Chapter 1
Introduction

Substantial progress improvements in air quality have been made, but the region still does not meet all federal and state health standards. The 2016 AQMP is designed to provide a path to clean air and address Clean Air Act requirements for ozone and PM2.5 standards.

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Purpose

The federal Clean Air Act (CAA or Act) requires areas that are not attaining the National Ambient Air Quality Standards (NAAQS or federal standards) to develop and implement an emission reduction strategy that will bring the area into attainment in a timely manner. The State of California also requires all feasible measures towards achievement of State of California ambient air quality standards (CAAQS or State standards) at the earliest practicable date. This strategy and the underlying technical analyses are integrated into Air Quality Management Plans (AQMPs or Plans) for the region. The South Coast Air Quality Management District (SCAQMD or District), with contributions from and collaborations with the California Air Resources Board (CARB) and Southern California Association of Governments (SCAG), has developed four comprehensive AQMPs since the late 1990's to address updates to air quality standards and attainment deadlines.

The 2016 AQMP evaluates integrated strategies and control measures to meet the NAAQS in Figure 1-1 as expeditiously as practicable, but no later than the statutory attainment deadlines. A Plan integrating several NAAQS and deadlines avoids wasted resources, streamlines efforts to demonstrate compliance and review of CAA requirements, and takes advantage of the co-benefits resulting from implementation of the integrated strategies.

The 2016 AQMP also provides a preliminary evaluation of the most recent federal 8-hour ozone standard (70 ppb), and incorporates energy, transportation, goods movement, infrastructure and other planning efforts that affect future air quality.

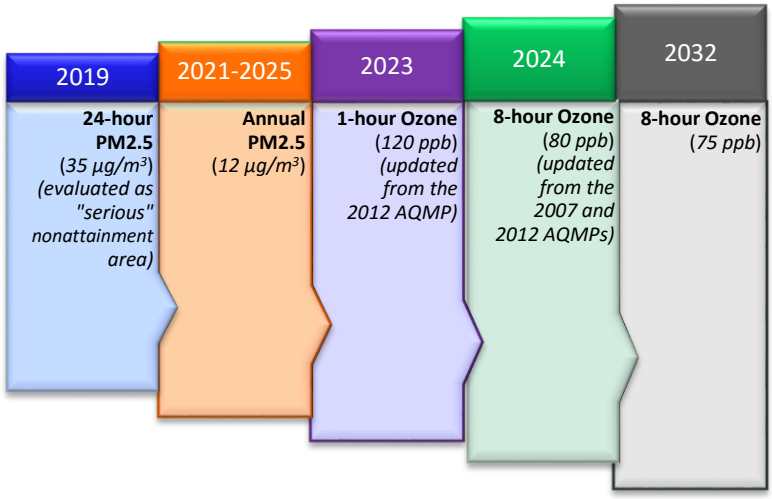


FIGURE 1-1
ATTAINMENT DEADLINES FOR NATIONAL AMBIENT AIR QUALITY STANDARDS EVALUATED IN 2016 AQMP

Historical Perspective

Photochemical smog is air pollution containing ozone and other reactive chemical compounds formed by nitrogen oxides (NOx) and hydrocarbons in sunlight. Los Angeles recorded its first smog event on July 26, 1943, although the region was experiencing smog for years before that due to the region's industrial smoke and fumes, as well as a growing population and increasing number of motor vehicles. In 1945, the City of Los Angeles established a Bureau of Smoke Control, and in 1947, State law authorized the creation of county-wide districts with jurisdiction across cities. The Los Angeles Board of Supervisors created the Air Pollution Control District (APCD), the first in the nation, as a county-wide air quality agency with broad powers to adopt and enforce air pollution regulations. That same year, the newly-formed agency required all major industries to have air pollution permits and adopted a rule to require metal melting plants to control dust and fumes with baghouse[1] controls. In 1948, Arie J. Haagen-Smit, a biochemistry professor at the California Institute of Technology in Pasadena, started examining the biology of plants and crops that had been damaged by smog. By the early 1950's, Dr. Haagen-Smit had determined smog caused eye irritation and damage to plants and materials, including rubber tubing that cracked in seven minutes when exposed to high smog levels. In 1953, the Los Angeles County APCD started requiring controls to reduce hydrocarbon emissions from industrial gasoline storage tanks, and vapor leaks from the filling of gasoline tank trucks and underground storage tanks at service stations. These actions were critical in helping to reduce the estimated 2,000 tons per day (tpd) of hydrocarbons and 250 tpd of NOx[2] at a time when the population in the region was only five million residents.

Downtown Los Angeles, 1950s
Smog got so bad in the shadow of City Hall that pedestrians would carry handkerchiefs to wipe away tears.

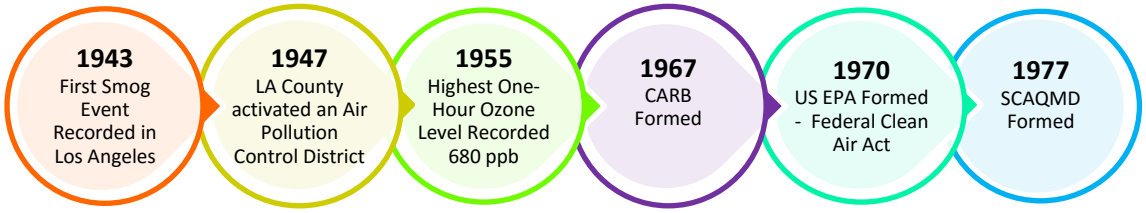
A Smog Emergency Warning System was launched in 1955 when the highest one-hour ozone level of 680 parts per billion (ppb) was recorded in downtown L.A. The first network of air monitors was initiated in 1956 and backyard trash incinerators were banned in 1958 when trash collection programs were established in the region. Other regulated sources included petroleum-based solvents, landfills, refineries, power plants, and industrial facilities.

[1] A baghouse or bag filter is an air pollution control device that removes particulates out of air or gas released from commercial or industrial processes.

[2] "Second Technical and Administrative Report on Air Pollution in Los Angeles County," Annual Report 1950–51, Air Pollution Control District, Los Angeles County, California, 1952.

Recognizing that counties could not adequately regulate motor vehicle pollution, the California Legislature established the California Motor Vehicle Pollution Control Board in 1960 to test vehicle emissions and certify emission control devices. Six years later, California became the first state in the nation to establish automobile tailpipe emission standards, one year before the creation of the CARB. By 1969, the first state ambient air quality standards were enacted in California. In the following year, the U.S. Environmental Protection Agency (U.S. EPA) was formed and the federal CAA became law. It soon became apparent that local programs were not enough to solve regional problems, as air pollution is not contained within city and county jurisdictional boundaries. Thus, air basins, defined by logical geographical/topographical boundaries, became the basis for regulatory programs.

U.S. EPA first adopted NAAQS in 1971 and California adopted regulations requiring the installation of a vehicle pollution control device, the catalytic converter, starting with the 1975 model year. Over time, motor vehicle fuels were reformulated to reduce photochemically reactive olefins, remove lead in gasoline, and utilize fewer smog-forming and toxic ingredients.



In 1977, the Los Angeles County APCD merged with the APCDs of Orange, Riverside, and San Bernardino counties to form the South Coast Air Quality Management District, pursuant to the Lewis Air Quality Management Act adopted by the California Legislature in 1976. The following year, gas stations were required to install vapor recovery "boots" on gasoline nozzles, further reducing hydrocarbon losses when filling the vehicle tank. SCAQMD has continued to adopt and implement regulatory measures in order to reduce air pollution emissions from a wide range of sources and to reduce public exposure to unhealthful air pollution. In addition, efforts on the federal and state level continue to contribute toward reducing air pollution from mobile and area sources in order to fulfill commitments to achieve the ground-level ozone and fine particulate matter (PM2.5) NAAQS.

Regional Setting

The SCAQMD has jurisdiction (Figure 1-2) over an area of approximately 10,743 square miles, consisting of the South Coast Air Basin (Basin), and the Riverside County portions of the Salton Sea Air Basin (SSAB) and Mojave Desert Air Basin (MDAB). The Basin, which is a sub-region 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 to the Palo Verde Valley. The Coachella Valley Planning Area is a federal nonattainment area that is part of a sub-region of Riverside County in 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).

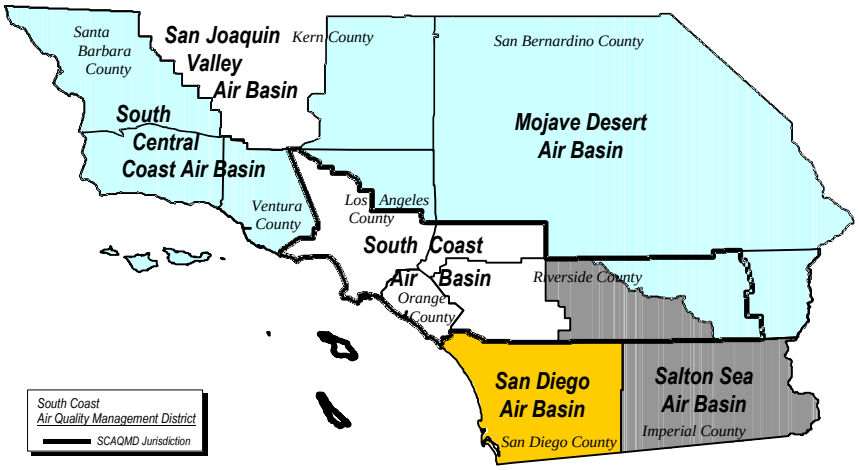


FIGURE 1-2
BOUNDARIES OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT AND NEIGHBORING FEDERAL PLANNING AREAS

The Coachella Valley Planning Area is impacted by pollutant transport from the 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 nonattainment area is provided in Chapter 7.

The topography and climate of Southern California combine to make the Basin an area of high air pollution potential. 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 traps the pollutants near the ground. Light winds can further limit ventilation. Additionally, abundant sunlight triggers the photochemical reactions which produce ozone and the majority of the particulate matter. The region experiences more days of sunlight than any other major urban area in the nation except Phoenix, AZ.

The Basin's economic base is diverse. Historically, the four counties of the Basin have collectively comprised one of the largest and 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, service and logistics, businesses have replaced some of the heavy industry, although there are still significant manufacturing operations (recent report in *The Wall Street Journal*[3]).

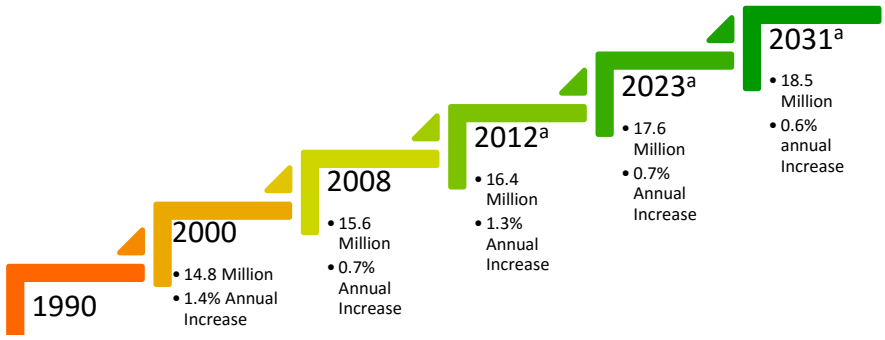
Emission Sources

In spite of substantial reductions already achieved through effective control strategies, additional significant reductions of NOx and PM in the Basin and limited, strategic reductions of volatile organic compounds (VOCs) 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 in the Basin are related to human activity. The air pollution control strategy in the 2016 AQMP is directed at controlling man-made sources. Examples of man-made emission sources include fuel combustion sources, such as cars and trucks, evaporation of organic liquids, such as those used in coating and cleaning processes, and abrasion processes, such as tires on roadways. 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. The annual average percent growth has slowed but the overall population of the region is expected to continue to increase through 2023 and beyond. Figure 1-3 shows the estimated population and projections based on SCAG's regional growth forecast.



[a] Based on SCAG's 2016 Regional Transportation Plan

[b] Average percent increase per year over the period

FIGURE 1-3

REGIONAL POPULATION GROWTH

Despite this population growth, air quality has improved significantly over the years, primarily due to the impacts of air quality

[3] http://blogs.wsj.com/economics/2015/07/15/where-are-the-most-u-s-manufacturing-workers-los-angeles/.

control programs at the local, state and federal levels. Figure 1-4 shows the trends since 1990 of the 8-hour ozone levels, the 1-hour ozone levels, and annual average PM2.5 concentrations (since 1999), compared to the regional gross domestic product, total employment and population. The 2007–2009 recession had a clear impact on gross domestic product and employment, but as depicted by Figure 1-4, the economy is recovering with rebounding employment numbers. Human activity in the region has an impact on achieving reductions in emissions. However, the ozone and PM levels continue to trend downward as the economy and population increase, demonstrating that it is possible to maintain a healthy economy while improving public health through air quality improvements.

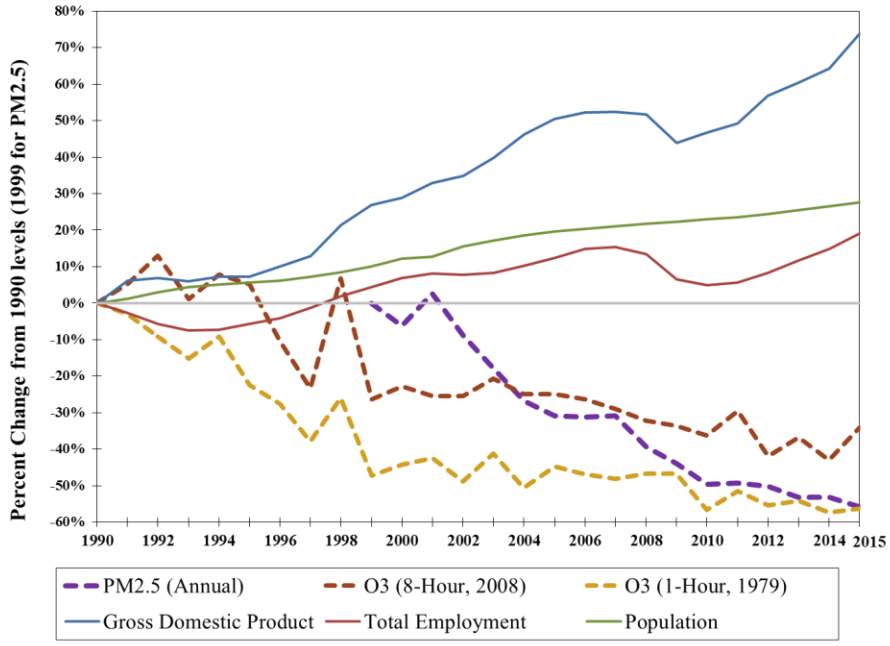


FIGURE 1-4
PERCENT CHANGE IN AIR QUALITY ALONG WITH DEMOGRAPHIC DATA FOR THE 4-COUNTY REGION (1990–2015)

U.S. EPA Standards

The federal CAA requires U.S. EPA to review NAAQS every five years considering the most recent scientific and health effects information, air quality information, and quantitative risk (e.g., size of at-risk groups affected). The review must consider the uncertainties and limitations of the scientific evidence as well as conclusions from U.S. EPA experts and advice from the Clean Air Scientific Advisory Committee (CASAC), which is an independent scientific advisory committee established by the CAA charged with providing advice to U.S. EPA. The purpose of the review is to determine if the current standards are “requisite to protect public health with an adequate margin of safety.”

It should be noted that there are both primary and secondary air quality standards. Primary standards are designed to protect public health such as the health of "sensitive" populations including persons with asthma, children, and the elderly. Secondary standards protect public welfare such as protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

After approving a standard, the U.S. EPA designates areas across the nation as attainment or as nonattainment of the standard. If an area is designated nonattainment of the NAAQS, the State is required to submit a State Implementation Plan (SIP) demonstrating compliance with a series of CAA

requirements. Chapter 6 provides a detailed explanation of the federal CAA requirements along with how the requirements are being addressed.

In addition, the U.S. EPA requires that transportation conformity budgets be established based on the most recent planning assumptions (i.e., within the last five years) and approved motor vehicle emission models. Transportation conformity ensures that transportation plans and programs do not cause or contribute to any new violation of a standard, increase the frequency or severity of any existing violation, or delay the timely attainment of the air quality standards. The 2016 AQMP is based on the most recent assumptions provided by both CARB and SCAG for motor vehicle emissions and demographic updates and includes updated transportation conformity budgets, located in Chapter 6.

Chapter 2 provides more detail on the federal and State ambient air quality standards, attainment status trends, and specific pollutant information such as the health effects due to exposure. The following is a brief overview of the ozone and PM NAAQS and attainment requirements that are included in the 2016 AQMP.

Ozone

U.S. EPA classifies areas of ozone nonattainment (e.g., "extreme," "severe," "serious," "moderate" or "marginal") based on how much an area exceeds the standard, which in turn affects the required attainment date. The higher the current exceedance, the more time is allowed to demonstrate attainment in recognition of the greater challenge involved. However, the higher classifications are also subject to more stringent requirements.

In 1979, the U.S. EPA approved a 1-hour ozone standard (120 ppb) that was replaced in 1997 with a more stringent 8-hour ozone standard (80 ppb) (U.S. EPA subsequently revoked the 1-hour standard entirely, effective in 2005). In 2008, the 8-hour ozone standard was lowered to 75 ppb. Because the Basin was designated as "extreme" nonattainment, the region has 20 years[4] to attain the ozone standards from the effective date of the final designation. For the 1997 and 2008 8-hour ozone standards, the attainment dates are June 15, 2024 and July 20, 2032, respectively. Because the attainment dates are mid-year deadlines, the demonstration of attainment and implementation of all emission reduction measures must take place by the previous calendar year, 2023 and 2031, respectively. Chapter 3 provides the emission inventory for these milestone years and Chapter 5 provides the modeled projected air quality in those years to demonstrate attainment of the standards. Although revoked in 2005, the 1-hour ozone standard originally should have been met by November 2010. The U.S. EPA then set a new deadline of February 6, 2023, with demonstration of the 1-hour ozone standard by December 31, 2022 in the Basin.

As an "extreme" nonattainment area, the Basin ozone SIP for the 2008 8-hour ozone NAAQS is required to be submitted within four years[5] after the designation effective date of July 20, 2012, thus by July 20, 2016. U.S. EPA has some discretion under the Act with submittal deadlines, and penalties are not incurred until 18 months after a finding of late submittal.

[4] CAA, Title I, Part D, Subpart 2, Section 181.

[5] CAA, Title I, Part D, Subpart 2, Section 182(e) that "extreme" areas submit according to Section 182(c)(2).

Particulate Matter

In July 1987, U.S. EPA promulgated a 24-hour NAAQS of 150 micrograms per cubic meter (μg/m^3) for particulate matter less than 10 microns (PM10), which the Basin has not violated since 2008. SCAQMD requested re-designation as attainment, and the re-designation and PM10 maintenance plan were approved by U.S. EPA effective July 26, 2013.

On December 17, 2006, the U.S. EPA strengthened the 24-hour PM2.5 NAAQS from 65 μg/m^3 to 35 μg/m^3 and the Basin was subsequently designated "moderate" nonattainment for 2006 24-hour PM2.5 NAAQS on December 14, 2009. U.S. EPA requires the SIP to be submitted no later than three years after the designation, hence December 14, 2012. The 2012 AQMP projected attainment of the 2006 24-hour PM2.5 NAAQS by 2014; however, due to the region's long-running drought conditions, attainment by 2014 or 2015 has been deemed not possible. The later date would have been an acceptable attainment date pursuant to the federal CAA.[6] Thus, the SCAQMD requested that U.S. EPA reclassify the Basin as "serious" nonattainment and committed[7] to demonstrate attainment of the 24-hour PM2.5 NAAQS as expeditiously as practicable, but not beyond December 31, 2019[8] as part of the 2016 AQMP. In addition, more stringent "serious" area requirements now apply including implementation of Best Available Control Measures / Best Available Control Technology (BACM/BACT), a lower major source threshold (from 100 tons per year to 70 tons per year), and an update to the reasonable further progress (RFP) analysis.

In 1997, U.S. EPA approved an annual PM2.5 NAAQS at 15 μg/m^3. In 2012, U.S. EPA revised the NAAQS for the annual PM2.5 standard from 15.0 μg/m^3 to 12.0 μg/m^3. The PM2.5 standard is attained when the 3-year average of the annual averages does not exceed 12.0 μg/m^3. States have until 2021 to meet the 2012 PM2.5 standard for "moderate" nonattainment areas, and if necessary, up to four additional years if the area is re-classified as "serious" nonattainment, or 2025. Annual PM2.5 emissions in the Basin have experienced a steady decline over the years since 2001, attaining the 1997 annual PM2.5 standard (15.0 μg/m^3) in 2013. On July 8, 2016 U.S. EPA issued a final rule for "Clean Data Determination" based on 2011–2013 monitoring period in South Coast Air Basin attaining the 1997 annual PM2.5 (15 μg/m^3) and 1997 24-hour PM2.5 (65 μg/m^3). The determination was published in Federal Register on July 25, 2016 *(with effective date on August 24, 2016).*

The 2016 AQMP demonstrates how the region will achieve the 2012 annual PM2.5 (12.0 μg/m^3) as expeditiously as practicable, but no later than the statutory attainment deadline.

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[6] For a "moderate" nonattainment area, "the attainment date shall be as expeditiously as practicable, but no later than the end of the sixth calendar year after the area's designation as nonattainment." (*CAA, Title 1, Part D, Subpart 4, § 188(c)(1)*).

[7] SCAQMD Reclassification letter to U.S. EPA, July 28, 2015.

[8] Based on CAA, Title 1, Part D, Subpart 4, § 188 (c)(2) for PM2.5 attainment at the end of the 10th calendar year after effective date of designations for "serious" nonattainment areas.

For PM standards, "moderate[9]" nonattainment areas and areas reclassified as "serious[10]" nonattainment are required to submit a SIP 18 months from the effective date of designation.

Air Quality Progress

Today, the population in the region is over 16 million people, with 2012 emissions of approximately 500 tpd of VOCs and 522 tpd of NOx. Based on current regulations and actions already taken, emissions are projected to be approximately 379 tpd of VOC and 255 tpd of NOx by 2023. By 2031, emissions are projected to be further reduced to approximately 362 tpd of VOC emissions and 214 tpd of NOx emissions (see Appendix III for 2012, 2023, and 2031 summer planning inventory emissions). However, these levels are not low enough to meet the NAAQS for the Basin, so additional emission reductions are necessary.

Winter day photo of downtown L.A. under snow-capped San Gabriel Mountains

Substantial progress has been made in reducing ozone and PM emissions through regulatory measures, voluntary actions and partnerships with other agencies and stakeholders. Figure 1-5 illustrates the ozone and PM ambient air concentrations as a percentage of the federal standard, demonstrating that while air quality progress has been dramatic since the 1990s, the five NAAQS that are analyzed and updated in the 2016 AQMP have yet to be met. Detailed ozone and PM concentrations and trends can be found in Chapter 2.

Even with the substantial progress, more action must occur to meet the federal and California health-based standards. The 2016 AQMP explores new and innovative ways to accomplish these goals through

[9] CAA, Title I, Part D, Subpart 4, Section 189 (a)(2)(B).

[10] CAA, Title I, Part D, Subpart 4, Section 189 (b)(2).

incentive programs, efficiency improvements, recognizing co-benefits from other programs, regulatory measures, and other voluntary actions.

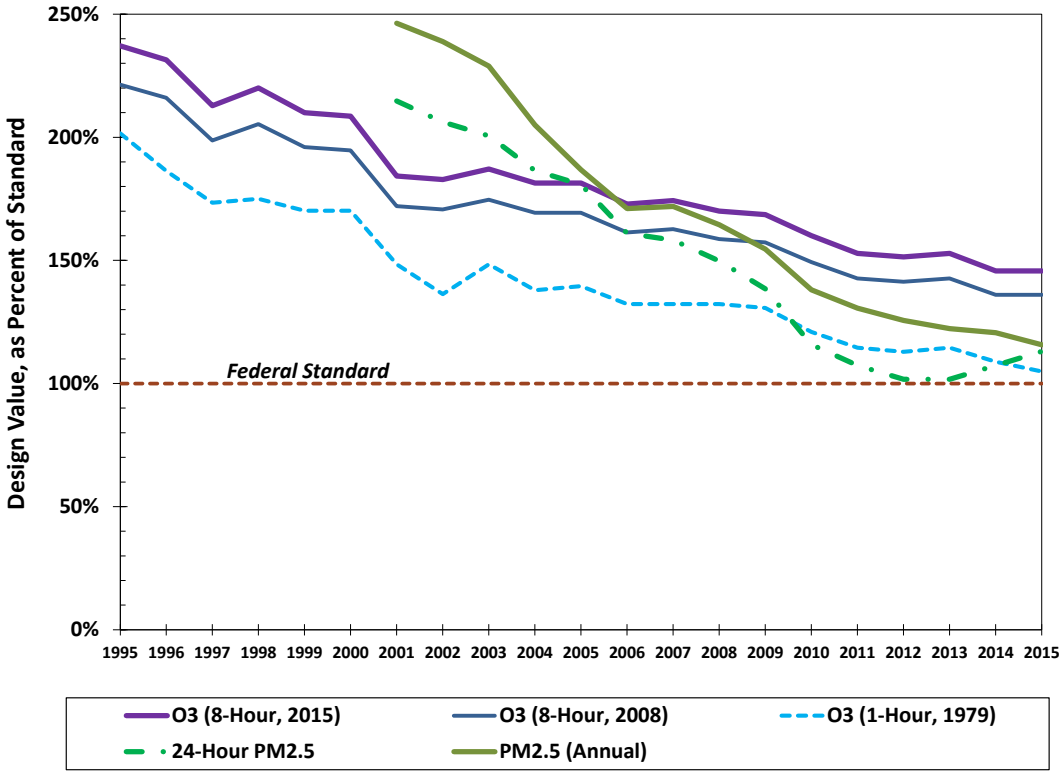


FIGURE 1-5
DESIGN VALUES IN PERCENTAGES OF THE FEDERAL STANDARDS

As vowed by Dr. Haagen-Smit 64 years ago in 1952, "Smog is on the way out; let us speed up its departure and let us keep it out."[11]

[11] Haagen-Smit, A.J. (May 1952), "Smog Research Pays Off." *Engineering and Science, Volume XV*.

Progress in Implementing the 2007/2012 AQMP

District's Actions

The ozone portion of the 2007 AQMP has been approved by U.S. EPA into the SIP. The "moderate" 24-hour PM2.5 elements of the 2012 AQMP have also been approved by U.S. EPA, and in January 2016 the U.S. EPA approved the Basin's re-designation as a "serious" nonattainment area for PM2.5. These approvals include SIP revisions submitted in response to U.S. EPA's initial findings.

The District continues to implement the 2012 AQMP, which received a limited approval and limited disapproval by U.S. EPA on April 14, 2016. Progress in implementing the 2012 AQMP can be measured by the progress in implementing control measures and the resulting emission reductions. Emission reduction commitments and reductions which were achieved in 2014 and will be achieved in 2023 through already-adopted measures are based on the emission inventories and milestone years from the 2012 AQMP.

2013	In 2013, several rulemaking efforts were completed or initiated to implement the 2012 AQMP. Specifically, Rules 444 (Open Burning) and 445 (Residential Wood Burning Devices) were amended to implement control measures BCM-01 and BCM-02, which were expected to achieve PM2.5 reductions estimated at 11.7 tons during winter episodic conditions. In addition, Rule 1114 (Petroleum Refinery Coking Operations) was adopted to implement Control Measure MCS-01, and is expected to result in a VOC reduction of 129 tons per year, a methane reduction of 547 tons per year and a reduction in hazardous air pollutants of 26 tons per year.
2014	In 2014, there were 13 rule amendments approved by the SCAQMD Governing Board. Five of these rules were amended as a result of SIP rule implementation issues (e.g., availability of advanced technology) and two of these rules were amended to strengthen public health protections with more stringent toxic emission requirements. The remaining rule amendments provided administrative revisions.
2015	In 2015, rulemaking concluded to implement Control Measure CMB-01 (Further Reductions from RECLAIM), which committed to achieve 3 tpd of NOx emissions by 2023 in the 2012 AQMP. In December 2015, the SCAQMD Governing Board approved amendments to Regulation XX which will reduce 12 tpd of NOx RECLAIM Trading Credits by 2023.

In addition, Rule 1113 was amended in 2016 achieving almost 1 tpd of VOC reductions, primarily by limiting the small container exemption. Other ongoing rulemaking efforts committed to in the 2012 AQMP seek further VOC reductions from emission sources such as adhesive and sealant applications (Rule 1168), mold release products (Rule 1161) and vacuum trucks (Rule 1188). However, these rules, and other VOC rules, have not been adopted or implemented yet as staff addresses technical and policy challenges. In lowering limits on the VOC content of coatings, solvents, adhesives, sealants, lubricants, inks and other VOC-containing products, manufacturers, in many cases, are using compounds that have

been exempted from the definition of VOC. These exemptions are based primarily on evidence that the compound does not significantly contribute to ozone formation. However, some exempt compounds may increase toxic risk to nearby receptors or workers. During the development of the VOC Controls White Paper[12] overseen by a 2016 AQMP Advisory Group, the need for regulating VOCs to assist in meeting the ozone standard was evaluated. The white paper discusses the role of VOCs in ozone and PM2.5 formation, including atmospheric chemistry, potential detrimental effects, and the rationale for the NOx heavy control strategy. Finally, the white paper considered and prioritized potential VOC control approaches such as sensitivity analysis, temporal or geographical, seasonality and incentives. It was determined that VOC reduction measures that lead to the increased use of chemicals that are known or suspected to be toxic should be avoided until it can be demonstrated that these replacement products do not lead to increased toxic risk for workers or the general public.

There were 12 amendments to rules or guidelines approved by the SCAQMD Governing Board in 2015. Two of these rules reduced NOx emissions, two rules reduced VOC emissions, two amendments focused on improving transportation rules, and six amendments strengthened public health protections by reducing air toxic emissions.

Table 1-1 lists the SCAQMD's 2012 AQMP commitments and the control measures or rules that were adopted through 2015. As shown in Table 1-1, for the control measures adopted by the SCAQMD over this period, 11.7 tons per day of PM2.5 reductions were achieved by 2014 and 2.4 tons per day of VOC reductions and 19.5 tons per day of NOx reductions will be achieved by 2023. The new control strategy and attainment demonstrations in the 2016 AQMP are expected to supersede any previous commitments not achieved and not re-introduced in the proposed control strategy.

N/A in the tables indicate a measure designed to ensure that reductions assumed to occur will in fact occur. TBD reductions are to be determined once the technical assessment is complete, and inventory and specific control approach are identified.

[12] Final VOC Controls White Paper (October 2015): http://www.aqmd.gov/docs/default-source/Agendas/aqmp/white-paper-working-groups/wp-voc-final.pdf?sfvrsn=2.

TABLE 1-1

2012 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	Control Measure Title	Adoption Date	COMMITMENT		ACHIEVED	
			2014	2023	2014	2023
PM2.5 EMISSIONS						
BCM-01	Further Reductions from Residential Wood Burning Devices (R445)	2013	7.1	--	7.1	--
BCM-02	Further Reductions from Open Burning (R444)	2013	4.6	--	4.6	--
BCM-03	Emission Reductions from Under-Fired Charbroilers	TBD	--	TBD	--	TBD
BCM-04	Further Ammonia Reductions from Livestock Waste	TBD	--	TBD	--	TBD
	TOTAL PM2.5 REDUCTIONS		**11.7**	**--**	**11.7**	**--**
NOx EMISSIONS						
OFFRD-01	Extension of the SOON Provision for Construction/Industrial Equipment	Ongoing	--	7.5	--	7.5
CMB-01	Further Reductions from RECLAIM [Regulation XX]	2015	2	3	0	12
CMB-02	NOx Reduction from Biogas Flares	Rulemaking Underway	--	TBD	--	TBD
CMB-03	Reductions from Commercial Space Heating	2016	--	0.18	--	TBD
	TOTAL NOx REDUCTIONS		**2**	**10.7**	**0**	**19.5**
VOC EMISSIONS						
CTS-01	Further VOC Reductions from Architectural Coatings [R1113]	2016	--	2	--	1
CTS-02	Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants	Rulemaking Underway	--	1	--	--
CTS-03	Further VOC Reduction from Mold Release Products [R1161]	Rulemaking Underway	--	0.8	--	--
FUG-01	VOC Reductions from Vacuum Trucks [R1188]	Rulemaking Underway	--	TBD	--	--
FUG-02	Emission Reduction from LPG Transfer and Dispensing [R1177]	Rulemaking Underway	--	1	--	--
FUG-03	Emission Reduction from Fugitive VOC Emissions	2016	--	1	--	--
MCS-01	Application of All Feasible Measure Assessment [R1114]	Ongoing	TBD	TBD	0.4	1.4
	TOTAL VOC REDUCTIONS		**0**	**5.8**	**0.4**	**2.4**

TABLE 1-1 (CONCLUDED)

2012 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	Control Measure Title	Adoption Date	COMMITMENT		ACHIEVED	
			2014	2023	2014	2023
MULTI-POLLUTANT						
IND-01	Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities [PR4001]	Rulemaking Underway	N/A[13]	N/A	N/A	N/A
MCS-02	Further Emission Reductions from Greenwaste Processing (Chipping and Grinding Operations not associated with composting)	Rulemaking Underway	--	TBD	--	TBD
MCS-03	Improved Start-Up, Shutdown and Turnaround Procedures [R1123]	2014	--	TBD[14]	--	TBD
INC-01	Economic Incentive Programs to Adopt Zero and Near-Zero Technologies	Ongoing	--	--	--	--
INC-02	Expedited Permitting and CEQA Preparation Facilitating the Manufacturing of Zero and Near-Zero Technologies [All Pollutants]	Ongoing	--	--	--	--
EDU-01	Further Criteria Pollutant Reductions from Education, Outreach and Incentives [All Pollutants]	Ongoing	--	--	--	--

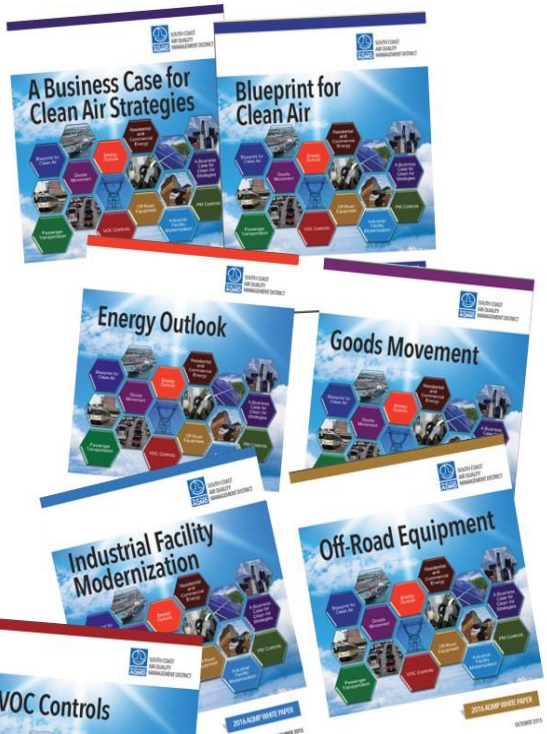
[13] Measure is designed to ensure reductions projected to occur are achieved.

[14] Reductions to be determined once the technical assessment is complete, and inventory and control approach are identified.

2016 AQMP

White Papers

As part of the development of the 2016 AQMP, a series of ten White Papers on key topics were published. These papers provided better integration of major planning issues regarding air quality, climate, energy, transportation, and business needs. Each White Paper had a specific Working Group to provide input and feedback.



2016 AQMP Advisory Group members and recommended technical experts participated in White Paper Working Group meetings, which were open to the public. The development of the papers began in June 2014 and the last paper was completed in December 2015.

All versions of the white papers, including the final versions presented to the SCAQMD Governing Board, are available online at http://www.aqmd.gov/home/about/groups-committees/aqmp-advisory-group/2016-aqmp-white-papers along with working group meeting materials. Each of the White Papers are summarized below.

Blueprint for Clean Air

The Blueprint for the Clean Air White Paper provides background information regarding the 2016 AQMP as well as introductory discussions relevant to the other white papers. The white paper discusses the health benefits of clean air, the standards evaluated in the 2016 AQMP, the additional analysis needed, and what it will take to achieve the standards. In addition, the white paper discusses the general approaches in developing the 2016 AQMP control strategies such as striving to eliminate reliance on the CAA Section 182(e)(5) measures to the extent feasible, fair share reductions at federal, state and local levels, incentivizing zero and near-zero emission technologies, and developing efficient and cost-effective strategies.

Goods Movement

Advanced vehicle technologies will be needed to achieve clean air goals. The Goods Movement White Paper evaluates goods movement sectors such as ships, locomotives, and trucks and analyzes a variety of advanced technologies such as hybrid-electric, advanced natural gas, fuel cells, electric, as well as potential infrastructure needs and commercialization schedules. This white paper also develops scenarios that assume different future mixes of these advanced technologies.

Passenger Transportation

The Passenger Transportation White Paper examines advanced technologies and operational efficiency opportunities, as well as programs that can help accelerate fleet turnover. Advantages that could be gleaned from the implementation of other programs such as SB 375 – *The Sustainable Communities and Climate Protection Act of 2008* are also discussed.

Energy Outlook

The Energy Outlook White Paper evaluates the energy implications due to deployment of various types of advanced technologies. Some of these advanced pollution control technologies for mobile sources will be based on traditional energy sources, while others will rely on alternative energy sources such as electricity or hydrogen. The Energy Outlook White Paper describes the demand and supply of all energy sources for the Basin and explores how that might change under current and future programs to reduce greenhouse gas (GHG) and criteria pollutant emissions. In addition, this white paper evaluates the existing and needed infrastructure for various energy sources. This white paper also evaluates the cost of these energy sources – including the cost to distribute the energy, cost impact to the end user, and infrastructure costs.

Residential and Commercial Energy Use

Reducing, managing, and changing the way energy is used in the commercial and residential sectors can provide emission reductions, reduced energy costs, and cross sector benefits such as reduced water consumption. The Residential and Commercial Energy Use White Paper provides insight and analysis on energy usage, while reviewing resulting emissions within the residential and commercial sectors.

Industrial Facility Modernization

The Industrial Facility Modernization White Paper identifies the hurdles to replace older equipment and mechanisms to incentivize use of clean equipment technologies and the modernization of industrial stationary source equipment.

VOC Controls

The VOC Controls White Paper studies the role VOCs play in the ozone and PM2.5 attainment strategy. The potential contribution of intermediate and semi-volatile organic compounds are also explored. The need for VOC reductions to achieve clean air goals is re-examined, along with the requisite quantity and timing of VOC emission reductions.

PM Controls

The PM Controls White Paper continues to evaluate feasible control technologies for sources of directly emitted PM2.5 as well as precursor emission sources including commercial cooking, fugitive dust, ammonia, and SOx sources. This white paper addresses how modeling results can assist in demonstrating the benefits of targeting both direct and indirect PM2.5 emission sources, including source categories for potential control through traditional approaches as well as through seasonal, episodic or geographically focused controls.

Off-Road Equipment

The Off-Road Equipment White Paper examines advanced technology opportunities as well as programs to accelerate the transition to newer equipment. This category consists of a wide variety of emission sources including construction and mining equipment such as forklifts, cranes, and portable engines. The focus of this white paper is on advanced technologies that go beyond current emission standards and what efforts will be needed to further reduce emissions from these sources.

A Business Case for Clean Air Strategies

A Business Case for Clean Air Strategies White Paper develops principles and concepts for control measures and related programs to be included in the 2016 AQMP that, to the extent possible, create a business case for deployment of needed technologies and efficiency measures towards attaining upcoming federal air quality standards. A business case exists where a technology, fuel, or other strategy reduces emissions and also improves energy efficiency, reduces fuel or maintenance costs, creates new job opportunities, or has other economic benefits. In addition to seeking to minimize potential adverse impacts, this white paper examines how SCAQMD staff, in developing the 2016 AQMP, will explore means to maximize emission control strategies that have a business case for implementation.

Scope

As mentioned earlier in this chapter, this 2016 AQMP is designed to address the federal 2008 8-hour ozone NAAQS, 2012 annual PM2.5 NAAQS and the 2006 24-hour PM2.5 NAAQS, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. Specific federal CAA requirements to be included in the 2016 AQMP are discussed later in this section. Once approved by the SCAQMD Governing Board and CARB, the 2016 AQMP will be submitted to U.S. EPA as the SIP for the Basin.

In addition, the 2016 AQMP includes a chapter reporting on the air quality status of the Riverside County portion of the Salton Sea Air Basin (Coachella Valley) (Chapter 7) and future air quality requirements (Chapter 8). An additional chapter provides the proposed air toxics control program that will reduce toxic risk (Chapter 9) and another examines the interplay between air quality and other planning efforts addressing climate change, energy and transportation (Chapter 10).

Approach

As demonstrated in Chapter 5, with the existing control program and the new control strategy in the 2016 AQMP, the Basin can attain the 2008 8-hour ozone NAAQS by 2031, the 2012 annual PM2.5 NAAQS by

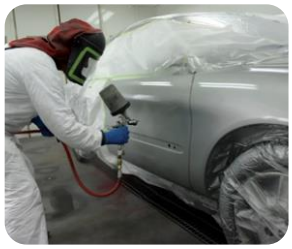
2025, and the 2006 24-hour PM2.5 NAAQS by 2019, as well as the now revoked 1-hour and 8-hour standards. Under the federal CAA, the Basin must achieve the federal NAAQS "as expeditiously as practicable." Therefore, if feasible measures are available, they must be adopted and implemented in the SIP. Chapter 4 of the 2016 AQMP outlines a comprehensive control strategy that meets the requirement for expeditious progress towards an attainment date for the five NAAQS being analyzed. A provision of the federal CAA, Section 182(e)(5), allows "extreme" ozone nonattainment areas to take credit for emission reductions from future improvements and breakthroughs in control techniques and technologies (known as the "black box"). As shown in the ozone strategy in Chapter 4, "black box" emission reductions strategies are now fully defined in terms of technology, but rely heavily on incentives to successfully achieve the emission reductions needed to reach attainment with the 8-hour ozone NAAQS. Given the magnitude of these needed emission reductions, it is critical that the SCAQMD maintain its continuing progress and work actively towards defining and achieving as many emission reductions as possible, and not wait until subsequent AQMPs to begin to address this looming shortfall.

With regard to the PM2.5 standards, only a few air monitoring stations currently exceed, and only one is projected to exceed the NAAQS. Further controls for PM2.5 are included to ensure attainment with the PM2.5 standards.

The control measures contained in the 2016 AQMP can be categorized as follows:

Ozone Measures. These measures provide for necessary actions to attain the 2008 8-hour ozone NAAQS in 2031, including incentive-based measures, co-benefits from other programs such as climate change mitigation and energy efficiency, NOx and VOC regulatory measures, technology assessments, and key investments. In addition, the accelerated measures allow for attainment of the 1997 8-hour ozone NAAQS in 2023 and the 1-hour ozone NAAQS in 2022. Ozone measures include actions to reduce NOx and VOC emissions from both stationary (point and area) and mobile sources. The mobile source measures include actions to be taken by the SCAQMD, CARB and the U.S. EPA.

PM2.5 Measures. These measures serve to reduce emissions locally and regionally in order to ensure attainment of the annual PM2.5 NAAQS. The 24-hour PM2.5 NAAQS is anticipated to be met without further controls. PM measures can be implemented as contingency measures, given that attainment of the annual PM2.5 NAAQS will be achieved through implementation of NOx reductions included in the ozone strategy.



Contingency Measures. These measures are to be automatically implemented if the Basin fails to achieve the PM2.5 standards by the latest statutory attainment date or Reasonable Further Progress requirements. Reductions achieved through adopted rules that reduce ambient levels below the NAAQS provide an alternative method to comply with contingency measure requirements.

Transportation Control Measures. These measures are generally designed to reduce vehicle miles traveled (VMT) as included in SCAG's 2016 Regional Transportation Plan.

Some of the control measures achieve emission reductions by taking advantage of existing programs, while some control measures focus on incentives, outreach, and education to bring about emission reductions through voluntary participation and behavioral changes needed to complement regulations.

Need for Integrated and Coordinated Planning

The Basin faces several ozone and PM2.5 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 reduction 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, an integrated planning approach is optimal. 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 this integrated approach.

Federal CAA Planning Requirements Addressed by 2016 AQMP

In November 1990, Congress enacted a series of amendments to the Clean Air Act (CAA), 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 NAAQS. 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 1-2 and 1-3, respectively. The general provisions apply to all applicable pollutants unless superseded by pollutant-specific requirements. Chapter 6 and Appendix 6 describe the pollutant-specific CAA requirements and how these requirements are satisfied by the 2016 AQMP.

TABLE 1-2

Nonattainment Plan Provisions [CAA Section 172(c)]

REQUIREMENT	DESCRIPTION
Reasonably available control measures	Implementation of all reasonably available control measures as expeditiously as practicable [Section 172(c)(1)]
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" [Section 172(c)(2)]
Inventory	Development and periodic revision of a comprehensive, accurate, current inventory of actual emissions from all sources [Section 172(c)(3)]
Allowable emission levels	Identification and quantification of allowable emission levels for major new or modified stationary sources [Section 172(c)(4)]
Permits for new and modified stationary sources	Permit requirements for the construction and operation of new or modified major stationary sources [Section 172(c)(5)]
Other measures	Inclusion of all enforceable emission limitations and control measures as may be necessary to attain the standard by the applicable attainment deadline [Section 172(c)(6)]
Contingency measures	Implementation of contingency measures to be undertaken in the event of failure to make reasonable further progress or to attain the NAAQS [Section 172(c)(9)]

TABLE 1-3

General CAA Requirements for Implementation Plans [CAA Section 110(a)]

REQUIREMENT	DESCRIPTION
Enforceable emission limitations	Enforceable emission limitations or other control measures as needed to meet the requirements of the CAA [Section 110(a)(2)(A)]
Ambient monitoring	An ambient air quality monitoring program [Section 110(a)(2)(B)]
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 submitted plans include information on tracking plan implementation and milestone compliance. Requirements for these elements are described in CAA Section 182(g), and 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 SCAQMD's AQMP public process includes multiple public workshops and public hearings on all of the required elements prior to submittal. Chapter 11 describes the public process, participation and comprehensive outreach program for the 2016 AQMP.

State Law Requirements Addressed by the 2016 AQMP

The California Clean Air Act (CCAA) (*Health & Safety Code §§ 40910 et seq*.) 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)). Chapter 6 describes how the 2016 AQMP meets the State planning requirements under the CCAA, including plan effectiveness, emission reductions of 5 percent per year or adoption of all feasible measures, reducing population exposure to criteria pollutants, and ranking control measures by cost-effectiveness.

Format of This Document

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

Chapter 1, "Introduction," introduces the 2016 AQMP including purpose, historical air quality progress, and the approach for the 2016 AQMP.

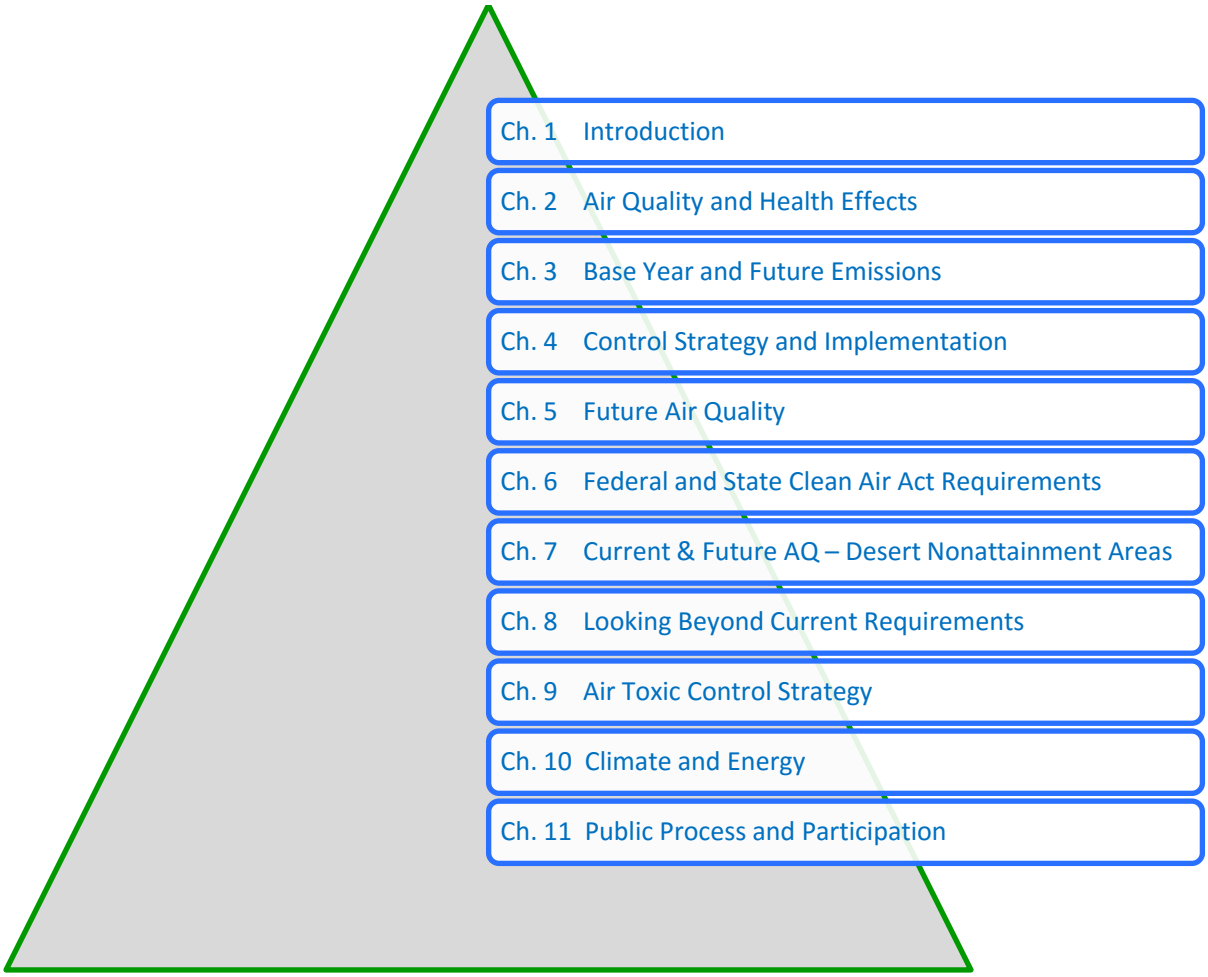
Chapter 2, "Air Quality and Health Effects," discusses the Basin's current air quality in comparison with federal and State health-based air pollution standards.

Chapter 3, "Base Year and Future Emissions," summarizes 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 the control strategy.

Chapter 6, "Federal and State Clean Air Act Requirements," discusses specific federal and State requirements as they pertain to the 2016 AQMP, including anti-backsliding requirements for revoked standards.



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 2015 lowering of the 8-hour ozone standard from 75 ppb to 70 ppb.

Chapter 9, "Air Toxic Control Strategy," examines the ongoing efforts to reduce health risk from toxic air contaminants, co-benefits from reducing criteria pollutants, and potential future actions.

Chapter 10, "Climate and Energy," provides a description of current and projected energy demand and supply issues in the Basin, and the relationship between 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 2016 AQMP.

A "Glossary" is provided at the end of the document, presenting definitions of commonly used terms found in the 2016 AQMP.

Numerous technical appendices are included and are listed below:

Appendix I (Health Effects) presents a summary of scientific findings on the health effects of ambient air pollutants, portions of which satisfy the requirements of California Health and Safety Code Section 40471(b).

Appendix II (Current Air Quality) contains a detailed summary of the air quality in 2014, along with prior year trends, in both the Basin and the Coachella Valley, as monitored by the SCAQMD.

Appendix III (Base and Future Year Emission Inventory) presents the 2012 base year emissions inventory and projected emission inventories of air pollutants in future attainment years for both annual average and summer planning inventories.

Appendix IV-A (SCAQMD's Stationary and Mobile Source Control Measures) describes SCAQMD staff's proposed stationary and mobile source control measures to attain the federal ozone and PM2.5 standards.

Appendix IV-B (CARB's Mobile Source Strategy) describes CARB staff's proposed 2016 strategy to attain health-based federal air quality standards as part of the SIP.

Appendix IV-C (SCAG's Regional Transportation Strategy and Control Measures) describes the SCAG's Final 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy and Transportation Control Measures to be included in the 2016 AQMP for the Basin.

Appendix V (Modeling and Attainment Demonstrations) provides the details of the regional modeling for the attainment demonstrations that illustrate that the proposed emission reductions will achieve the federal air quality standards by the regulatory attainment deadlines.

Appendix VI (Compliance with Other Clean Air Act Requirements) provides the details demonstrating that the 2016 AQMP complies with specific the federal and California Clean Air Act requirements.