

EXECUTIVE SUMMARY

Introduction

The Air Resources Board's (ARB) 2007 State Implementation Plan (SIP) proposal is a comprehensive strategy designed to attain federal air quality standards as quickly as possible through a combination of technologically feasible, cost-effective, and far reaching measures. Mobile source measures are the heart of the strategy, with modernization of diesel fleets an essential near-term focus. Long-term strategies will also be necessary. The total magnitude of the reductions to be achieved through new actions is primarily driven by the scope of the air quality problems in the San Joaquin Valley and South Coast Air Basin. However, ARB's mobile source control program is statewide in nature and also provides most of the new reductions needed to meet and maintain federal air quality standards in Sacramento, San Diego, Ventura, the San Francisco Bay Area, and other local air districts.

Under State law, the Board plays two primary roles in the SIP process. The first is to deliver emission reductions from mobile sources, fuels, consumer products, and other sources under ARB jurisdiction. The second is to ensure California's compliance with federal Clean Air Act requirements. State law also establishes a process by which SIPs are developed at a regional level by local air districts, in coordination with transportation agencies, for ultimate approval by ARB and the U.S. Environmental Protection Agency (U.S. EPA).

When this process was put in place, emissions from stationary air pollution sources under air district jurisdiction contributed a greater share of the emissions than they do today. Now the landscape has changed, and actions by ARB, U.S. EPA, and international bodies are more critical than ever for attainment of ozone and particulate matter (PM_{2.5}) air quality standards. In the case of the goods movement sector, increasingly California's most challenging air quality problem, port operators and others also play important roles.

Ideally, the shared responsibility for SIP development would result in a shared federal, state, and local vision of how best to attain air quality standards in California. However, given the complexity and severity of the problem, federal preemption issues, and tremendous funding needs, SIP development is more challenging than ever. This document presents ARB staff's view of where California stands in terms of compliance with the federal 8-hour ozone and PM_{2.5} standards and proposes a comprehensive new SIP strategy. This strategy will be difficult and expensive, but is necessary to protect public health. Staff believes all the measures we are proposing are technologically feasible and cost-effective. They will set the stage for further long-term actions.

The PM2.5 attainment deadline of 2015 is the most pressing issue to be resolved. The legacy fleets of diesel engines are the biggest contributor to the regional PM2.5 problem in the South Coast. This includes fleets of trucks, construction equipment, ships, harbor craft, and locomotives. The cleanup costs will be in the billions of dollars. Practical constraints will affect the pace of accelerated fleet turnover whether through regulation or incentive programs. ARB is prepared to take on the job of defining the necessary actions – but it is still an open question whether the 2015 deadline is achievable. More time may be needed to bring all locations into attainment.

The South Coast and San Joaquin Valley will need to take the full time allowable for ozone attainment which means a 2024 deadline. U.S. EPA guidelines require the necessary emission reductions to be achieved by 2023. In both cases, most of the air basin is expected to attain before that date, but the SIP must demonstrate that the last remaining violation sites would be in compliance.

It is imperative that we are successful in our efforts to meet air quality standards. The SIP process is a valuable planning mechanism to focus on that goal. A public dialogue is also important because of the stakes involved. This document is intended to provide key information for consideration in the public process. It outlines ARB staff's assessment of how far adopted regulations will take us towards attainment of federal standards, what new actions should be taken, timing of new technology, and the role of incentive funds. After additional public input is received, ARB staff will release a final proposal for Board consideration. The proposal will include ARB's new measures and enforceable emission reduction commitments, as well as actions that need to be taken by other agencies.

Statewide Ozone SIP Development

California has 8-hour ozone SIPs for 15 areas under development to meet the June 15, 2007 deadline for submittal to U.S. EPA. While a recent court decision raises some questions about the process, U.S. EPA has not yet responded to the decision or directed states to change course. ARB staff believes California should continue to proceed with the new SIPs so no time is lost while the federal government responds to the court decision. By completing the planning process now underway, we can ensure continued momentum in our efforts to improve ozone air quality in California. In addition, SIPs in California are routinely revised for a variety of reasons, including new technical information and control strategies. There will be opportunity to respond to any new SIP requirements once the legal processes are concluded.

ARB technical staff has worked closely with staff of air districts to develop emission inventories and air quality modeling for use in the ozone SIPs. California's ozone modeling has been conducted separately for two overarching regions: (1) Northern

and Central California and (2) Southern California. The northern/central modeling includes the San Joaquin and Sacramento Valleys, the San Francisco Bay Area, and mountain counties along the Sierra Nevada Mountains. The southern modeling region includes the South Coast Air Basin, Ventura County, San Diego, Imperial County, and the Mojave Desert area. Air quality studies done in each of the modeling domains provide data inputs for use in SIP modeling. With these two large modeling areas, the impacts of air pollution transport and upwind emission reductions can be accounted for in the SIP process.

The modeling results indicate that with the continued reductions in emissions on track to occur in each of the 15 areas, all but the San Joaquin Valley and the South Coast Air Basin will be able to show attainment by 2021 or earlier with identified measures. With additional reductions from ARB's proposed new strategies, the Sacramento region is projected to attain by 2019 with a reclassification from serious to severe. However, for the San Joaquin Valley and South Coast, substantially more reductions and time will be needed. The year 2021 has been used as a placeholder deadline for SIP development. ARB staff expects both regions to be reclassified as extreme with a 2024 deadline.

Mobile source programs will provide over 90 percent of the emission reductions that will occur between now and 2023 in the South Coast and the San Joaquin Valley. As we proceed with development of the near-term SIP measures, we will also work with air districts and others on long-term concepts that will be needed to reach ozone attainment in the South Coast and the San Joaquin Valley.

PM2.5 SIP Development

Both the San Joaquin Valley and South Coast are required to prepare PM2.5 SIPs for submittal to U.S. EPA by April 5, 2008. The San Joaquin Valley Air Pollution Control District is on track to meet that schedule. However, as the region's ozone SIP is being developed, both ARB and air district staff have considered the nature of the region's PM2.5 problem. This is necessary to ensure that the ozone SIP strategy will support PM2.5 attainment as well. The science indicates that reductions of nitrogen oxides (NOx) are relatively more beneficial for both ozone and PM2.5 attainment than other contributing pollutants. The San Joaquin Valley ozone SIP is being designed with this in mind. So while the PM2.5 SIP will follow later, the strategies are expected to be complementary. When the PM2.5 plan is complete, the air district plans to review the ozone strategy to ensure this is the case.

The South Coast Air Quality Management District has chosen to develop ozone and PM2.5 SIPs concurrently. While this process has provided some valuable information about the need for further NOx controls, ARB staff is recommending that

we make use of the available time to complete final PM2.5 SIPs for both South Coast and the San Joaquin Valley. The magnitude and scientific complexity of the problem, the need to replace legacy fleets of diesel engines, and the 2015 attainment deadline all come into play. This is the first time gridded aerosol PM2.5 modeling has been attempted for SIP purposes. The modeling incorporates complex atmospheric processes, and is supplemented with technical analyses to reconcile results with monitoring data. The multiple pollutants involved, the differences in pollutant contributions at various locations, and the sensitivity of the model's response to emission reductions all add to the complexity of the analysis. The District's 2014 NOx reduction target would require a 70 percent reduction from 2006 emission levels. Since diesel engines are the dominant NOx emissions source, massive fleet turnover to the cleanest engines would be needed to achieve reductions of that magnitude.

Overview of Proposed ARB Strategy

To attain federal standards in the San Joaquin Valley and South Coast it is essential to further reduce emissions from all mobile sources. Goods movement related emissions are of particular concern due to the growth and concentration of emissions in some communities. In April 2006, the Board adopted an emission reduction plan for statewide goods movement. That plan forms the core of the proposed new SIP measures and is currently being implemented. Along with reducing community exposures to diesel particulate, reducing statewide exposure to ozone and PM2.5 is a primary goal of ARB's emission reduction plan for goods movement. That plan is being implemented today.

The ozone SIP is linked to that effort through the emphasis on NOx reductions. ARB staff has used the results of SIP modeling for both ozone and PM2.5 to reassess the NOx emission reduction targets for two major rulemakings already underway – the rules for private truck fleets and construction equipment. These rulemaking activities are the first of their kind in the nation because they will require retrofit or early retirement of truck engines and construction equipment throughout California. These rules rely on the introduction of cleaner technology, and as a practical matter must take into account the timing of U.S. EPA's diesel engine standards and availability of newer, cleaner engines.

The NOx control component of U.S. EPA's new engine standards for diesel trucks takes effect in 2010. However, under the federal rules full NOx control for construction and farm equipment does not begin until 2014. Similar NOx controls for locomotive engines are under development by U.S. EPA, but not yet adopted. The timing of these federal new engine standards, combined with federal preemptions on locomotive controls, form a legal and practical framework that limits how much clean

up of diesel fleets in California can be accelerated. Another consideration is the typical lifetime of diesel engines which differs by engine application. Trucks, construction- equipment, farm equipment, and locomotives all have different useful lives, greatly affecting the economics of accelerated fleet turnover. Each of these considerations are evaluated and addressed in this plan and will be further evaluated in the rulemaking process.

Within certain limits, the federal Clean Air Act gives ARB the ability to adopt regulations more stringent than the federal government. ARB has a longstanding tradition of doing just that. Other states, and at times U.S. EPA, have followed our lead. Recently, California's unique ability to adopt more stringent mobile source requirements was questioned by some in Congress, but in the end both the need and the appropriateness of ARB's actions were recognized. In the public meetings on this issue, the thoroughness of the technical analyses and public processes used by ARB for the rulemaking process were acknowledged as strong rationales for maintaining our unique authority.

In the past few months, ARB staff has held public meetings to discuss the proposed SIP State Strategy, with the emphasis on identifying new measures for inclusion. After considering public input and reviewing the draft SIPs for the San Joaquin Valley and South Coast, we are proposing a list of new near-term measures for development and consideration by the Board. We have also proposed a list of concepts for long-term strategy development by ARB and others.

Furthermore, we identify efforts that are needed to integrate incentive funding mechanisms into the SIP State Strategy – this includes the Carl Moyer Program, the \$1 billion air quality mitigation bond, and other State and federal funding programs. In the San Joaquin Valley, a coordinated effort is underway to develop additional incentive funds through the efforts of the San Joaquin Valley Partnership. As we refine ARB staff's proposal we will try to clarify as much as possible how incentive programs interface with our regulatory programs and how SIP credit can be granted.

Important national and international sources – ocean-going ships and aircraft – are only partially addressed in ARB staff's proposal due to practical and legal limitations. Aircraft emissions, which become one of the South Coast's top five NOx sources by 2020, are unaddressed due to the lack of effective international standards. The federal government needs to take a leadership role to represent our interests in the international standard setting process. We are proposing several measures to reduce ship emissions through a combination of ARB regulation, incentives, and actions by ports and the private sector. However, national and international action to clean up shipping fleets is also needed to fully meet our clean air goals.

Growth in vehicle travel is another issue that California air agencies can only partially address through trip reduction and indirect source rules. As vehicle travel increases, the benefits of ARB's mobile source regulations are diminished. Both the South Coast and San Joaquin Valley are facing a post-2021 horizon for meeting the ozone standard due to the severity of the remaining problem. This means the SIP must rely on the development of new technologies to provide new long-term reductions. Over the same timeframe, substantial population and vehicle growth is projected. How land use planners and transportation systems accommodate this growth will be primarily determined by local governments. Air quality goals need to be factored into these decisions.

ARB staff's proposed near-term SIP measures and strategies will provide new emission reductions from each of these emission categories:

- Diesel Truck Fleets
- Construction Fleets
- Passenger Vehicles
- Ships traveling and in-port
- Ship Fuels
- Port Trucks
- Harbor Craft
- Locomotive Fleets
- Consumer Products
- Evaporative and Exhaust Emissions
- Fuels
- Pesticides

The table below provides a list of proposed ARB regulations and other actions to reduce emissions from these categories. Most of the actions are regulatory, but incentives and voluntary steps will help accelerate clean up of existing diesel fleets.

Proposed ARB Regulations and Other Actions Needed

	ARB Regulation Proposed	Incentives/ Voluntary Action Needed	EPA Regulations Needed	National/ International Standard Needed
MOBILE FLEETS				
Statewide Truck Fleet	✓	✓	2010 standard	
Port Truck Fleets	✓	✓		
Construction, Agricultural and Other Fleets	✓		2014 standard	
Harbor Craft Fleets	✓		✓	
Cargo Handling Fleets	✓ (2005 rule)			
Forklifts and Other Fleets	✓ (2006 rule)			
Smog Check Improvements	✓ (BAR)			
Passenger Vehicle Early Retirement		✓		
Ship Fleets	✓	✓		✓
Ship Shore Power	✓	✓		
Ship Speed Limits	✓			
Locomotive Standards			✓	
Locomotive Fleets		✓		
Aircraft				✓
FUELS				
Ship Auxiliary Engine Fuel	✓ (2005 rule)			
Ship Main Engine Fuel	✓			
Harbor Craft Fuel	✓ (2005 rule)			
Locomotive Fuel	✓ (2004 rule)		2012 standard	
EVAPORATION & EXHAUST				
Gasoline Storage Tanks	✓			
Off-Road Recreational Vehicles	✓			
Recreational Boats / Watercraft	✓			
Portable Fuel Storage (Marine)	✓			
Gasoline Vapor Recovery Hoses	✓			
CONSUMER PRODUCTS				
Standards	✓			
Market Approaches	✓			
PESTICIDES				
DPR Pesticide Plan	✓ (DPR)			
Total Tons Per Day Impact in 2023 South Coast (ROG+NOx)	212 Tons per day	To Be Quantified	Locomotive Rule Pending	None Proposed
Total Tons Per Day Impact in 2023 San Joaquin Valley (ROG+NOx)	68 Tons per day			

As in previous SIPs, ARB's goal is to maximize the emission reductions from each strategy during measure development. During rule development new options can arise and are incorporated into the process. Sometimes these ideas can be incorporated immediately, in other cases more data will be developed before a concept proceeds to rulemaking. This iterative process has led to new ARB rule development and emission reductions with each new SIP. This is possible in large part due to the development of new technology over time, which is recognized in the Clean Air Act through provisions that allow for long-term measures.

ARB's concepts for long-term strategy development reflect the need to achieve further NO_x reductions from mobile sources, as well as address the challenging category of consumer products that grows with California's population. We expect the nature of long-term strategies to evolve over time along with other societal changes. Positive actions by consumers can substantially affect the rate of progress and the magnitude of the challenge that remains.

From travel patterns to product choices, how California chooses to grow will make a difference. Local governments, transportation agencies, and the private sector need to join air agencies to define the long-term strategies needed to meet our public health goals and address quality of life issues. The federal government must also play a leadership role on a national and international basis. Long-term strategies ARB staff believes should be pursued include:

- Market based strategies for consumer products
- Incentives for low-emission technologies
- Efficient regional land use and transportation strategies
- Further vehicle technology advancements in engine design, after-treatment, and on-board diagnostics
- Further fuel improvements that complement low-carbon vehicle fuel
- Continued emphasis on water-based product formulations
- Targeted retirement of the dirtiest engines remaining in on-road and off-road fleets
- National/international NO_x standards to reduce aircraft emissions (given the long engine life, standards need to be developed now)
- Further reductions in ship emissions through international standards
- Technology advancements in stationary source controls

These concepts are just a starting point. As we develop our proposed near-term measures we will continue to give thought to what more should be done longer term.

Mobile Source NO_x Controls

ARB staff's proposed strategy reflects the importance of more mobile source NO_x reductions for attainment of ozone and PM_{2.5} standards in South Coast and the San Joaquin Valley. Adopted rules provide most of the future reductions from passenger

vehicles, trucks, and construction equipment. For ships, ARB's new strategies would provide all the reductions since ships are not well controlled and emissions are growing. In contrast, ARB's stringent passenger vehicles standards are being implemented now, and fleet turnover provides substantial new reductions each year. Smog Check improvements, combined with early vehicle retirement, are essential new strategies for passenger vehicles. These strategies will provide both NOx and ROG reductions. Because Smog Check improvements can be implemented by 2010, these are important near-term actions to reduce vehicle emissions and public health impacts from California's passenger vehicle fleet. Implementing the proposed Smog Check improvements by 2010 would enable most of the benefits to be achieved by 2014.

For heavy-duty diesel trucks, natural fleet turnover to the cleanest engines does not begin until 2010. This makes accelerating introduction of cleaner engines into fleets that operate in California essential. Exploring ways to ensure these engines are maintained and do not produce excess emissions is the second measure in the proposed strategy. In developing the emission reduction estimates for the proposed measure for heavy-duty trucks, staff made simplifying assumptions. In the rulemaking process for the statewide private truck fleet rule already underway, a mix of PM retrofit and engine replacement strategies are being evaluated in terms of feasibility and cost-effectiveness. The results of these evaluations will frame staff's final proposal for Board consideration. The second proposed measure is at the concept stage and needs to be developed as part of the SIP implementation process.

The situation for construction fleets is similar – new federal NOx standards for off-road diesel engines do not take effect until 2014. ARB is developing a fleet rule for this category designed to reduce both diesel particulates and NOx emissions. Because of the timing of the federal standards, and California's inability to adopt new engine standards due to preemption, we cannot achieve all the necessary NOx reductions from this category by 2014. ARB staff is now developing a rule for Board consideration that is designed to maximize the emission reductions by 2014 in recognition of the PM2.5 deadline for South Coast and San Joaquin Valley.

Strategies for ships and locomotives are described below under the South Coast SIP discussion. The ship strategies are very significant for South Coast and the locomotive strategy is important for both regions.

New Measures and Reductions

The table below shows proposed new measures and estimated emission reductions (NOx and ROG) in 2023 for South Coast and San Joaquin Valley. The emission reductions are estimated for planning purposes based on the information at hand, and will be refined during measure development. Measures like early vehicle retirement rely on funding, some Smog Check improvements require authorizing legislation, and several ARB regulatory proposals for goods movement will occur in parallel with actions by ports and others.

**Expected Emission Reductions from Proposed New SIP Measures
(tons per day)**

South Coast and San Joaquin Valley – 2023

	South Coast		San Joaquin Valley	
Proposed New SIP Measures	NOx	ROG	NOx	ROG
ON-ROAD SOURCES				
Passenger Vehicles	7.1	10.5	2.1	3.3
Smog Check Improvements (BAR)	6.9	7.5	2.1	1.9
Expanded Vehicle Retirement	0.2	0.5	0.0	0.1
Modifications to Reformulated Gasoline Program	--	2.5	--	1.3
Trucks	18.3	1.7	21.2	1.7
Cleaner In-Use Heavy-Duty Trucks	18.3	1.7	21.2	1.7
GOODS MOVEMENT SOURCES	99.2	2.5	16.4	1.3
Auxiliary Ship Engine Emission Reductions	30.8	--	--	--
Cleaner Main Ship Engines and Fuel	39.9	--	--	--
Port Truck Modernization	7.0	--	--	--
Accelerated Introduction of Cleaner Locomotives*	15.6	1.9	16.4	1.3
Clean Up Existing Harbor Craft	5.9	0.6	--	--
OFF-ROAD SOURCES				
Off-Road Equipment	12.2	2.0	4.7	0.8
Cleaner In-Use Off-Road Equipment (over 25hp)	12.2	2.0	4.7	0.8
Agricultural Equipment	NYQ	NYQ	NYQ	NYQ
Other Off-Road Sources	2.4	42.9	0.6	11.8
New Emission Standards for Recreational Boats	2.4	17.7	0.6	5.3
Expanded Off-Road Rec. Vehicle Emissions Standards	--	17.4	--	4.8
Portable Outboard Marine Tank Evap. Standards	--	4.0	--	0.7
Refueling Gas Storage Tank Evaporative Standards	--	2.1	--	0.7
Gas Station Fueling Hose Evaporative Standards	--	1.7	--	0.3
Above Ground Storage Tanks Enhanced Vapor Recovery	--	NYQ	--	NYQ
AREAWIDE SOURCES				
Consumer Products	--	13.7	--	3.8
Consumer Products Program	--	13.7	--	3.8
Pesticides	--	NYQ	--	NYQ
DPR Pesticide Plan			--	--
Total Emission Reductions from Proposed New SIP Measures	139	73	45	23

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

* Locomotive measure relies on US EPA rulemaking and industry agreement to accelerate fleet turnover.

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

San Joaquin Valley SIP

The San Joaquin Valley has experienced ozone levels exceeding the federal 8-hour ozone standard from 72 to 109 days per year between 2004 and 2006. The high values are 35 percent over the standard. The Valley has grown nearly 25 percent over the past 10 years and is traversed by two major highways that are critical California transportation corridors. Population exposure to ozone air pollution has decreased as emissions have been reduced, but the geography and climate make ozone an especially challenging pollutant to address. By comparison, annual PM_{2.5} pollution continues its steady decline consistent with the downward trend in emissions. The region now meets the current federal 24-hour PM_{2.5} standard.

In October 2006, the San Joaquin Valley Air Pollution Control District released a draft ozone SIP that left open the question as to when the Valley could feasibly attain the 8-hour ozone standard. The region is now classified as serious with a nominal attainment date of 2013. However, given the severity of the problem, the need for reclassification with a later attainment date was recognized as a key issue early in the SIP development process.

Ozone modeling has now been done with the final SIP emissions inventory. The modeling continues to show that NO_x reductions are relatively more effective than ROG reductions. The targeted NO_x emissions level for attainment (“carrying capacity”) is 160 tons per day. Realistically, this puts the Valley in the 2021 or later timeframe for ozone attainment region-wide. While most communities are projected to attain the standards by 2021 or earlier, the SIP attainment date must reflect what it takes to bring the last remaining violation site down to the standard. Also, Clean Air Act requirements come into play. At the time a SIP is submitted to U.S. EPA, it must demonstrate that the measures necessary for attainment are or will be in place by the attainment date. Only areas classified as extreme can rely, in part, on new technology and long-term measures to be developed as part of the SIP implementation process.

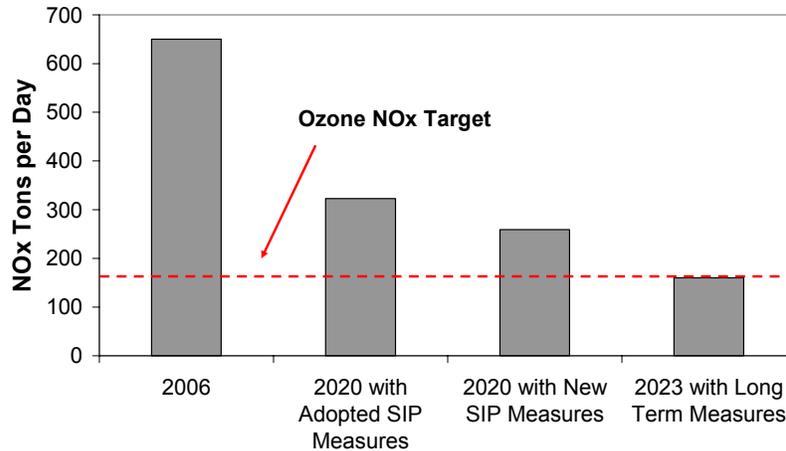
The District’s new draft plan has a targeted carrying capacity of 160 tons per day of NO_x. The targets in the plan reflect continued reductions in both NO_x and ROG, with a greater emphasis on NO_x reductions as new engine technologies become available post-2010.

The ROG carrying capacity reflects new near-term ROG reductions but no new long-term ROG measures. However, as ARB develops new statewide long-term strategies additional ROG reductions will occur in the San Joaquin Valley. Current modeling indicates this would lessen the NO_x reduction target by only a few tons. Comparing the carrying capacity to today’s emission levels shows the magnitude of the problem and frames the analysis of the feasibility of potential attainment dates.

The figure below shows that reaching these emission levels requires new NO_x reductions of about 75 percent. The combination of adopted and proposed new SIP

measures will provide about a 62 percent reduction. As a result, the San Joaquin Valley must rely on some long-term measures to reach the attainment target.

San Joaquin Valley

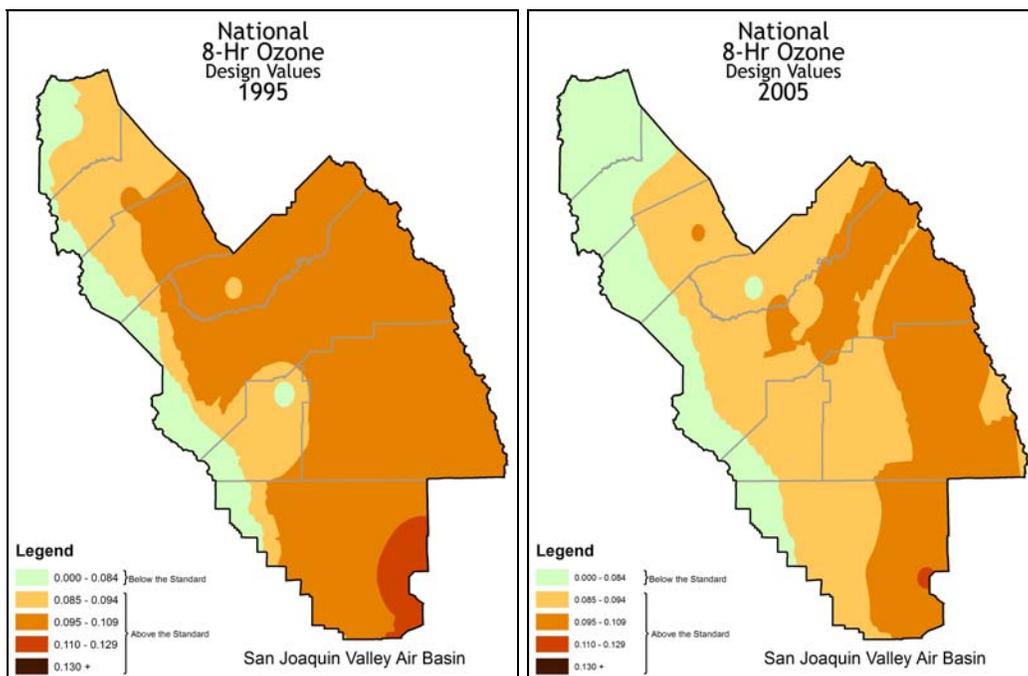


The federal Clean Air Act provides that the severity of a region’s air quality problem be taken into account in establishing attainment dates. For the areas with the highest, most persistent ozone levels, the law also provides the option to move to an extreme classification which allows long-term strategies to deliver the last increment of emission reductions. In this case, it would be 18 percent of the total, or 87 tons per day. A change to an extreme classification is a decision made by states – which in California would be initiated by the governing board of an air district and approved by ARB. When it became clear that the San Joaquin Valley’s current attainment date of 2013 was not feasible, the District staff requested ARB staff’s assessment of the feasibility of demonstrating attainment by 2021, meaning emission targets would need to be achieved by 2020. The 2021 date was selected as the earliest potential date that would enable the region to avoid reclassification to extreme. The 2021 analysis equates to a classification of severe-17.

As part of the development of ARB’s proposed SIP strategy, staff looked at possible scenarios that might be able to deliver the additional 87 tons per day for 2021 attainment with the certainty required by the Clean Air Act. A refined analysis would involve taking into account how the proposed SIP measures would be designed, so there is no double counting of emission reductions. Such an analysis is not simple since the most significant new NOx strategies involve retiring diesel engines at an accelerated rate and the SIP already takes these reductions into account. However, since the shortfall is large – 87 tons per day – a more broad brush analysis was performed. The approach was to assess if the shortfall could be covered by assuming complete replacement of mobile source fleets with the cleanest new technology standards that phase in from 2010-2014. Cost was not evaluated in this analysis, but legal authority was considered since SIP measures cannot be approved if a state lacks authority. The scenario assumed the following: no passenger vehicles older than ten years, all diesel trucks meeting 2010 standards, and all construction and farm equipment meeting 2014 standards. The result was an emissions level of

220 tons per day compared to the carrying capacity of 160 tons per day of NOx. About half of the remaining emissions, 103 tons per day, are from stationary sources. Based on these types of analyses, long-term measures that include new technologies for both mobile and stationary sources will be needed. This makes reclassification to extreme with a 2024 deadline necessary in ARB staff's view.

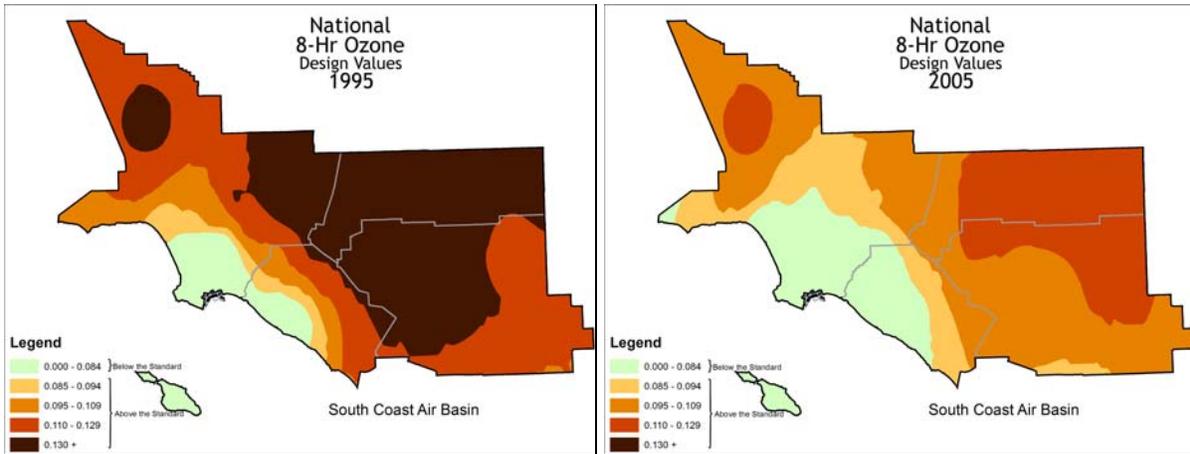
The extended deadline is necessary to bring the last predicted area, the community of Arvin, into attainment. While elevated levels at Arvin are not desirable, it will take more work to define the ultimate set of strategies to resolve that problem. As shown in the maps below population exposure has been decreasing over the last decade and we expect that trend to continue.



South Coast SIP

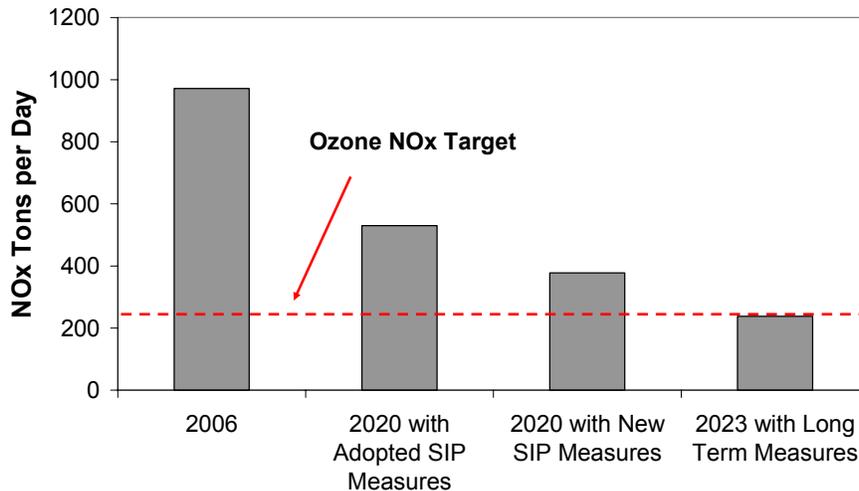
While long-term air quality progress in the South Coast has been dramatic, ozone and PM2.5 pollution levels still exceed federal air quality standards by a wide margin. ARB control programs for mobile sources, fuels, and consumer products have historically focused on the attainment needs of this region. The air quality status of the South Coast, and now the San Joaquin Valley as well, set the stage for development of ARB's 2007 SIP strategy.

The maps below show how ozone exposures have decreased. The peaks have shifted towards the eastern part of the air basin towards higher, less populated locations.



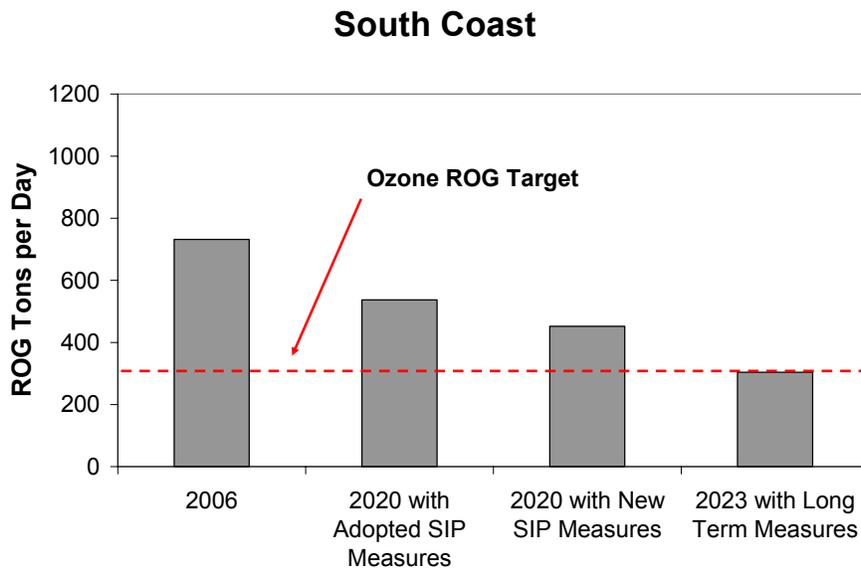
The South Coast AQMD's October 2006 draft plan included the District's carrying capacity estimates for both ozone and PM2.5 attainment. The ozone carrying capacities are 238 tons per day for NOx and 304 tons per day for ROG. For ozone, the region is currently classified as severe-17 with an attainment date of 2021. The draft plan acknowledges that the region would need to be reclassified to extreme in order to rely on long-term concepts as provided by section 182(e)(5) of the Clean Air Act. Based on modeling analyses, the District selected ozone carrying capacities that would require roughly equal NOx and ROG reductions from long-term concepts. ARB staff considers the mix between long-term NOx and ROG to be a placeholder assumption that will change over time as near-term SIP measures are implemented, long-term concepts developed, and the SIP periodically revised.

South Coast



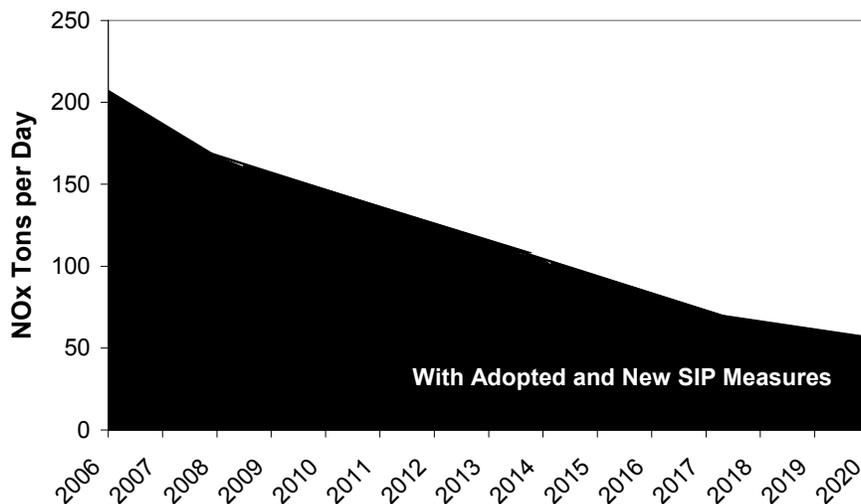
The figure above shows that from today's levels about a 75 percent reduction in NOx is needed for ozone attainment. ARB's SIP strategy, including adopted and proposed SIP measures, will provide about a 60 percent reduction in NOx by 2020, and 65 percent reduction by 2023. Long-term concepts are needed to achieve an additional 114 tons per day of reductions, requiring an extreme classification with a 2024 attainment deadline.

With the estimated ROG carrying capacity of 304 tons, an additional 139 tons per day will be needed from long-term measures as shown below. In the end, a smaller proportion of ROG than NOx reductions may be targeted based on future technology advancements, feasibility and cost-effectiveness.

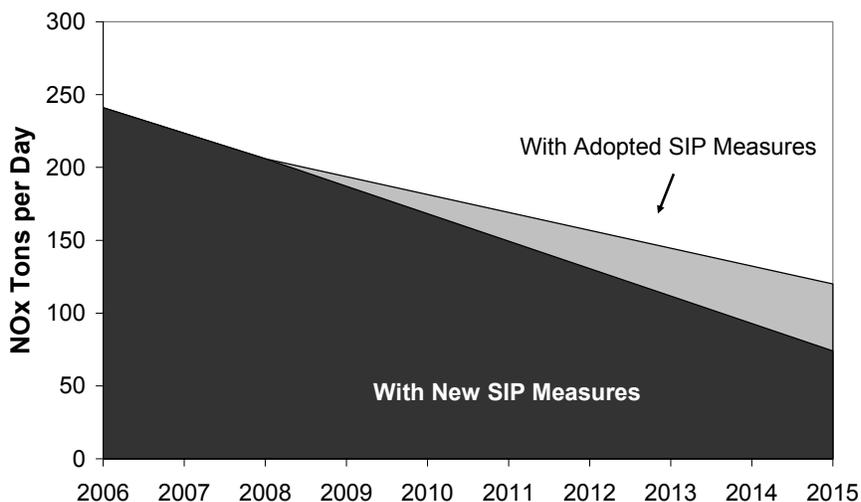


The benefits of ARB's mobile source NOx strategy in the South Coast are evident when emissions trends are evaluated. The figures below show how adopted measures are reducing emissions, and how ARB's proposed new measures will provide additional near-term reductions. The first figure shows how passenger vehicle emissions are decreasing even with continued growth in vehicle travel. The next figure shows how diesel truck emissions decrease over time as cleaner engines enter the fleet. This is represented by the top line. With the estimated benefits of ARB's truck fleet rule now under development, emissions would drop by another 32 tons per day by 2015. With this new rule, 2015 emissions would drop a total of 24 percent.

South Coast Passenger Vehicle Emissions-NOx



South Coast Truck Emissions - NOx

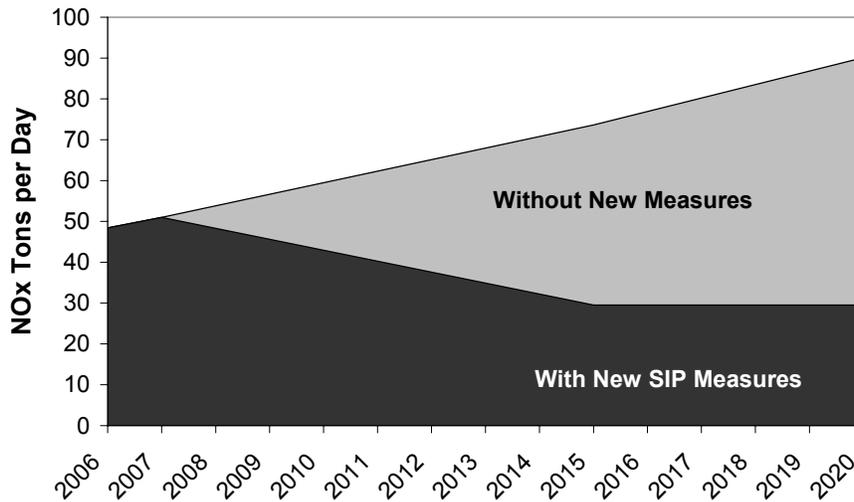


Emissions from ports and goods movement pose a significant challenge for attainment in the region. Ship emissions are a large and growing emissions category, trucks servicing the ports are older and dirtier than the average fleet, and ARB regulation of line haul locomotives is largely preempted by federal law. NOx emissions from these categories contribute to regional ozone and PM2.5 pollution, direct diesel particulate emissions are of special concern to local communities, and SOx emissions from ships contribute to PM2.5 levels.

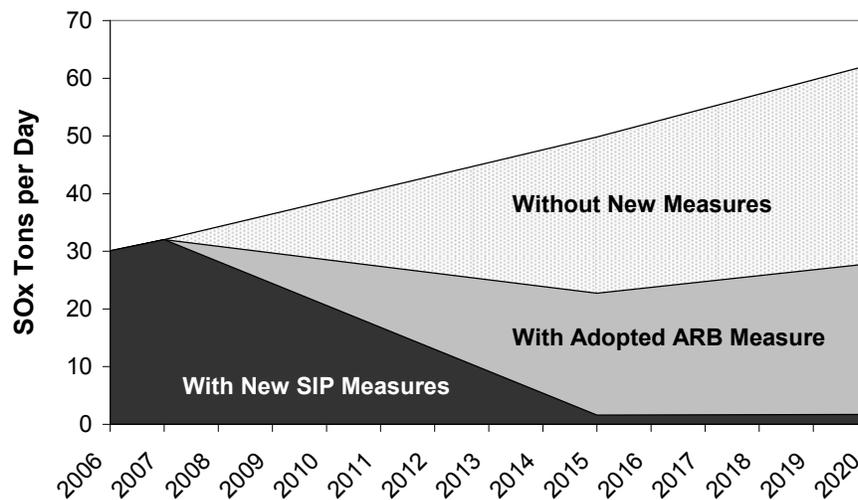
ARB's SIP strategy includes new measures for these key sectors, a number of which are already under development. In aggregate, these strategies provide the greatest benefit in the South Coast as a result of multiple measures to reduce emissions at ports and from ocean-going ships and harbor craft.

The figures below show the combined benefits of several proposed ARB strategies to reduce ship emissions both in port and in transit. The NOx reductions are needed for ozone and PM2.5 attainment. The SOx reductions are essential for PM2.5 attainment.

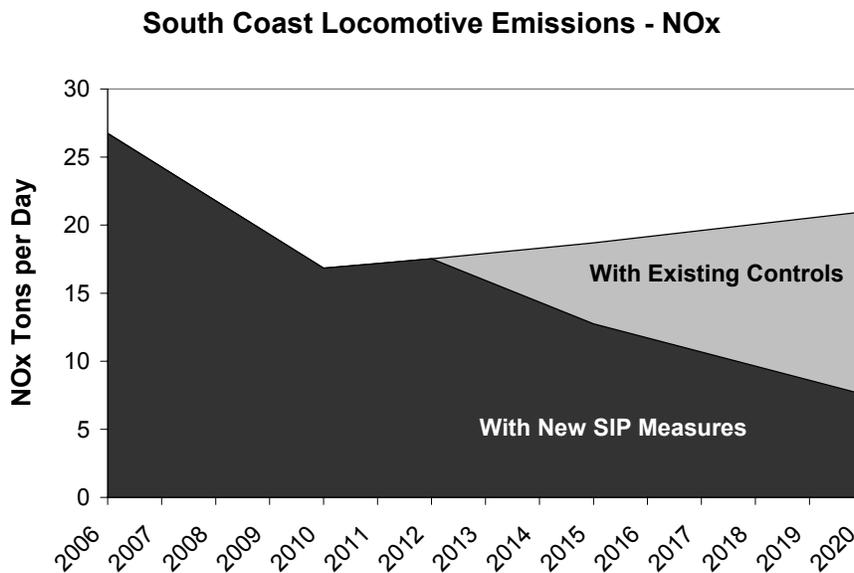
South Coast Ship Emissions - NOx



South Coast Ship Emissions - SOx



Locomotives pose a difficult challenge due to their long life, interstate operations, and California’s reliance on U.S. EPA to adopt new engine standards. Several strategies are underway to clean up locally-based switcher engines, reduce idling emissions at railyards, and concentrate the cleanest available line haul engines in South Coast. These activities are important for community health and NOx emission reductions between now and 2015. However, with growth, locomotive NOx emissions will increase by 2020 without further action. ARB’s SIP strategy proposes U.S. EPA adoption of more stringent new engine standards and a new industry commitment to accelerate introduction of cleaner engines in California to meet the attainment needs of the South Coast and the San Joaquin Valley. The figure below shows the benefits of ARB’s proposed strategy for locomotives.



Although PM2.5 SIPs are not due this year, the South Coast’s draft plan includes emissions targets for PM2.5 attainment. Developing these targets has posed technical challenges since this is the first time comprehensive PM2.5 modeling has been attempted for SIP purposes. The technical staff of ARB and U.S. EPA consulted with the South Coast staff on PM2.5 modeling approaches. The District’s gridded aerosol modeling indicates PM2.5 attainment will be more difficult than is indicated by evaluating current air quality and emissions trends.

Annual PM2.5 air quality shows a consistent downward trend that parallels the downward trend in emissions. The District’s modeling does not predict this relationship will hold, resulting in a more stringent emission reduction target than a “linear rollback” analysis would indicate. If the SIP were due now, ARB staff would recommend proceeding with the more stringent targets. However, given the complexity of PM2.5 formation and the inherent uncertainties in modeling, staff believes further technical analyses would improve our understanding of both the problem sites and the benefit of various strategies.

For example, while the District's proposed PM2.5 strategy appropriately focuses on regional atmospheric formation of PM2.5, ARB staff believes the district should further evaluate directly emitted particles in the eastern part of the region where attainment appears to be most difficult. If additional local controls could be identified, attainment might be expedited.

Based on ARB staff's analysis, most of the region is projected to reach attainment by 2015. More needs to be done to demonstrate attainment in eastern portions of the air basin. The combination of adopted SIP measures and ARB's proposed new measures would reduce South Coast NOx emissions by 475 tons per day by 2014. Adopted measures provide 350 tons per day of reductions. ARB's proposed new measures would reduce NOx emissions from diesel engines in the goods movement sector, construction industry, and other businesses by about another 110 tons per day by 2014. Smog Check improvements would provide 22 tons per day of reductions, about half of which are NOx reductions. ARB's proposed strategy also includes new reductions in SOx, direct PM2.5, and ROG that will aid in PM2.5 attainment.

Long-term emission reductions of ROG will be needed for ozone attainment in the South Coast. Consumer products and evaporative emissions from mobile sources, solvents, and coatings are all important emission categories. ARB and the District will need to jointly identify new strategies for these categories as part of the SIP implementation process.

Benefits of Adopted and Proposed SIP Measures

The tables below provide a summary of how much the adopted and proposed new SIP measures combined will reduce today's emissions in South Coast and San Joaquin Valley by 2023, the year emission reduction targets must be met for extreme ozone areas.

South Coast NOx			
	NOx Tons Per Day		Percent of Total Reductions
	2006	2023	
Stationary/Area (Local)	87	54	5%
On-Road (California)	526	129	64%
Off-Road (California)	262	95	27%
Locomotives (National)	31	12	3%
Ships (National / International)	51	33	3%
Aircraft (National / International)	16	29	2% increase
Total	972	352	

South Coast ROG			
	ROG Tons Per Day		Percent of Total Reductions
	2006	2023	
Stationary/Area (Local)	158	153	2%
Consumer Products (California)*	101	96	2%
On-Road (California)	264	92	60%
Off-Road (California)	197	84	39%
Locomotives (National)	3	1	1%
Ships (National / International)	1	3	1% increase
Aircraft (National / International)	8	13	2% increase
Total	732	443	

* Long-term strategy to be developed
Numbers may not add up due to rounding.

San Joaquin Valley NOx			
	NOx Tons Per Day		Percent of Total Reductions
	2006	2023	
Stationary/Area (Local)	128	107	5%
On-Road (California)	361	81	69%
Off-Road (California)	136	46	22%
Locomotives (National)	22	6	4%
Ships (National / International)	0	1	<1% increase
Aircraft (National / International)	3	5	<1% increase
Total	650	247	

Numbers may not add up due to rounding.

San Joaquin Valley ROG			
	ROG Tons Per Day		Percent of Total Reductions
	2006	2023	
Stationary/Area (Local)	254	237	16%
Consumer Products (California)*	24	26	2% increase
On-Road (California)	99	37	58%
Off-Road (California)	66	33	31%
Locomotives (National)	2	0	2%
Ships (National / International)	0	0	0%
Aircraft (National / International)	7	11	4% increase
Total	452	345	

* Long-term strategy to be developed
Numbers may not add up due to rounding.

These tables also show the importance of NOx emission reductions from the mobile sources primarily subject to ARB regulation, off-road sources subject to national or international standards, and stationary and area sources under local air district jurisdiction.

Emissions from locomotives and aircraft show an increase. Ship emissions would be increasing without California's efforts to reduce emissions through a combination of ARB regulation, incentives, port actions, and voluntary strategies. In 2023, mobile sources represent about 85 percent of NOx emissions in South Coast and about 60 percent of the NOx emissions in the San Joaquin Valley.

The rate ROG emission reductions by 2023 is less than that for NOx in both regions. In the South Coast population-driven emissions growth for consumer products overtakes the benefits of ARB regulations. In the San Joaquin Valley, ROG from livestock operations decreases but remains the largest category.

ARB's 2007 Proposed State Strategy, including air district measures, provides for about 90 percent of the new NOx reductions needed in the South Coast by 2023, the year emission reduction targets must be met for extreme ozone areas, based on draft carrying capacities. This sets the stage for development of long-term strategies for both NOx and ROG. In the South Coast, the current combination of ROG and NOx carrying capacities would require very substantial new ROG reductions. As long-term strategies are developed during the SIP implementation and update process, carrying capacities will be revisited. The San Joaquin Valley carrying capacities rely more heavily on NOx reductions with ARB's proposed strategy providing about 80 percent of the needed reductions by 2023.

With the South Coast's current estimate of carrying capacity for PM2.5, more reductions are needed to demonstrate attainment by 2015. However, attainment by 2021 could be achieved with the adopted and proposed SIP measures. The delay in achieving the necessary reductions is primarily the result of the timing of federal diesel engine controls combined with inadequate international standards for ocean-going ships. For example, federal Tier 4 off-road engines will not be introduced until model year 2014, and no new international standards for ships proposed. This is the most critical outstanding issue to be addressed as SIP development proceeds. ARB staff believes that a cooperative effort among local, state, federal agencies to resolve this issue is necessary to serve the best interests of the region's breathing public. The next few months should be used for this purpose and to complete the PM2.5 planning process.

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