DRAFT **OCTOBER 2014**

2013

CLEAN AIR PLAN

SANTA BARBARA COUNTY'S PLAN TO ATTAIN THE STATE OZONE STANDARD

TRIENNIAL UPDATE TO THE 2010 CLEAN AIR PLAN

Santa Barbara County Air Pollution Control District

260 N. SAN ANTONIO ROAD, SUITE A
SANTA BARBARA, CALIFORNIA 93110
WWW.SBCAPCD.ORG
(805) 961-8800

SBCAG
santa barbara county association of governments

260 N. SAN ANTONIO ROAD, SUITE B
SANTA BARBARA, CALIFORNIA 93110
WWW.SBCAG.ORG
(805) 961-8900

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1. INTRODUCTION

The 2013 Clean Air Plan (Plan) is the sixth triennial update to the initial State Clean Air Plan adopted by the Santa Barbara County Air Pollution Control District Board of Directors in 1991. Each of the Santa Barbara County plan updates have implemented "an all feasible measures" strategy to ensure continued progress towards attainment of the state ozone standards. Since 1992, Santa Barbara County has adopted or amended rules implementing over twenty five control measures controlling stationary source emissions. This has resulted in substantial amounts of reductions in ozone precursor pollutant (nitrogen oxides and reactive organic compounds). To date, this strategy has been successful as Santa Barbara County's air quality has improved such that we are now in attainment of the state 1-hour ozone standard. While we have yet to attain the state 8-hour ozone standard, we are getting closer.

Because Section 40913 of the California Health and Safety Code mandates that the Plan must include a cost-effective strategy to achieve the attainment of the ozone standard, the Plan brings us to a crossroads. As we look for possible reductions in stationary source emissions, it is clear the "low hanging fruit" has been picked. Further stationary source control measures will result in small amounts of emission reductions at higher and higher cost. While we include proposed control measures for stationary sources in our overall strategy (see Chapter 4), it is possible that an individual measure may not be implemented if our Board of Directors ultimately determines it is not cost-effective, among other factors. In this Plan, we carry forward proposed stationary source control measures from the 2010 Clean Air Plan that are pending rule adoption except for two which have been reclassified as "further study" measures. However, our primary focus will be on marine shipping emissions. Marine shipping ozone precursor emissions have and will continue to account for the largest percentage of our inventory, over 50%. While the California Air Resources Board's future on-road vehicle standards for almost zero or zero tailpipe emissions (e.g., Partial Zero Emission Vehicles and Zero Emission Vehicles) will result in substantial emission reductions, without strategies to gain emission reductions from marine shipping, very little additional progress can be made towards attainment of the state 8-hour ozone standard. Chapter 3 provides more detail on the importance of marine shipping to our overall clean air strategy.

The California Clean Air Act requires that we report our progress in meeting state mandates and revise our 1991 Air Quality Attainment Plan to reflect changing conditions on a triennial basis. There are two major items required to be in the triennial update (Sections 40924 and 40925 of the California Health and Safety Code): a triennial progress report and a triennial plan revision. The triennial progress report must assess the overall effectiveness of an air quality program and the extent of air quality improvement resulting from the Plan. The triennial plan revision must also incorporate new data or projections into the Plan. This Plan satisfies all state triennial planning requirements. Table 1 provides a more complete list of triennial plan revision requirements and where those requirements are addressed in the Plan.

TABLE 1

TRIENNIAL PLAN REVISION REQUIREMENTS

REQUIREMENT	SUBMITTAL
Air Quality Analysis	Chapter 2
Population Trends	Chapter 5
Population Exposure	Chapter 2
Emission Inventory	Chapter 3
Control Measures	Chapter 4
Control Strategy Cost-Effectiveness	Appendix A includes a cost effectiveness assessment of control measures
Transportation Control Measures	Chapter 5
Vehicle Trips & Vehicle Miles Traveled Trends	Chapter 5
Contingency Measures	Chapter 4
Every Feasible Measure and Expeditious Adoption	Chapter 4 and Chapter 5

2. LOCAL AIR QUALITY

The California Clean Air Act requires the California Air Resources Board (ARB) to evaluate and identify air quality related indicators for the Santa Barbara County Air Pollution Control District (District) to use in assessing their progress toward attainment of the state standards. This District is required to assess their progress triennially and report to the ARB as part of the triennial plan revision. The assessment must address (1) the peak concentrations in the peak "hot spot" subarea, (2) the population-weighted average of the total exposure, and (3) the area-weighted average of the total exposure.

The peak "hot spot" indicator is assessed in terms of the Expected Peak Day Concentration (EPDC). The EPDC is provided to the District by the ARB for each monitoring site in Santa Barbara County (County) and represents the maximum ozone concentration expected to occur once per year. The EPDC is calculated using ozone data for a three-year period (the summary year and the two years preceding the summary year). For example, the 2011 EPDC for a monitoring site uses data from 2009, 2010 and 2011. The data used in the calculation are the daily maximum 1-hour and 8-hour ozone concentrations. The EPDC is useful for tracking air quality progress at individual monitoring stations since it is relatively stable, thereby providing a trend indicator that is not heavily influenced by year-to-year changes in weather.

Figures 2-1 and 2-2 show the 1-hour and 8-hour EPDC trends for the period 1990 through 2011 for five selected monitoring sites in the County that typically record the highest ozone concentrations. These figures show that peak day concentrations have significantly decreased during the period and all sites have 1-hour peak day concentrations below the state 1-hour ozone standard. 8-hour peak day concentrations remain above the state 8-hour ozone standard at each of the sites, but show significant improvement over time.

Figures 2-3 and 2-4 depict the percent reduction in 1-hour and 8-hour EPDC values. The 1-hour EPDC percent reductions range from 25 percent at the Carpinteria site to 38 percent at the Los Flores Canyon site. The corresponding 8-hour percent reductions range from 20 percent at Carpinteria to 28 percent at Los Flores Canyon.

The EPDC data are also used in the area designation process. Designation values are used to determine whether an area is in or out of attainment of applicable air quality standards. In the state designation process, measured concentrations that are higher than the EPDC are identified as being affected by an extreme concentration event (e.g., weather conditions conducive to high concentrations of ozone) and are not considered violations of the state standard. The designation value, therefore, is the highest concentration remaining at a given site that is less than or equal to the EPDC. Any designation value that exceeds an applicable standard is considered a violation of that standard. Designation values continue to exceed the state 8-hour standard of 0.070 ppm, and thus the County remains out of attainment for the state 8-hour ozone standard.

The exposure indicators are the population-weighted exposure (PWE) indicator and the area-weighted exposure (AWE) indicator. These metrics provide an indication of the potential for chronic adverse health impacts. Unlike the EPDC, which tracks progress at individual locations, the population-weighted and area-weighted exposure indicators consolidate hourly ozone measurements from all sites within the District into a single exposure value. The resulting value represents the average potential exposure in an area, which in this case, is a District. The term "potential" is used, because daily activity affects an individual's exposure. For example, being

indoors during the hours of peak ozone concentration will decrease a person's exposure to outdoor concentrations.

The population-weighted exposure indicator characterizes the potential average annual outdoor exposure per person, to concentrations above the level of the State ozone standard. The population-weighted exposure indicator represents a composite of exposures at individual locations that have been weighted to emphasize equally, the potential exposure for each individual in the District. In contrast, the area-weighted exposure indicator characterizes the potential average annual outdoor exposure per unit area. The area-weighted exposure indicator represents a composite of exposures at individual locations that have been weighted to emphasize equally, the potential exposure in all parts of the District.

Both exposure indicators are based solely on ambient (outdoor) ozone data. The calculation methodology assumes that an "exposure" occurs when a 1-hour ozone measurement is higher than 0.09 ppm, the level of the State 1-hour ozone standard. The PWE and AWE consider both the level and the duration of hourly ozone concentrations above the State standard. The resulting annual exposure indicator is the sum of all the hourly exposures during the year and presents the results as an average per exposed person (PWE indicator) or average per exposed unit of land area (AWE indicator).

Population- and area-weighted trends are presented in Figure 2-5. This figure shows that both exposure indicators have decreased over time since 1990 and that indicator values have been very low during the last several years due to dramatic improvement in air quality. The values are near zero since the County rarely has ozone exceeding 0.09 parts per million for an hour period. These trends in the population- and area-weighted exposure data show progress toward meeting the state 8-hour ozone standard.

Air quality improvement is also seen in the declining number of state 1-hour and 8-hour ozone concentration exceedances that have been experienced in the County between 1990 and 2012. As displayed in Figure 2-6, 1-hour ozone exceedances have decreased from a high of 37 days (1990 and 1991) to zero days (2005, 2006 and 2010). The number of 8-hour ozone exceedance days range from a high of 97 days during 1991 to just 3 days during 2011. These significant improvements in air quality have occurred despite a 15 percent increase in Countywide population and an 18 percent increase in daily vehicles miles travelled (VMT) between 1990 and 2011(see Figure 2-7).

This Plan documents progress toward the state 1-hour and 8-hour ozone standards. Although the County violates the state 8-hour standard, recent data show that the County continues to attain the state 1-hour standard of 0.09 ppm. The County's air quality has improved dramatically over the years as evidenced by the 1-hour and 8-hour EPDC data, population- and area-weighted exposure data, and in the long-term decline in the number of Countywide ozone exceedances.

FIGURE 2-1
STATE 1-HOUR OZONE EXPECTED PEAK DAY CONCENTRATION
TOP FIVE SANTA BARBARA COUNTY MONITORING SITES
1990 – 2011

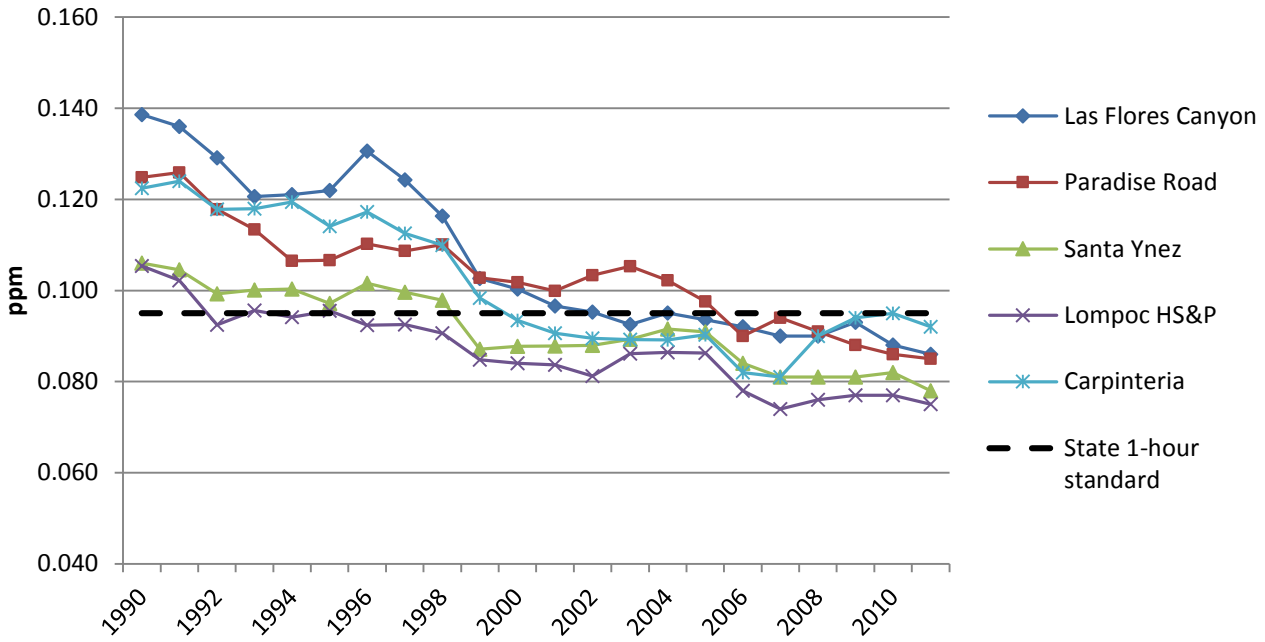


FIGURE 2-2
STATE 8-HOUR OZONE EXPECTED PEAK DAY CONCENTRATION
TOP FIVE SANTA BARBARA COUNTY MONITORING SITES
1990 – 2011

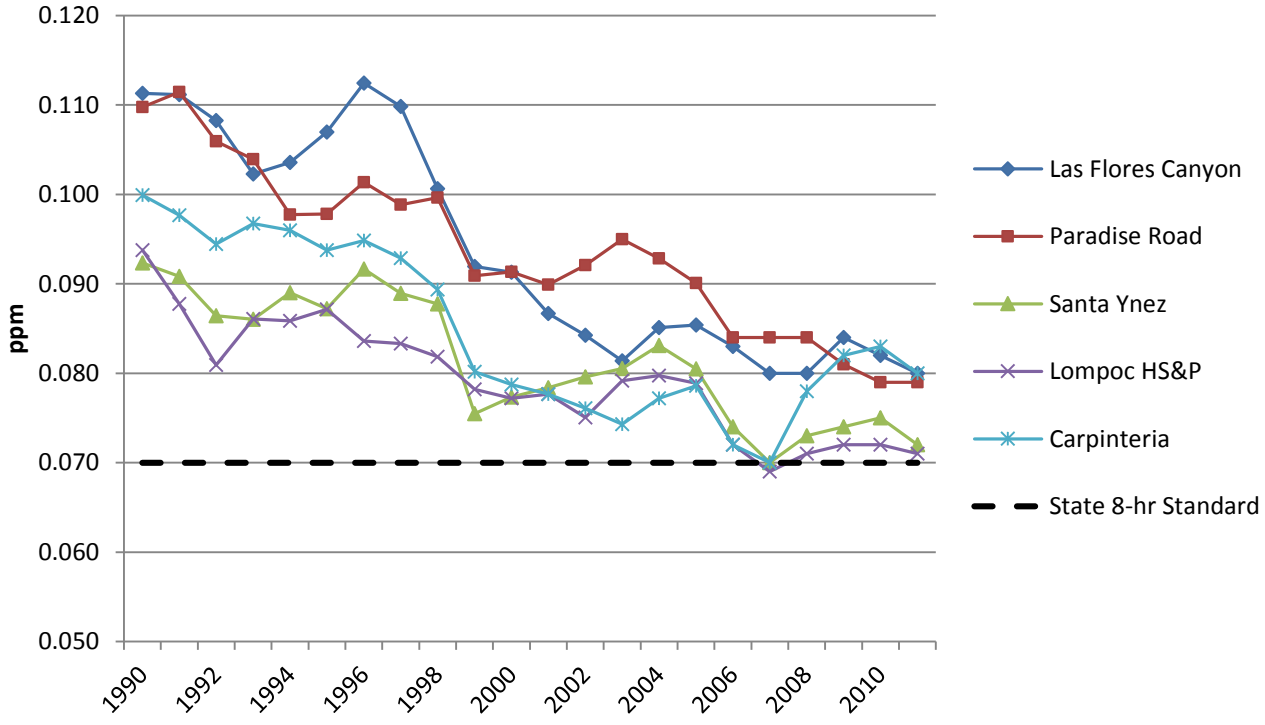


FIGURE 2-3
PERCENT REDUCTION IN EXPECTED PEAK DAY 1-HOUR OZONE CONCENTRATIONS: 1990 – 2011

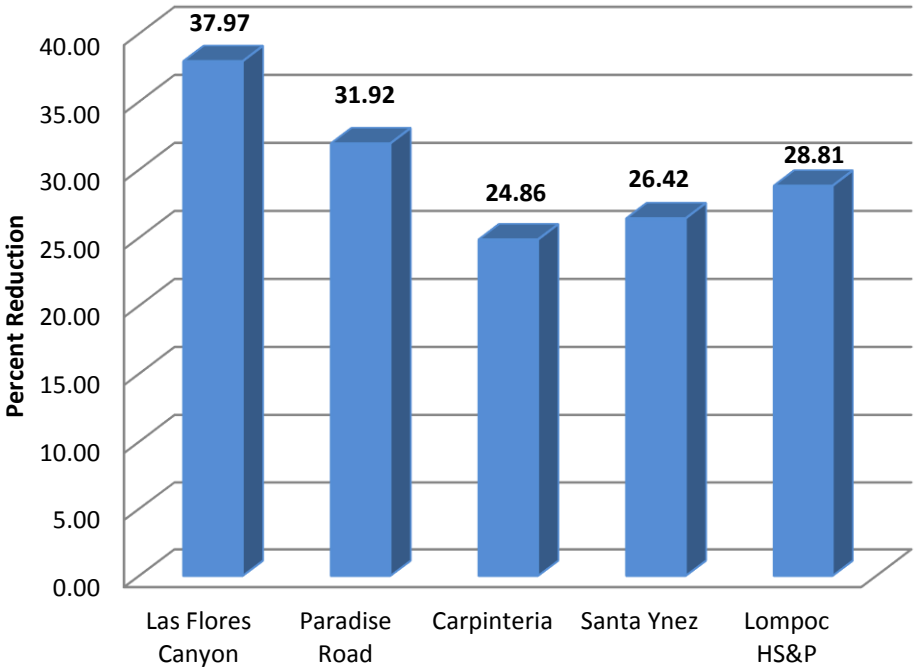


FIGURE 2-4
PERCENT REDUCTION IN EXPECTED PEAK DAY 8-HOUR OZONE CONCENTRATIONS: 1990 – 2011

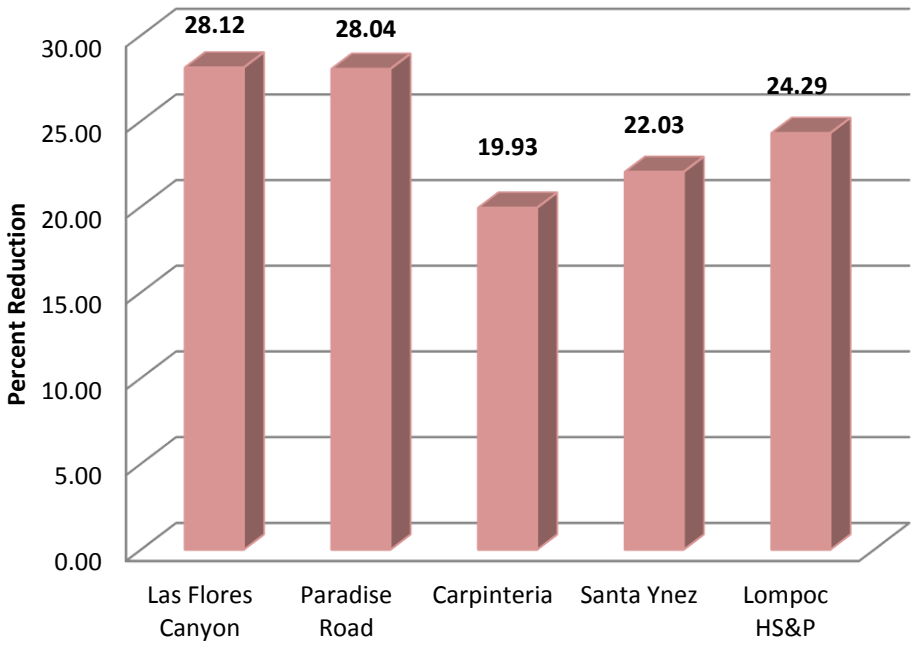


FIGURE 2-5
POPULATION- AND AREA-WEIGHTED EXPOSURE
SANTA BARBARA COUNTY
1990 – 2011

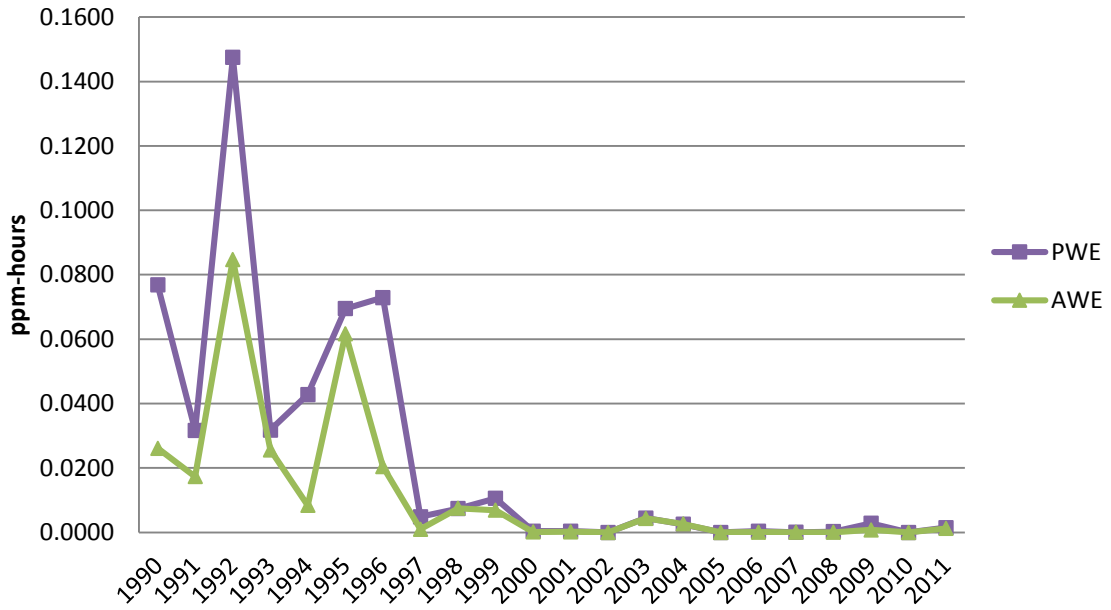


FIGURE 2-6
1-HOUR AND 8-HOUR OZONE EXCEEDANCE TRENDS
SANTA BARBARA COUNTY
1990 – 2012

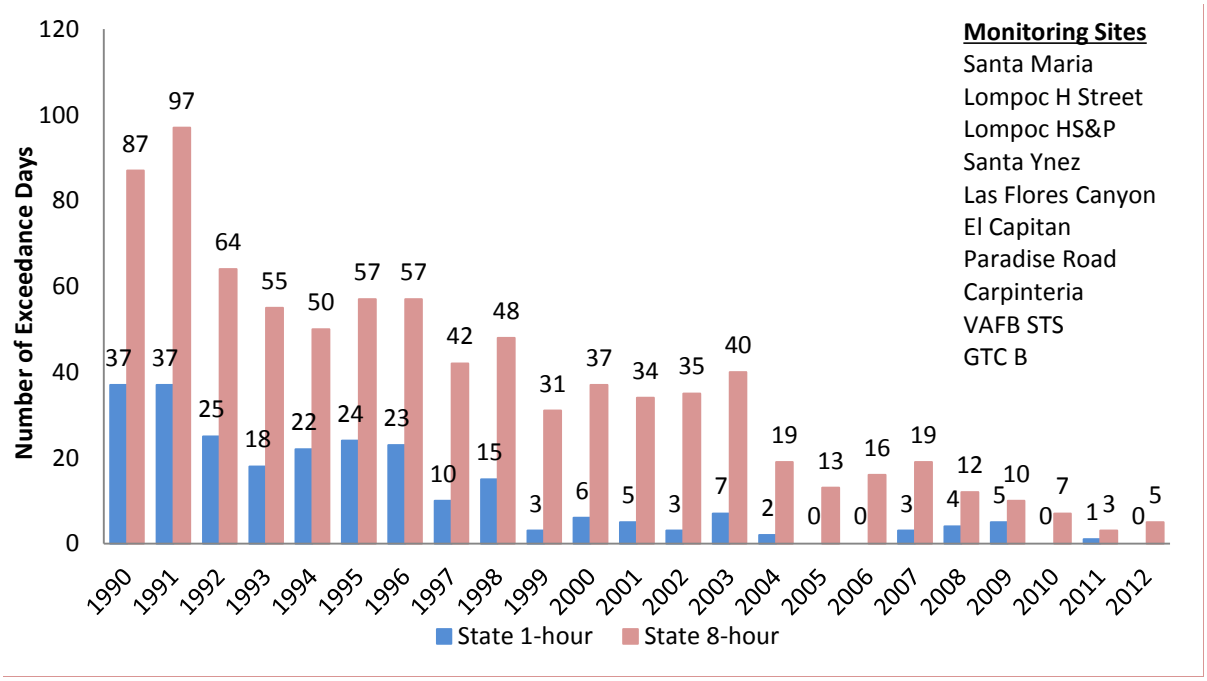
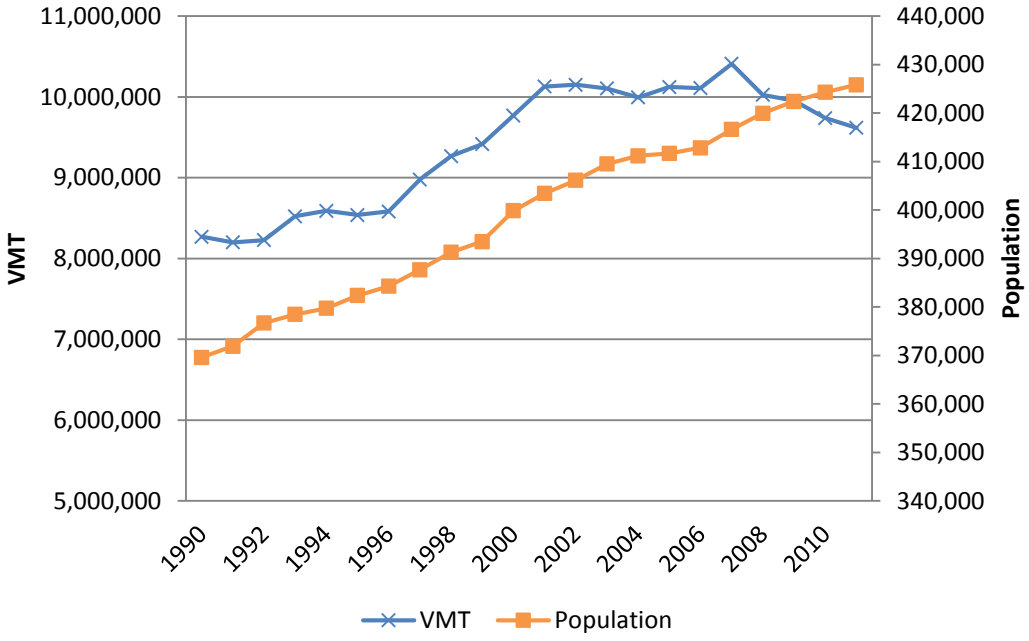


FIGURE 2-7
POPULATION AND DAILY VMT TRENDS
SANTA BARBARA COUNTY
1990 – 2011



SOURCES: CALTRANS AND CALIFORNIA DEPARTMENT OF FINANCE

3. EMISSION INVENTORY

3.1 INTRODUCTION

This chapter presents the 2008, 2020, and 2030 nitrogen oxides (NOx) and reactive organic compounds (ROC) emission inventories used in the development of this 2013 Clean Air Plan (Plan). The Santa Barbara County Air Pollution Control District's (District) emission inventories account for the types and amounts of pollutants emitted from a wide variety of sources, including on-road motor vehicles and other mobile sources, fuel combustion at industrial facilities, solvent and surface coating usage, and consumer product usage.

The inventories presented in this Plan are "planning emissions inventories," commonly referred to as "summer seasonal" inventories. A planning inventory accounts for seasonal variation because most exceedances of ozone standards occur during the April to October ozone season. It does not include the emissions from natural sources such as biogenics, oil and gas seeps, and wildfires since they are not regulated or controlled through implementation of emission control measures. However, this Plan includes a discussion of natural source emissions in Appendix D, in order to provide additional perspective on the overall emission inventory of Santa Barbara County (County).

The baseline and projected inventories include emissions from two geographical regions: ***Santa Barbara County*** and the ***Outer Continental Shelf*** *(OCS).* The County region encompasses all onshore sources of air pollution within Santa Barbara County and the State Tidelands (three miles from the shoreline). The OCS region includes pollution sources 25 miles beyond the State Tideland boundary offshore of the County.

The baseline (2008) and future year (2020 and 2030) planning inventories include emissions from the following source categories:

- Stationary Sources - these sources are subject to District permitting requirements.
- Area-Wide Sources – these sources are not subject to District permitting requirements. Emissions from area sources are geographically dispersed throughout the county.
- Mobile Sources – this source type is subdivided into two categories:
  - On-Road Mobile sources – these are vehicles driven on roads and highways.
  - Other Mobile Sources – this category pertains to emission sources that do not produce emissions on roads and highways. These include ships, boats, airplanes, trains, and construction and mining equipment.

3.2 BASELINE INVENTORY

The emissions inventory is divided into four major classifications: point, area, on-road, and off-road sources. The 2008 base year point source emissions are based on annual data from facilities reported to the District. The area source emissions are estimated jointly by California Air Resources Board (ARB) and the District. On-road emissions are calculated by applying ARB's EMFAC2011 emission factors to the transportation activity data provided by the Santa Barbara County Association of Governments (SBCAG). ARB provides off-road emissions, such as ocean-going vessels, locomotives, agricultural equipment, and aircraft.

Table 3-1 and Figure 3-1 show the emissions and relative contribution of ROC and NOx during 2008 for each source category. As presented in the figure, 72 percent of the NOx inventory is

attributed to sources in the other mobile sources category. A majority of these emissions are from ocean-going vessels in the OCS (see section 3.4 for further discussion of marine shipping emissions). An additional 18 percent of the NOx emissions in the baseline inventory are from on-road cars and trucks. Area-wide and stationary sources contribute the remaining 10 percent of the baseline NOx emissions.

Stationary and area-wide sources account for about 63 percent of the baseline ROC inventory. On-road mobile sources account for 18 percent of the baseline ROC emissions with the remaining 19 percent coming from sources in the Other Mobile category.

3.3 INVENTORY TRENDS

To forecast future year emissions for stationary and area sources, the estimated changes in the level of pollution producing activities, known as "activity indicators," are used to grow the 2008 baseline inventory (see Table 3-2). Examples of activity indicators include population, housing, and employment. SBCAG provides several of the activity indicator estimates. The ARB is responsible for growing a majority of sources within the area-wide and other mobile source categories. This is accomplished through ARB's California Emission Projection Analysis Model (CEPAM). CEPAM incorporates county-specific economic and demographic growth profiles and emission control factors that are derived from adopted and proposed District rules and statewide regulations. Note that the activity factors for oil and gas related activity have been set to one, due to growth uncertainty in that sector over the long-term. This is based on three considerations:

1) While some major oil and gas projects are on the horizon, stringent Best Available Control Technology (BACT) typically will be required during the permit process. This low emission control technology improves over time and drives down overall project emissions (e.g., NOx emissions from steam generators decreased from 50 parts per million in the past to BACT levels as low as 5 parts per million today).
2) Some larger oil and gas projects on the horizon have already obtained emission reduction credits (ERCs). As discussed below, ERCs are accounted for as forecasted growth, and thus already cover to some extent growth in this industry.
3) The Plan activity indicators cover a long-term period out to 2030. From Figure 3-2, it can be seen that trends in emissions and oil production vary, and projecting emission growth out to 2030 would be speculative.

The Plan forecasted emission inventories are adjusted upwards based on the ERCs that were in the District Source Register as of April 2014. ERCs are previous voluntary emission reductions that can be credited to allow increased emissions from a new or modified stationary source. The ERC's in the source register were reduced by approximately 17 percent (factor of 1/1.2) to take into account that ERC's must include a tradeoff ratio of at least 1.2 to 1 to ensure a net air quality benefit. After the reduction, the total available ERCs for Santa Barbara County are 0.20 tons per day of ROC and 0.54 tons per day of NOx.

Table 3-1 and Figure 3-3 display District-wide ozone precursor emission forecasts out to 2030. The emission estimates incorporate local, state, federal, and international control strategies as well as forecasted growth. As shown in the figure, NOx emissions are projected to decrease substantially over the next several years. Emissions of NOx are projected to decrease from 71.70 tons per day in 2008 to 55.09 tons per day by 2030. This substantial long-term NOx reduction is primarily derived from reductions in emissions from on-road cars and trucks and offroad equipment.

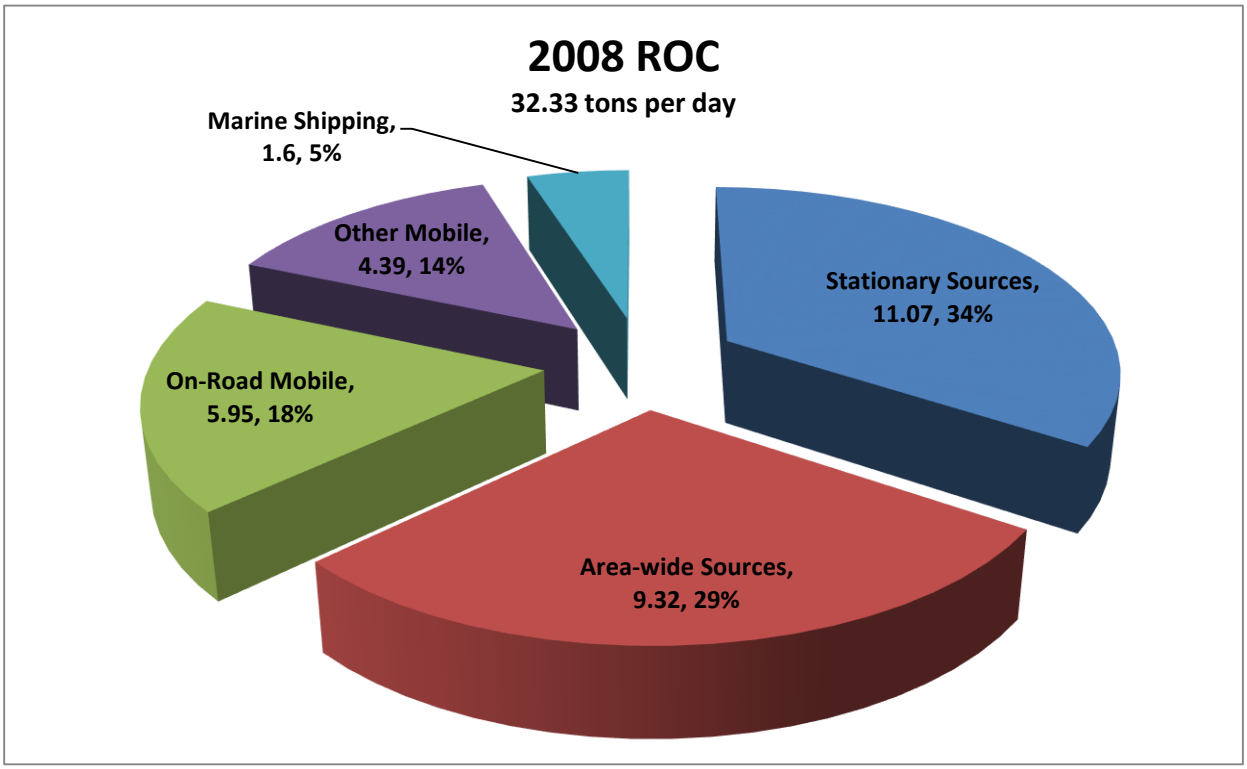
The ROC emissions trend remains relatively flat over the period with about a 2.5 tons per day decrease from 2008 to 2030. Decreases in on-road emissions account for most of the ROC reductions over the period.

TABLE 3-1
ROC AND NOX EMISSION TRENDS (TONS PER DAY)[a]

	2008		2020		2030	
	ROC	**NOx**	**ROC**	**NOx**	**ROC**	**NOx**
Stationary Sources	11.07	6.15	10.31	5.58	10.50	5.37
Area-wide Sources	9.32	1.07	8.95	0.71	9.25	0.81
On-Road Mobile	5.95	12.67	1.94	4.30	1.52	2.77
Other Mobile[b]	4.39	10.81	3.27	7.26	2.93	5.53
Marine Shipping	1.60	41.00	3.09	49.68	5.39	40.07
ERC's	-	-	0.20	0.54	0.20	0.54
Total	32.33	71.70	27.76	68.07	29.79	55.09

[a] See Table 3-3 for a listing of emissions by individual source category.
[b] Marine Shipping emissions have been broken-out of the Other Mobile category in this table.

FIGURE 3-1
2008 BASELINE ROC AND NOX EMISSIONS (TONS PER DAY) AND DISTRIBUTION (%)



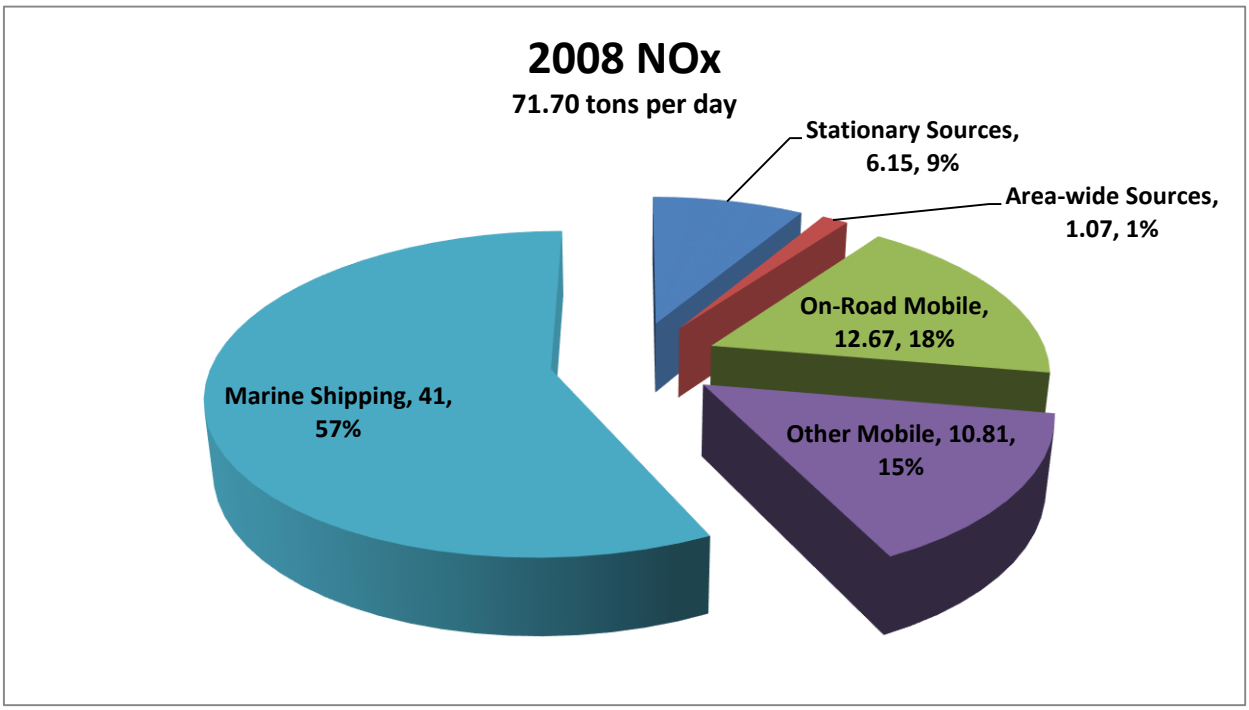


FIGURE 3-2
OIL PRODUCTION (MILLION BBLS) VS. O&G SECTOR ROC +NOX EMISSIONS
(TONS PER YEAR)

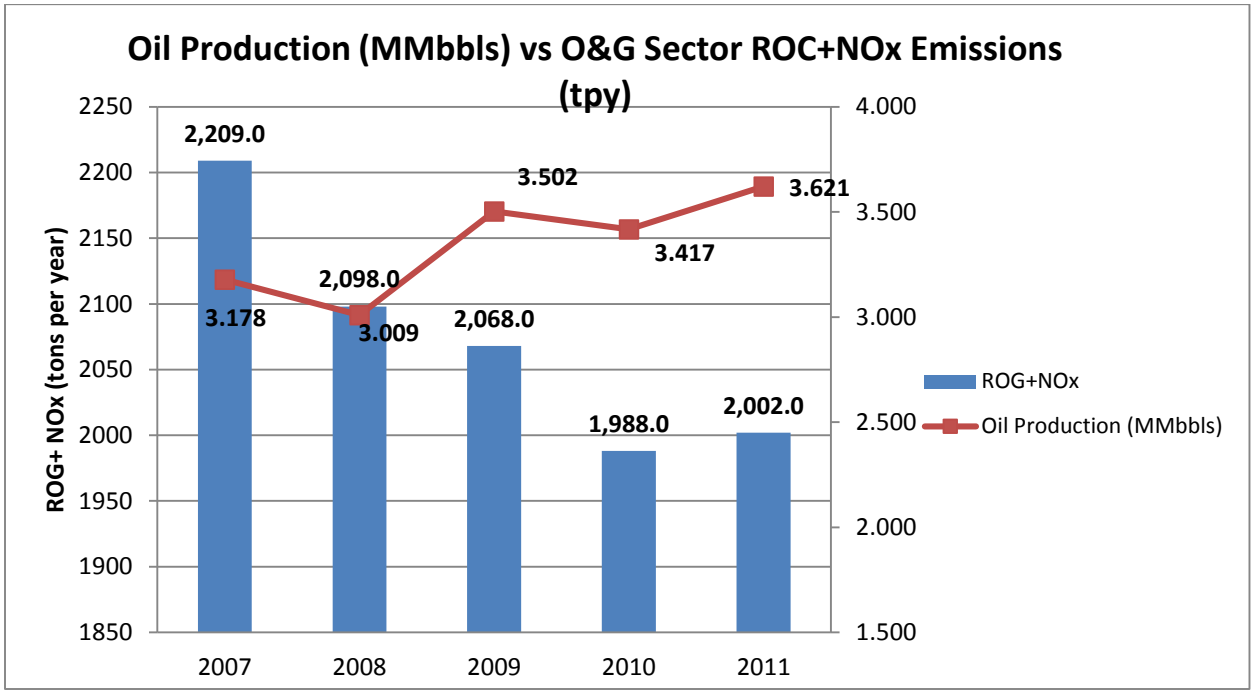


FIGURE 3-3
SANTA BARBARA COUNTY ROC AND NOX TRENDS 2008 TO 2030
(TONS PER DAY)

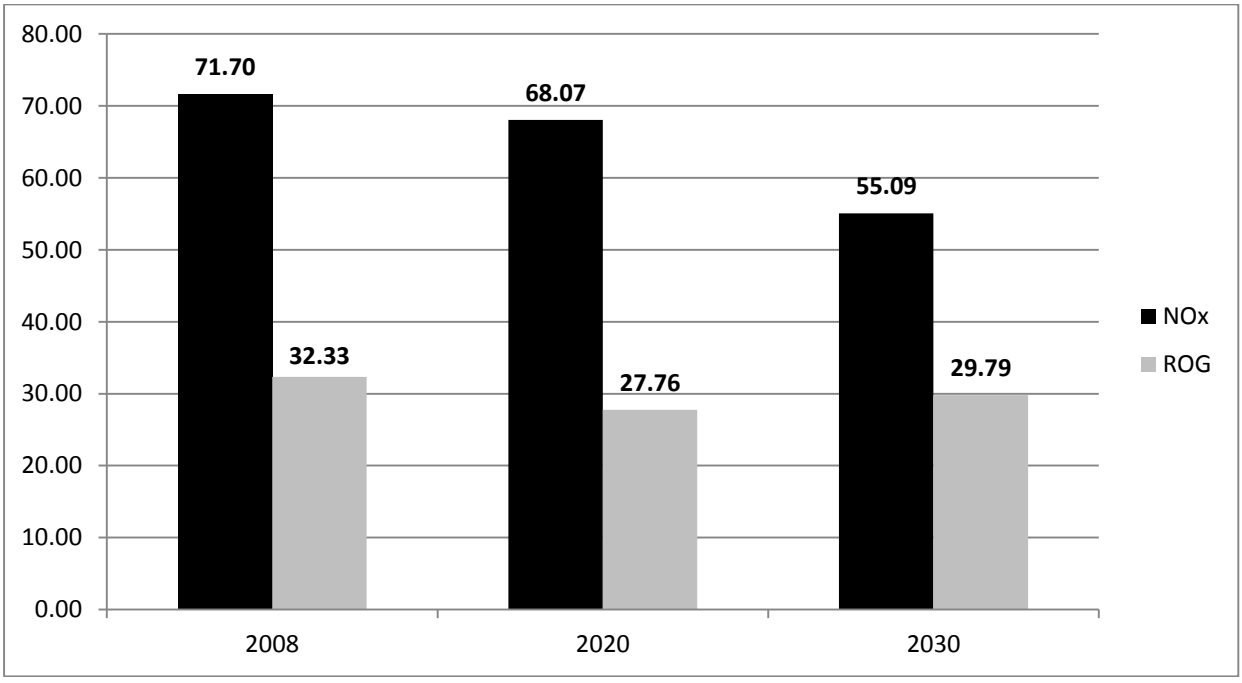


TABLE 3-2
SANTA BARBARA COUNTY GROWTH FACTORS

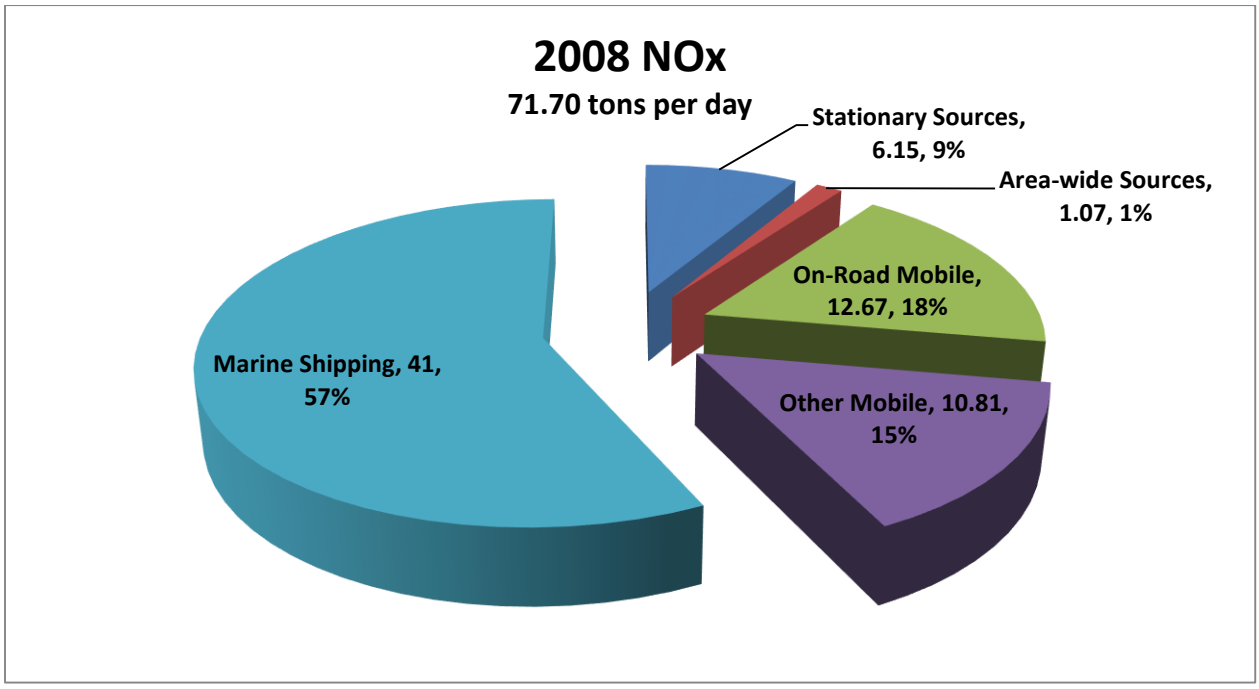
Activity Indicator[c]	Units	Value			Factor	
		2008	2020	2030	2020	2030
Commercial Employment	Employees	111,300	128,600	138,200	1.1554	1.2417
Industrial Employment	Employees	23,800	22,200	22,000	0.9328	0.9244
Public Services	Employees	37,300	39,400	41,000	1.0563	1.0992
Housing	Households	141,385	151,100	170,500	1.0687	1.2059
Population	Residents	418,309	445,900	495,000	1.0660	1.1833
OCS Production	No Units	1	1	1	1	1
Petroleum Production	No Units	1	1	1	1	1
Petroleum Wells	No Units	1	1	1	1	1

3.4 IMPACTS FROM MARINE SHIPPING EMISSIONS

Large ships traveling along the coast of Santa Barbara County produce significant air emissions. While the County does not have a port, the location of internationally-designated shipping lanes in the Santa Barbara Channel means that ships are traveling along an approximately 100 mile stretch of water off the County's coastline. In the base year (2008), ship transits through the Channel numbered approximately 6,000.

Specifically, as displayed in Figure 3-4 below, base-year NOx emissions from marine shipping comprise over 50 percent of the Countywide planning inventory. This is by far the single largest (human generated) source of ozone-precursor emissions in the County.

FIGURE 3-4
2008 NOX EMISSIONS (TONS PER DAY) AND DISTRIBUTION (%)



c The oil and gas related activity factors have been set to one, due to long term growth uncertainty in that sector.

Figure 3-5 below shows that marine shipping emissions in 2030 are forecasted to remain relatively unchanged from baseline levels. While the inventory projects shipping growth in the near term, beginning in 2016 more stringent engine NOx standards for new engines will be phased in under International Maritime Organization (IMO) and United States Environmental Protection Agency regulations. Marine engines typically have a long life-span, thus emission reductions from the introduction of cleaner ship engines are expected to slowly counteract the anticipated growth in the shipping industry. However, by 2030, shipping emissions will represent an even greater total percentage of the County total ozone-precursor inventory (i.e., 73% of emissions).

FIGURE 3-5
2030 NOX EMISSIONS (TONS PER DAY) AND DISTRIBUTION (%)

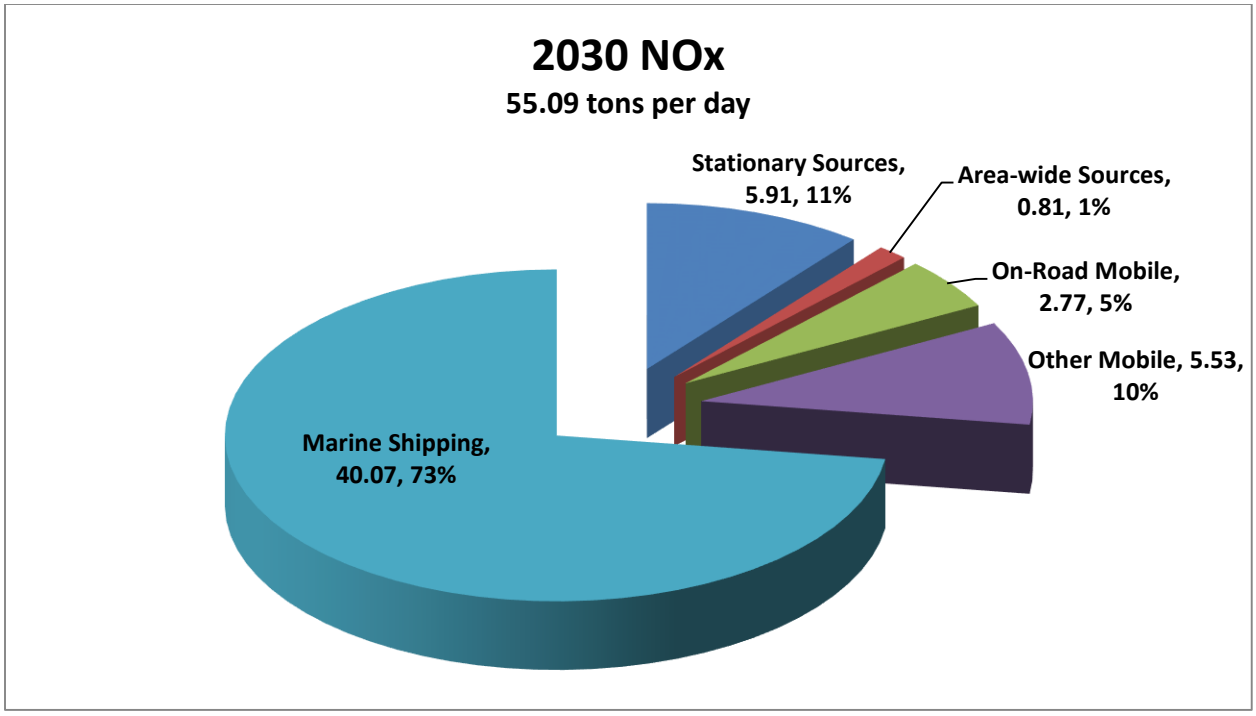


Figure 3-5 is based on ARB estimates for Santa Barbara County for base (2008) and future year (2020 and 2030) NOx and ROG marine shipping emissions, using the California Emissions Projection Analysis Model (CEPAMS). The emissions are associated with all shipping activity from the shoreline out to 24 nautical miles. Projections include both shipping growth (based on trends in growth of net registered tonnage) and the phase-in of fuel and engine standards.

While the ARB has made every effort to provide accurate forecasts of future marine shipping emissions in Santa Barbara County, it is important to note that there is inherent uncertainty about future emissions from marine shipping, due to a wide range of factors, including the pace of economic recovery and changing traffic patterns within the Santa Barbara Channel. Review of actual ship transit data from the past few years, however, suggests that ARB may be over-estimating near-term shipping growth. ARB is projecting that peak emissions from shipping will occur in 2016 then steadily decline to approximately base-year levels by 2030. Available ship transit data, however, show that shipping activity has yet to reach peak levels that were realized in 2006 and the actual annual growth rate in the near- term may be less than projected. However, the 2030 emissions projections are reasonable as recovery in the shipping industry occurs over time.

Strategies to Reduce Shipping Emissions

The District has worked for decades to raise awareness of the problem of marine shipping emissions, identifying these emissions in *Clean Air Plans* since 1994, and calling for regulations to reduce this large source of emissions. Significant gains have been made, and state, federal, and international measures are now in place that will reduce this pollution over the long term. Even with these gains, air pollution produced by ships transiting off the coast will overwhelm onshore efforts to reduce pollution in Santa Barbara County. Achieving additional NOx reductions from shipping is key to ensuring continued progress towards attainment of the state ozone standard.

Vessel speed reduction (VSR) is a promising strategy for NOx reductions. We estimate up to a 55 percent reduction in NOx could be achieved from the shipping sector if all ships reduced speeds down to 12 knots from historical average speeds in the Santa Barbara Channel. This corresponds to an overall County-wide reduction of 31% of NOx relative to the 2008 baseline inventory. In addition, speed reduction would have the co-benefits of reducing particulate matter, and sulfur dioxide emissions. VSR can be implemented by all ships, without capital investments. VSR has great potential for reduction of fuel use and greenhouse gas emissions. VSR is the only emission-reduction strategy that also addresses the problem of lethal ship strikes on whales off the coast. The Santa Barbara Channel is a seasonal feeding ground and migration path for several whale species, including blues, grays, fins, and humpbacks, which travel in and around the shipping lanes.

The District along with National Oceanic and Atmospheric Administration Channel Islands National Marine Sanctuaries, Ventura County Air Pollution Control District, and the Environmental Defense Center, are partners in a trial VSR incentive program in the Santa Barbara Channel. We have worked with the shipping industry to implement a trial program to slow ships down to 12 knots in the Channel from July 1-October 30, 2014. This trial VSR program covers approximately 110 miles in the Channel and was modeled after the highly successful voluntary incentive programs in place at the Ports of Long Beach and Los Angeles (that also slows ships down to 12 knots). After the trial is completed we will analyze the data, and evaluate the potential for a larger-scale VSR program in the Channel. We have been discussing with ARB and USEPA possible funding avenues for a larger-scale VSR program. We will continue these discussions and work hard to build on existing partnerships in order to further our efforts to reduce speed and emissions in the Channel.

In addition, we will also explore other promising strategies for achieving NOx reductions, including use of emission-reduction practices and technologies by the shipping industry. Ports offer a useful model in this area as well. As part of the Technology Advancement Program as described in the *San Pedro Bay Ports Clean Air Action Plan*, the Ports of Long Beach and Los Angeles are examining main engine retrofits (selective catalytic reduction, sea water scrubbers dry low NOx combustion), more efficient fuel injectors (slide valves) and techniques for operating main engines in a low-NOx emissions mode.

We will continue to track developments at the ports and in the shipping industry, as we make a concerted effort to reduce the shipping sector NOx emissions in our inventory.

TABLE 3-3
EMISSIONS BY SOURCE CATEGORY (TONS PER DAY)

	2008		2020		2030	
	NOx	**ROC**	**NOx**	**ROC**	**NOx**	**ROC**
Stationary Sources						
ELECTRIC UTILITIES	0.0042	0.0019	0.0042	0.0019	0.0042	0.0019
COGENERATION	0.1262	0.0338	0.1262	0.0338	0.1262	0.0338
OIL AND GAS PRODUCTION (COMBUSTION)	1.8147	0.1212	1.8072	0.1212	1.8056	0.1212
PETROLEUM REFINING (COMBUSTION)	0.0139	0.0006	0.0073	0.0006	0.0073	0.0006
MANUFACTURING AND INDUSTRIAL	1.0537	0.0699	0.9818	0.0652	0.9730	0.0646
FOOD AND AGRICULTURAL PROCESSING	2.3485	0.1640	1.8365	0.1216	1.6043	0.1053
SERVICE AND COMMERCIAL	0.5897	0.0598	0.6230	0.0626	0.6500	0.0644
OTHER (FUEL COMBUSTION)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SEWAGE TREATMENT	0.0022	0.0020	0.0024	0.0020	0.0025	0.0023
LANDFILLS	0.0042	0.1127	0.0045	0.1201	0.0050	0.1334
INCINERATORS	0.0027	0.0002	0.0029	0.0003	0.0030	0.0003
SOIL REMEDIATION	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OTHER (WASTE DISPOSAL)	0.0000	0.9392	0.0000	0.9092	0.0000	1.0092
LAUNDERING	0.0000	0.0050	0.0000	0.0054	0.0000	0.0060
DEGREASING	0.0000	2.2888	0.0000	1.6536	0.0000	1.6390
COATINGS AND RELATED PROCESS SOLVENTS	0.0000	2.1204	0.0000	2.1299	0.0000	2.1765
PRINTING	0.0000	0.4812	0.0000	0.4583	0.0000	0.5087
ADHESIVES AND SEALANTS	0.0000	0.8247	0.0000	0.7664	0.0000	0.7595
OTHER (CLEANING AND SURFACE COATINGS)	0.0000	0.1056	0.0000	0.0985	0.0000	0.0977
OIL AND GAS PRODUCTION	0.0762	2.9636	0.0762	2.9636	0.0762	2.9636
PETROLEUM REFINING	0.0002	0.0404	0.0002	0.0404	0.0002	0.0404
PETROLEUM MARKETING	0.0000	0.5432	0.0000	0.5468	0.0000	0.5532
CHEMICAL	0.0000	0.0176	0.0000	0.0165	0.0000	0.0163
FOOD AND AGRICULTURE	0.0000	0.1126	0.0000	0.1301	0.0000	0.1399
MINERAL PROCESSES	0.0306	0.0046	0.0286	0.0043	0.0283	0.0042
ELECTRONICS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OTHER (INDUSTRIAL PROCESSES)	0.0839	0.0546	0.0839	0.0546	0.0839	0.0546
Stationary Sources Total	**6.1509**	**11.0676**	**5.5849**	**10.3069**	**5.3697**	**10.4966**

	2008		2020		2030	
	NOx	**ROC**	**NOx**	**ROC**	**NOx**	**ROC**
Area Sources						
CONSUMER PRODUCTS	0.0000	2.5704	0.0000	2.2875	0.0000	2.3999
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.0000	1.3462	0.0000	1.1730	0.0000	1.3236
PESTICIDES/FERTILIZERS	0.0000	3.1925	0.0000	4.2148	0.0000	4.2148
ASPHALT PAVING / ROOFING	0.0000	0.2352	0.0000	0.3076	0.0000	0.3076
RESIDENTIAL FUEL COMBUSTION	1.0436	1.1504	0.7088	0.1943	0.8067	0.2316
FARMING OPERATIONS	0.0000	0.7399	0.0000	0.7395	0.0000	0.7395
CONSTRUCTION AND DEMOLITION	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PAVED ROAD DUST	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
UNPAVED ROAD DUST	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FUGITIVE WINDBLOWN DUST	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FIRES	0.0011	0.0036	0.0012	0.0038	0.0012	0.0038
MANAGED BURNING AND DISPOSAL	0.0275	0.0824	0.0037	0.0263	0.0037	0.0263
COOKING	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OTHER (MISCELLANEOUS PROCESSES)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Area Source Total	**1.0722**	**9.3206**	**0.7137**	**8.9468**	**0.8116**	**9.2471**
On-Road Mobile Sources						
LIGHT DUTY PASSENGER (LDA)	2.2513	2.3038	0.4951	0.4462	0.3829	0.3184
LIGHT DUTY TRUCKS - 1 (LDT1)	0.3724	0.4021	0.0842	0.0762	0.0443	0.0498
LIGHT DUTY TRUCKS - 2 (LDT2)	2.0908	1.2189	0.4616	0.3523	0.2591	0.2681
MEDIUM DUTY TRUCKS (MDV)	1.3717	0.6270	0.5506	0.3691	0.3044	0.2917
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.5744	0.4088	0.3072	0.1860	0.2205	0.1145
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.0479	0.0418	0.0247	0.0113	0.0174	0.0074
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.1618	0.1009	0.0500	0.0253	0.0245	0.0152
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.0459	0.0266	0.0320	0.0059	0.0257	0.0036
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	1.0107	0.0483	0.4312	0.0300	0.2406	0.0204
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.2680	0.0125	0.1090	0.0074	0.0575	0.0049
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	1.4489	0.0822	0.3706	0.0224	0.2069	0.0219
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	1.9310	0.1014	0.6515	0.0417	0.4195	0.0509
MOTORCYCLES (MCY)	0.1096	0.4368	0.0999	0.2997	0.1056	0.3164
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.3601	0.0134	0.2925	0.0113	0.2580	0.0102

	2008		2020		2030	
	NOx	**ROC**	**NOx**	**ROC**	**NOx**	**ROC**
HEAVY DUTY GAS URBAN BUSES (UB)	0.0331	0.0286	0.0317	0.0278	0.0218	0.0058
SCHOOL BUSES - GAS (SBG)	0.0128	0.0124	0.0091	0.0056	0.0061	0.0028
SCHOOL BUSES - DIESEL (SBD)	0.2005	0.0146	0.1491	0.0026	0.0927	0.0035
OTHER BUSES - GAS (OBG)	0.0513	0.0217	0.0262	0.0114	0.0136	0.0080
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.1216	0.0060	0.0371	0.0024	0.0239	0.0030
ALL OTHER BUSES - DIESEL (OBD)	0.0790	0.0056	0.0283	0.0012	0.0142	0.0014
MOTOR HOMES (MH)	0.1226	0.0387	0.0594	0.0066	0.0350	0.0022
On-Road Mobile Sources Total	**12.6654**	**5.9521**	**4.3010**	**1.9424**	**2.7742**	**1.5201**
Other Mobile Sources						
AIRCRAFT	0.8552	0.3044	1.0298	0.3367	1.0297	0.3366
TRAINS	2.6335	0.1763	2.2424	0.0903	1.5621	0.0593
SHIPS AND COMMERCIAL BOATS	0.3396	0.0113	0.3247	0.0104	0.3247	0.0104
OCEAN GOING VESSELS	40.9990	1.6020	49.6790	3.0920	40.0710	5.3930
COMMERCIAL HARBOR CRAFT	2.2254	0.1918	1.2444	0.1525	1.1224	0.1512
RECREATIONAL BOATS	0.0716	0.4609	0.0938	0.5250	0.0959	0.3931
OFF-ROAD RECREATIONAL VEHICLES	0.0444	0.8429	0.0521	0.6776	0.0665	0.6935
OFF-ROAD EQUIPMENT	2.2782	1.6585	1.0222	1.0559	0.7263	0.9952
FARM EQUIPMENT	2.3620	0.4703	1.2519	0.2213	0.5984	0.1400
FUEL STORAGE AND HANDLING	0.0000	0.2712	0.0000	0.1994	0.0000	0.1520
Other Mobile Source Total	**51.8089**	**5.9896**	**56.9403**	**6.3611**	**45.5970**	**8.3243**
Emission Reduction Credits			**0.5400**	**0.2000**	**0.5400**	**0.2000**
GRAND TOTAL FOR SANTA BARBARA COUNTY	**71.6974**	**32.3299**	**68.0799**	**27.7572**	**55.0925**	**29.7881**

4. EMISSION CONTROL MEASURES

4.1 INTRODUCTION

This chapter summarizes emission control measures adopted and proposed by the Santa Barbara County Air Pollution Control District (District) to reduce reactive organic compounds (ROC) or nitrogen oxides (NO_x) emissions, and identifies additional ***stationary source*** control measures for further study. This chapter also addresses the state triennial plan assessment and update requirements specified in Health and Safety Code Sections 40924 and 40925. Control measures that focus on reducing local transportation-related emissions are discussed in *Chapter 5 – Transportation Control Measures*.

Control measures are evaluated and classified as *adopted*, *proposed*, *contingency*, or *further study*, based on an analysis of the measures' applicability to Santa Barbara County, potential emission reductions, and the implementation of similar measures in other areas of California. The following describes the control measure classes:

- ***Adopted*** control measures are those that the District has formally adopted as District rules. Table 4-1 identifies the control measures adopted or modified within the reporting period (2010 to 2012) for this 2013 Clean Air Plan (Plan). In addition, the District adopted Rule 323.1, Architectural Coatings, in 2014.
- ***Proposed*** control measures are those that the District plans to adopt for the purposes of 1) maintaining the state 1-hour ozone standard, and 2) attaining the state 8-hour ozone standard. These measures are scheduled as either near-term (2015 to 2016) or mid-term (2017 to 2019). Table 4-2 shows the proposed control measures for this Plan.
- ***Contingency*** control measures are those that are required by Section 40915 of the Health and Safety Code.
- ***Further study*** measures are emission-reduction techniques that the District plans to investigate further before making a commitment to adopt them in our next triennial plan update and revision. Table 4-4 identifies the control measures for further study. Several of the listed measures have been found not to be cost-effective at this time, but they have been included as further study measures for possible future consideration.

There are seven proposed control measures, one contingency measure, and four measures proposed for further study. The seven measures proposed for adoption, all of which are identified in prior adopted Plans, were evaluated for cost effectiveness, and considered to be feasible. These measures are projected to result in emission reductions of 160 tons per year of ROC and 5 tons per year of NOx from 2008 to 2030.

4.2 EMISSION CONTROL MEASURE MANDATES

Under the California Clean Air Act, each air district that is nonattainment for the state ozone standards must demonstrate a five percent reduction in emissions per year or adopt every feasible measure available to that district.[a] The District has taken the approach of evaluating and adopting every feasible measure since the 1991 Air Quality Attainment Plan failed to produce the state mandated five percent per year emission reductions and was approved by the California Air Resources Board (ARB) under the every feasible measure option. Appendix B summarizes

[a] Health and Safety Code Section 40914(b).

the "every feasible measure" analyses" conducted for this triennial assessment.

To ensure that the District has adopted or has proposed to adopt every feasible measure, staff did the following:

1. Compared the District's rules to rules of other California air districts using ARB's document titled, "Identification of Performance Standards," April 1999, which evaluates emission control measures adopted throughout the state.
2. Reviewed and considered information provided in the California Air Pollution Control Officer Association document titled, "Potential All Feasible Measures," September 2003.
3. Considered the cost-effectiveness of the measures.

Furthermore, for proposed control measures (Table 4-2), if an analysis performed during the rulemaking process indicates that the cost-effectiveness of a measure is too high, the District will not move forward with adopting the new or revised rule.

The control measure requirements (e.g., ppm limits, grams/liter ROC-content limits) indicated in this Plan are subject to change when the actual rulemaking efforts are undertaken. The District is using the figures herein to develop emission reduction estimates required to be in the Plan by ARB and to give a general indication of today's limits necessary to comply with the "every feasible measure" mandate. However, there could be technological advancements between the time of adoption of this 2013 Clean Air Plan and the time when the District begins to undertake the rulemaking effort, which would lower the emission limits or other limits used in this Plan. The rulemaking staff will consider such improvements in technology and lower emission limits or other limits found in other air district rules during the rule development process.

4.3 EMISSION CONTROL MEASURES ADOPTED OR SCHEDULED FOR ADOPTION DURING THE REPORTING PERIOD (2010 TO 2012)

Rulemaking activities during the 2010 to 2012 period focused on revisions to control measure N-XC-1 (Rule 352), R-SL-2 (Rule 321), R-SC-2 (Rules 330 and 337), R-SL-5 (Rule 349) and R-SL-9 (Rule 353). In addition to these control measures, several other rulemaking projects and mandates displaced staff from revising control measures originally scheduled in the 2010 Clean Air Plan. These included:

- ❖ Rule 334 (repealed)
- ❖ Rules 102 & 202 (amended to implement the California regulation on reducing greenhouse gases from semiconductor operations)
- ❖ Rule 901 (amended to update references to the New Source Performance Standards)
- ❖ Rules 102, 202, 370, 810, and 1301 (amended four rules and added new Rule 810 to implement EPA's federal Prevention of Significant Deterioration and Part 70 Greenhouse Gas Tailoring Rule)

In Table 4-1, the District has identified 1) the *expected* emission reductions that were in the 2010 Clean Air Plan and 2) the *revised* emission reduction projections for each measure scheduled for adoption in the 2010 Clean Air Plan during the 2010 to 2012 reporting period.[a] Appendix C provides emission reduction summaries for the control measures shown in Table 4-1.

[a] Health and Safety Code Section 40924(b)(2) requires the District to provide this information.

TABLE 4-1, EMISSION CONTROL MEASURES ADOPTED OR SCHEDULED FOR ADOPTION DURING THE REPORTING PERIOD (2010-2012)

Rule	Control Measure ID	Description	Scheduled Rule Adoption Date	Actual Rule Adoption Date	Pollutant	Cost-Effectiveness ($/Ton)	2010 Clean Air Plan Expected Emission Reductions, Tons/Day (Tons/Year)[a]	Revised Emission Reductions, Tons/Day (Tons/Year)	
								2020	2030
321 (Revised)	R-SL-2	Solvent Cleaning Machines and Solvent Cleaning	2007[b]	September 2010	ROC	$-3,310 to $12,940	0.5261 (192.0187)	0.4831 (176.3276)	0.4787 (174.7398)
330 (Revised)	R-SC-2	Surface Coating of Metal Parts and Products (Revisions to Include Solvent Cleaning Requirements)	2010-2012	June 2012	ROC	$-243 to $4,744	0.0212 (5.5146)	0.0222 (5.7769)	0.0220 (5.7249)
337 (Revised)	R-SC-2	Surface Coating of Aircraft or Aerospace Vehicle Parts and Products (Revisions to Include Solvent Cleaning Requirements)	2010-2012	June 2012	ROC	0	0.0006 (0.1482)	0	0
342 (Revised)	N-XC-4 and N-XC-5	Revisions to Reduce the NOx Limits to 15 ppmv at 3% Oxygen for Boilers, Steam Generators and Process Heaters Greater than or Equal to 5 MMBtu/hr	2010-2012	Not yet adopted	NOx	N/A[c]	0.0080 (2.9345)	N/A[c]	N/A[c]
349 (Revised)	R-SL-5	Polyester Resin Operations (Revisions to Include Solvent Cleaning Requirements)	2010-2012	June 2012	ROC	0	0.0058 (1.4964)	0 (0)	0 (0)
351 (Revised)	R-SC-5	Coating of Wood Products (Revisions to Include Solvent Cleaning Requirements)	2010-2012	Not yet adopted	ROC	$477 to $909	0.0019 (0.4941)	0.0023 (0.6088)	0.0023 (0.6033)

[a] The figures shown are for planning year 2020.
[b] Delayed from the schedule shown in the 2007 Clean Air Plan.
[c] Not applicable because the control measure has been moved to the *further study* category.

TABLE 4-1, EMISSION CONTROL MEASURES ADOPTED OR SCHEDULED FOR ADOPTION DURING THE REPORTING PERIOD (2010-2012)

Rule	Control Measure ID	Description	Scheduled Rule Adoption Date	Actual Rule Adoption Date	Pollutant	Cost-Effectiveness ($/Ton)	2010 Clean Air Plan Expected Emission Reductions, Tons/Day (Tons/Year)[a]	Revised Emission Reductions, Tons/Day (Tons/Year)	
								2020	2030
352 (Revised)	N-XC-1	Residential Water Heaters; Residential and Commercial Space Heaters (Revision Reduced the NOx Limits on the Residential Water Heaters to 15 ppmv)	2013-2015	October 2011	NOx	$2,979 to $9,292	0.0627 (22.8685)	0.0967[b] (35.2949)[b]	0.1406 (51.3036)
353 (Revised)	R-SL-9	Adhesives and Sealants	2010-2012	June 2012	ROC	$-194 to $3,036	0.0050 (1.8246)	0.0029 (1.0421)	0.0028 (1.0328)
354 (Revised)	R-SL-7	Graphic Arts and Paper, Film Foil, and Fabric Coatings (Revisions to Rule 354 to Include Solvent Cleaning and Additional Requirements for Rotogravure, Flexographic, Lithographic, Letterpress, and Screen Printing)	2010-2012	Not yet adopted	ROC	$1,002 to $3,130	0.0579 (21.1404)	0.0552 (20.1444)	0.0612 (22.3507)
						Totals for ROC.[c]	**0.6184 (222.6371)**	**0.5657 (203.8999)**	**0.5671 (204.4514)**
						Totals for NOx.[c]	**0.0707 (25.8030)**	**0.0967 (35.2949)**	**0.1406 (51.3036)**

[a] The figures shown are for planning year 2020.
[b] The Rule 352 figures are based on 80% rule implementation in planning year 2020.
[c] Totals may not appear to be correct due to rounding.

CONTROL MEASURE ADOPTED IN 2014

Rule (Status)	Control Measure ID	Description	Adoption Schedule	Cost-Effectiveness ($/Ton)	Emission Reductions in Tons/Day (Tons/Year) [a]	
					ROC	NO_X
323.1 (New Rule)[b]	R-SC-1	Architectural Coatings (New Rule to reduce ROC content limits of coatings per the State 2007 Suggested Control Measure Provisions).	Adopted on June 19, 2014	$3,090	0.2657 (96.9842)	—

4.4 PROPOSED AND CONTINGENCY EMISSION CONTROL MEASURES

The proposed control measures are summarized in Table 4-2. Each of the proposed measures in Table 4-2 were contained in prior Clean Air Plans, but have yet to be revised. These control measures are scheduled as either near-term (2015-2016) or mid-term (2017-2019).

TABLE 4-2
PROPOSED EMISSION CONTROL MEASURES

Rule (Status)	Control Measure ID	Description	Adoption Schedule	Cost-Effectiveness ($/Ton)	Emission Reductions in Tons/Day (Tons/Year) [c]	
					ROC	NO_X
321 (Revised)	R-SL-2	Solvent Cleaning Machines and Solvent Cleaning (Revisions to Lower ROC-Content Limits).	2015 - 2016	$2,784	0.3735 (136.3448)	—
325, 326, 343, & 344 (Revised)	R-PP-1, R-PT-1, and R-PT-2	Crude Oil Production and Separation and Storage of Reactive Organic Compound Liquids; Petroleum Tank Degassing; and Petroleum Sumps, Pits and Well Cellars [Add Solvent Cleaning Provisions (e.g., Solvent with 25 grams of ROC per liter or less), Solvent Cleaning Machines Need to Comply with Rule 321, etc.].	2017 - 2019	$606	0.0090 (3.2728)	—

[a] The figures shown are for planning year 2020 with 100% rule implementation.
[b] Rule 323.1 will eventually replace Rule 323 and does not add solvent cleaning requirements as previously proposed.
[c] With the exception of Rule 360, the figures shown are for planning year 2020 with 100% rule implementation. The Rule 360 figure is for planning year 2030 with 70% rule implementation.

TABLE 4-2
PROPOSED EMISSION CONTROL MEASURES

Rule (Status)	Control Measure ID	Description	Adoption Schedule	Cost-Effectiveness (Dollars per Ton of Emissions Reduced)	Emission Reductions in Tons per Day (Tons per Year) from the Control Measure[a]	
351 (Revised)	R-SC-5	Surface Preparation and Coating of Wood Products (Revisions to Include Solvent Cleaning Requirements and to Incorporate any New or Modified State Suggested Control Measure Provisions).	2015 - 2016	$477 to $909	0.0023 (0.6088)	—
354 (Revised)	R-SL-7	Graphic Arts and Paper, Film Foil, and Fabric Coatings (Revisions to Rule 354 to Include Solvent Cleaning and Additional Requirements for Rotogravure, Flexographic, Lithographic, Letterpress, and Screen Printing).	2017 - 2019	$1,000 to $3,130	0.0552 (20.1444)	—
360 (Revised)	N-XC-2	Revisions to Reduce the NOx Limits to 20 ppmv at 3% Oxygen for Large Water Heaters and Small Boilers Rated 0.075 MMBtu/hr to 2 MMBtu/hr.	2015 - 2016	$2,683 to $17,888	—	0.0137[b] (5.0133)[b]
			Totals for ROC.[c]	—	**0.440 (160.3709)**	—
			Totals for NOx.[c]	—	—	**0.0137 (5.0133)**

Appendix C provides emission reduction summaries for the control measures shown in Table 4-2.

A contingency measure, as required by Health and Safety Code Section 40915, is shown in Table 4-3. The Enhanced Motor Vehicle Inspection and Maintenance program measure is carried over from the 2010 Plan.

TABLE 4-3
CONTINGENCY MEASURE

MEASURE	DESCRIPTION
Motor Vehicle Inspection and Maintenance (T-21)[d]	Enhanced Motor Vehicle Inspection and Maintenance program. The overall cost effectiveness of the Enhanced I & M program is $5,300 dollars per ton of hydrocarbon and NOx reduced (2004 dollars).

[a] With the exception of Rule 360, the figures shown are for planning year 2020 with 100% rule implementation. The Rule 360 figure is for planning year 2030 with 70% rule implementation.
[b] Emission Reductions are for planning year 2030 with 70% rule implementation.
[c] Totals may not appear to be correct due to rounding.
[d] This contingency measure was shown in the 2010 Clean Air Plan's chapter 5, Transportation Control Measures.

4.5 EMISSION CONTROL MEASURES FOR FURTHER STUDY

A possible new control measure and modifications to existing control measures that merit further study are shown in Table 4-4 (Further Study).

TABLE 4-4
FURTHER STUDY

Rule	Control Measure ID	Description	Comments	Other Air District Rule that could be used as a model for a SBCAPCD Rule
—	—	Organic Material Composting Operations	The composting measure would limit emissions of reactive organic compounds from commercial composting operations.	San Joaquin Valley Unified APCD Rule 4566.
316	R-PM-2	Storage and Transfer of Gasoline - Gasoline Dispensing Phase I	Delete the Rule 316, Section I.2 exemption. Currently, this provision exempts agricultural operations from vapor recovery system requirements if more than 50 percent of the annual throughput is used to fuel implements of husbandry.	South Coast AQMD Rule 461.
342	N-XC-4 and N-XC-5	Boilers, Steam Generators and Process Heaters Greater than or Equal to 5 MMBtu/hr	Reduce the NOx Limit to 15 parts per million by volume at 3 percent oxygen or less.	South Coast AQMD Rule 1146 and San Joaquin Valley Unified APCD Rule 4306.
361	N-XC-4	Small Boilers, Steam Generators, and Process Heaters (Greater than 2 MMBtu/hr to Less than 5 MMBtu/hr)	Reduce the NOx Limit to 12 parts per million by volume at 3 percent oxygen or less.	South Coast AQMD Rule 1146.1 and San Joaquin Valley Unified APCD Rule 4307.

4.6 CONCLUSION

The Plan control measures include controls over a range of categories that contribute NOx and ROC emissions (e.g., water heaters and use of solvents, coatings, and inks). The control measures evaluated and identified in this chapter, combined with the emissions reductions expected from on-road mobile sources in *Chapter 5, Transportation Control Measures*, show that Santa Barbara County is making significant progress in reducing emissions from sources subject to our control.

5. TRANSPORTATION CONTROL MEASURES

5.1 BACKGROUND

In June 1993, the boards of the Santa Barbara County Association of Governments (SBCAG) and the Santa Barbara County Air Pollution Control District (District or APCD) jointly approved a Memorandum of Understanding (MOU), which effectively placed the responsibility for developing the transportation elements of the air quality plans with SBCAG. This MOU allows SBCAG to assist the District in a cooperative effort toward meeting the District's responsibilities for developing the transportation elements of its State and federal air quality plans. Under the MOU, SBCAG is responsible for the development and analysis of the 2013 Plan's on-road mobile source emission estimates and Transportation Control Measures (TCMs). SBCAG also provides the District with socio-economic projections that form the basis for many of the stationary and area source growth forecasts for this 2013 Plan.

5.2 HISTORICAL TRENDS IN VEHICLE ACTIVITY

5.2.1 STATE ACT PERFORMANCE MEASURE

State law requires areas classified as having a "moderate" non-attainment classification for the State 1-hour ozone standard, such as Santa Barbara County, to track and meet the following transportation performance standard: a substantial reduction in the rate of increase in passenger vehicle trips and vehicle miles traveled (VMT).[a] ARB has defined "substantial reduction" as holding growth in VMT and trips to the same growth rate as population. Figure 5-1 shows annual growth rates for daily VMT and population for Santa Barbara County for the 21-year period between 1990 and 2011. Table 5-1 similarly shows average annual growth rates for population and VMT over the last three decades. As shown, the average annual VMT growth rate from 1990 to 1999 was 1.31 percent. The annual average population growth rate over this same period was 0.63 percent – below the comparable average annual rate of VMT growth. The trend over the last ten years has been a further decline in the VMT growth rate. For the period 2000 to 2010, the average annual VMT growth rate was 0.33 percent, compared to an average annual population growth rate for this same time period of 0.69 percent – higher than the comparable average annual rate of VMT growth. The ten-year growth rate ratios over the last three decades indicate that the VMT growth rate has decreased relative to the population growth rate.

5.3 TRANSPORTATION CONTROL MEASURES

TCMs are programs or activities that states and localities can implement to encourage the traveling public to rely less on the automobile or to use the automobile more efficiently. TCMs reduce emissions from on-road motor vehicles and trucks by: improving the existing transportation system to allow motor vehicles to operate more efficiently; inducing people to change their travel behavior to less polluting modes; or, ensuring emission control technology improvements in the motor vehicle fleet are fully and expeditiously realized. TCMs address the need for the traveling public to carefully consider: 1) the implications of continued reliance on the single-occupant vehicle as the major choice of commute trips; 2) the need to provide and promote alternatives to single-occupant vehicle travel; and, 3) the need to consider regulating those factors which promote single-occupant vehicle travel. While the greatest on-road mobile

[a] California Health & Safety Code §40918(a)(3). VMT is considered a surrogate for vehicle trips for State performance standard monitoring.

source emission reductions (over 95 percent) are attributable to motor vehicle emission controls established by federal and State laws and the natural attrition of older, more polluting vehicles (i.e., fleet turnover), TCMs should be considered as an integral part of air quality plans given that they help meet multiple objectives (e.g., congestion relief, energy efficiency, etc.).

Table 5-2 summarizes the implementation characteristics of all currently adopted TCM categories in the county. Identified are: the type of TCM; the adopting agency/agencies; the agency/agencies responsible for implementing the TCM; the formal agreements between the adopting and implementing agencies; and how TCM implementation will be monitored and by whom.

For State air quality planning purposes, control measures are classified as being adopted, proposed, contingency, further study, or deleted. Adopted TCMs are those projects and programs that the District has formally adopted and were developed as part of the 1994, 1998, 2001, 2004, 2007 and 2010 Plans. Where a district is in non-attainment with respect to a pollutant such as ozone, State law requires that the District include "every feasible measure" should the district not achieve a 5 percent annual reduction in district-wide emissions. The adopted transportation control measures meet this statutory provision.

All TCMs evaluated as part of the last triennial update (2010 Plan) are listed below.

Currently Adopted

T-1 Trip Reduction Ordinance
T-2 Employer-Based Transportation Demand Management (TDM) Programs
T-3 Work Schedule Changes
T-4 Area-wide Ridesharing Incentives
T-5 Improve Commuter Public Transit Service
T-6 High Occupancy Vehicle (HOV) Lanes
T-7 Traffic Flow Improvements
T-8 Parking Management
T-9 Park-and-Ride Fringe Parking
T-10 Bicycle and Pedestrian Programs
T-13 Accelerated Retirement of Vehicles
T-17 Telecommunications
T-18 Alternative Fuels
T-19 Public Education
T-20 Parking Management to Reduce Non-Commute Single Occupant Vehicle Use

Proposed For Further Study

T-9 Park-and-Ride Lots (expansion of adopted T-9)
T-14 Activity Centers

Contingency Measure

T-21 Enhanced Inspection and Maintenance Program

The TCMs contained in the prior Clean Air Plan (2010 Clean Air Plan) form the basis for the 2013 Plan on-road mobile source control strategy (see Table 5-2). Table 5-3 lists several new projects that have been implemented during the 2010 – 2013 reporting period. Table 5-4 includes two prior "further study" TCMs, described below, that are proposed for adoption. Table 5-5 identifies an Enhanced Inspection and Maintenance (I/M) Program as a contingency measure.

As shown above, the 2010 Clean Air Plan contained a Park-and-Ride Lots measure (T-9) "for further study" to determine if Park-and-Ride facilities are capable of providing measurable emission reductions in criteria pollutants. SBCAG completed a study in June 2014 and the study determined that development of the "high priority" Park-and-Ride facilities could provide a reduction of up to 71,000 VMT (estimated upper bound). Since the Park-and-Ride TCM (T-9) has already been adopted in the past, completion of the Park-and-Ride Study further validates a continuation of this TCM strategy. Thus, this expanded T-9 is proposed for adoption.

TCM T-14, "Activity Centers" is also proposed for adoption in the 2013 Plan. This proposed TCM arose from Senate Bill 375, which was passed in 2008 by the California legislature. The EPA defines the Activity Centers TCM as "a program and/or ordinance to facilitate non-automobile travel or utilization of mass transit to reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to centers of vehicle activity."[b] SB 375 places new regional planning responsibilities on Metropolitan Planning Organizations like SBCAG. This law is intended to help meet the State's greenhouse gas (GHG) emission reduction goals in AB 32 to reduce emissions from car and light-duty truck travel through regional transportation and land use strategies. SB 375 ties the regional housing and transportation planning and land use planning processes together by mandating the preparation of a Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan (RTP).

In August 2013, SBCAG adopted the 2040 RTP-SCS, which shows how the region will achieve the required GHG per capita emission targets as well the co-benefits of reducing criteria pollutants. The 2040 RTP-SCS is based on a preferred land use and transportation scenario, which lays out one possible pattern of future growth and transportation investment for the region. The RTP-SCS preferred scenario emphasizes a transit-oriented development and infill approach to land use and housing, supported by complementary transportation and transit investments. Population and job growth is allocated principally within existing urban areas near public transit. Allocation of future growth directly addresses jobs-housing balance issues by emphasizing job growth in the North County and housing growth in the South County.

The preferred scenario consists of three core, inter-related components:

1. A land use plan, including residential densities and building intensities sufficient to accommodate projected population, household and employment growth;
2. A multi-modal transportation network to serve the region's transportation needs; and
3. A "regional greenprint" cataloguing open space, habitat, and farmland as constraints to urban development.

Overall, reactive organic gases (ROG) and oxides of nitrogen (NOx) emissions are forecast to continue to decline under both scenarios analyzed within the draft RTP-SCS (the "Future Baseline" scenario and the preferred growth scenario (see Figure 5-2). The reductions primarily result from state and federal controls on light-duty vehicles and heavy-duty diesel emissions, as well as the natural attrition of older vehicles being replaced by newer vehicles (fleet turnover). Consistent with the Sustainable Communities Strategy, TCM T-14 emphasizes transit-oriented development, smart growth, and complementary investments to a multi-modal transportation network, which will result in reductions of ozone precursor emissions.

[b] Source: www.epa.gov/oms/stateresources/policy/transp/tcms/activity_centers.pdf.

TABLE 5-1
POPULATION AND VMT GROWTH RATES

TIME PERIOD	ANNUAL AVG. GROWTH RATE – POPULATION	ANNUAL AVG. GROWTH RATE – VMT	ANNUAL AVG. GROWTH RATIO (POP:VMT)
1981-1989	1.98%	4.58%	1:2.31
1990-1999	0.63%	1.31%	1:2.08
2000-2010	0.69%	0.33%	1:0.49

TABLE 5-2
SANTA BARBARA COUNTY TRANSPORTATION CONTROL MEASURES

TCM	TCM DESIGNATION	TCM TYPE	ADOPTING AGENCY(IES)	IMPLEMENTING AGENCY(IES)	COMMITMENTS	MONITORING MECHANISM (AGENCY)
T-1 T-2	Trip Reduction Program Employer-Based TDM Program	Voluntary; TDM Program; State AQAP	Tier 1: Guadalupe; Buellton; Solvang; County, SYV Tier 2: Lompoc; Santa Maria; Carpinteria; County Unincorporated Tier 3: Santa Barbara; County, Goleta	Tier 1 (County/ Cities) Tier 2 (County/Cities) Tier 3 (County/Cities)	Tiers 1 & 2: Resolution of Commitments from Affected Jurisdictions; Tier 3: City and County TDM Program City of Santa Barbara and Goleta area	Transportation Demand Management Program (SBCAG) Congestion Mitigation Program Conformity (SBCAG)
T-3	Work Schedule Changes	Voluntary	County and Cities	County and Cities; Private Sector	Adopted Policy, County, 1988	Not Applicable (TDM)
T-4	Area Wide Ridesharing	Voluntary	County and Cities	SBCAG	Interagency Agreement	TDM Program (SBCAG)
T-5	Public Transportation	Programmed	County and Cities	SBMTD; SMAT; SBCAG; APCD; COLT; SYVT	FTIP and RTIP; SRTP, TDP	RTP List of Programmed Projects (SBCAG)
T-6	High Occupancy Vehicle Lanes	Programmed	Caltrans and SBCAG	Caltrans and SBCAG	FTIP and RTIP; Measure A Strategic Plan	RTP List of Programmed Projects (SBCAG)
T-7	Traffic Flow Improvement	Programmed	County and Cities	County and Cities; Caltrans; SBMTD; SBCAG	FTIP and RTIP	RTP List of Programmed Projects (SBCAG)
T-8	Parking Management	Parking Ordinance	City of Santa Barbara	City of Santa Barbara	Not Applicable	City of Santa Barbara Parking Task Force
T-9	Park-and-Ride Fringe Parking	Voluntary; Programmed	County and Cities	County and Cities; Caltrans	FTIP and RTIP	Caltrans, District 5; RTP List of Programmed Projects (SBCAG)
T-10	Bicycle/Pedestrian	Programmed	County and Cities	County and Cities; Caltrans; SBCAG	FTIP and RTIP; General Bikeway Elements; Bikeway Master Plans	RTP List of Programmed Projects (SBCAG)
T-13	Accelerated Retirement of Vehicles	Voluntary	APCD	APCD	Contract APCD/Engineering	APCD
T-17	Telecommunication	Voluntary	County and Cities	County and Cities; Private Sector	Not Applicable	Not Applicable (TDM)
T-18	Alternative Fuel Program	Voluntary	APCD	APCD; County and Cities	Interagency Agreements Unnecessary	APCD
T-19	Public Education	Committal; Voluntary	County and Cities APCD; SBCAG	County and Cities APCD; SBCAG	Interagency Agreements Unnecessary	Not Applicable; CMP Conformance (SBCAG)

TABLE 5-3
SUMMARY OF PROJECTS COMPLETED UNDER PREVIOUSLY ADOPTED TRANSPORTATION CONTROL MEASURES

TCM	DESIGNATION	PROJECT SPONSOR	PROJECT
T-4	Area-wide Ridesharing	Traffic Solutions / SBCAG	CalVans monthly subsidy (up to 50%) for newly formed vanpools. Vans added as needed.
T-5	Public Transportation	MTD / SBCAG	Breeze Route 200: Weekday A.M., mid-day, and evening transit service between Santa Maria, Los Alamos, and Santa Ynez
		SMAT / COLT / SYVT / County	Coastal Express Limited
T-10	Bicycle	City of Lompoc	Allan Hancock Bikeway: Class I bike path from H Street-Highway 1 to Allan Hancock College

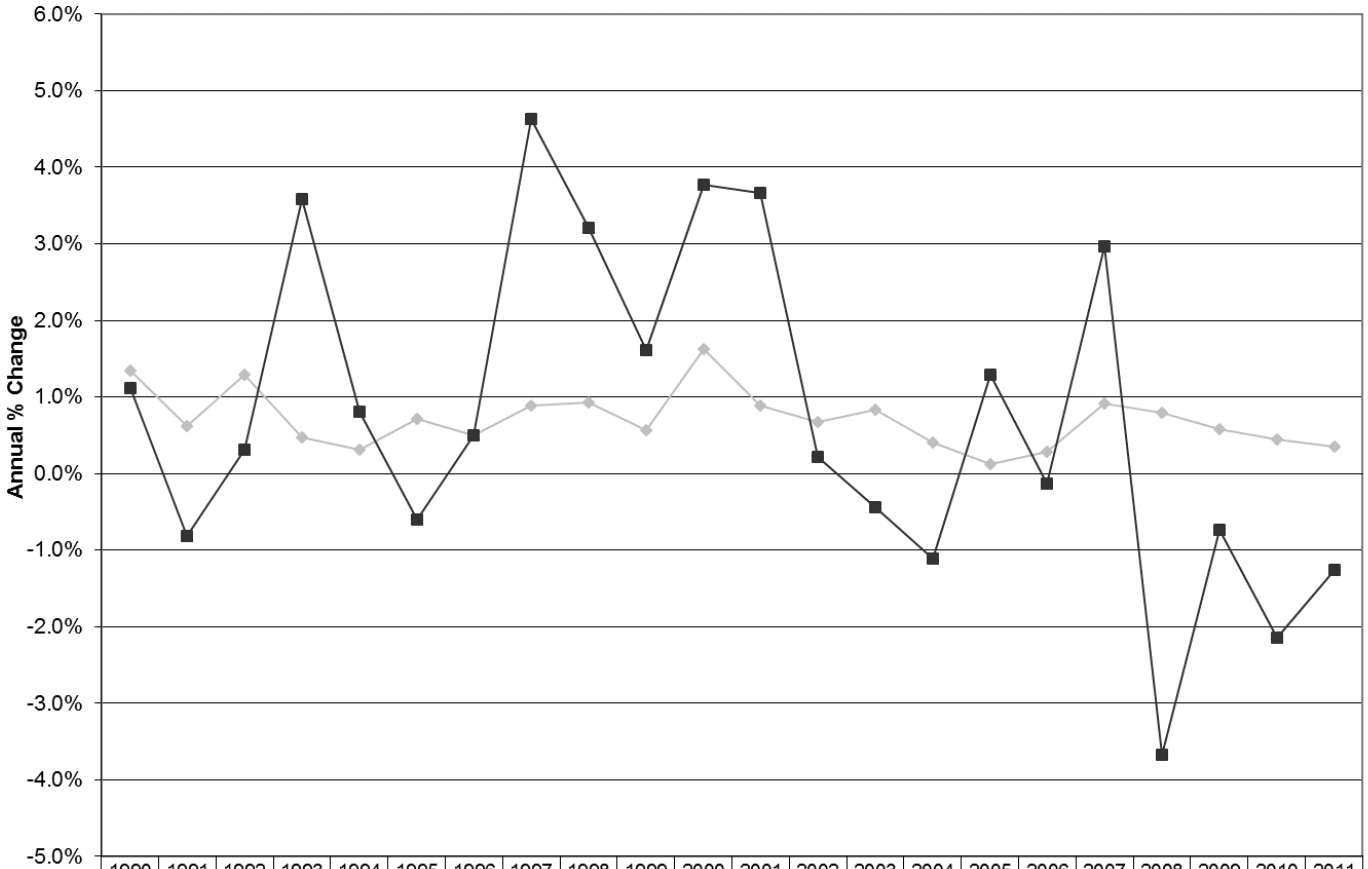
TABLE 5-4
TRANSPORTATION CONTROL MEASURES PROPOSED FOR ADOPTION

TCM	DESIGNATION	PROJECT SPONSOR	PROJECT/PROGRAM DESCRIPTION	PROCESS
T-9	Park-n-Ride Lots	Caltrans/SBCAG	Countywide, Southern SLO County and Western Ventura County. Study completed by SBCAG staff.	SBCAG Overall Work Program
T-14	Activity Centers	SBCAG / Transit Agencies / Local Jurisdictions	The Sustainable Communities Strategy (mandated by SB 375) identifies a preferred scenario that emphasizes transit-oriented development, smart growth, and complementary investments to a multi-modal transportation network. The SCS includes an analysis of potential co-benefits of criteria pollutant reduction with various SCS strategies.	SBCAG RTP-SCS

TABLE 5-5
CONTINGENCY TRANSPORTATION CONTROL MEASURES

TCM	DESIGNATION	PROJECT SPONSOR	PROJECT/PROGRAM DESCRIPTION	PROCESS
T-21	Inspection and Maintenance	Bureau of Automotive Repair	Enhanced I/M Program	Pending

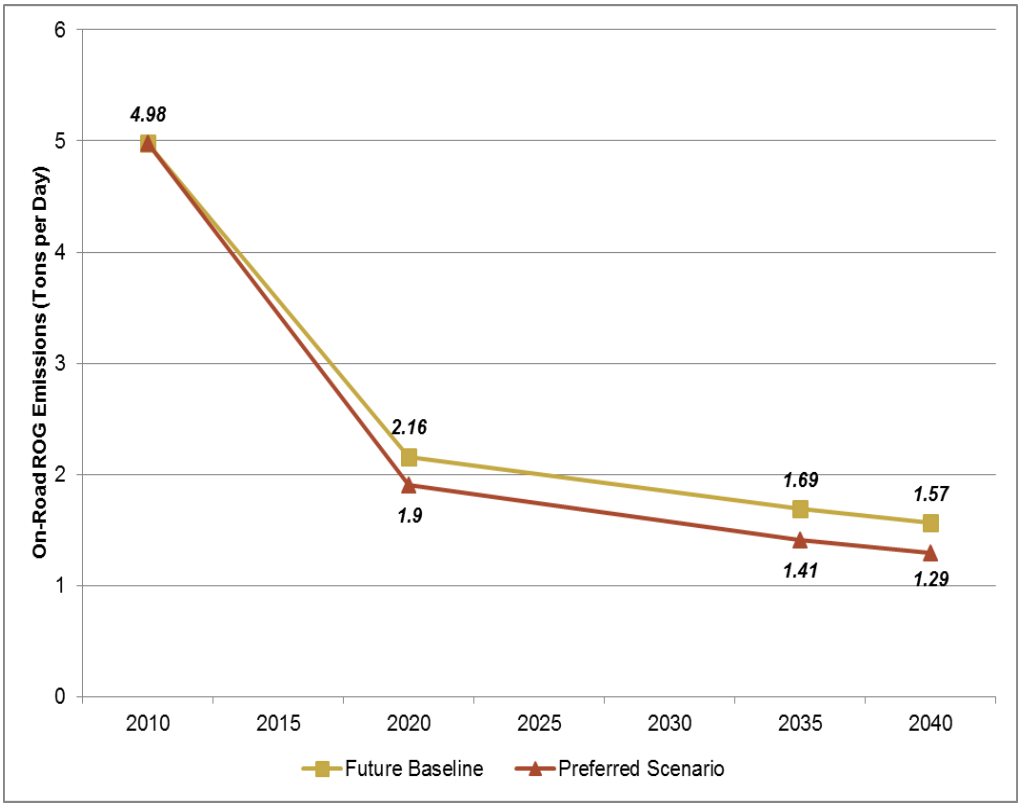
FIGURE 5-1
HISTORICAL POPULATION GROWTH RATE VS. DAILY VEHICLE MILES TRAVELED (DVMT) GROWTH RATE (1990-2011)

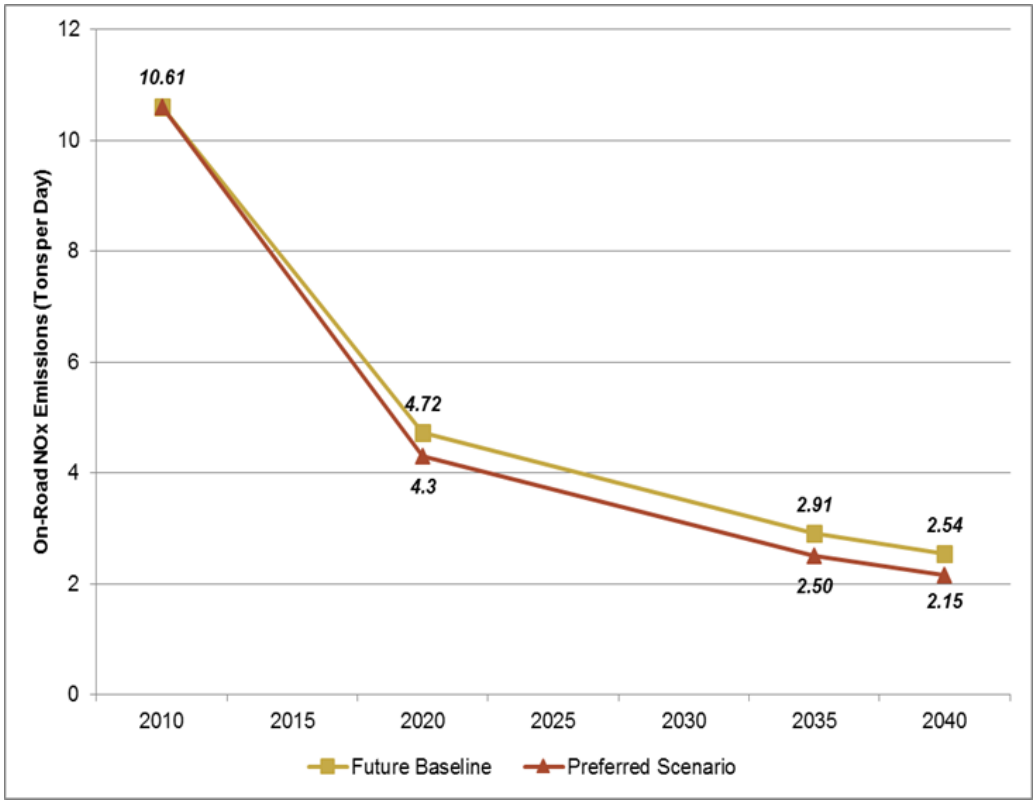


	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Pop. GR	1.3%	0.6%	1.3%	0.5%	0.3%	0.7%	0.5%	0.9%	0.9%	0.6%	1.6%	0.9%	0.7%	0.8%	0.4%	0.1%	0.3%	0.9%	0.8%	0.6%	0.4%	0.3%
DVMT GR	1.1%	-0.8%	0.3%	3.6%	0.8%	-0.6%	0.5%	4.6%	3.2%	1.6%	3.8%	3.7%	0.2%	-0.4%	-1.1%	1.3%	-0.1%	3.0%	-3.7%	-0.7%	-2.1%	-1.3%

FIGURE 5-2

RTP/SCS AND FUTURE BASELINE ON-ROAD EMISSIONS





APPENDIX A - BASIS FOR COST EFFECTIVENESS DATA IN THE 2013 CLEAN AIR PLAN

Rule	Description	Cost-Effectiveness ($/Ton)	Basis
321 (Revised in 2010)	Solvent Cleaning Machines and Solvent Cleaning	$-3,310 to $12,940	Based on information in the San Joaquin Valley Unified Air Pollution Control District, Final Staff Report - Amendments to Rule 4662 (Organic Solvent Degreasing Operations), May 11, 2001.
321 (Future Revision)	Solvent Cleaning Machines and Solvent Cleaning (Revisions to Lower ROC-Content Limits).	$2,784	In the SC Rule 1171 Sept. 27, 1999 staff report, the cost effectiveness information for **product cleaning during manufacturing process or surface preparation for coating, adhesive, or ink application** indicates: There is no expected cost increase for the proposed VOC reduction in this category due to minimal material substitution to lower VOC content. However, this same staff report indicates for **cleaning of coating or adhesive application equipment** that the cost effectiveness is $2,784 per ton of ROC emissions reduced. Since one of the substantial changes to PAR 321 is to reduce the application equipment clearing ROC content limit from 950 to 25 g/l, the District is using the $2,784 per ton figure for the cost effectiveness data.
323.1 (Adopted June 19, 2014)	Architectural Coatings (New Rule to Reduce ROC content limits of coatings per the State 2007 Suggested Control Measure Provisions).	$3,090	Based on information from the 2007 Air Resources Board Suggested Control Measure for Architectural Coatings.
325, 326, 343, & 344 (Future Revision)	Crude Oil Production and Separation and Storage of Reactive Organic Compound Liquids; Petroleum Tank Degassing; and Petroleum Sumps, Pits and Well Cellars (Add Solvent Cleaning Provisions, e.g., Solvent with 25 grams of ROC per liter or less, Cleaning Machines need to comply with Rule 321, etc…)	$606	Assumed only the solvent cleaning machine solvent will need to be replaced with aqueous or low-ROC solvent. That is, there will be essentially no change to the solvent cleaning operations. For the solvent cleaning machine solvent cost increase, staff assumed the replacement solvent will cost $1 more than the current solvent and that usage will be increased by 50 percent. That is, the ratio of low-ROC solvent to petroleum-based solvent is 1.5 to 1.
330 (Revised in 2012)	Surface Coating of Metal Parts and Products (Revisions to Include Solvent Cleaning Requirements)[a]	$-241 to $4,744	Four scenarios were considered: 100% switch to aqueous solvent, 20/80 switch to acetone/aqueous, 100 switch to acetone, and, for gun cleaning, use of an enclosed gun washer. Similar to the approach used in SJV.

APPENDIX A - BASIS FOR COST EFFECTIVENESS DATA IN THE 2013 CLEAN AIR PLAN

Rule	Description	Cost-Effectiveness ($/Ton)	Basis
337 (Revised in 2012)	Surface Coating of Aircraft or Aerospace Vehicle Parts and Products (Revisions to Include Solvent Cleaning Requirements)	0	No emission reductions.
349 (Revised in 2012)	Polyester Resin Operations (Revisions to Include Solvent Cleaning Requirements)	$-4,145 to $1,888	Four scenarios were considered: 100% switch to aqueous solvent, 20/80 switch to acetone/aqueous, 100 switch to acetone, and, for gun cleaning, use of an enclosed gun washer. Similar to the approach used in SJV.
351 (Future Revision)	Surface Preparation and Coating of Wood Products (Revisions to Include Solvent Cleaning Requirements and to Incorporate any New or Modified State Suggested Control Measure Provisions).	$477 to $909	Similar to the VC Rule 74.30 April 20, 2006 C/E approach. Two scenarios were considered: replacement of solvent with acetone ($2/gallon cost difference) and replacement of solvent with a low-ROC solvent ($1/gallon cost difference). Also, included a low-ROC or no-ROC solvent to petroleum-based solvent ratio of 1.5 to 1.
352 (Revised in 2011)	Residential Water Heaters; Residential and Commercial Space Heaters (Revision Reduced the NOx Limits on the Residential Water Heaters to 15 ppmv)	$2,979 to $9,292	SC AQMD Rule 1121 staff report dated September 2004.
353 (Revised in 2012)	Adhesives and Sealants	$-194 to $3,036	Four scenarios were considered: 100% switch to aqueous solvent, 20/80 switch to acetone/aqueous, 100 switch to acetone, and, for gun cleaning, use of an enclosed gun washer. Similar to the approach used in SJV.
354 (Future Revision)	Graphic Arts and Paper, Film Foil, and Fabric Coatings (Revisions to Rule 354 to Include Solvent Cleaning and Additional Requirements for Rotogravure, Flexographic, Lithographic, Letterpress, and Screen Printing)	$1,002 to $3,130	Three EPA Control Techniques Guideline documents: 1. Offset Lithographic Printing and Letterpress Printing, Sept. 2006, EPA-453/R-06-002. 2. Flexible Package Printing, Sept. 2006, EPA 453/R-06-003. 3. Paper, Film, and Foil Coatings, Sept. 2007, EPA 453/R-07-003.
360 (Future Revision)	Revisions to Reduce the NOx Limits to 20 ppmv at 3% Oxygen for Large Water Heaters and Small Boilers Rated 0.075 MMBtu/hr to 2 MMBtu/hr.	$2,683 to $17,888	SC AQMD Rule 1146.2.

APPENDIX B - "EVERY FEASIBLE MEASURE" ANALYSES

Control Measure, Rule (If Any), and Summary of "Every Feasible Measure" Analysis	Include in Every Feasible Measure List?
R-SL-2; Rule 321, Solvent Cleaning Machines and Solvent Cleaning Rule 321 solvent limits were last amended on September 20, 2010. With a **general solvent** reactive organic compound limit of 50 grams per liter, this rule is not as stringent as those found in other air districts. For example, the Ventura County APCD (Rules 74.6 and 74.6.1) **general solvent** reactive organic compound content is limited to 25 grams per liter.	**Yes**
R-SC-1, Rule 323.1, Architectural Coatings The District amended Rule 323 in 2001 to include the June 2000 Suggested Control Measure provisions. The June 19, 2014 adoption of Rule 323.1 incorporates the October 2007 Suggested Control Measure provisions.	**Yes**
R-PP-1, R-PT-1, and R-PT-2; Rules 325, 326, 343, & 344; Crude Oil Production and Separation, Storage of Reactive Organic Compound Liquids, Petroleum Storage Tank Degassing, and Petroleum Sumps, Pits and Well Cellars These petroleum rules currently have no provisions on solvent cleaning machines or solvent cleaning. The District plans to add such requirements to each of these rules. The solvent cleaning provision will be similar to the San Joaquin Valley Unified APCD Rule 4623 §5.7.5.5.1 requirement.[a]	**Yes**
N-XC-4 and N-XC-5; Rule 342, Control of Oxides of Nitrogen (NOx) from Boilers, Steam Generators and Process Heaters Rule 342 applies to external combustion equipment having input ratings of 5 million British thermal units per hour and greater. In 2012, the District studied reducing the Rule 342 nitrogen oxides limit to 15 parts per million, by volume, at 3 percent oxygen. The study indicated that the cost-effectiveness of such an amendment would be $471,612 per ton. This was determined not cost effective based on the range of costs for past District-adopted rules. The proposed revision to Rule 342 is considered infeasible.	**No**

[a] The provisions will likely indicate: 1) While performing solvent cleaning, operators may use the following cleaning agents: diesel fuel, solvents with an initial boiling point of greater than 302 degrees Fahrenheit, solvents with a vapor pressure of less than 0.5 pounds per square inch actual, or solvents with 25 grams per liter reactive organic compound content or less, and 2) Any person who owns, operates, or uses any solvent cleaning machine shall comply with the applicable provisions of Rule 321, Solvent Cleaning Machines and Solvent Cleaning.

APPENDIX B - "EVERY FEASIBLE MEASURE" ANALYSES

Control Measure, Rule (If Any), and Summary of "Every Feasible Measure" Analysis	Include in Every Feasible Measure List?
R-SC-5; Rule 351, Surface Preparation and Coating of Wood Products Rule 351 currently has minimal solvent cleaning requirements (e.g., keep containers closed when not in use). Hence, this rule's solvent cleaning requirements are not as stringent as those found in other air district rules. The District plans to amend Rule 351 to include solvent cleaning requirements modeled on those found in the San Joaquin Valley Unified APCD Rule 4606 and/or the Ventura County APCD Rule 74.30. In general, the solvent reactive organic compound limit will be reduced to 25 grams per liter and any solvent cleaning machine used at the facility will need to comply with Rule 321.	**Yes**
R-SL-7; Rule 354, Graphic Arts and Paper, Film Foil, and Fabric Coatings Presently Rule 354 applies to two types of graphic art printing operations: rotogravure and flexographic printing processes. And sources performing these printing processes emitting less than 301 pounds per month of reactive organic compound emissions are exempt from the rule's ROC content limits for inks, coatings, adhesives, and solvents. In addition, many of the rule's ROC content limits are higher than those found in other air districts. Hence, Rule 354 is not as stringent as those found in other air districts. The District plans to model the revised Rule 354 on those found in the South Coast AQMD (Rules 1171, 1130, and 1130.1), the San Joaquin Valley Unified APCD (Rule 4607), and the Ventura County APCD (Rules 74.3, 74.19, and 74.19.1). The scope of the graphic art rules in these districts include: gravure, letterpress, flexographic, lithographic, and screen printing operations.	**Yes**
N-XC-2; Rule 360, Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers Rule 360 applies to water heaters, boilers, steam generators, and process heaters with rated heat input capacities ranging from 0.075 million British thermal units per hour to 2 million British thermal units per hour. Other air district rules that apply to these types of external combustion units limit the nitrogen oxides emissions to 20 parts per million, by volume, at 3 percent oxygen. This limit is less than the Rule 360 limits; therefore, the Rule 360 is not as stringent as those found in other air districts. The District plans to model the revised Rule 360 on those found in the South Coast AQMD (Rule 1146.2), the San Joaquin Valley Unified APCD (Rule 4308), and/or the Ventura County APCD (Rules 74.11.1 and 74.15.1).	**Yes**
N-SC-4; Rule 361, Small Boilers, Steam Generators, and Process Heaters Rule 361 applies to external combustion equipment with rated heat input capacities ranging from 2.0001 million British thermal units per hour to 4.9999 million British thermal units per hour. In 2012, the District studied reducing the Rule 361 nitrogen oxides limit to 12 parts per million, by volume, at 3 percent oxygen. The study indicated that the cost-effectiveness of such an amendment would be $32,081 per ton. This was determined not cost effective based on the range of costs for past District-adopted rules. The proposed revision to Rule 361 is considered infeasible.	**No**

APPENDIX C - EMISSION REDUCTION SUMMARIES FOR CONTROL MEASURES LISTED IN TABLES 4-1 AND 4-2

The following tables show the *projected emissions before control*, *projected emission reductions*, and *projected emissions after control* for various rules.[a] The columns provide these three items for the Plan's baseyear (2008) and two planning years (2020 and 2030). The relationships between the row data is as follows:

> Projected Emissions Before Control – Projected Emission Reductions = Projected Emissions After Control

Emission Reduction Summary for Rule 321 as Adopted in 2010 (reference Table 4-1):

ROC Planning Emission Inventory	**2008, Tons/Day (Tons/Year)**	**2020, Tons/Day (Tons/Year)**	**2030, Tons/Day (Tons/Year)**
Projected Emissions Before Control	2.2888 (835.3969)	2.1367 (779.9039)	2.1177 (772.9673)
Projected Emission Reductions	0.5179 (189.0305)	0.4831 (176.3276)	0.4787 (174.7398)
Projected Emissions After Control	1.7709 (646.3665)	1.6536 (603.5763)	1.6390 (598.2275)

Emission Reduction Summary for Rule 321 as Scheduled for Adoption in 2015-2016 (reference Table 4-2):

ROC Planning Emission Inventory	**2008, Tons/Day (Tons/Year)**	**2020, Tons/Day (Tons/Year)**	**2030, Tons/Day (Tons/Year)**
Projected Emissions Before Control	1.7709 (646.3665)	1.6536 (603.5763)	1.6390 (598.2275)
Projected Emission Reductions	0.4005 (146.1672)	0.3735 (136.3448)	0.3702 (135.1170)
Projected Emissions After Control	1.3704 (500.1992)	1.2801 (467.2315)	1.2688 (463.1105)

Emission Reduction Summary for Rule 330 as Adopted in 2012 (reference Table 4-1):

ROC Planning Emission Inventory	**2008, Tons/Day (Tons/Year)**	**2020, Tons/Day (Tons/Year)**	**2030, Tons/Day (Tons/Year)**
Projected Emissions Before Control	0.0736 (19.1321)	0.0686 (17.8464)	0.0680 (17.6857)
Projected Emission Reductions	0.0238 (6.1931)	0.0222 (5.7769)	0.0220 (5.7249)
Projected Emissions After Control	0.0498 (12.9390)	0.0464 (12.0695)	0.0460 (11.9608)

[a] The District implements control measures as rules.

APPENDIX C - EMISSION REDUCTION SUMMARIES FOR CONTROL MEASURES LISTED IN TABLES 4-1 AND 4-2

Emission Reduction Summary for Rule 351 Scheduled for Adoption in 2010-2012 (reference Table 4-1) and Scheduled for Adoption in 2015-2016 (reference Table 4-2):

ROC Planning Emission Inventory	2008, Tons/Day (Tons/Year)	2020, Tons/Day (Tons/Year)	2030, Tons/Day (Tons/Year)
Projected Emissions Before Control	0.0621 (16.1489)	0.0579 (15.0637)	0.0574 (14.9281)
Projected Emission Reductions	0.0025 (0.6527)	0.0223 (0.6088)	0.0223 (0.6033)
Projected Emissions After Control	0.0596 (15.4962)	0.0556 (14.4549)	0.0551 (14.3247)

Emission Reduction Summary for Rule 352 as Adopted in 2011 (reference Table 4-1):

ROC Planning Emission Inventory	2008, Tons/Day (Tons/Year)	2020, Tons/Day (Tons/Year)	2030, Tons/Day (Tons/Year)
Projected Emissions Before Control	0.4860 (177.3771)	0.4856 (177.2351)	0.5479 199.9886
Projected Emission Reductions	0.1413 (51.5780)	0.0967 (35.2949)	0.1406 (51.3036)
Projected Emissions After Control	0.3447 (125.7992)	0.3889 (141.9402)	0.4074 (148.6850)

Emission Reduction Summary for Rule 353 as Adopted in 2012 (reference Table 4-1):

ROC Planning Emission Inventory	2008, Tons/Day (Tons/Year)	2020, Tons/Day (Tons/Year)	2030, Tons/Day (Tons/Year)
Projected Emissions Before Control	0.8247 (301.0209)	0.7693 (280.7923)	0.7624 (278.2637)
Projected Emission Reductions	0.0031 (1.1172)	0.0029 (1.0421)	0.0028 (1.0328)
Projected Emissions After Control	0.8217 (299.9037)	0.7664 (279.7502)	0.7595 (277.2310)

Emission Reduction Summary for Rule 354 Scheduled for Adoption in 2010-2012 (reference Table 4-1) and Scheduled for Adoption in 2017-2019 (reference Table 4-2):

ROC Planning Emission Inventory	2008, Tons/Day (Tons/Year)	2020, Tons/Day (Tons/Year)	2030, Tons/Day (Tons/Year)
Projected Emissions Before Control	0.4812 (175.6468)	0.5135 (187.4137)	0.5699 (208.0183)
Projected Emission Reductions	0.0515 (18.8024)	0.0552 (20.1444)	0.0612 (22.3507)
Projected Emissions After Control	0.4297 (156.8444)	0.4583 (167.2693)	0.5087 (185.6676)

APPENDIX C - EMISSION REDUCTION SUMMARIES FOR CONTROL MEASURES LISTED IN TABLES 4-1 AND 4-2

Emission Reduction Summary for Rule 323.1 as Adopted in 2014 (reference Table 4-1):

ROC Planning Emission Inventory	2008, Tons/Day (Tons/Year)	2020, Tons/Day (Tons/Year)	2030, Tons/Day (Tons/Year)
Projected Emissions Before Control	1.3462 (491.3680)	1.4387 (525.1314)	1.6234 (592.5540)
Projected Emission Reductions	0.2486 (90.7486)	0.2657 (96.9842)	0.2998 (109.4362)
Projected Emissions After Control	1.0976 (400.6194)	1.1730 (428.1472)	1.3236 (483.1178)

Emission Reduction Summary for Rules 325, 326, 343, & 344 as Scheduled for Adoption in 2017-2019 (reference Table 4-2):

ROC Planning Emission Inventory	2008, Tons/Day (Tons/Year)	2020, Tons/Day (Tons/Year)	2030, Tons/Day (Tons/Year)
Projected Emissions Before Control	0.0263 (9.6080)	0.0263 (9.6080)	0.0263 (9.6080)
Projected Emission Reductions	0.0090 (3.2728)	0.0090 (3.2728)	0.0090 (3.2728)
Projected Emissions After Control	0.0174 (6.3352)	0.0174 (6.3352)	0.0174 (6.3352)

Emission Reduction Summary for Rule 360 as Scheduled for Adoption in 2015-2016 (reference Table 4-2):[a]

ROC Planning Emission Inventory	2008, Tons/Day (Tons/Year)	2020, Tons/Day (Tons/Year)	2030, Tons/Day (Tons/Year)
Projected Emissions Before Control	0.1492 (54.4432)	0.1316 (48.0355)	0.1298 (47.3813)
Projected Emission Reductions	0.0165 (6.0248)	0.0037 (1.3435)	0.0137 (5.0133)
Projected Emissions After Control	0.1327 (48.4184)	0.1279 (46.6920)	0.1161 (42.3680)

[a] The 2008 figure is for 100% rule implementation. The 2020 figure assumes 20% rule implementation and the 2030 figure assumes 70% rule implementation.

APPENDIX D – NATURAL SOURCES

NATURAL SOURCES

Natural source emissions are those that are not man-made. Emission estimates for these sources tend to be difficult to quantify with any degree of certainty. As discussed in Section 3.1, emissions from natural sources are not included in the planning emission inventory because these sources are not regulated or controlled through implementation of emission control measures.

There are three primary categories of natural source emissions:

1. Biogenic Sources: Biogenic emissions are emissions from plants and trees. The California Air Resources Board estimates emissions of biogenic volatile organic compounds (BVOCs) from vegetation for natural areas, crops, and urban vegetation using their BEIGIS model. The main inputs to BEIGIS are land use and vegetation land cover maps, gridded leaf area indices derived from satellite data, leaf area/dry leaf mass factors, base emission rates, and gridded hourly ambient temperature and light intensity data.

2. Geogenic Sources: Geogenic sources are naturally occurring oil and gas seeps located off the southern coast of Santa Barbara County. Seep emissions flow out from subsurface sources on the ocean floor, primarily in the State Tidelands and exhibit a high degree of temporal and spatial variability. We have worked in cooperation with the Institute of Crustal Studies at the University of California at Santa Barbara to determine estimates of seep emissions in the Santa Barbra Channel. The results of their research have been used in this inventory.

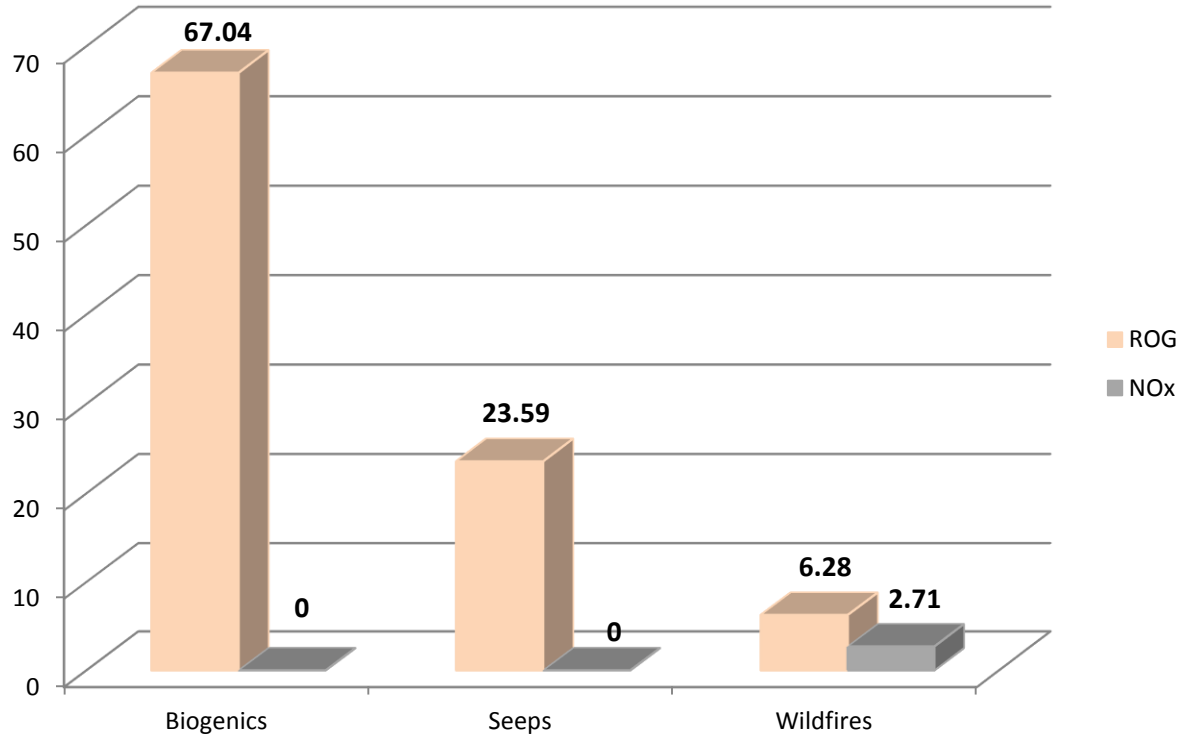
3. Wildfires: This category includes emissions from timber, grass, and brush wildfires. Wildfire emissions are calculated by the ARB using a GIS-based fire emissions model. Wildfire emissions during 2008 are associated with the Gap Fire that burned 9,500 acres and the Tea Fire that burned approximately 1,940 acres.

Figure D-1 provides ROG and NOx emissions from natural sources. Total ROC emissions from natural sources during 2008 were 96.91 tons per day. Biogenic emissions comprise about 69% of ROC from natural sources. The only NOx contribution to the natural source inventory is from wildfires. NOx emissions from wildfires were 2.71 tons per day during 2008.

Figure D-2 provides emissions from all sources including natural in units of tons per year. This figure shows that ROC emissions from natural sources comprise a significant portion of the overall base year inventory (75%). NOx emissions from natural sources, however, account for only 4% of the base year inventory.

APPENDIX D – NATURAL SOURCES

FIGURE D-1
2008 NATURAL SOURCE ROC AND NOX EMISSIONS
(TONS PER DAY)



APPENDIX D – NATURAL SOURCES

FIGURE D-2
2008 ROC AND NOX EMISSIONS - ALL SOURCES
(TONS PER YEAR)