Valley, including emissions inventories, designations, and current and future air quality.

Chapter 8, “Looking Beyond Current Requirements,” assesses the Basin’s status with respect to the recently proposed lowering of the annual PM<sub>2.5</sub> standard from 15 ug/m<sup>3</sup> to 12-13 ug/m<sup>3</sup>, as well as potential new ozone standards under consideration.

Chapter 9, “Near-Roadway Exposure and Ultrafine Particles,” examines the emerging issue of near-roadway exposure and health impacts, including a focus on ultrafine particles, research needs and potential future actions.

Chapter 10, “Energy and Climate” provides a description of current and projected energy demand and supply issues in the Basin and their relationship to air quality improvement and greenhouse gas mitigation goals.

Chapter 11, “Public Process and Participation” describes the District’s public outreach effort associated with the development of the Final 2012 AQMP.

A “Glossary” is provided at the end of the document, presenting definitions of commonly used terms found in the Final 2012 AQMP.