

Executive Summary



The 2016 Air Quality Management Plan is the regional blueprint for achieving air quality standards in the South Coast Air Basin, an area that includes Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties. Through a combination of regulatory and incentive approaches via partnerships at all levels of government, the elusive goal of healthy air is within reach.

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Overview

The 2016 Air Quality Management Plan (2016 AQMP or Plan) is a regional blueprint for achieving the federal air quality standards and healthful air. The South Coast Air Quality Management District (SCAQMD or District) is responsible for clean air in the South Coast Air Basin (SCAB or Basin), an area that includes Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties. While air quality has dramatically improved over the years, the Basin still exceeds federal public health standards for both ozone and particulate matter (PM) and experiences some of the worst air pollution in the nation. The 2016 AQMP represents a thorough analysis of existing and potential regulatory control options, includes available, proven, and cost-effective strategies, and seeks to achieve multiple goals in partnership with other entities promoting reductions in greenhouse gases and toxic risk, as well as efficiencies in energy use, transportation, and goods movement. The Plan recognizes the critical importance of working with other agencies to develop funding and incentives that encourage the accelerated transition to cleaner vehicles, and the modernization of buildings and industrial facilities to cleaner technologies in a manner that benefits not only air quality, but also local businesses and the regional economy. These “win-win” scenarios are key to implementation of this Plan with broad support from a wide range of stakeholders.

Air Quality Standards

The federal Clean Air Act (CAA) requires areas not attaining the national ambient air quality standards (NAAQS) to develop and implement an emission reduction strategy that will bring the area into attainment in a timely manner. The region is given a classification that describes the degree of nonattainment. This classification dictates specific planning requirements under the CAA, including the time provided to attain the standard. The CAA requires attainment of the standard to be achieved as “expeditiously as practicable,” but no later than the attainment years listed in Table ES-1 below. It should be noted that the years listed in Table ES-1 are the latest calendar year to achieve the requisite emission reductions, and not the statutory attainment date. For example, the attainment date for the 2008 8-hour ozone standard in an extreme non-attainment area is July 20, 2032. But attainment must be demonstrated with projected emissions reductions in the prior year (2031).

Five NAAQS are being evaluated in this integrated Plan. Three standards – the 8-hour ozone NAAQS established in 2008 (2008 8-hour Ozone), the annual PM_{2.5} NAAQS established in 2012 (2012 annual PM_{2.5}), and the 24-hour PM_{2.5} NAAQS established in 2006 (2006 24-hour PM_{2.5}) are required to have new attainment demonstration in this Plan. However, given the overlaps in emissions and control strategies for other yet-to-be-attained NAAQS, this integrated Plan will also include revisions to the attainment demonstrations for two other standards: the 1997 8-hour ozone NAAQS and the 1979 1-hour ozone NAAQS. While the 2012 AQMP focused on attainment of the 2006 24-hour PM_{2.5} standard, it has since been determined, primarily due to unexpected drought conditions, that it was impracticable to meet the standard by the original attainment year. Since that time, U.S. Environmental Protection Agency (U.S. EPA) has approved a re-classification to “serious” nonattainment for the 24-hour PM_{2.5} standard, which requires a new attainment demonstration with a new attainment deadline.

TABLE ES-1

Standard	Concentration	Classification	Latest Attainment Year
2008 8-hour Ozone	75 ppb	Extreme	2031
2012 Annual PM2.5	12 µg/m ³	Moderate	2021
		Serious	2025
2006 24-hour PM2.5	35 µg/m ³	Serious	2019
1997 8-hour Ozone	80 ppb	Extreme	2023
1979 1-hour Ozone	120 ppb	Extreme	2022

Challenges

The 2016 AQMP includes both stationary and mobile source strategies to ensure that rapidly approaching attainment deadlines are met, that public health is protected to the maximum extent feasible, and that the region is not faced with burdensome sanctions if the Plan is not approved or if the NAAQS are not met on time. As with every AQMP, a comprehensive analysis of emissions, meteorology, atmospheric chemistry, regional growth projections, and the impact of existing control measures is updated with the latest data and methods. The most significant air quality challenge in the Basin is to reduce nitrogen oxide (NO_x) emissions sufficiently to meet the upcoming ozone standard deadlines. Based on the inventory and modeling results, 522 tons per day (tpd) of total Basin NO_x 2012 emissions are projected to drop to 255 tpd and 214 tpd in the 8-hour ozone attainment years of 2023 and 2031 respectively, due to continued implementation of already adopted regulatory actions (“baseline emissions”). The analysis suggests that total Basin emissions of NO_x must be reduced to approximately 141 tpd in 2023 and 96 tpd in 2031 to attain the 8-hour ozone standards. This represents an additional 45 percent reduction in NO_x in 2023, and an additional 55 percent NO_x reduction beyond 2031 levels. The following chart presents the future projections of NO_x emissions, the reductions from the proposed control strategy and the levels necessary to attain the standards. The chart also illustrates how the strategy to meet the 8-hour ozone standard in 2023 should lead to sufficient NO_x emission reductions to attain the 1-hour ozone standard by 2022. Since NO_x emissions also lead to the formation of PM_{2.5}, the NO_x reductions needed to meet the ozone standards will likewise lead to improvement of PM_{2.5} levels and attainment of PM_{2.5} standards.

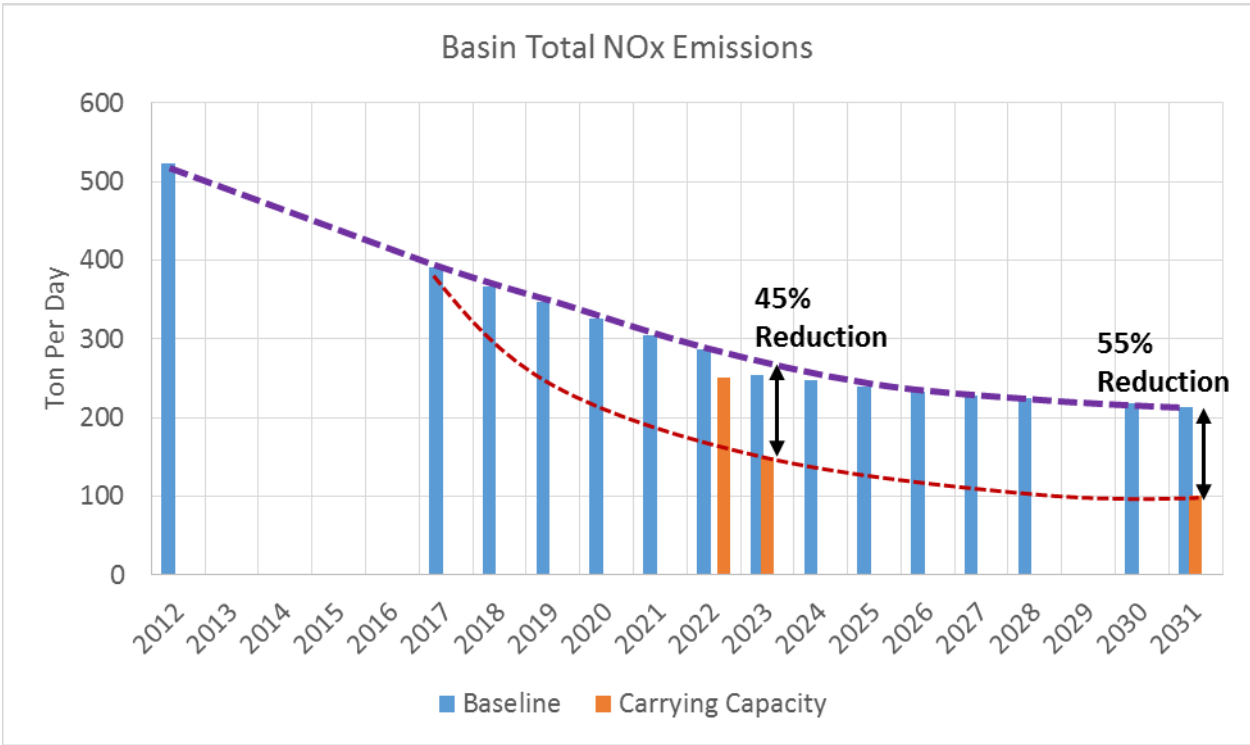


FIGURE ES-1. BASIN TOTAL NOX EMISSIONS (2012–2031)

Plan Objectives

To ensure air quality goals will be met while maximizing benefits and minimizing adverse impacts to the regional economy, the following policy objectives have guided the development of the 2016 AQMP:

Eliminate reliance on future technologies (CAA §182(e)(5)) measures to the maximum extent feasible.

As an “extreme” nonattainment area for ozone, the CAA allows the Basin to rely on unspecified future technological advancements to show future attainment of air quality standards. Given the fast approaching deadlines – as early as 2022 and 2023, and given that the majority of the zero and near-zero technologies needed for attainment have already or will soon be commercially available, it is now possible to specify the technologies and the implementation pathways to attainment. Some CAA §182(e)(5) flexibility may still be needed for Plan approval by U.S. EPA given the need for continued technological and cost improvements and new funding and incentive programs.

Calculate and take credit for co-benefits from other planning efforts.

Other local, state and federal efforts addressing GHG reductions, energy efficiency, transportation, and goods movement have and will continue to lead to air quality improvements. Where possible, this Plan seeks to quantify and include emission reductions from these parallel and complementary programs.

2016 AQMP Policy Objectives



Eliminate reliance on future technologies (CAA §182(e)(5)) measures to the maximum extent possible by providing specific control measures which have quantifiable emission reductions and associated costs.

Calculate and take credit for co-benefits from other planning efforts (e.g., GHG reduction targets, energy efficiency, and transportation).

Develop a strategy with fair-share emission reductions at the federal, state, and local levels.

Develop a strategy with fair-share emission reductions at the federal, state, and local levels. SCAQMD will make full use of its legal authorities to seek a cleaner air future. But with limitation on SCAQMD authority over the mobile sources that contribute the most to our air quality problems, attainment cannot be achieved without State and federal actions. Proposed measures include a new ultra-low NOx federal engine emission standard for heavy duty trucks and other State mobile source regulations. In some cases, additional authority provided to the State or SCAQMD for sources traditionally under the jurisdiction of the federal government (e.g., locomotives, aircraft, and ships) should be considered.

Invest in strategies and technologies meeting multiple objectives regarding air quality, climate change, air toxics exposure, energy, and transportation. With multiple environmental and societal objectives, targets, deadlines, and strategies underway, it is critical that planning efforts are integrated at all levels and across all agencies. To this end, when progress towards multiple goals is possible, those strategies should be designed to maximize the co-benefits and then prioritized for implementation and investment. The Plan embraces strategies that reduce toxic risk impacting local neighborhoods and disadvantaged communities adjacent to goods movement and transportation corridors.

Identify and secure significant funding for incentives to implement early deployment and commercialization of zero and near-zero technologies. The 2016 AQMP control strategy strongly relies on a transition to zero and near-zero emission technologies in the mobile source sector, including automobiles, transit buses, medium- and heavy-duty trucks, and off-road applications. The plan focuses on existing commercialized technologies and energy sources including their supporting infrastructure, along with newer technologies that are nearing commercialization based on recent demonstration programs and limited test markets. Prioritizing and expanding funding in Environmental Justice (EJ) areas will be sought.



Invest in strategies and technologies meeting multiple objectives regarding air quality, climate change, air toxics exposure, energy, and transportation. Prioritize strategies that meet fast approaching deadlines and assist EJ impacted areas.

Seek and identify significant secured funding for incentives to implement early deployment and commercialization of known zero and near-zero technologies, particularly in the mobile source sector.

Enhance the socioeconomic analysis and select the most efficient and cost-effective path to achieve multi-pollutant and multi-deadline targets.

Prioritize non-regulatory, innovative and “win-win” approaches for emission reductions. As shown in the past, air quality standards can be achieved while maintaining a healthy economy.

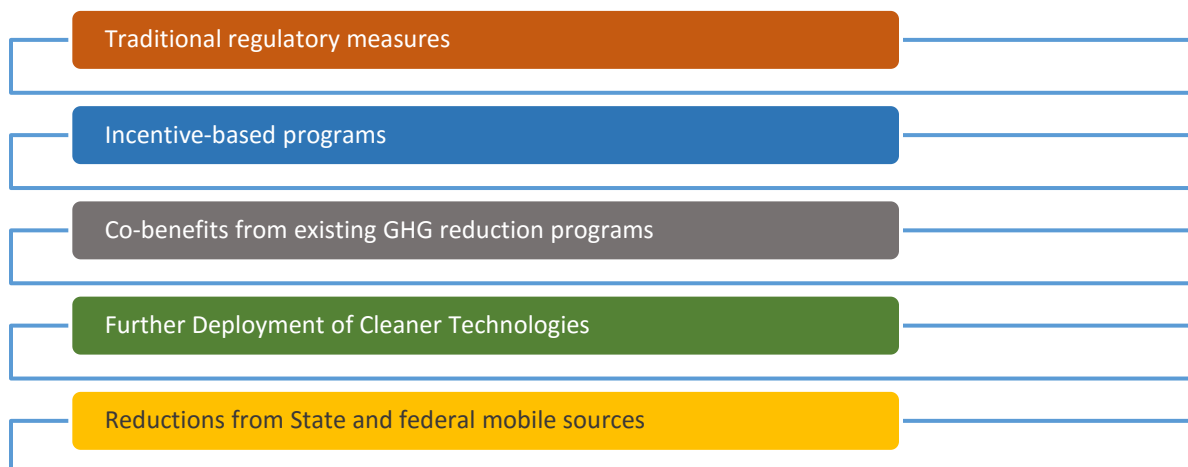
Enhance the socioeconomic analysis and pursue the most efficient and cost-effective path to achieve multi-pollutant and multi-deadline targets. Integrated planning across multiple pollutants and multiple deadlines allows for efficient and cost-effective control strategy design. An enhanced socioeconomic impact analysis also quantifies the impacts of the strategy on health, jobs, businesses and the local economy.

Prioritize enforceable regulatory measures as well as non-regulatory, innovative and “win-win” approaches for emission reductions. As shown in the past, significant air quality improvements can be achieved while maintaining a healthy economy. The 2016 AQMP calls for a priority on maximizing emission reductions utilizing zero-emission technologies wherever feasible and cost-effective, near-zero emission technologies in other applications, and innovative “win-win” approaches for emission reductions when new regulations are not yet practical. A full life-cycle in-Basin emissions analysis will be considered in determining the full emissions profile and cost-effectiveness of these technologies. In designing the control strategy needed to achieve the ozone and PM_{2.5} air quality standards, there will be special consideration of strategies that can contribute to the economic vitality of the region and the needs of both the public and local small businesses. The Plan will prioritize distribution of incentive funding to maximize emissions reductions in the most disadvantaged communities in the region.

Control Strategies

The overall control strategy is an integral approach relying on fair-share emission reductions from federal, state and local levels. The 2016 AQMP is composed of stationary and mobile source emission reductions from traditional regulatory control measures, incentive-based programs, co-benefits from climate programs, mobile source strategies and reductions from federal sources, which include aircraft, locomotives and ocean-going vessels. These strategies are to be implemented in partnership with the California Air Resources Board (CARB) and U.S. EPA. In addition, the Southern California Association of Governments (SCAG) recently approved their 2016 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS)¹ that include transportation programs, measures, and strategies generally designed to reduce vehicle miles traveled (VMT), which are contained within baseline emissions inventory in the Plan.

¹ <http://scagrtpscscs.net/Pages/FINAL2016RTPSCS.aspx>.



Mobile sources contributed about 88 percent of the region’s total NOx emissions in 2012. Since the SCAQMD has limited authority to regulate mobile sources, staff worked closely with CARB and U.S. EPA, which have primary authority over mobile sources, to ensure mobile sources perform their fair share of pollution reduction responsibilities. In May 2016, CARB released an updated Mobile Source Strategy² and a Proposed State SIP Strategy³ supporting multiple planning efforts to meet air quality standards, greenhouse gas (GHG) emission reduction targets, petroleum consumption reduction, and reduced health risks from transportation emissions over the next 15 years. The integrated approach allows consideration of the multi-pollutant co-benefits, and identification of interaction between control measures to guide policy and maximize program effectiveness. Specifically, the mobile source strategy outlines a coordinated suite of measure concepts for on-road light- and heavy-duty vehicles, off-road equipment, as well as federal and international sources. The strategy also provides regulatory and programmatic mechanisms to implement the measures and estimated NOx reductions for the South Coast Air Basin. A subset of the statewide strategy is a mobile source strategy for the South Coast SIP. The reductions from these mobile source measures are included in the attainment demonstration and are critical for meeting the standards. Without significant reductions from the mobile source sector demonstration of attainment is not possible.

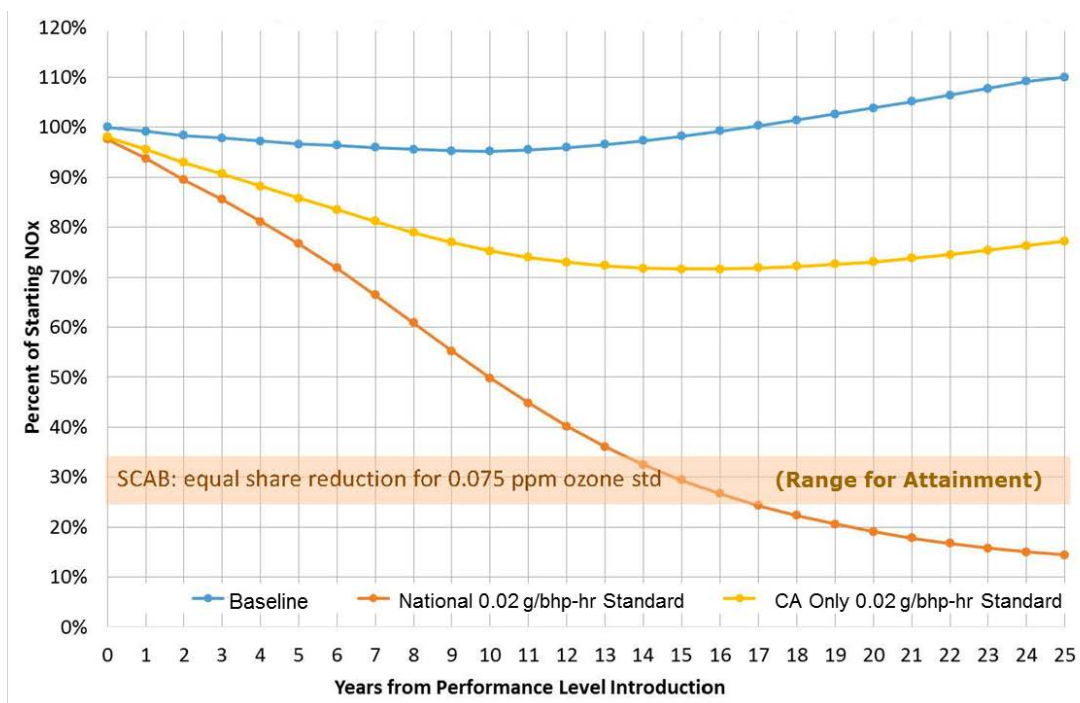


In June 2016, SCAQMD and 10 co-petitioners requested the U.S. EPA Administrator to undertake rulemaking to revise the national on-road heavy-duty engine exhaust NOx emission standard from 0.2 g/bhp-hr to 0.02 g/bhp-hr. It was recommended that the regulation be implemented by January 2022 or if not feasible, by January 2024, with a phase-in starting in January 1, 2022. A national standard is estimated to result in NOx emission reductions from this source category from 70 to 90 percent in 14 to 25 years, respectively. Given that the Basin must attain the 75 ppb ozone NAAQS by 2031 (within the

² <http://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.htm>.

³ <http://www.arb.ca.gov/planning/sip/2016sip/2016sip.htm>.

next 15 years), a new on-road heavy-duty engine exhaust emissions standard for NO_x is critical given the time needed for such standards to be adopted, for manufacturers to develop and produce compliant vehicles, and for national fleet turnover to occur. The following chart shows the difference in NO_x reductions from heavy duty trucks between baseline (no action) emissions (in blue), a low NO_x standard adopted only in California (yellow) and reductions if the same low NO_x standard is implemented nationally (orange).



Source: Presentation by Mr. Cory Palmer, ARB at the Symposium on California's Development of its Phase 2 Greenhouse Gas Emission Standards for On-Road Heavy-Duty Vehicles (April 22, 2015)

FIGURE ES-2. YEARS FROM PERFORMANCE LEVEL INTRODUCTION

Some of the control measures achieve emission reductions by continuing existing regulatory requirements and programs and extensions of those programs, while some control measures are not regulatory in form, but instead focus on incentives, outreach, and education to bring about emission reductions through voluntary participation and behavioral changes needed to complement regulations.

Regulatory Measures

In order to meet ozone standards, both NO_x and volatile organic compounds (VOC) emissions need to be addressed. However, air quality modeling demonstrates that NO_x reductions prove to be much more effective in reducing ozone levels and will also lead to significant improvement in PM_{2.5} concentrations. NO_x-emitting stationary sources regulated by the SCAQMD include RECLAIM facilities (e.g., refineries, power plants, etc.), natural gas combustion equipment (e.g., boilers, heaters, engines, burners, flares) and other combustion sources that burn wood or propane. The 2016 AQMP proposes robust NO_x reductions

from new regulations on RECLAIM facilities, non-refinery flares, commercial cooking, and residential and commercial appliances. Such combustion sources are already heavily regulated with the lowest NOx emissions levels achievable but there are opportunities to require and accelerate replacement with cleaner zero-emission alternatives, such as residential and commercial furnaces, pool heaters and back-up power equipment. Such replacements can be achieved through a combination of regulations and incentives. Technology-forcing regulations can drive development and commercialization of clean technologies, with future year requirements for new or existing equipment. Incentives can then accelerate deployment and enhance public acceptability of new technologies.

It should be emphasized that beginning in 2012, continued implementation of previously adopted regulations will lead to NOx emission reductions of 68 percent by 2023 and 80 percent by 2031. Examples of stationary source reductions include 12 tpd from RECLAIM facilities, 4.1 tpd from Rule 1147 sources, 3.2 tpd from Rule 1110, 1146, and 1146.1 sources and 3 tpd from the implementation of Rule 1111. With the addition of 2016 AQMP proposed regulatory measures, a 30 percent reduction of NOx from stationary sources is expected in the 15 year period between 2008 and 2023. This is in addition to significant NOx reductions from stationary sources achieved in the decades prior to 2008. This Plan builds upon these past successes with new regulatory commitments for additional emissions reductions to the same extent as past AQMPs.

Incentive Funding

Given the significant NOx emission reductions needed to attain the federal ozone air quality standards by 2023 and 2031, a combination of regulatory actions and public funding incentives are needed. With fast approaching ozone standard attainment deadlines, faster reductions are critical to complying with federal requirements and improving public health in the short term. The purpose of incentive programs is to advance deployment of new cleaner technologies at a pace that is not feasible through regulation alone. The approach that the SCAQMD and CARB are proposing to achieve the incentive-based emission reductions identified in the State Mobile Source Strategy (Appendix IV-B) and the SCAQMD's mobile and stationary source measures (Appendix IV-A) is predicated on securing the amount of funding needed to achieve the NOx emission reductions by 2023 and 2031.

The amount of incentive funding needed is estimated to be approximately \$11–14 billion in total funding over a seven to fifteen year period. Given this significant funding level needed to attain the federal ozone air quality standards, an action plan is being developed as part of the 2016 AQMP public adoption process to identify the necessary actions by the District, the region, the state, the federal government, and other partnerships to ensure the requisite levels of funding are secured as early as possible and sustained through 2031.

Currently, the SCAQMD receives around \$56 million per year in incentives funding to accelerate turnover of on- and off-road vehicles and equipment under SB 1107, a portion of the state's Tire Fee, and AB923. AB 923 will sunset in 2024. In addition, the District has received close to \$550 million in Proposition 1B funding. The last round of Proposition 1B will be ending in the next couple of years. The District has also received funding under the DERA program on a competitive basis. However, the amount of funding needed to achieve the NOx emission reductions associated with the "Further Deployment"

measures proposed in the State Mobile Source Strategy and the 2016 AQMP will require on the order of \$1 billion per year if funding is available beginning in 2017.

Attainment Demonstration

The 2016 AQMP demonstrates how and when the South Coast Air Basin, as well as the Coachella Valley, will attain the ozone and PM_{2.5} standards as “expeditiously as practicable,” but no later than the latest statutory attainment date. For the three ozone standards, the control strategy will reduce baseline emissions below the amount of allowable emissions in the region that would still meet the standards also referred to as the region’s “carrying capacity.” The following table provides the projected NO_x baseline emissions and reductions in tons per day for the three ozone attainment years from implementing the different measures, programs and strategies in the overall control strategy. Traditional regulatory measures are a mix of SCAQMD and CARB control measures. Incentive measures include SCAQMD stationary and mobile source as well as CARB mobile source programs. Further deployment of cleaner technologies focus on additional incentives for the cleanest on-road vehicles and off-road equipment. Federal sources are comprised of aircraft, locomotives, and ocean-going vessels.

TABLE ES-2

Proposed NO_x Reductions to Achieve Ozone Carrying Capacities

NO _x Emissions (tpd)	2022 – 1-hour Ozone (120 ppb)	2023 – 8-hour Ozone (80 ppb)	2031 – 8-hour Ozone (75 ppb)
Baseline Inventory	287	255	214
Carrying Capacity	245	141	96
Traditional Regulatory Measures	2.6	3.2	18.2
Incentive-based Programs	18.2	23.9	25.7
CARB’s Further Deployment of Cleaner Technologies (On-Road, Off-Road)	0	62	34
Federal Reductions in State Strategy	9	46	64
TOTAL Reductions	30	135	142
Remaining NO _x Emissions†	257	120	72
Set Aside Account	3	3	1
TOTAL Remaining NO _x Emissions	260*	123	73

† Baseline Inventory minus Total Reductions

* Concurrent VOC reduction will assist in meeting the carrying capacity

The 2016 AQMP also demonstrates that the 24-hour PM_{2.5} standard will be met by the 2019 attainment year with no additional reductions needed beyond already adopted measures. Therefore, no additional measures are necessary for this standard. The annual PM_{2.5} standard, however, cannot be met by 2021 by implementing all feasible measures, which is the attainment year for our current “moderate” nonattainment area classification. As a “serious” nonattainment area, four more years are provided to attain the annual PM_{2.5} standard by 2025.

Since NO_x emissions also lead to the formation of PM_{2.5}, the NO_x reductions needed to meet the ozone standards will lead to significant improvements in PM_{2.5} levels. The modeling results show that the ozone strategy will greatly assist in reducing PM_{2.5} concentrations, reaching attainment for the annual PM_{2.5} standard in 2023 when the benefits from the ozone strategy are fully realized. However, it is impracticable to demonstrate attainment by 2021, the “moderate” PM_{2.5} nonattainment area deadline. Thus, the SCAQMD is seeking to reclassify the South Coast Air Basin as a “serious” nonattainment area that will meet annual standard as “expeditiously as practicable,” but no later than the attainment year of 2025. The impracticability demonstration can be found in Appendix VI-B.

Clean Air Act Requirements

This Plan complies with applicable federal CAA includes a series of requirements to be included in State Implementation Plans for nonattainment areas. The following required elements have been included and/or analyzed in the 2016 AQMP and corresponding appendices.

- Emission Inventory
- Reasonably Available Control Measures (RACM)
- Best Available Control Measures (BACM)
- Control Strategy and Needed Other Measures
- Attainment Demonstration
- Impracticability Demonstration (for “moderate” annual PM_{2.5} area)
- Reasonable Further Progress (RFP) and Milestones
- Contingency Measures
- General Conformity
- Transportation Conformity
- Vehicle Miles Traveled (VMT) Offset Demonstration
- PM Precursors
- New Source Review (NSR)
- Emissions Statements

Collaboration and Outreach

The 2016 AQMP relies on significant integration and coordination with other agencies in order to successfully meet the Basin's clean air goals. This integration included the traditional collaboration between the SCAQMD, CARB, U.S. EPA and SCAG but also includes the California Energy Commission (CEC), the California Public Utilities Commission, and the California State Transportation Agency (Caltrans). Regional and local governments, such as counties, cities, coalitions of governments, and regional transportation agencies, have also been part of the integrated planning process. Such a process is useful when implementing strategies that are consistent with the State's Vision for Clean Air⁴ and strategies and goals of the 2016 AQMP. In addition to an integrated planning process with other agencies, the 2016 AQMP development process incorporates collaborative efforts by a wide range of non-government stakeholders. These efforts focus on businesses, environmental and health organizations, community groups, and academia. For example, in the months leading to the 2016 AQMP development, a series of AQMP White Papers were published in close collaboration with stakeholders.⁵ These provided the technical and policy foundation for many aspects of the Plan. A two-day Control Strategy Symposium took place as a forum of ideas for new control technologies, efficiencies and innovative approaches to reduce emissions. The 2016 AQMP Advisory Group also continues to meet to discuss specific plan elements, requirements, and control strategies. The SCAQMD has a long and productive history of reducing health risk from air toxics and criteria pollutant emissions through an extensive control program including traditional and innovative rules and policies. A continuing commitment to an inclusive, transparent, and collaborative process is key to program success.

⁴ <http://www.arb.ca.gov/planning/vision/vision.htm>.

⁵ <http://www.aqmd.gov/home/about/groups-committees/aqmp-advisory-group/2016-aqmp-white-papers>.