

# **EXECUTIVE SUMMARY**

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## PREFACE

**On behalf of the 16.5 million residents of the South Coast Basin, the 2007 AQMP must rise to meet the following major challenges.**

***Stiff new Federal standards have been set in place for ozone and PM2.5.***

- Slightly longer timeframe for attainment than was allowed under previous standards, but significantly more stringent than old (withdrawn) standards.
- Fast-approaching and very difficult PM2.5 deadline (2014).
- Even more challenging 8-hour ozone deadline by 2023 timeframe.
- Recently revised 24-hour PM2.5 standard more stringent than current standards. (attainment deadline expected to be around 2020)

***Significant reductions are needed from all sources, but especially Mobile Sources, since the bulk of the remaining air quality problem stems from Mobile Source emissions.***

- Need new ultra-low emission standards for both new and existing fleet, including on-road and off-road heavy-duty trucks, industrial & service equipment, locomotives, ships & other watercraft, and aircraft.
- Must dramatically accelerate fleet turnover to achieve benefits of cleaner engines.
- Significant reformulation of consumer products which collectively are a major source of pollutant emissions.
- Stationary sources must continue to do their fair share of the emission reduction effort including expedited equipment modernization and technology advancements.

***Even today's improved smog conditions result in known public harm. New and additional health studies indicate urgent public health concerns, especially from fine particulate exposure.***

- Impaired lung function in children growing up in Southern California.
- Increased episodes of respiratory disease symptoms.
- Increase in doctor visits for heart disease.
- Increase in death rates.

***To have any reasonable expectation of meeting the 2014 PM2.5 deadline, the pace of improvement must intensify for Mobile Sources under state and federal jurisdiction.***

- At current pace, South Coast would fail to reach attainment of old standards.
- Given the huge challenge and the public health threat involved, there is no margin for error in the overall Plan strategy, and there is no room for wavering or hesitation in the implementation of its control measures.
- Substantial public and private funding is needed to expedite the retirement of older, higher-polluting engines and vehicles.
- The time for all responsible authorities to expeditiously adopt and aggressively implement effective control strategies is **now**.

## **INTRODUCTION**

The long-term trend of the quality of air we Southern Californians breathe shows continuous improvement, although recent leveling off in ozone improvement causes marked concern. The remarkable historical improvement in air quality since the 1970's is the direct result of Southern California's comprehensive, multiyear strategy of reducing air pollution from all sources as outlined in its Air Quality Management Plan (AQMP). Yet the air in Southern California is far from meeting all federal and state air quality standards and, in fact, is among the worst in the nation. Although the new federal fine particulates (PM<sub>2.5</sub>) and 8-hour surface level ozone standards provide a longer compliance schedule, the standards are much more stringent than the previous PM<sub>10</sub> and 1-hour surface level ozone standards. To reach clean air goals in the next seven to sixteen years provided by the Clean Air Act deadlines, Southern California must not only continue its diligence but intensify its pollution reduction efforts.

Continuing the Basin's progress toward clean air is a challenging task, not only to recognize and understand complex interactions between emissions and resulting air quality, but also to pursue the most effective possible set of strategies to improve air quality while maintaining a healthy economy. To ensure continued progress toward clean air and comply with state and federal requirements, the South Coast Air Quality Management District (AQMD or District) in conjunction with the California Air Resources Board (CARB), the Southern California Association of Governments (SCAG) and the U.S. Environmental Protection Agency (U.S. EPA) is preparing the Final 2007 revision to its AQMP (2007 AQMP or 2007 Plan). This Final 2007 AQMP employs the most up-to-date science and analytical tools and incorporates a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, on-road and off-road mobile sources and area sources.

The Final Plan proposes attainment demonstration of the federal PM<sub>2.5</sub> standards through a more focused control of sulfur oxides (SO<sub>x</sub>), directly-emitted PM<sub>2.5</sub>, and nitrogen oxides (NO<sub>x</sub>) supplemented with volatile organic compounds (VOC) by 2015. The 8-hour ozone control strategy builds upon the PM<sub>2.5</sub> strategy, augmented with additional NO<sub>x</sub> and VOC reductions to meet the standard by 2024 assuming a bump-up is obtained.

The Final 2007 AQMP proposes policies and measures currently contemplated by responsible agencies to achieve federal standards for healthful air quality in the Basin and those portions of the Salton Sea Air Basin (formerly named the Southeast Desert Air Basin) that are under District jurisdiction (namely, Coachella Valley).

This Final Plan also addresses several federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes and new air quality modeling tools. This Final Plan builds upon the approaches taken in the 2003 AQMP for the South Coast

Air Basin for the attainment of the federal ozone air quality standard. However, this Final Plan highlights the significant amount of reductions needed and the urgent need to identify additional strategies, especially in the area of mobile sources, to meet all federal criteria pollutant standards within the timeframes allowed under federal Clean Air Act.

This Final Plan as well as other key supporting information are available electronically and can be downloaded from the District's home page on the Internet (<http://www.aqmd.gov>, "Inside AQMD" tab at top, and click on "Clean Air Plans").

## **WHY IS THIS FINAL PLAN BEING PREPARED?**

The federal Clean Air Act requires an 8-hour ozone non-attainment area to prepare a SIP revision by June 2007 and a PM<sub>2.5</sub> non-attainment area to submit by April 2008. However, since the attainment date for PM<sub>2.5</sub> is earlier than that for 8-hour ozone and because of the interplay between precursor emissions, it is prudent to prepare a comprehensive and integrated plan to design the most effective path to attain both standards within the specified timeframe. In addition, 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 model. The Final Plan is based on assumptions provided by both CARB and SCAG reflecting their most recent computer model (EMFAC) for motor vehicle emissions and demographic updates.

## **IS AIR QUALITY IMPROVING?**

Yes. Over the years, the air quality in the Basin has improved significantly, thanks to the comprehensive control strategies implemented to reduce pollution from mobile and stationary sources. For instance, the total number of days on which the Basin exceeds the federal 8-hour standard has decreased dramatically over the last two decades from about 150 days to less than 90 while Basin station-days [detail follows] decreased by approximately 80 percent. However, the Basin still exceeds the federal 8-hour standard more frequently than any other location in the U.S. Under federal law, the Basin is designated as a "severe-17" nonattainment area for the 8-hour ozone standard. Figure ES-1 shows the long-term trend in ambient ozone counts over the federal standard since 1990. The figure depicts two types of exceedance measurements: the number of Basin-days and Basin-station-days above the federal 8-hour ozone standard, which represent, respectively the number of days the standard was exceeded anywhere in the Basin or by any station.

Lack of significant progress in ozone air quality for the last several years has raised some concern regarding the present-day effectiveness of control programs. The District held is planning to hold a technical forum in October 2006 on ozone air quality, to

examine the issue of why progress has slowed in detail, including accuracy of emissions inventory, effectiveness of control strategies, ambient photochemistry, etc. It was generally believed that VOC reductions in the last several years have not kept up the pace with NO<sub>x</sub> reductions, especially with the MTBE phase-out and the introduction of ethanol that caused higher VOC emissions. A key policy question explored at the technical forum was what could be done differently to more effectively reduce ozone levels, given the need to attain fine particulate standards that NO<sub>x</sub> reductions are needed not only to achieve the PM<sub>2.5</sub> and ozone standards, but also to benefit downwind ozone levels. Since it is likely that the VOC emissions are underestimated in the inventory, concurrent VOC reductions are desirable to provide near-term ozone improvement.

Relative to the 1-hour ozone standard, which was recently revoked by the U.S. EPA in favor of the new 8-hour ozone standard, the past air pollution controls have had an overall positive impact. The number of days where the Basin exceeds 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 the beginning of the decade. The Basin currently still experiences ozone levels over the federal standard on more than 20 days per year. By 2010, this plan shows that the Basin will still exceed the federal 1-hour ozone standard by more than 30 percent despite the implementation of the 2007 AQMP control measures. The District and a number of environmental organizations have litigated against U.S. EPA's revocation of the 1-hour standard; the case is still pending. In December 2006, the Court ruled that the U.S. EPA acted within its authority in revoking the 1-hour standard. However, the Court also decided that certain 1-hour control measures must stay in place including, New Source Review, conformity, and the Section 185 emission fee measure.

In 2005, the annual PM<sub>2.5</sub> standard was exceeded at several locations throughout the Basin. However, the 24-hour PM<sub>2.5</sub> standard (98<sup>th</sup> percentile greater than 65 ug/m<sup>3</sup>) was not exceeded during the year<sup>1</sup>. In 2005, the Basin did not exceed the standards for carbon monoxide, nitrogen dioxide, sulfur dioxide, sulfates or lead. Figure ES-2 shows the annual average PM<sub>2.5</sub> concentrations in the Basin in 2005 and Figure ES-3 shows the trends in PM<sub>10</sub> and PM<sub>2.5</sub>.

The Basin has met the PM<sub>10</sub> standards at all stations except for western Riverside where the annual PM<sub>10</sub> standard has not been met as of 2006. Additional efforts, through localized programs, are under way to ensure compliance with this standard. These efforts are also outlined in the Final 2007 AQMP.

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<sup>1</sup> In September 2006, U.S. EPA issued revised PM<sub>2.5</sub> NAAQs lowering the 24-hr standard to 35 ug/m<sup>3</sup>. However, the present Plan is not required to address this standard.

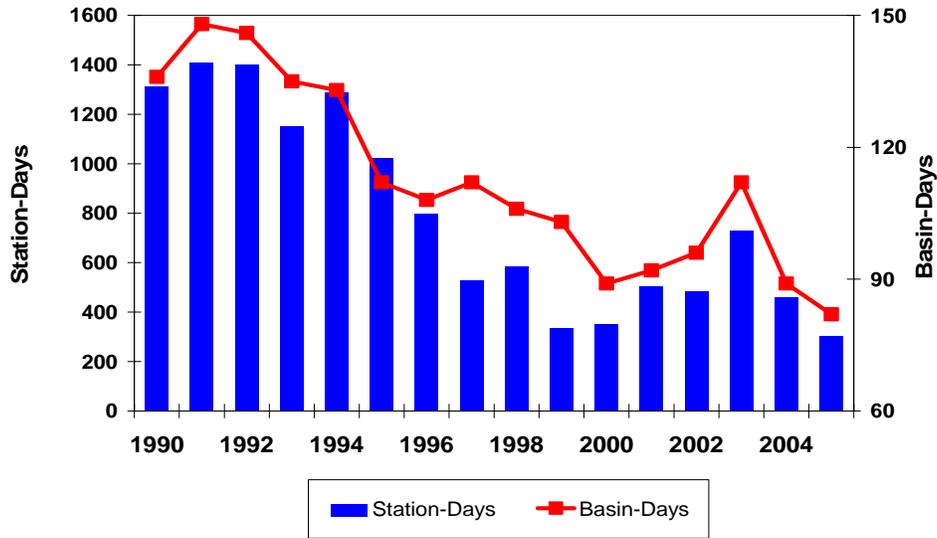


FIGURE ES-1

Total Basin-Days Above the Federal 8-Hour Ozone Standard from 1990-2005

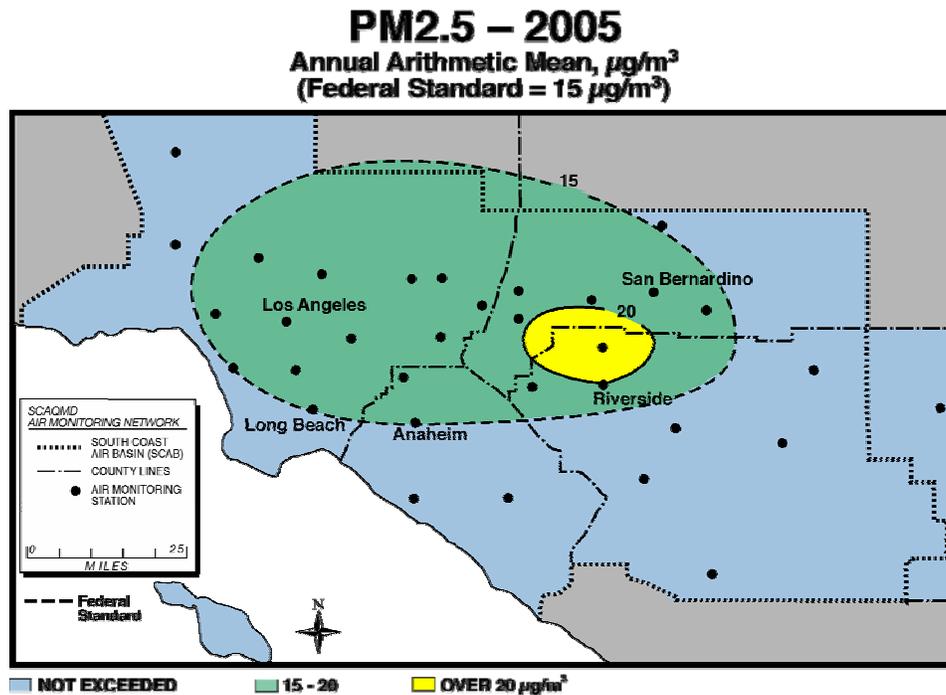
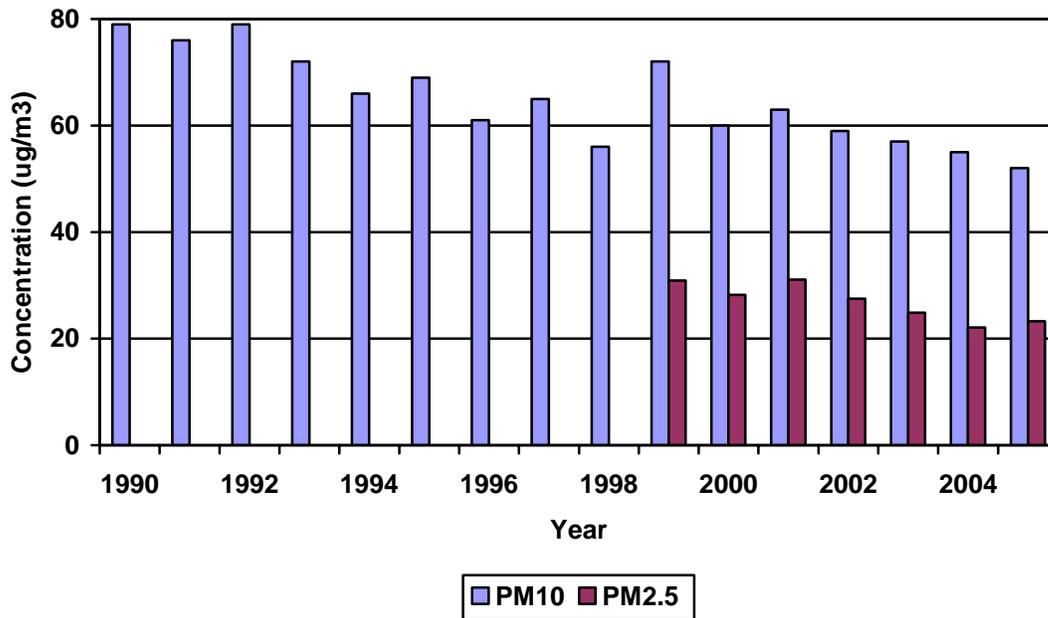


FIGURE ES-2  
PM2.5 – 2005

Annual Average Concentration Compared to Federal Standard

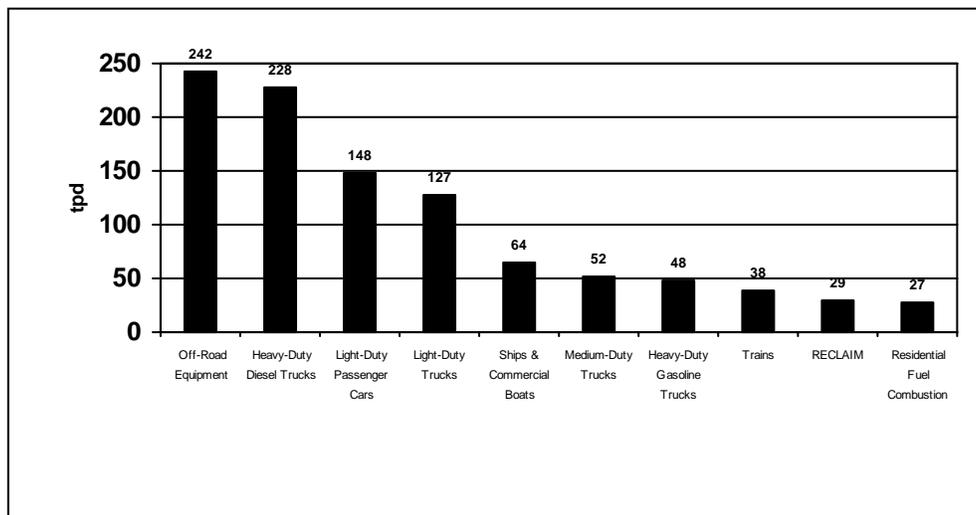


**FIGURE ES-3**  
Trends in Basin Maximum Annual PM10 and PM2.5 Concentrations

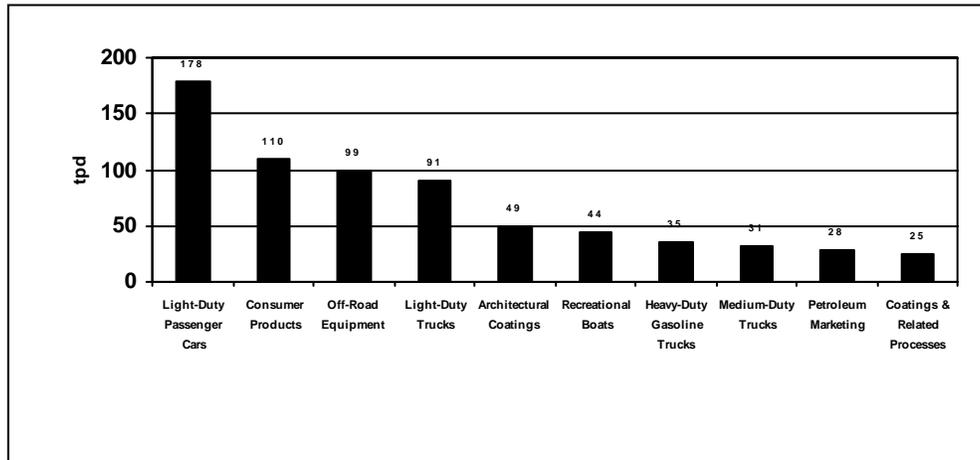
**WHAT ARE THE MAJOR SOURCES CONTRIBUTING TO AIR QUALITY PROBLEMS?**

Figures ES-4 to ES-6 present the top ten categories for NOx, VOC, and SOx emissions.

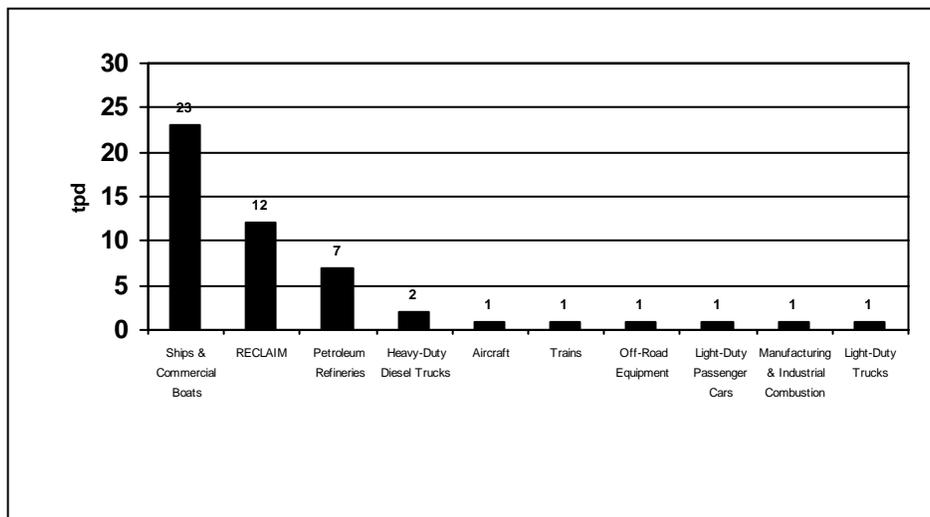
**FIGURE ES-4**  
Top Ten Categories for NOx Emissions  
**NOx Annual Average Emissions - 2002**



**FIGURE ES-5**  
Top Ten Categories for VOC Emissions  
**VOC Annual Average Emissions - 2002**



**FIGURE ES-6**  
Top Ten Categories for SOx Emissions  
**SOx Annual Average Emissions - 2002**



The combined Ports of Los Angeles and Long Beach including sources such as ocean-going vessels, harbor craft, trains, trucks, and cargo handling equipment represent the largest single source of emissions in the Basin, accounting for 60% of SO<sub>x</sub>, 27% of NO<sub>x</sub>, and 6% of PM<sub>2.5</sub> in 2023.

### **SHOULD THE PM<sub>2.5</sub> AND OZONE PLAN SUBMITTALS BE BIFURCATED?**

The formal deadline for submission of the ozone attainment plan is June 15, 2007. The formal deadline for submission of the PM<sub>2.5</sub> plan is April 15, 2008. Therefore, technically speaking, the PM<sub>2.5</sub> plan is not due until 2008. However, the PM<sub>2.5</sub> attainment date (i.e., 2015) is earlier than the 8-hour ozone of 2021 or 2024. In order to design the most efficient path to clean air, it is imperative that an integrated plan including both PM<sub>2.5</sub> and ozone be developed. Furthermore, there are only seven years left to implement the necessary measures to attain the PM<sub>2.5</sub> standard. The South Coast region needs a road map *now* to commit its resources for rule development, public and private funding, and technology deployment.

### **WHAT IS THE OVERALL CONTROL STRATEGY TO MEET THE CURRENT AIR QUALITY STANDARDS?**

The Final 2007 AQMP builds upon improvements accomplished from the previous plans, and aims to incorporate all feasible control measures while balancing costs and socioeconomic impacts. The few years remaining to meet attainment deadlines afford little margin for error in implementing such a comprehensive control strategy. Further, the combined control strategies selected to attain the federal PM<sub>2.5</sub> and 8-hour ozone standards must complement each other, representing the most effective route to achieve and maintain the standards.

The Final 2007 AQMP relies on a comprehensive and integrated control approach aimed at achieving the PM<sub>2.5</sub> standard by 2015 through implementation of short-term and mid-term control measures and achieving the 8-hour ozone standard by 2024 based on implementation of additional long-term measures. Table ES-1 presents the overall reductions necessary for demonstrating attainment of the PM<sub>2.5</sub> standard by 2015 and the 8-hour ozone standard by 2024. In order to demonstrate attainment by the prescribed deadlines, emission reductions needed for attainment must be in place by 2014 and 2023, respectively.

**TABLE ES-1**

Emission Reduction Targets for  
PM2.5 and 8-Hour ozone Attainment  
(tons per day, % reduction)

	<b>2014</b>	<b>2023</b>
<b>NOx</b>	<b>192 (29%)</b>	<b>383 (76%)</b>
<b>VOC</b>	<b>59 (11%)</b>	<b>116 (22%)</b>
<b>SOx</b>	<b>24 (56%)</b>	----
<b>PM2.5</b>	<b>15 (15%)</b>	----

Since PM2.5 in the Basin is overwhelmingly formed secondarily, the overall Final control strategy focuses on reducing precursor emission of SOx, directly-emitted PM2.5, NOx, and VOC instead of fugitive dust. Based on the District's modeling sensitivity analysis, SOx reductions, followed by directly-emitted PM2.5 and NOx reductions, provide the greatest benefits in terms of reducing the ambient PM2.5 concentrations. While VOC reductions are less critical to overall reductions in PM2.5 air quality (compared with equivalent SOx, directly-emitted PM2.5, and NOx reductions), they are relied upon for meeting the 8-hour ozone standard. It is further determined that SOx is the only pollutant that is projected to grow in the future, due to ship emissions at the ports, requiring significant controls. Directly-emitted PM2.5 emission reductions from on-going diesel toxic reduction programs and from the short-term and mid-term control measures are also incorporated into the Final 2007 AQMP. NOx reductions primarily based on mobile source control strategies (e.g., add-on control devices, alternative fuels, fleet modernization, repowers, retrofits) are essential for both PM2.5 and ozone attainment. Also, adequate VOC controls need to be in place in time for achieving significant VOC reductions needed for the 8-hour ozone standard by 2024. Reducing VOC emissions in early years would also ensure continued progress in reducing the ambient ozone concentrations. The 8-hour ozone control strategy builds upon the PM2.5 attainment strategy augmented with additional long-term VOC and NOx reductions for meeting the ozone standard by 2024. Based on the sheer magnitude of emission reductions needed for ozone attainment and the readiness of NOx control technologies, a NOx-heavy strategy is proposed for the Final AQMP which provides the most efficient path to clean air. With respect to PM10, since the Basin will not attain the annual standard by 2006 for one station, additional local programs are proposed to address the attainment issue in an expeditious manner.

The Final 2007 AQMP control measures consist of four components: 1) the District's Stationary and Mobile Source Control Measures; 2) CARB's Proposed State Strategy; 3) District Staff's Proposed Policy Options to Supplement CARB's Control Strategy; and 4) Regional Transportation Strategy and Control Measures provided by SCAG. These measures are outlined in Appendix IV-A (District's Stationary and Mobile Source Control Measures), Appendix IV-B-1 (CARB's Draft Proposed State Strategy for California's 2007 State Implementation Plan), Appendix IV-B-2 (District's Proposed Policy Options to Supplement CARB's Strategy), and IV-C (Regional Transportation Strategy and control Measures).

### **IS THE BUMP-UP REQUEST NECESSARY?**

The South Coast Air Basin (Air Basin) is currently classified as a "Severe-17" non-attainment area for the federal ambient 8-hour ozone air quality standard with an attainment date of 2021. For any non-attainment area, the Clean Air Act (CAA) also provides for voluntary reclassification of such areas to a higher classification by submitting a request for "bump-up." The District is requesting a "bump-up" to "extreme" non-attainment classification for the Basin, which would extend the attainment date to 2024 and allow for the attainment demonstration to rely on emission reductions from measures that anticipate the development of new technologies or improving of existing control technologies (CAA Section 182(e)(5) measures). These measures are often referred to as "black box" measures and go beyond the short-term measures that are based on known and demonstrated technologies.

Under its current non-attainment classification, the District is prohibited from relying on "black-box" measures to demonstrate attainment. However, as shown in Table ES-2 approximately 43% of the ozone attainment strategy relies on "black-box" measures and 57% of reductions come from short-term measures.

**TABLE ES-2**

Emission Reductions Needed for Ozone Attainment  
(2023, tons per day)

	VOC	NO <sub>x</sub>
Overall Reductions	116	383
Short-Term Reductions	89	193
Black Box Reductions	27	190

Converting these “black-box” reductions to short-term measures represents unique and complex challenges to this region and warrants additional time for development and implementation of more defined strategies, including in some cases sustainable funding.

If the region is unable to submit a SIP revision demonstrating attainment by the deadline, U.S. EPA must impose sanctions on the region. The first sanction, imposed after 18 months, is an offset ratio of 2 to 1 for major stationary sources (25 tpy or more). The second sanction (after 24 months) is withholding of all federal transportation funding for the region, except funding for transportation control measures and safety projects; in the South Coast, this amounts to billions of dollars. Finally, if the region cannot submit an approvable attainment demonstration, U.S. EPA must within 24 months adopt a “federal implementation plan” (FIP) demonstrating attainment by the severe-17 deadline. The FIP likewise could not rely on “black box” measures, and thus would likely impose draconian measures on mobile and stationary sources in the region.

Given the risk of becoming subject to sanctions and a FIP, and the benefits of a later attainment date and use of “black box” measures, AQMD staff recommends a voluntary bump-up request to “extreme” status as part of the 2007 AQMP submittal to the U.S. EPA. The bump-up would provide the basis for an approved plan for this region and implementation of short-term measures while providing an opportunity for a close collaboration among all agencies, industry, environmental organizations, and the public to define and implement these long-term measures as expeditiously as possible.

Despite the aggressive strategy proposed for the South Coast Air Basin, the Coachella Valley will not be able to meet the ozone standard by 2013, where the ozone problem is predominately a transport issue from the upwind South Coast Air Basin. Consequently, Ozone air quality will not meet the federal standard in the Coachella Valley until 2019 through the implementation of the Basin plan. Therefore, a “bump-up” request is also being made for Coachella Valley from a non-attainment classification of “serious” to “severe-15 with an extended attainment date of 2019.

## **WHAT ARE THE MAIN CHALLENGES OF ATTAINMENT?**

Attainment of the new federal PM<sub>2.5</sub> and 8-hour ozone standards poses yet another tremendous challenge for the South Coast Air Basin. The latest emissions inventory and air quality modeling analysis employed in the 2007 AQMP indicate that significant reductions above and beyond those already achieved are still needed for meeting these standards. The main challenges of attainment are described in this section.

## **PM2.5 ATTAINMENT BY 2015**

Attainment of the federal health-based PM2.5 standard would demand significant emission reductions in PM2.5 components within the next seven years. Based on the District's recent air quality modeling analysis, these reductions are on the order of 192 tons per day of NOx, 59 tons per day of VOC, 24 tons per day of SOx, 15 tons per day of PM2.5 emissions. This range of reductions identifies the overall path to clean air and policy direction in designing the attainment strategy.

In 2014, sources primarily under the state and federal jurisdictions will account for 88% of NOx, 72% of VOC, and 63% of SOx emissions in the Basin in 2014. Therefore, in order to meet the federal PM2.5 standard by 2014, significant reductions are required from these sources. CARB has the overall responsibility of developing the State Element of the SIP outlining the state's specific short-term and long-term strategies for reducing emissions from mobile sources and consumer products. CARB has recently released its revised draft Proposed State Strategy for California's 2007 State Implementation Plan. By 2014, the proposed State measures are estimated to achieve 122 tons per day of NOx, 43 tons per day of VOC, 20 tons per day of SOx, and 9 tons per day of PM2.5 reductions.

### **District Staff's Proposal for PM2.5 Attainment Strategy**

In the Proposed Modifications to the Draft Plan, released in March 2007, District staff identified a reduction gap of 71 tons per day of NOx for PM2.5 attainment by 2015 based on the estimated reductions from the draft proposed State strategy along with District's proposed control measures. Consequently, three policy options based on implementation of additional control measures and incentive funding were provided to close the gap (described in Appendix IV-B-2). In the revised draft state strategy, the reduction gap has increased to 74 tons per day of NOx due to foregone emission reductions for one of the state measures (i.e., off-road diesel equipment).

Based on further 3-agency (i.e., District, CARB, and SCAG) discussions to date, the District staff is proposing the following:

- The District is enhancing two of its proposed control measures (i.e., wood-burning fireplaces and wood stoves and commercial under-fired charbroilers) to obtain an additional 1.4 tons per day of directly-emitted PM2.5, which is equivalent to about 11 tons per day of NOx.
- CARB will commit to an additional 63 tons per day of NOx reductions to close the attainment gap, bringing the total commitment to 185 tons per day by 2014.

In its revised draft State strategy, CARB staff has suggested that the District consider additional local measures for directly-emitted PM sources to close the reduction gap. Specifically, CARB staff has suggested mandatory curtailment of the use of fireplaces

and woodstoves during winter months, requiring additional controls on commercial cooking (i.e., charbroilers), and strengthening fugitive dust controls.

District staff has agreed to enhance its existing control measure on wood-burning fireplaces and woodstoves but has serious concerns over the feasibility and enforceability of the extent of mandatory curtailment suggested by CARB staff and the uncertainties in ambient concentrations from wood burning. Also, the District's control measure on commercial under-fired charbroilers has been strengthened to achieve additional PM<sub>2.5</sub> reductions based on the installation of new and retrofit control equipment, similar to the proposed regulation currently being developed by the Bay Area Air Pollution Control District. However, despite these new reductions from measures proposed by the District, the PM<sub>2.5</sub> standard can not be fully achieved by 2015 without additional reductions from mobile sources. In addition, inadequate initial steps would be made towards attainment of the new 24-hour PM<sub>2.5</sub> standard and 8-hour ozone standard.

Therefore, since not fully attaining the PM<sub>2.5</sub> standard by 2015 is not an acceptable or legally allowed public policy, the District staff is proposing that CARB commit to the additional 63 tons per day of NO<sub>x</sub> reductions from mobile sources to close the reduction gap for PM<sub>2.5</sub> attainment by 2015. These NO<sub>x</sub> reductions will also be critically needed for achieving the 8-hour ozone and the 24-hour PM<sub>2.5</sub> standards and making expeditious progress to implement all feasible measures. The District staff's proposed policy options identify a combination possible regulatory actions and public funding programs to achieve the additional NO<sub>x</sub> reductions. District staff believes these measures are feasible.

### **8-HOUR OZONE ATTAINMENT BY 2024**

Attainment of the 8-hr ozone standard by 2024 will require significant additional reductions above and beyond those necessary for PM<sub>2.5</sub> attainment. These reductions are expected to be achieved through implementation of new and advanced control technologies as well as improvement of existing control technologies. Control techniques requiring substantial levels of committed funding for implementation would also fall under this category of long-term emission reductions.

Based on District staff's air quality modeling analysis, the additional "black box" reductions needed for ozone attainment are estimated to be 190 tpd of NO<sub>x</sub> and 27 tpd of VOC reductions between 2015 and 2023 timeframe. These reductions are equally, if not more, challenging as the reduction gap for PM<sub>2.5</sub>, in that significant reductions are needed in a short timeframe. Actions are needed in the next couple of years to ensure technical readiness and significant quantity of product supply.

Table ES-3 provides a listing of some of the advanced technologies and innovative control approaches which could be relied upon to achieve the long-term reductions

needed for ozone attainment, highlighting the level of stringency and aggressiveness of controls required.

**TABLE ES-3**

Possible Approaches for Long-Term Control Measures

<b>Light Duty Vehicles</b>	<ul style="list-style-type: none"> <li>▪ Extensive retirement of high-emitting vehicles and accelerated penetration of PZEVs and ZEVs</li> </ul>
<b>On-Road Heavy Duty Vehicles</b>	<ul style="list-style-type: none"> <li>▪ Expanded modernization and retrofit of heavy-duty trucks and buses</li> <li>▪ Expanded Inspection and Maintenance Program</li> <li>▪ Advanced Near-Zero and Zero Emitting Cargo Transportation Technologies</li> </ul>
<b>Off-Road Vehicles</b>	<ul style="list-style-type: none"> <li>▪ Expanded modernization and retrofit of off-road equipment</li> </ul>
<b>Fuels</b>	<ul style="list-style-type: none"> <li>▪ More stringent gasoline and diesel specifications; Extensive use of diesel alternatives</li> </ul>
<b>Marine Vessels</b>	<ul style="list-style-type: none"> <li>▪ More stringent emission standards and programs for new and existing ocean-going vessels and harbor craft</li> </ul>
<b>Locomotives</b>	<ul style="list-style-type: none"> <li>▪ Advanced Near-Zero and Zero Emitting Cargo Transportation Technologies</li> </ul>
<b>Pleasure Craft</b>	<ul style="list-style-type: none"> <li>▪ Accelerated replacement and retrofit of high-emitting engines</li> </ul>
<b>Aircraft</b>	<ul style="list-style-type: none"> <li>▪ More stringent emission standards for jet aircraft (engine standards, clean fuels, retrofit controls), Airport Bubble</li> </ul>
<b>Consumer Products</b>	<ul style="list-style-type: none"> <li>▪ Ultra Low-VOC formulations; Reactivity-based controls</li> </ul>
<b>Renewable Energy</b>	<ul style="list-style-type: none"> <li>▪ Accelerated use of renewable energy and development of hydrogen technology and infrastructure</li> </ul>
<b>AB32 Implementation</b>	<ul style="list-style-type: none"> <li>▪ Concurrent criteria pollutant reduction technologies</li> </ul>

For light-duty vehicles, extensive retirement and replacement of high-emitting vehicles would be required through either mandatory or incentive-based programs. Furthermore, achieving further reductions from this source category will require an even more accelerated penetration of ATPZEVs and ZEVs beyond the 1 million target in 2020 currently proposed under short-term measures and could be as high as 4 to 5 million in 2023.

For heavy duty vehicles, a more extensive modernization program could be instituted to require the replacement of the remaining trucks not meeting the 2010 model year standard in 2020 after implementation of short-term measures. For off-road heavy diesel equipment, opportunities may also exist to achieve additional reductions by requiring that all of these equipment meet Tier 4 off-road engine standards or better through replacements or retrofits by 2020/2023. Reformulation of gasoline and diesel fuels coupled with requirements for using diesel alternatives (e.g., CNG, LNG, gas-to-liquid)

would also provide an opportunity for additional long-term NO<sub>x</sub>, VOC, and PM reductions from on-road and off-road mobile sources.

Advanced cargo transportation technologies such as Maglev and other types of linear induction motor technologies could also be used to transport containers to and from ports thereby significantly reducing emissions from locomotives and heavy-duty trucks. Such alternative electric propulsion systems would have the added benefit of reducing congestion and reliance on fossil fuels. Accelerated development and implementation of these advanced technologies would provide a tremendous opportunity for achieving the emission reductions needed for ozone attainment

Further emission reductions from ocean-going vessels beyond those considered under CARB's goods movement plan could also be achieved through a more expanded main engine retrofit program which would target all vessels calling on the San Pedro Bay ports (i.e., including those making non-frequent or less frequent calls) to achieve higher levels of NO<sub>x</sub> reductions from existing vessels. CARB or the Ports have the ability to adopt and implement such programs, but may require authorization from U.S. EPA

Accelerated replacement of existing pleasure craft with new models meeting the most stringent engine standards and application of potential retrofit technologies provides another strategy for achieving long-term reductions. In addition, aircraft emissions could be further reduced through strategies such as lower engine emission standards, reformulation of jet fuel, and installation of retrofit kits which would require extensive technology development.

Finally, additional VOC reductions from consumer products could be achieved based on the application of low-VOC technologies and formulations developed for industrial coatings and solvents categories. Also, reformulation based on lower reactive compounds could offer an additional alternative for achieving equivalent reductions.

## **UNCERTAINTIES IN MOBILE SOURCE EMISSIONS INVENTORY**

Although the emissions inventory and projections in the 2007 AQMP represent the latest available methodologies, emission factors, and growth projections, there are uncertainties in the mobile source emissions inventory which need to be addressed in the final AQMP or, if necessary, immediately following the AQMP adoption. The mobile source inventory for this Final 2007 AQMP represents an increase over the previous AQMP primarily because of ethanol permeation, heavy-duty vehicle in-use emissions, increased evaporative emissions for pleasure craft, and other adjustments.

As part of the on-road mobile source inventory evaluation, it became clear that the EMFAC VMT estimates portrayed a 2005 "blip" as a result of CARB's methodology to adjust the 2005 VMT (provided by SCAG) based on Department of Motor Vehicle

(DMV) vehicle registrations and Bureau of Automotive Repair (BAR) odometer readings collected through the Smog Check program.

AQMD staff examination of the EMFAC VMT indicated that for 2005 the difference in CARB's VMT estimates and SCAG's was on the order of 10 percent for light- and medium-duty vehicles (or 30 million more VMT per day in CARB's estimates) and 20 percent for heavy duty vehicles (or about 5 million more VMT per day). The AQMD's consultants reviewed CARB's assumptions and to the extent possible some of the DMV and BAR data used to produce the 2005 VMT estimates. They concluded that there is no independent evidence to support a decline in VMT between 2005 and 2010, and recommended conducting sensitivity analysis in the near-term (given the need to develop an AQMP Revision) to determine the magnitude of the differences.

A sensitivity analysis was conducted to estimate the emissions impact of projecting the SCAG linear VMT trend using the 2005 CARB estimate as the anchor. The analysis indicates that should the revised VMT projections be a more accurate representation of future estimates, the ozone attainment strategy would need additional 30 to 40 tons per day of NOx reductions.

While the technical work to improve the inventory is on-going, the past plan revisions have shown continuous upward adjustment of the mobile source inventory. The control strategy for attainment demonstration should provide a certain level of safety margin to address this potential underestimation of emissions with only seven years remaining for PM2.5 attainment.

### **FAIR SHARE AGENCY RESPONSIBILITY**

In order to achieve necessary reductions for meeting air quality standards, all four agencies (i.e., AQMD, CARB, U.S. EPA, and SCAG) would have to aggressively develop and implement control strategies through their respective plans, regulations, and alternative approaches for pollution sources within their primary jurisdiction. Even though SCAG does not have direct authority over mobile source emissions, it will commit to the emission reductions associated with implementation of the 2004 Regional Transportation Plan and 2006 Regional Transportation Improvement Program which are imbedded in the emission projections. Similarly, the Ports of Los Angeles and Long Beach have authority they must utilize to assist in the implementation of various strategies if the region is to attain clean air by federal deadlines.

The following figures (ES-7 and ES-8) represent the projected emission contributions by agency primary authority for major pollutants in 2014 and 2023 for key pollutants.

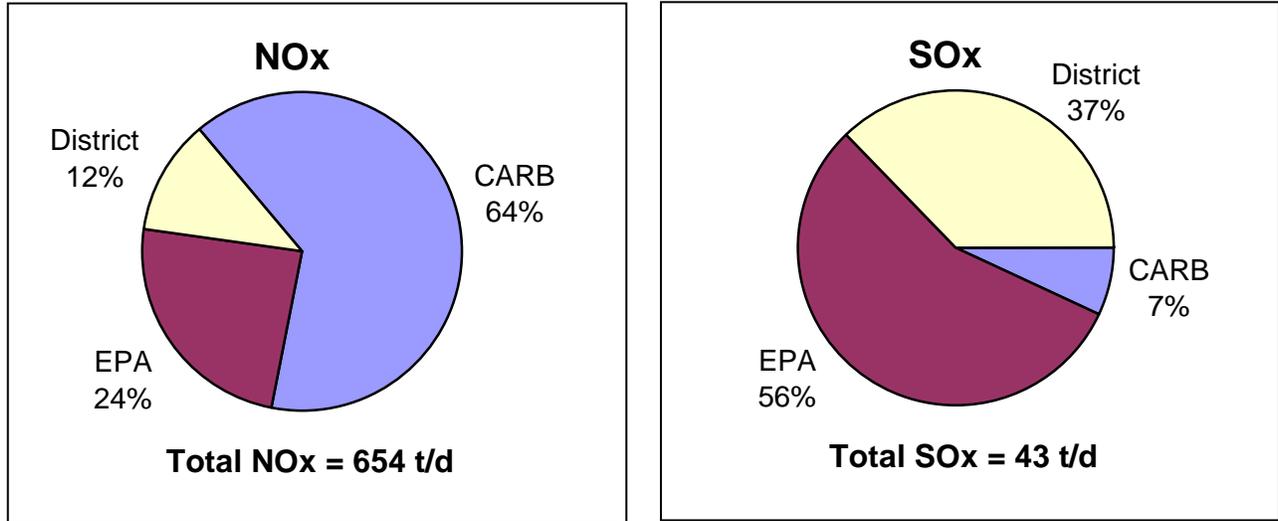
Although the District has completely met its obligations under the 2003 AQMP and stationary sources subject to the District's jurisdiction account for only 12% of NOx and 37% of SOx emissions in the Basin in 2014, the Final 2007 AQMP contains several

short-term and mid-term control measures aimed at achieving further NO<sub>x</sub> and SO<sub>x</sub> reductions (as well as VOC and PM<sub>2.5</sub> reductions) from these already regulated sources. These strategies are based on facility modernization, energy conservation measures and more stringent requirements for existing equipment (e.g., space heaters, ovens, dryers, furnaces).

Clean air for this region requires CARB to aggressively pursue reductions and strategies for on-road and off-road mobile sources and consumer products. In addition, considering the significant contribution of federal sources such as marine vessels, locomotives, and aircraft in the Basin (i.e., 56% of SO<sub>x</sub> in 2014 and 37% of NO<sub>x</sub> in 2023), it is imperative that the U.S. EPA pursue and develop regulations for new and existing federal sources to ensure that these sources contribute their fair share of reductions toward attainment of the federal standards. Unfortunately, regulation of these emission sources has not kept pace with other source categories and as a result, these sources are projected to represent a significant and growing portion of emissions in the Basin. Without a collaborative and serious effort among all agencies, attainment of the federal standards will be seriously jeopardized.

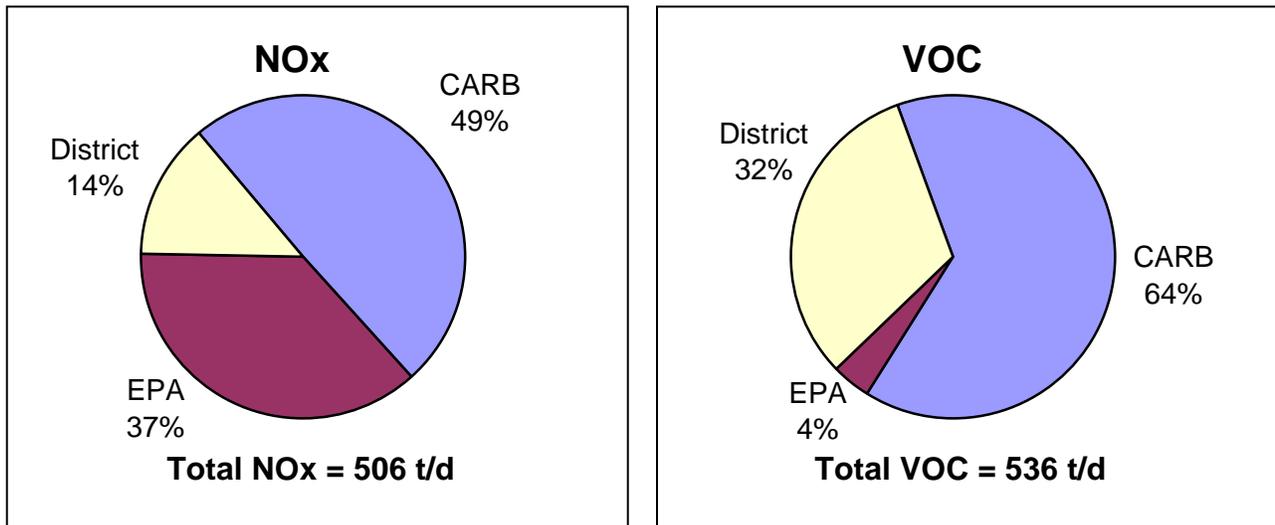
**FIGURE ES-7**

Emissions Contribution by Primary Agency Responsibility  
(2014, Annual Average Inventory)



**FIGURE ES-8**

Emissions Contribution by Primary Agency Responsibility  
(2023, Planning Inventory)



## **FUNDING AVAIABILITY**

The overall costs of implementing the control measures proposed in the Final 2007 AQMP are in the billions of dollars. In-use mobile source fleet modernizations, accelerated retirement of high-emitting vehicles and equipment, alternative fuels and their infrastructure, advanced retrofits, facility modernization, and product reformulations and replacements are among strategies which require significant levels of funding. For illustration purposes, the estimated costs associated with the recently released San Pedro Bay Port's Draft Clean Air Action Plan and CARB's Goods Movement Plan targeting ports and goods movement sectors alone are approximately \$2 billion dollars and \$10 billion dollars, respectively. The costs of implementing the AQMP control measures affecting virtually all source categories in the Basin will add to these estimates. However, the economic values of avoiding adverse health effects are projected to be many times higher than the implementation cost of clean air strategies.

In order to meet the federal PM<sub>2.5</sub> and 8-hour ozone ambient air quality standards, a significant amount of public and private funding will be required to implement some measures. A close collaboration among all stakeholders, government agencies, businesses, and residents would be critical to identify and secure adequate funding sources for implementing the AQMP control measures.

In addition to public funding for mobile sources, financial assistance to stationary sources should be explored in light of the need to further reduce emissions from local businesses. The Plan discussed the desire to seek tax incentives for early deployment of clean air technologies as part of plant modernization or to establish "Carl Moyer" type programs for stationary sources for pollution prevention, such as process changes to apply near-zero pollution technologies.