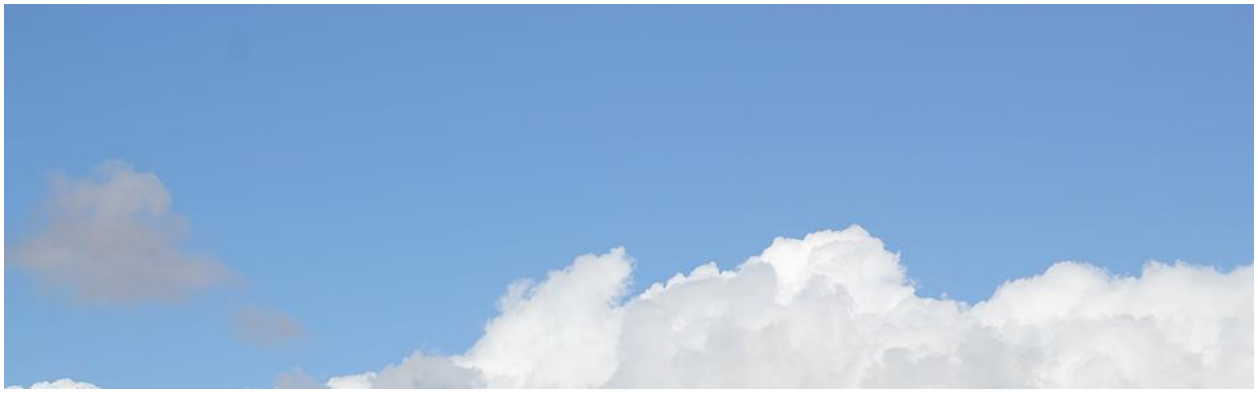

Santa Barbara County
Air Pollution Control District

2016 OZONE PLAN
October 2016

Santa Barbara County Air Pollution Control District
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Air Pollution Control Officer

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1 – INTRODUCTION

Updating our Plan for Clean Air in Santa Barbara County

The 2016 Ozone Plan (2016 Plan) is the eighth triennial update to the initial state Air Quality Attainment Plan adopted by the Santa Barbara County Air Pollution Control District (District) Board of Directors in 1991 (other updates were done in 1994, 1998, 2001, 2004, 2007, 2010, and 2013). Each of the Santa Barbara County plan updates have implemented an "every feasible measure" strategy to ensure continued progress toward attainment of the state ozone standards.[1] Since 1992, Santa Barbara County has adopted or amended rules implementing more than 25 control measures aimed at reducing emissions at stationary sources. These measures have substantially reduced ozone precursor pollutants (nitrogen oxides, or NOx, and reactive organic compounds, or ROCs). This strategy has successfully improved the County's air quality so that we now meet the state 1-hour ozone standard. While we have yet to attain the state 8-hour ozone standard, we are getting closer. In order to be designated attainment, air quality measurements must show that both the 1-hour and the 8-hour standards are not violated.

In the past, the District has developed numerous air quality attainment plans that address the federal ozone standard, the state ozone standard, or both. Table 1-1 provides a summary of the state and federal ambient air quality standards for ozone, and their effective dates.

TABLE 1-1: STATE AND FEDERAL OZONE STANDARDS

Ambient Air Quality Standard	Concentration	Year Adopted	Status for Santa Barbara County
State 1-Hour	0.09 ppm	1988	Nonattainment
State 8-Hour	0.070 ppm	2005	
Federal 8-Hour (old)	0.075 ppm	2008	Attainment
Federal 8-Hour (new)	0.070 ppm	2015	Undetermined

At this point in time, the District is designated "unclassifiable/attainment" for the federal 8-hour ozone standard of 0.075 ppm, and is therefore not currently required to prepare any plans for the federal ozone standard. The U.S. Environmental Protection Agency (EPA) revised the federal ozone standard to be 0.070 ppm in December 2015. Attainment designations for the lower federal standard will be made in October 2017, after which the District will prepare any required plans or updates. This 2016 Plan addresses the state ozone standard only.

[1] As with many California air districts and pursuant to California Health and Safety Code Section 40914 (b), the District employs an alternative emission reduction strategy that employs "*every feasible measure*" and follows an "*expeditious adoption schedule*".

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 2016 Plan satisfies all state triennial planning requirements. Table 1-1 provides a more complete list of triennial plan revision requirements and where those requirements are addressed in the 2016 Plan.

TABLE 1-2: TRIENNIAL PLAN REVISION REQUIREMENTS

Requirement	Section
Air Quality Trends	Chapter 2
Population Exposure	Chapter 2
Population Trends	Chapter 3, Chapter 5
Emission Inventory	Chapter 3, Appendix C
Stationary Source Control Measures	Chapter 4
Control Strategy Cost-Effectiveness	Chapter 4
Transportation Control Measures	Chapter 5
Vehicle Activity and Emission Trends	Chapter 5
Contingency Measures	Chapter 5
Every Feasible Measure and Expeditious Adoption	Chapter 4, Chapter 5, Appendix A

Plan Highlights

The California Health and Safety Code requires that the plan include cost-effective strategies to achieve attainment of the ozone standard.[2] Each plan update includes an evaluation of feasible reduction measures for stationary sources and considers numerous factors such as technology advancements, efficiency measures, cost-effectiveness, and the successful implementation of measures at other California air districts. However, most of the measures found to be feasible in prior plan updates have been implemented and the additional measures that are proposed yield

[2] California Health and Safety Code Section 40913 (b) states that, "*Each district plan shall be based upon a determination by the district board that the plan is a cost-effective strategy to achieve attainment of the state standards by the earliest practicable date*."

relatively smaller emission reductions overall, with higher associated costs. Chapter 4 includes a discussion of the proposed control measures for stationary sources. It is possible that an individual measure may not be implemented if our Board of Directors ultimately determines it is not feasible or cost-effective.

In this 2016 Plan, we carry forward proposed stationary source control measures from the 2013 Clean Air Plan that are pending rule adoption. We have also moved two stationary source control measures that were listed as "further study" measures to proposed control measures. We have moved one control measure that was scheduled for adoption in the 2013 Clean Air Plan to the "further study" list.

The California Air Resources Board (ARB) continues to pursue substantial reductions of ozone precursor emissions in the mobile source sector. The ARB has developed a comprehensive mobile source strategy that implements and/or expands research and pilot projects, incentive programs, and regulations related to on-road light-, medium-, and heavy-duty vehicles, as well as off-road vehicles. California's Advanced Clean Car Program aims to reduce emissions through tighter vehicle exhaust standards, clean fuels requirements, and vehicle efficiency standards. California's Zero Emission Vehicle (ZEV) regulation, revised in October 2015, requires manufacturers to produce increasing numbers of ZEVs and plug-in hybrid electric vehicles in the 2018-2025 model years. Although California's "Truck and Bus" regulation[3] is principally aimed at reducing particulate matter from the heavy-duty fleet, over time it also achieves substantial reductions in NOx emissions and other criteria pollutants.

Because ozone precursor emissions from marine shipping account for a large percentage of our inventory, we continue to focus our efforts on achieving reductions in this sector. While existing federal and international regulations in the marine shipping sector are expected to achieve emission reductions over time, significant reductions of NOx will not be achieved until the shipping fleet "turns over," which may take decades. For this reason, we continue to pursue programs that will achieve near-term NOx reductions in the marine shipping category. Chapter 5 provides more detail on the importance of marine shipping to our overall clean air strategy.

[3] Title 13, California Code of Regulations, Section 2025, Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants from In-Use Heavy-Duty Diesel-Fueled Vehicles.

2 – LOCAL AIR QUALITY

How Is Our Air?

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 to use in assessing its progress toward attainment of the state standards.[4] This District is required to assess its 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.

Air Quality Indicators – Peak Concentrations

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 for each site is calculated using the daily maximum 1-hour and 8-hour ozone concentrations for the previous three years. For example, the 2014 EPDC for a monitoring site uses data from 2012, 2013 and 2014. 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 2015 for the 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. Eight-hour peak day concentrations remain above the state 8-hour ozone standard at the Carpinteria, Las Flores Canyon, and Paradise Road sites, although these sites have shown significant improvement over time.

[4] California Health & Safety Code, Section 39607 (f) and (g).

FIGURE 2-1: STATE 1-HOUR OZONE EXPECTED PEAK DAY CONCENTRATION TOP FIVE SANTA BARBARA COUNTY MONITORING SITES, 1990-2015

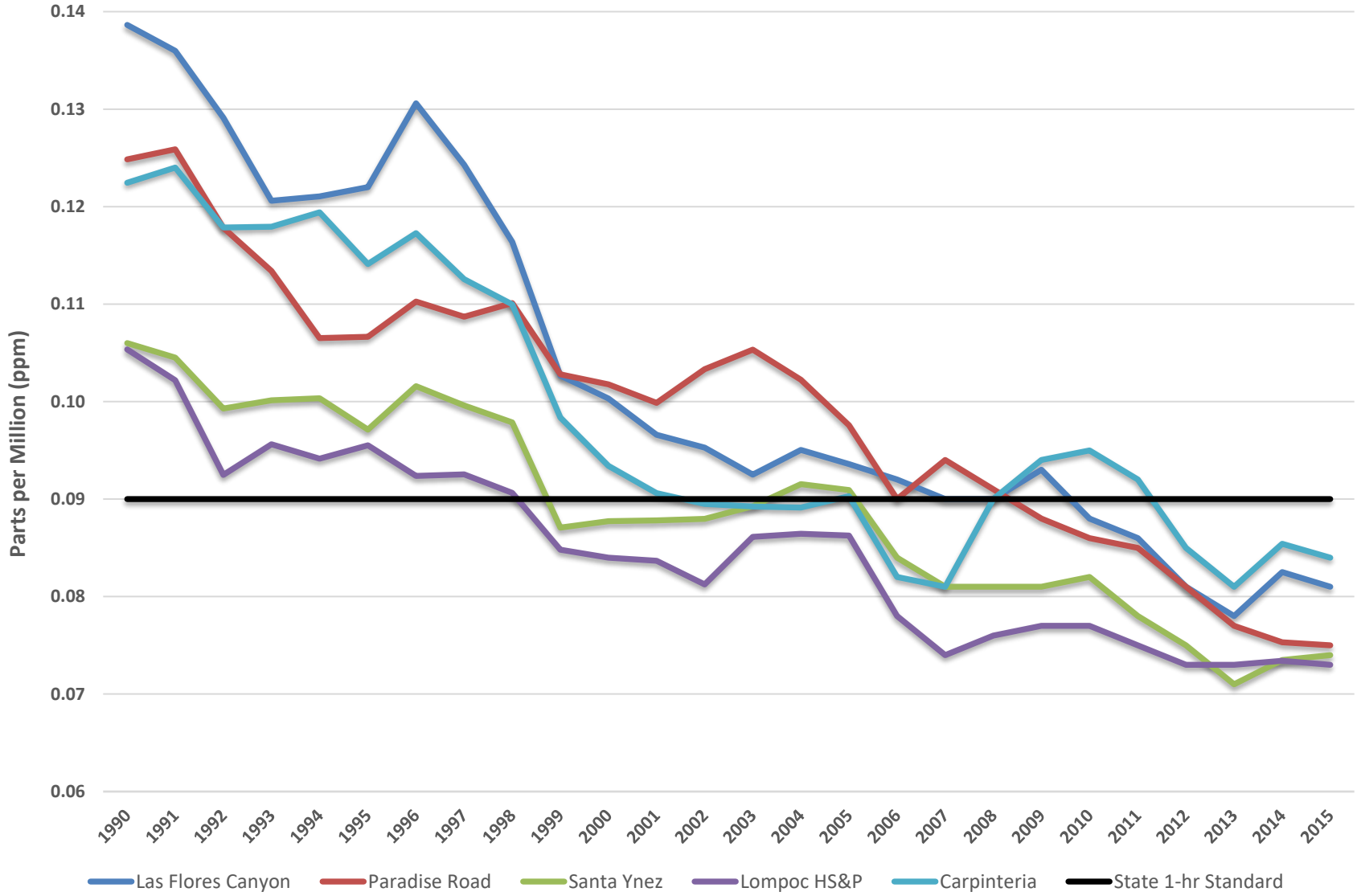
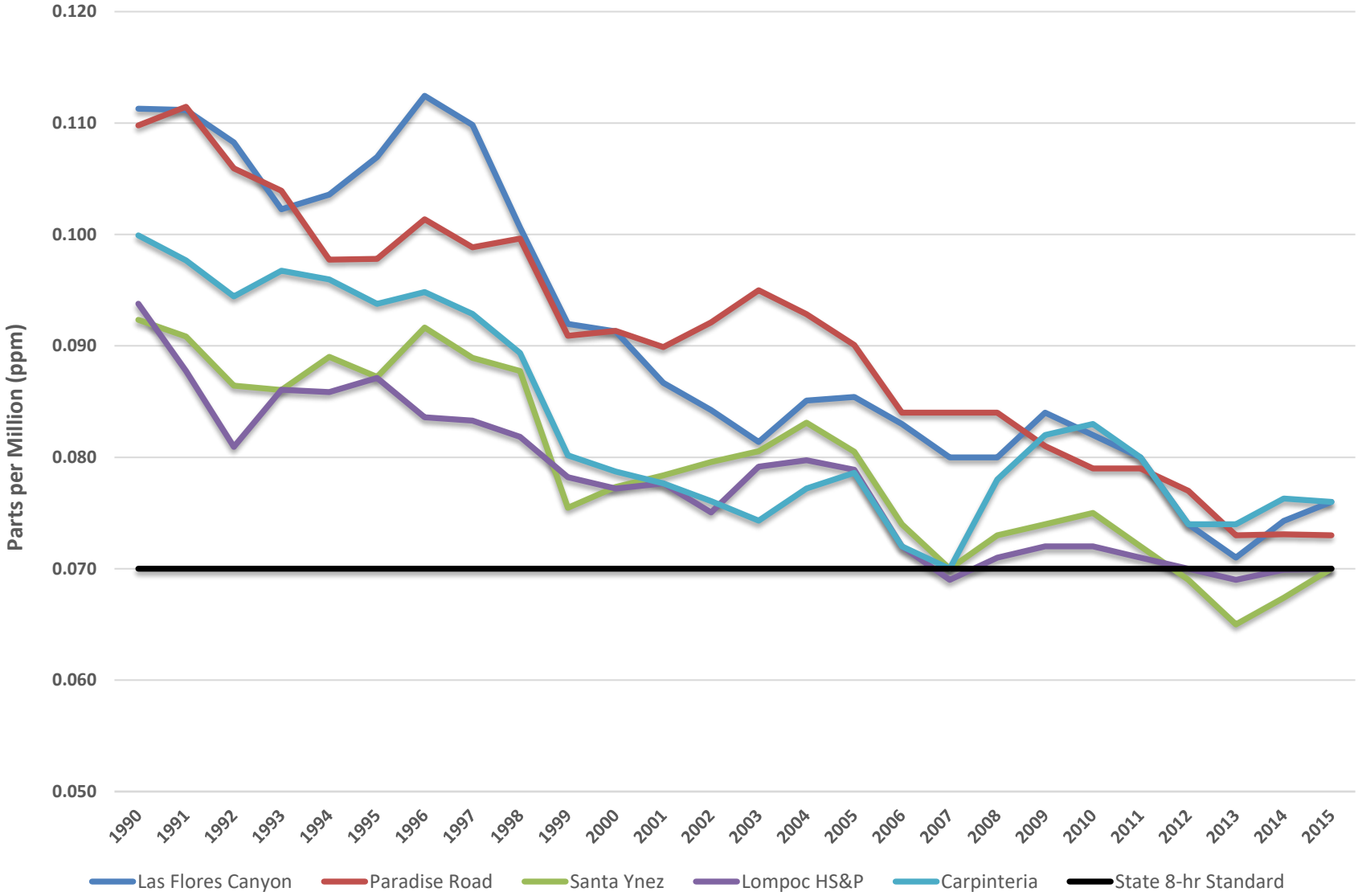


FIGURE 2-2: STATE 8-HOUR OZONE EXPECTED PEAK DAY CONCENTRATION
TOP FIVE SANTA BARBARA COUNTY MONITORING SITES, 1990-2015



The Path Toward Attainment

For an area to attain the state air quality standard, the highest representative reading at each site must not violate the standard. These representative readings are called *designation values*. 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 for each site is therefore the highest concentration less than or equal to the EPDC at that site. Any designation value that exceeds an applicable standard is considered a violation of that standard. In Santa Barbara County, designation values continue to exceed the state 8-hour standard of 0.070 ppm, and thus the County is designated nonattainment for the state ozone standard.[5]

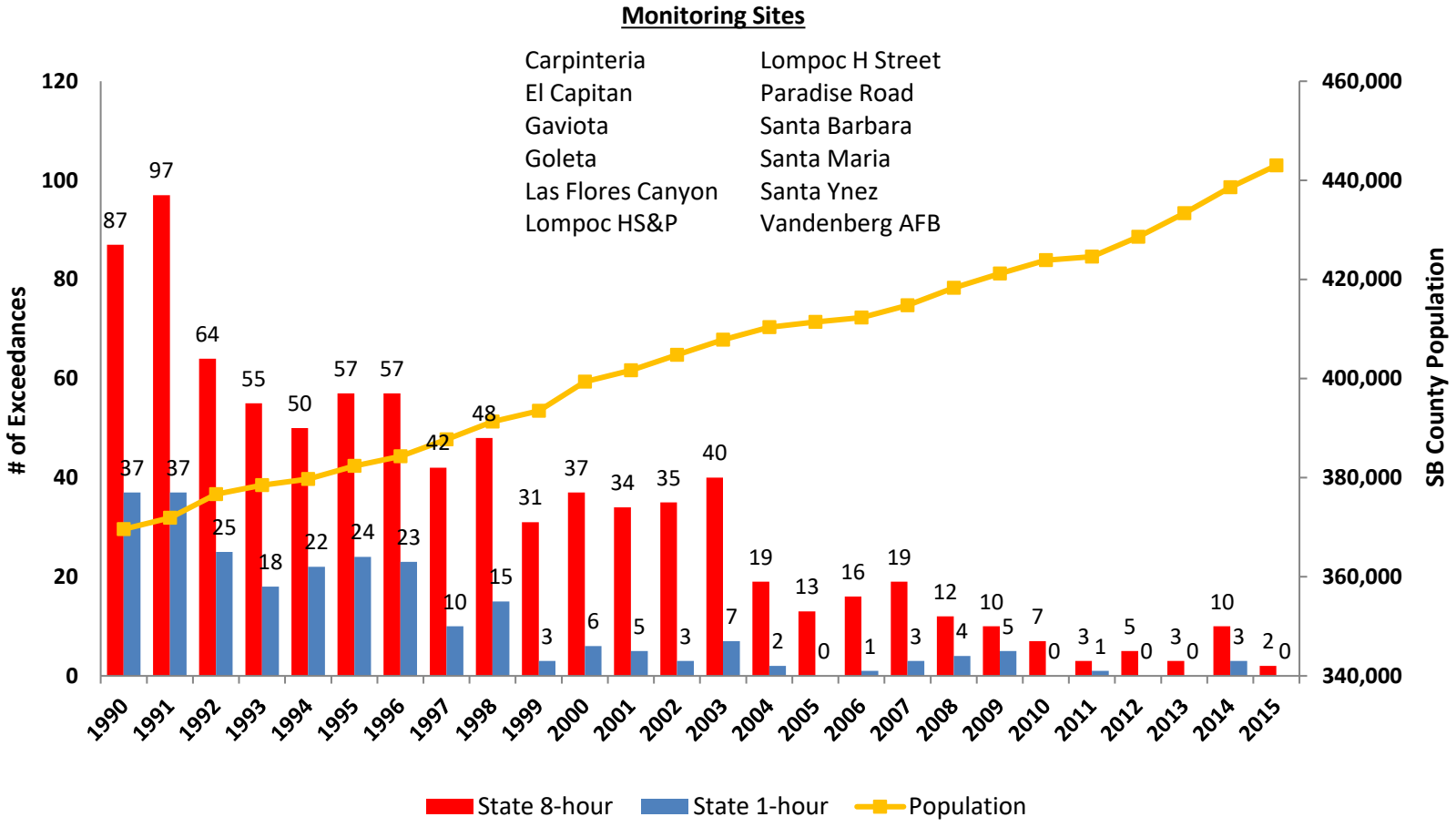
In order to be designated attainment for the state ozone standard, the data must show that the standard was not violated during the previous three calendar years.

Air quality improvement is also seen in the declining number of state 1-hour and 8-hour ozone exceedances that have occurred in the County between 1990 and 2015. As displayed in Figure 2-3, 1-hour ozone exceedances have decreased from a high of 37 days in 1990 and 1991 to zero days in 2005, 2010, 2012, 2013, and 2015. The number of 8-hour ozone exceedance days range from a high of 97 days during 1991 to just two days in 2015. These significant improvements in air quality have occurred despite a 20 percent increase in countywide population.

This 2016 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 and in the long-term decline in the number of countywide ozone exceedances.

[5] Area Designation Criteria for the state ozone standard are laid out in California Code of Regulations Title 17, Sections 70300 through 70306, and Appendices 1 through 3. Appendix 3 indicates the "data for record" that are required to make a designation of attainment.

FIGURE 2-3: 8-HOUR AND 1-HOUR OZONE EXCEEDANCE TRENDS VS POPULATION SANTA BARBARA COUNTY, 1990-2015[6]



[6] Population data in Figure 2-3 are from State of California Department of Finance.

Air Quality Indicators – Population and Area Exposure

The ARB has developed a methodology to assess population exposure to air pollutants. 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 average potential exposure value. 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 to concentrations above the level of the state ozone standard, weighted to emphasize equally the potential exposure for each individual in the District. So, concentrations measured near population centers are weighted more than concentrations measured at more remote locations.

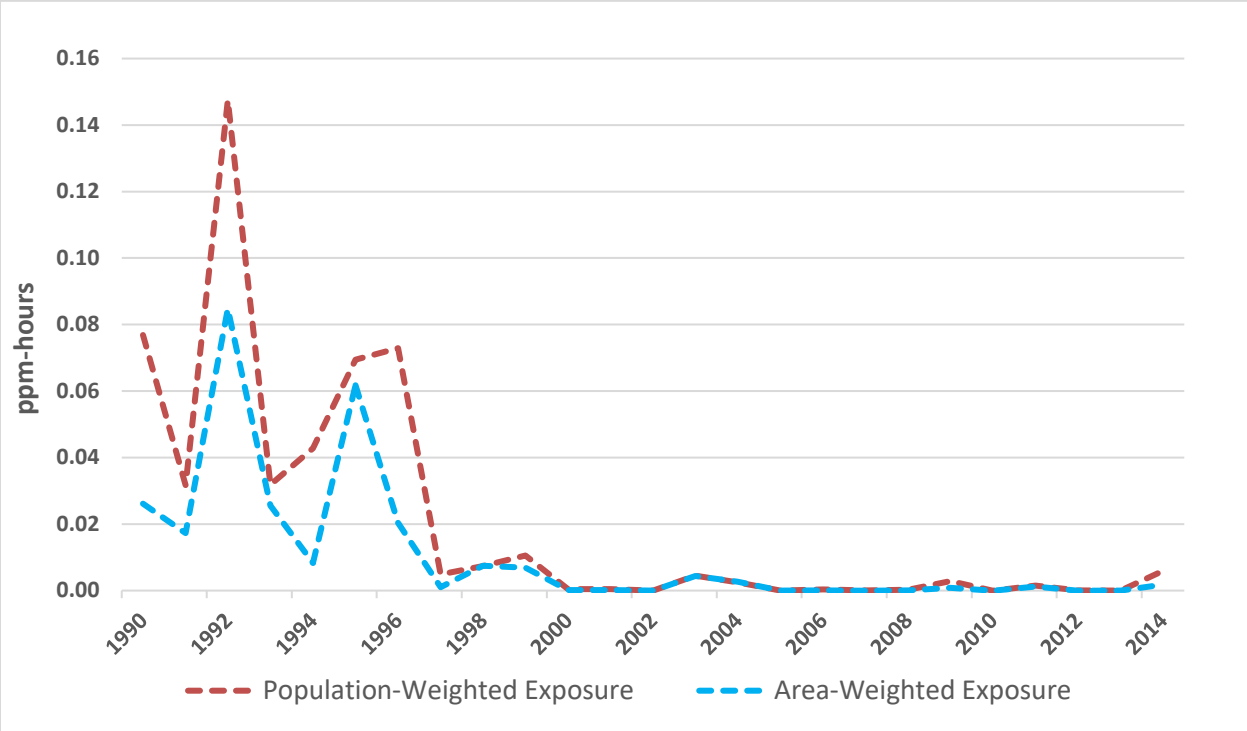
The area-weighted exposure indicator characterizes the potential average annual outdoor exposure per unit area. So, measured concentrations are weighted based on the area covered by each monitoring location.

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 exposure data are obtained from ARB. These data are periodically updated, and available data are presented in Figure 2-4. 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 improvements in air quality. The values are near zero since ozone levels in the County rarely exceed 0.09 ppm for an hour period.

The trend lines show that over time, Santa Barbara County's exposure to levels above the one-hour standard has become less frequent, and is currently close to zero.

FIGURE 2-4: POPULATION- AND AREA-WEIGHTED EXPOSURE SANTA BARBARA COUNTY, 1990-2014



Possible Nonattainment-Transitional Status for Santa Barbara County

The California Clean Air Act, as codified in the Health & Safety Code, includes a provision for designating certain areas as "nonattainment-transitional" if, during a single calendar year, the state standard is not exceeded more than three times at any monitoring location within the district.[7]

Table 2-1 presents the Santa Barbara County exceedance days for the 8-hour ozone standard, as well as the designation values, for the last three years (2013, 2014, and 2015). For both 2013 and 2015, Santa Barbara County had three or fewer exceedances of the 8-hour ozone standard. However, during 2014, there were 10 exceedance days. As discussed earlier in this chapter, Santa Barbara County no longer exceeds the state 1-hour ozone standard.

TABLE 2-1: SANTA BARBARA COUNTY EXCEEDANCE DAYS, 2013-2015

	Number of Days > State 8-Hour Standard			8-Hour State Designation Value (ppm)*		
Monitor Location	2013	2014	2015	2013	2014	2015
Carpinteria	1	7	0	**0.074**	**0.074**	0.073
El Capitan SB	0	1	0	0.063	0.065	0.065
Gaviota	0	2	0	0.063	0.065	0.065
Goleta	0	3	0	0.062	0.070	0.070
Las Flores Canyon	1	4	2	0.071	**0.074**	**0.075**
Lompoc HS&P	1	1	0	0.068	0.069	0.069
Lompoc H St.	0	1	0	0.058	0.063	0.064
Paradise Road	2	1	0	0.073	0.073	0.069
Santa Barbara	0	3	0	0.060	0.067	0.067
Santa Maria	0	0	0	0.054	0.058	0.059
Santa Ynez	0	0	0	0.062	0.066	0.070
Vandenberg AFB	1	3	0	0.064	0.067	0.067
*Total Exceedance Days***	**3**	**10**	**2**			

* Highest countywide designation values for each year are in **bold**.

** *Total Exceedance Days* indicates the number of days within a year where an exceedance was measured in at least one monitoring location in Santa Barbara County.

The designation of nonattainment-transitional occurs by operation of law; however, the procedures for designating air districts as nonattainment-transitional require an evaluation of the current year of ozone monitoring data prior to making the designation. Specifically, the California Code of Regulations states that, "*If an area qualifies for designation as*

[7] CA Health and Safety Code Section 40925.5*, Nonattainment-transitional district*.

nonattainment-transitional for ozone for the previous calendar year under section 70303.5(a), and the Executive Officer or his or her delegate has determined that data for the current calendar year indicate more than three exceedance days at any one monitoring location, that area is designated as nonattainment."[8] Therefore, Santa Barbara County will only be designated nonattainment-transitional for the state ozone standard if the data for the current year (i.e., 2016) indicate no more than three exceedance days. It is expected that this consideration of whether or not to designate Santa Barbara County as nonattainment-transitional will occur sometime in the fall of 2016. ***As of this writing, Santa Barbara County is officially designated nonattainment for the state ozone standard.***

What does a designation of nonattainment-transitional mean, in terms of air quality planning and control measure implementation?

If Santa Barbara County's designation changes to nonattainment-transitional, the main requirements of the 2016 Plan are not changed. However, prior to implementing new control measures, the District must review the plan and determine whether the stationary source control measures scheduled for adoption or implementation within the next three years are needed to accomplish expeditious attainment of the state ozone standard. The District may delay a control measure if it determines that delaying the measure will not slow progress toward achieving or maintaining the state ozone standard.

In summary, a shift to nonattainment-transitional status for Santa Barbara County might mean that some of the proposed stationary source control measures identified in this 2016 Plan would be delayed or that they would not be implemented. However, it would not affect the control measures that are already in place and being implemented.

[8] California Code of Regulations, Title 17, Section 70303.5(b).

3 – EMISSION INVENTORY

Introduction

This chapter presents the reactive organic compound (ROC) and nitrogen oxide (NOx) emission inventory used in the development of this 2016 Plan. The District's emission inventory accounts for pollutants emitted from all emission sources, including fuel combustion at industrial facilities, consumer product usage, and motor vehicles. Every type of emission in the County will fall under one of the following source categories:

- **Stationary Sources** – these are typically larger facilities that are subject to District permitting requirements.
- **Area-Wide Sources** – these are typically small, geographically dispersed processes that are not subject to District permitting requirements.
- **Mobile Sources** – this source type is subdivided into two categories:
  - **On-Road Motor Vehicles** – passenger cars, motorcycles, trucks, and buses.
  - **Other Mobile Sources** – ships, planes, trains, and off-road equipment.

The inventory includes 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 (all waters within three nautical miles of the shoreline). The OCS extends from the State Tideland boundary out to 25 miles from the shoreline.

For every inventory, a baseline has to be chosen. This 2016 Plan uses 2012 as the base year. The ARB has compiled the base year 2012 inventory for inclusion in their 2016 State Implementation Plan (SIP) submittal to the EPA; the 2012 inventory is the most complete and accurate inventory for all of the source categories. In deciding to use the 2012 inventory for the base year, District staff considered whether there were any over-arching changes in the economy, technology, or regulations that would make 2012 an inappropriate choice as a base year; none were identified. This 2012 inventory is then projected into the future, which will estimate the future inventories in Santa Barbara County based on County growth data and currently adopted local, state, and federal rules that are planned for implementation. The District has chosen future years 2025 and 2035 for this 2016 Plan.

The baseline (2012) and future year (2025 and 2035) inventories are "planning emissions inventories," commonly referred to as "summer seasonal" inventories. A planning inventory accounts for seasonal variation because most exceedances of the ozone standards occur during the April to October ozone season. A planning inventory 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 2016 Plan includes information on natural sources, as shown in Appendix C, in order to provide additional

perspective on the overall emission inventory of Santa Barbara County.

Baseline Inventory

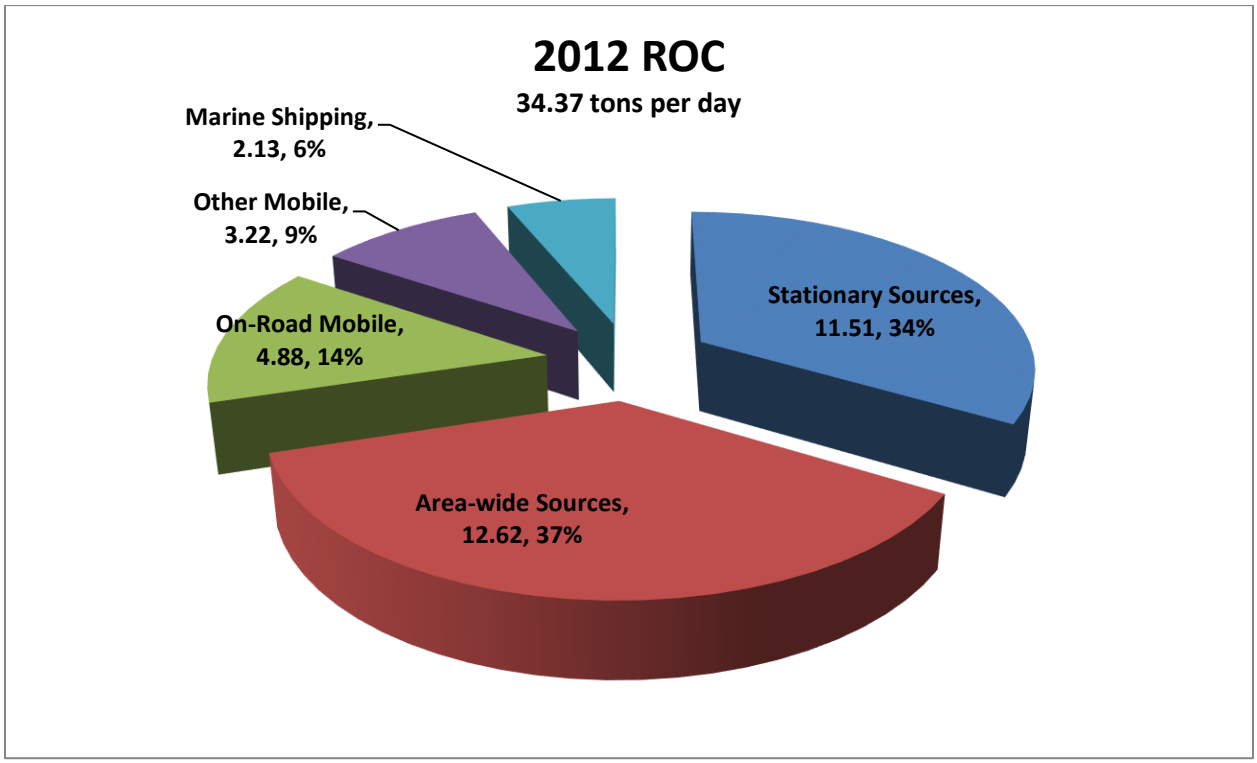
The emission inventory is divided into four major categories: stationary, area, on-road vehicle, and other mobile sources. The emissions from each category are calculated with approved methodologies that use the most current data available for the category. For example, the 2012 base year stationary source emissions are calculated with annual data that facilities reported to the District. The area source emissions are estimated jointly by the California Air Resources Board and the District. On-road emissions are calculated by applying ARB's EMFAC2014 emission model output to the transportation activity data provided by the Santa Barbara County Association of Governments (SBCAG). More information regarding the process and assumptions for the on-road mobile source emission estimates and projections can be found in Chapter 5 of this 2016 Plan. Finally, ARB provides emission estimates for other mobile sources, such as ocean-going vessels, locomotives, agricultural equipment, and aircraft.

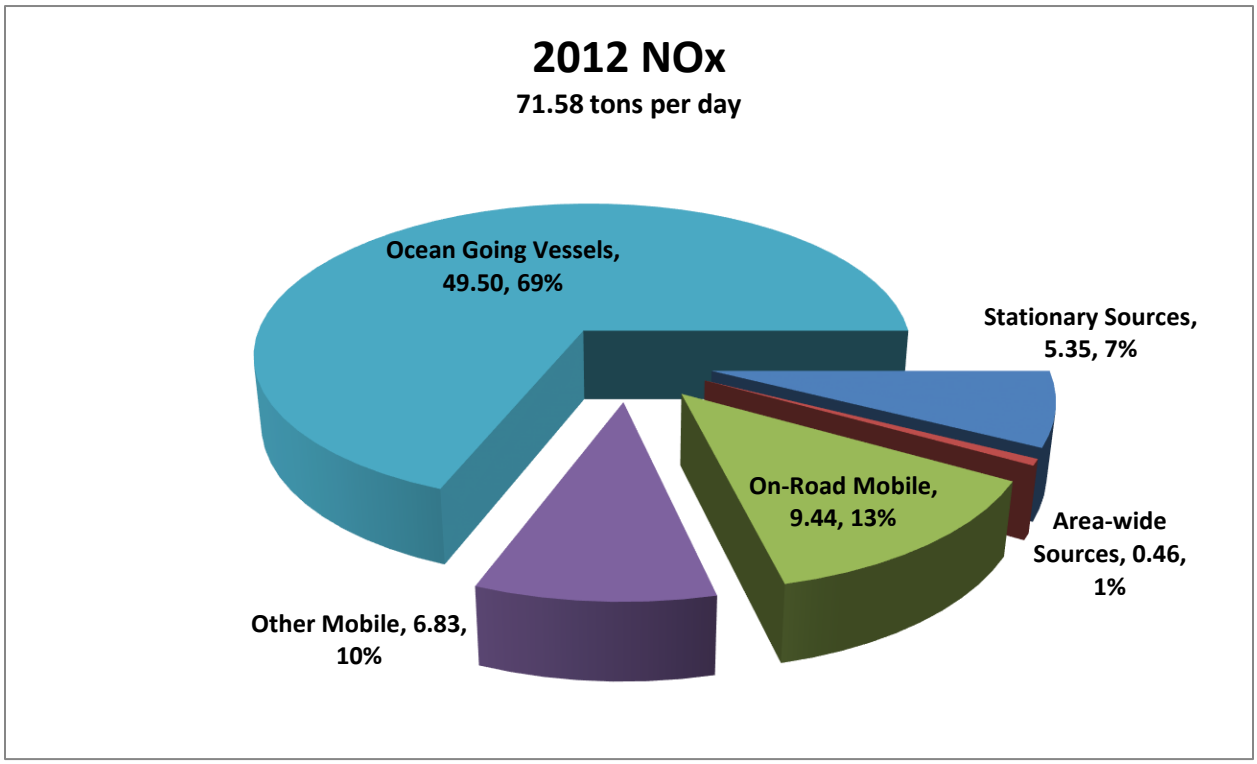
Figure 3-1 shows the emissions and relative contribution of ROC and NOx during 2012 for each major category. Due to the large amount of marine shipping emissions in the District's emission inventory, the District has broken out ocean going vessels from the other mobile sources category so that the relative impact can be more easily identified.

As presented in the figure, stationary and area-wide sources account for about 71 percent of the baseline ROC inventory. The majority of these emissions are from coating and solvent operations, oil and gas operations, and pesticide and fertilizer usage. On-road motor vehicles account for 14 percent of the baseline ROC emissions, with the remaining 15 percent coming from sources in the other mobile and ocean-going vessels category.

For NOx, 69 percent of the inventory is attributed to ocean-going vessels in the OCS (see marine shipping section at the end of this chapter for further discussion). An estimated 13 percent of the NOx emissions in the baseline inventory are from on-road motor vehicles. Area-wide sources, stationary sources, and the remaining other mobile sources contribute the remaining 18 percent of the baseline NOx emissions.

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





Growth Profiles

To forecast future year emissions for the County, the estimated changes in the value of pollution-producing activities, known as "activity indicators," are used to grow the 2012 base year inventory. Examples of activity indicators include population, housing, and economic output, and the ratio of these activity indicators (relative to the base year) creates the growth factor. The ARB develops growth profiles by collecting information from reputable sources such as the California Energy Commission and the Department of Finance. ARB then projects how this data may change using various economic models called REMI (Regional Economic Models, Inc.). If the District has more accurate information or estimates based on local data, the District can work with ARB to refine the growth profiles. In this plan, all ARB growth factors are being used except for those pertaining to oil and gas-related activities. Example growth profile data is shown below in Table 3-1.

TABLE 3-1: SANTA BARBARA COUNTY GROWTH FACTORS

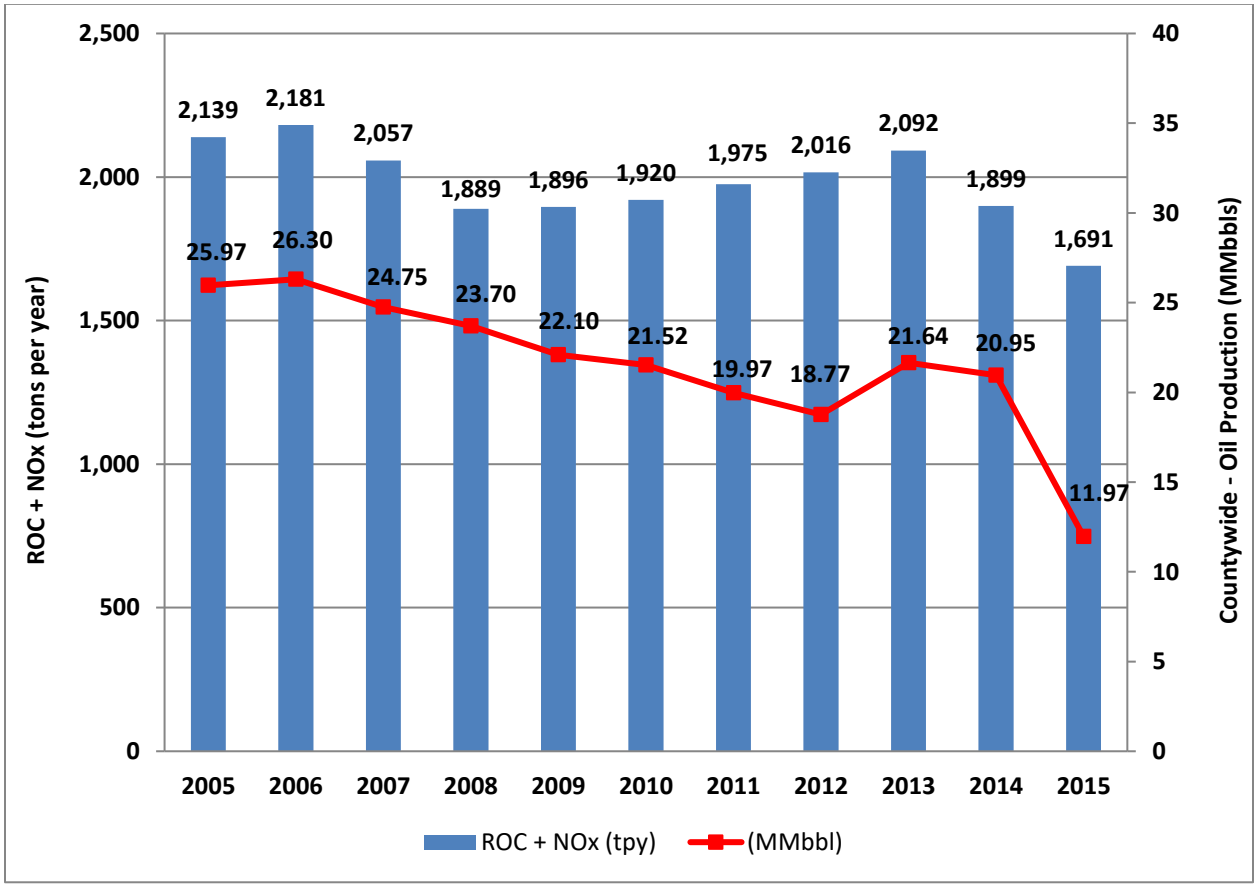
Activity Indicator	Units	Value			Growth Factor	
		2012	2025	2035	2025	2035
Population	Residents	426,063	473,124	507,912	1.11	1.19
Housing	Households	142,920	155,560	167,010	1.09	1.17
Residential – NG Combustion	REMI model output	52.14	55.07	53.43	1.06	1.02
Commercial – NG Combustion	REMI model output	21.12	24.74	26.66	1.17	1.26
Industrial – NG Combustion	REMI model output	10.88	10.39	11.02	0.95	1.01
Petroleum Production – Onshore	No Units	1	1	1	1	1
Petroleum Production – OCS	No Units	1	1	1	1	1
Petroleum Wells	No Units	1	1	1	1	1

Since the 2013 Plan, the District has set the growth factors for oil and gas-related activities to one due to uncertainty in the sector over the long term. This is based on four considerations:

1) The growth projections cover a long time, and petroleum production has gone both up and down in the past. Projecting growth in the petroleum industry out to 2035 would be speculative. Each triennial plan update presents an opportunity to revise this assumption if there is new data that would support a different growth factor.
2) From Figure 3-2, it can be seen that increases in oil production may cause an increase in emissions (as shown in 2006 and 2013), but the convention does not hold true for the remaining years. The figure shows that ozone precursor emissions do not trend at a 1:1 ratio with oil production in the County.

3) While some major oil and gas projects are on the horizon, stringent Best Available Control Technology (BACT) and offsets will typically be required during the permit process at these large sources, driving down the overall project emissions. This is because BACT improves over time. For example, NOx emission control requirements for steam generators decreased from 50 parts per million in the 1990s to BACT levels as low as 5 parts per million today. For projects which trigger offsets, potential emission increases must be offset by decreases in actual emissions either at the source, or elsewhere in the County.
4) Some larger oil and gas projects on the horizon have already obtained emission reduction credits (ERCs). As discussed in the Inventory Forecast section below, ERCs are accounted for as forecasted growth.

FIGURE 3-2: SANTA BARBARA COUNTY OIL PRODUCTION VS. O&G SECTOR EMISSIONS[9]



Inventory Forecast

After applying the growth profiles to the District's 2012 Base Year Inventory, the District-wide ozone precursor emissions are forecasted for 2025 and 2035. This is accomplished through ARB's California Emission Projection Analysis Model (CEPAM). CEPAM incorporates county-

[9] Figure 3-2 includes data from facilities both onshore and in the Outer Continental Shelf (OCS).

specific economic and demographic growth profiles and emission control profiles that are derived from adopted District rules and statewide regulations. Table 3-2 displays the results.

TABLE 3-2: ROC AND NOX EMISSION FORECASTS (TONS PER DAY) [10]

Source Category	2012		2025		2035	
	ROC	NOx	ROC	NOx	ROC	NOx
Stationary Sources	11.51	5.35	11.90	5.15	13.59	5.25
Area-wide Sources	12.62	0.46	11.09	0.30	11.44	0.27
On-Road Vehicles	4.88	9.44	1.81	2.65	1.61	2.11
Other Mobile [11]	3.22	6.83	2.18	4.51	1.93	3.83
Marine Shipping	2.13	49.50	4.14	39.36	6.09	36.24
ERCs	-	-	0.27	0.76	0.27	0.76
Total	**34.37**	**71.58**	**32.33**	**52.72**	**35.93**	**48.45**

As shown in the table, NOx emissions are projected to decrease substantially over the next several years. Emissions of NOx are projected to decrease from 71.58 tons per day in 2012 to 48.45 tons per day by 2035. This trend is primarily from reductions in emissions from on-road vehicles and from marine shipping. The ROC emissions trend remains relatively stable over the period with about a 1.6 ton per day increase from 2012 to 2035. On-road emissions account for most of the ROC reductions over the period while degreasing and coating operations account for the increases. This data is also presented graphically in Figures 3-3 and 3-4. These figures include inventory data from 2000 through 2011 to give additional perspective on the emission trends in the District.

The 2016 Plan's emission inventory forecasts are adjusted upward based on the ERCs that were in the District Source Register as of February 2016. These ERCs represent previous voluntary emission reductions that can be credited to allow increased emissions from a new or modified stationary source. If the ERCs are used for future projects, offset trading ratios may also be applied, further reducing the amount of potential emission increases related to the use of ERCs.

[10] Summary of Table 3-3, which includes emissions occurring both onshore and in the Outer Continental Shelf (OCS). See Table 3-3 for a listing of emissions by individual source categories.
[11] Marine Shipping emissions have been broken-out of the Other Mobile category in this table.

FIGURE 3-3: ROC EMISSION TRENDS BY SOURCE CATEGORY

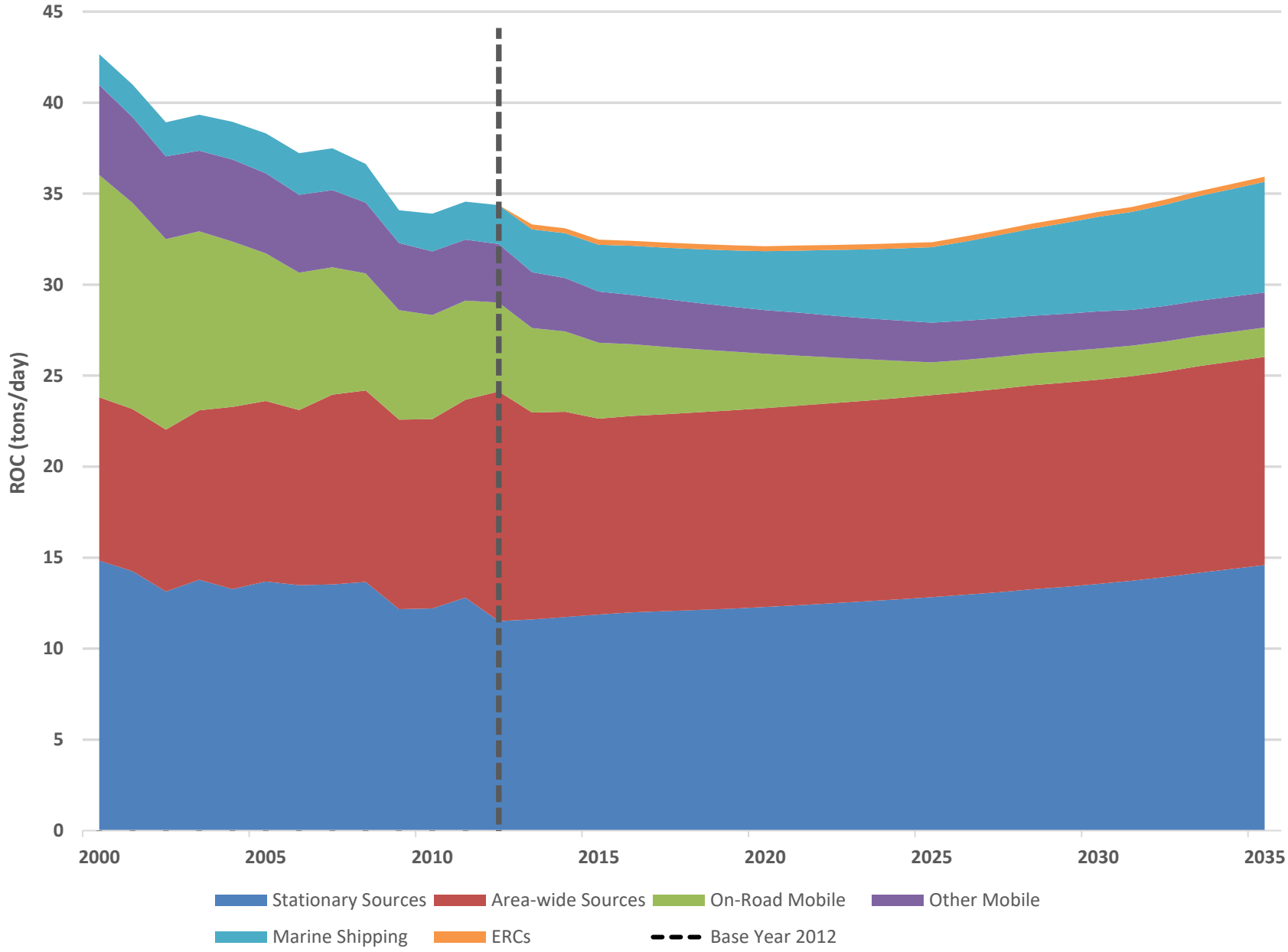
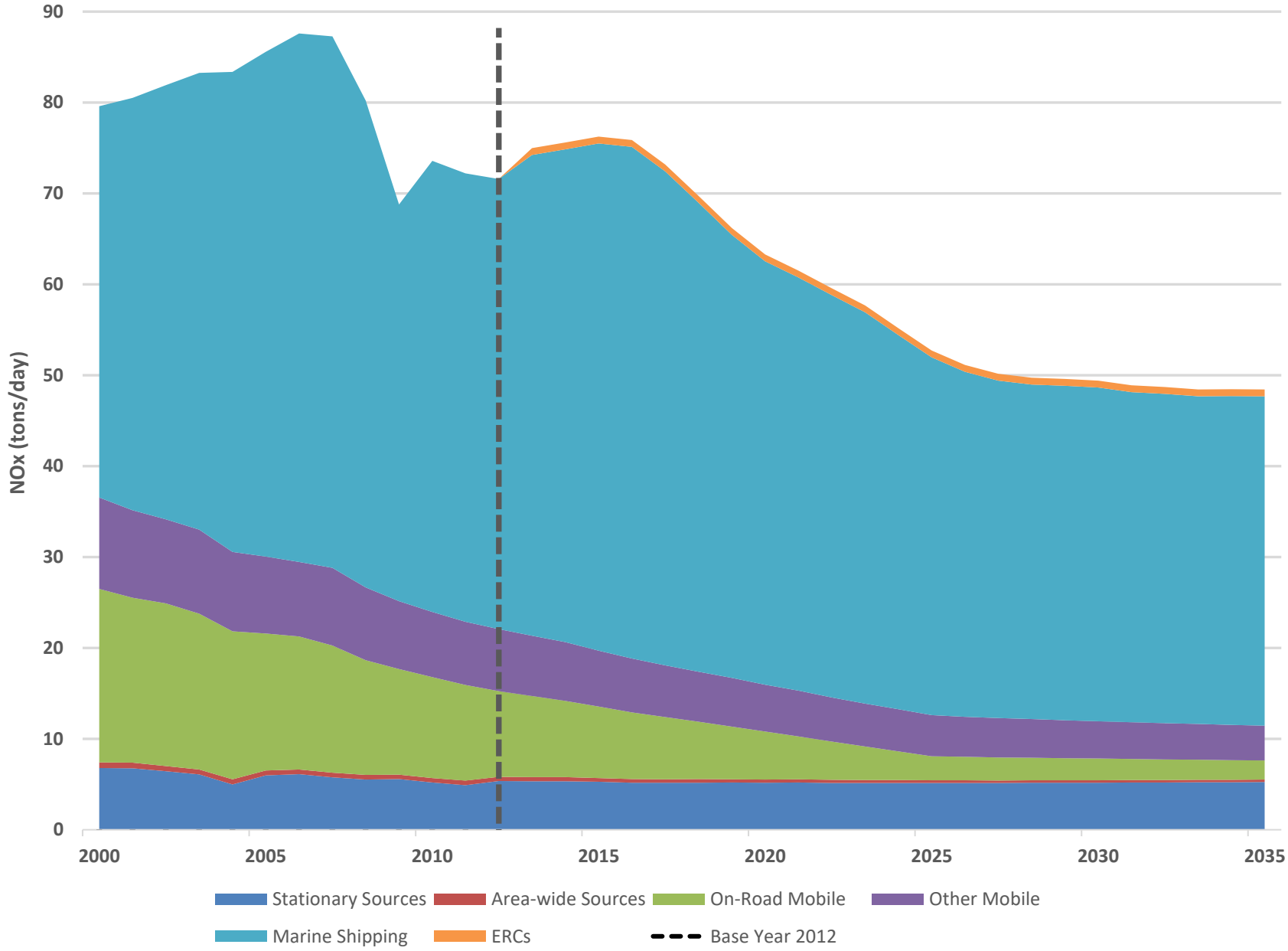


FIGURE 3-4: NOX EMISSION TRENDS BY SOURCE CATEGORY



Impacts from Marine Shipping

Large ships traveling along the coast of Santa Barbara County produce significant air emissions. In the base year (2012), about 2,500 ships traveled through the Santa Barbara Channel. Specifically, as shown previously in Figure 3-1, base year NOx emissions from marine shipping comprise more than 65 percent of the countywide planning inventory. This is the single largest source of NOx emissions in the County.

The District has studied the local meteorological conditions that have led to high ozone readings and exceedances of the state and federal ozone standards. Exceedances typically occur between April and October (the ozone "season"), and the conditions that are most conducive to exceedances are stagnant air, higher-than-normal temperatures, temperature inversions, and the presence of ozone precursor pollutants. The Santa Barbara area frequently experiences a pressure gradient that moves air from offshore to onshore, and air masses containing offshore ozone precursor emissions can move onshore and contribute to the ozone levels that are measured onshore.

Figure 3-4 above shows that NOx emissions from marine shipping are forecast to decrease approximately 25 percent from baseline levels (in 2012) by 2035. More stringent NOx standards for new engines will be phased in beginning this year under International Maritime Organization (IMO) and United States Environmental Protection Agency (EPA) regulations. Marine engines typically have a long lifespan. Thus emission reductions from the introduction of cleaner ship engines are expected to slowly counteract the anticipated growth in shipping activity. However, because the engine standards are not as effective at controlling ROC, ROC emissions are expected to increase through 2035, as shown in Table 3-2 and Figure 3-3.

Marine shipping emissions are estimated by the ARB using its in-house "Ocean Going Vessel" (OGV) model. The OGV model was updated in September 2013 and makes assumptions about vessel types, routes, and numbers of transits based on available information. While the ARB has made every effort to provide accurate estimates of current and 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 types of vessels in use, increases and variations in international trade activities and routes, as well as changing vessel traffic patterns in the Santa Barbara Channel and surrounding areas.

The emissions are associated with all shipping activity from the shoreline out to 24 nautical miles. Projections include both shipping growth and the phase-in of new engine standards.

The District continues to raise awareness of the air quality impacts related to marine shipping activities. Strategies to reduce shipping emissions are discussed in more detail in Chapter 5 of this 2016 Plan.

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

	2012		2025		2035	
STATIONARY SOURCES	**ROC**	**NOx**	**ROC**	**NOx**	**ROC**	**NOx**
ELECTRIC UTILITIES	0.005	0.011	0.005	0.011	0.005	0.012
COGENERATION	0.034	0.145	0.039	0.158	0.043	0.168
OIL AND GAS PRODUCTION (COMBUSTION)	0.153	1.770	0.153	1.770	0.153	1.770
PETROLEUM REFINING (COMBUSTION)	-	0.004	-	0.004	-	0.004
MANUFACTURING AND INDUSTRIAL	0.040	1.029	0.040	1.026	0.040	1.030
FOOD AND AGRICULTURAL PROCESSING	0.654	0.905	0.610	0.581	0.577	0.510
SERVICE AND COMMERCIAL	0.090	1.198	0.096	1.247	0.101	1.342
OTHER (FUEL COMBUSTION)	0.001	0.057	0.001	0.049	0.001	0.054
SEWAGE TREATMENT	0.005	0.004	0.005	0.005	0.006	0.005
LANDFILLS	0.081	0.005	0.089	0.005	0.096	0.005
INCINERATORS	-	0.002	-	0.003	-	0.003
SOIL REMEDIATION	-	-	-	-	-	-
OTHER (WASTE DISPOSAL)	0.844	-	0.937	-	1.006	-
LAUNDERING	0.005	-	0.005	-	0.006	-
DEGREASING	1.884	-	2.236	-	2.838	-
COATINGS AND RELATED PROCESS SOLVENTS	2.257	-	2.691	-	3.406	-
PRINTING	0.485	-	0.547	-	0.604	-
ADHESIVES AND SEALANTS	0.796	-	1.100	-	1.337	-
OTHER (CLEANING AND SURFACE COATINGS)	0.127	-	0.153	-	0.195	-
OIL AND GAS PRODUCTION	3.204	0.089	3.204	0.089	3.204	0.089
PETROLEUM REFINING	0.046	-	0.046	-	0.046	-
PETROLEUM MARKETING	0.595	-	0.580	-	0.579	-
OTHER (PETROLEUM PRODUCTION)	-	-	-	-	-	-
CHEMICAL	0.018	-	0.029	-	0.040	-
FOOD AND AGRICULTURE	0.118	-	0.157	-	0.169	-
MINERAL PROCESSES	0.016	0.050	0.020	0.063	0.023	0.075
ELECTRONICS	-	-	-	-	-	-
OTHER (INDUSTRIAL PROCESSES)	0.056	0.084	0.091	0.136	0.119	0.180
STATIONARY SOURCE TOTAL	**11.513**	**5.354**	**12.833**	**5.146**	**14.593**	**5.246**

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

	2012		2025		2035	
AREA SOURCES	**ROC**	**NOx**	**ROC**	**NOx**	**ROC**	**NOx**
CONSUMER PRODUCTS	2.383	-	2.459	-	2.623	-
ARCHITECTURAL COATINGS AND SOLVENTS	1.576	-	1.281	-	1.375	-
PESTICIDES/FERTILIZERS	7.423	-	6.002	-	6.002	-
ASPHALT PAVING / ROOFING	0.180	-	0.271	-	0.342	-
RESIDENTIAL FUEL COMBUSTION	0.192	0.449	0.208	0.288	0.221	0.256
FARMING OPERATIONS	0.784	-	0.784	-	0.784	-
CONSTRUCTION AND DEMOLITION	-	-	-	-	-	-
PAVED ROAD DUST	-	-	-	-	-	-
UNPAVED ROAD DUST	-	-	-	-	-	-
FUGITIVE WINDBLOWN DUST	-	-	-	-	-	-
FIRES	0.003	0.001	0.004	0.001	0.004	0.001
MANAGED BURNING AND DISPOSAL	0.066	0.012	0.066	0.012	0.066	0.012
COOKING	0.016	-	0.018	-	0.019	-
OTHER (MISCELLANEOUS PROCESSES)	-	-	-	-	-	-
AREA SOURCE TOTAL	**12.621**	**0.462**	**11.091**	**0.301**	**11.435**	**0.270**

ON-ROAD MOTOR VEHICLES	**ROC**	**NOx**	**ROC**	**NOx**	**ROC**	**NOx**
LIGHT DUTY PASSENGER (LDA)	1.697	1.276	0.488	0.307	0.271	0.137
LIGHT DUTY TRUCKS - 1 (LDT1)	0.271	0.179	0.055	0.028	0.028	0.012
LIGHT DUTY TRUCKS - 2 (LDT2)	1.079	1.181	0.437	0.279	0.263	0.121
MEDIUM DUTY TRUCKS (MDV)	0.635	0.925	0.334	0.253	0.330	0.168
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.291	0.356	0.125	0.123	0.298	0.353
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.035	0.050	0.008	0.013	0.007	0.013
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.077	0.122	0.012	0.021	0.013	0.019
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.019	0.027	0.002	0.009	0.002	0.016
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.036	0.824	0.018	0.236	0.025	0.162
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.010	0.229	0.005	0.045	0.006	0.011
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.102	1.196	0.008	0.321	0.009	0.344
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.137	1.956	0.020	0.612	0.017	0.426
MOTORCYCLES (MCY)	0.385	0.110	0.270	0.077	0.322	0.100
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.026	0.575	0.007	0.150	0.004	0.103

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

	2012		2025		2035	
ON-ROAD MOTOR VEHICLES (Continued)	**ROC**	**NOx**	**ROC**	**NOx**	**ROC**	**NOx**
HEAVY DUTY GAS URBAN BUSES (UB)	0.026	0.029	0.004	0.010	0.001	0.005
SCHOOL BUSES - GAS (SBG)	0.009	0.010	0.004	0.005	0.003	0.002
SCHOOL BUSES - DIESEL (SBD)	0.012	0.167	0.002	0.096	-	0.035
OTHER BUSES - GAS (OBG)	0.011	0.028	0.004	0.008	0.003	0.005
OTHER BUSES - MOTOR COACH - DIESEL (OBC)	0.004	0.052	-	0.015	-	0.025
ALL OTHER BUSES - DIESEL (OBD)	0.007	0.096	-	0.029	-	0.020
MOTOR HOMES (MH)	0.014	0.053	0.002	0.014	0.003	0.026
ON-ROAD MOTOR VEHICLE TOTAL	**4.882**	**9.440**	**1.804**	**2.649**	**1.606**	**2.105**

OTHER MOBILE SOURCES	**ROC**	**NOx**	**ROC**	**NOx**	**ROC**	**NOx**
AIRCRAFT	0.228	0.443	0.246	0.516	0.261	0.573
TRAINS	0.013	0.218	0.011	0.217	0.009	0.189
SHIPS AND COMMERCIAL BOATS	0.015	0.482	0.014	0.438	0.014	0.438
OCEAN GOING VESSELS	2.134	49.499	4.145	39.361	6.089	36.242
COMMERCIAL HARBOR CRAFT	0.186	2.224	0.167	1.521	0.152	1.294
RECREATIONAL BOATS	0.536	0.089	0.279	0.066	0.181	0.059
OFF-ROAD RECREATIONAL VEHICLES	0.125	0.005	0.108	0.007	0.104	0.008
OFF-ROAD EQUIPMENT	1.468	1.754	0.997	0.854	0.971	0.731
FARM EQUIPMENT	0.352	1.614	0.188	0.887	0.136	0.537
FUEL STORAGE AND HANDLING	0.297	-	0.170	-	0.102	-
OTHER MOBILE SOURCE TOTAL	**5.353**	**56.327**	**6.323**	**43.867**	**8.017**	**40.071**

EMISSION REDUCTION CREDITS	-	-	**0.27**	**0.76**	**0.27**	**0.76**

GRAND TOTAL FOR SANTA BARBARA COUNTY	**34.370**	**71.582**	**32.328**	**52.718**	**35.928**	**48.447**

* All ARB source categories are included in the table.

** Cells with a "-" imply that the source category contributes less than 0.001 tons/day of ROC or NOx, or the emissions are included in another category.

4 – STATIONARY SOURCE EMISSION CONTROL MEASURES

Introduction

This chapter summarizes the recent emission control measures that have been adopted or are proposed to be adopted by the District to reduce reactive organic compound (ROC) and nitrogen oxide (NO_x) emissions from stationary sources of air pollution.

Control measures are evaluated and classified as *adopted*, *proposed*, *further study,* or *contingency.* The control measures are classified according to an analysis of their applicability to Santa Barbara County, their potential emission reductions, their cost-effectiveness, and whether similar measures have already been implemented in other areas of California. The following describes the four control measure classes:

- ***Adopted*** control measures are those that the District has formally adopted as District rules since the last Ozone Plan.
- ***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 by the earliest practicable date.
- ***Further study*** control measures are those that the District plans to investigate further before making a commitment to adopt them.
- ***Contingency*** control measures are those that are required by Section 40915 of the Health and Safety Code. The 2016 Plan has no contingency stationary source measures.

This chapter also addresses the state triennial plan assessment and update requirements specified in Health and Safety Code sections 40924 and 40925. This entails incorporating any new data or emission reduction estimates pertaining to the control measures.

The District has adopted one control measure that was listed on the 2013 Plan. As part of the plan assessment and update process, the District reevaluated the remaining 2013 Plan control measures and assembled a new rule adoption schedule that will achieve cost-effective and feasible emission reductions. These measures are projected to result in emission reductions of 104.98 tons of ROC and 36.58 tons of NOx per year if they are adopted and fully implemented.

Emission Control Mandates

Under the California Clean Air Act, each air district that is nonattainment for the state ozone standard must demonstrate a five percent reduction in emissions per year or adopt every feasible measure available to that district.[12] Since previous Ozone Plans have shown that the District cannot achieve a five percent per year emission reduction, the District has taken the approach of evaluating and adopting every feasible measure. This approach has been approved by the California Air Resources Board.

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

1) Compared the District's rules to rules currently adopted by other California air districts;
2) Reviewed new staff reports and guidance documents on any recent or upcoming revisions to other air district, ARB, and EPA rules; and
3) Considered the magnitude of the emissions reductions as well as the cost-effectiveness (C/E) of the measures.

Most of the feasible rules in the 2016 Plan are simply being rolled over from the previous 2013 Plan. However, there have been some changes, which will be fully discussed in this chapter.

Adopted Rules During the 2013-2015 Period

During the 2013 to 2015 period, the District revised its Architectural Coatings rule by adopting Rule 323.1. This rule lowered ROC limits for various architectural coatings in accordance with the California Air Resources Board's 2007 Suggested Control Measure. The 2013 Plan used ARB's 2007 methodology to estimate a reduction of 96.9 tons per year of ROC emissions from Rule 323.1. However, for adopted rules, the California Health and Safety Code requires the District to show if emission reduction estimates from the previous Plan have been revised. Using the most recent Control Profiles provided by the Air Resources Board, the emission reduction estimate has been revised to 147 tons of ROC per year.

Table 4-1 shows the previous control measure development schedule that was listed in the 2013 Plan and the progress that was made towards adopting these measures. Three rules were proposed for adoption in 2015-2016, but have yet to be adopted. These rules will be placed on the upcoming rule development schedule for 2017-2018, which is discussed in more detail in the next section.

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

TABLE 4-1: EMISSION CONTROL MEASURES SCHEDULED FOR ADOPTION IN THE 2013 PLAN

Rule	Description	2013 Plan Adoption Schedule	Rule Adoption Date	2013 Plan Cost-Effectiveness ($/Ton)	2013 Plan Emission Reductions Tons/Day (Tons/Year)	
					ROC	NO_X
323.1	**Architectural Coatings** New rule to reduce ROC content limits of coatings per the State 2007 Suggested Control Measure. Rule 323.1 will eventually replace existing Rule 323.	2014	June 19, 2014	$3,090	0.266 (96.9)	-
360	**Boilers, Water Heaters, and Process Heaters (0.075 - 2 MMBtu/hr)** Revisions to reduce the NOx limits to 20 ppmv at 3% oxygen for newly installed natural gas fired units.	2015 - 2016	Not yet adopted	$2,683 to $17,888	-	0.014 (5.01)
321	**Solvent Cleaning Machines and Solvent Cleaning** Revisions to lower the general cleaning ROC limit from 50 grams per liter to 25 g/L.	2015 - 2016	Not yet adopted	$2,784	0.373 (136.3)	-
351	**Surface Coating of Wood Products** Revisions to include solvent cleaning provisions at 25 g/L.	2015 - 2016	Not yet adopted	$477 to $909	0.0023 (0.61)	-
354	**Graphic Arts** Revisions to include solvent cleaning provisions at 25 – 100 g/L and additional requirements for Rotogravure, Flexographic, Lithographic, Letterpress, and Screen Printing operations.	2017 - 2019	Not yet adopted	$1,000 to $3,130	0.055 (20.1)	-
325 **326** **343** **344**	**Crude Oil Production and Separation;** **Storage of ROC Liquids;** **Petroleum Tank Degassing; and** **Petroleum Sumps, Pits and Well Cellars** Revisions to include solvent cleaning provisions.	2017 - 2019	Not yet adopted	$606	0.0090 (3.28)	-
				Totals:	**0.705** **(257.19)**	**0.014** **(5.01)**

Proposed Emission Control Measures

The District has assembled a new rule adoption schedule that focuses on achieving cost-effective and feasible emission reductions. Many of the proposed measures in this chapter were contained in the prior 2013 Plan, but have yet to be adopted. However, the emission reduction estimates and C/E values for the proposed rules have been recalculated, resulting in a few rules being reprioritized and scheduled for near-term adoption. The District's proposed adoption schedule is shown in Table 4-2, and summaries of each of the proposed control measures are described in this section.

All of the proposed emission control measures are revisions to existing District rules, as opposed to brand new rules.

Please note that the control measure descriptions and requirements (e.g., ppm limits, ROC-content limits) indicated in this Plan are subject to change when the actual rulemaking efforts are undertaken. The District is using preliminary data to develop the necessary emission reduction estimates and to give a general indication of the impacts of the rule. However, there could be technological advancements between the time of adoption of the final 2016 Plan and when the District begins to undertake the rulemaking effort, which would lower the emission limits or require additional changes in the proposed rule. Staff will consider implementing such changes during the rule development process. Furthermore, if the in-depth analysis performed during the rulemaking process reveals new information and indicates that the rule is not feasible, the District would not move forward with adopting the rule. Instead, the District would prioritize other rules that could achieve cost-effective emission reductions.

For a list of the similar California air district rules that the District based our "feasible measure" analysis on, please refer to Appendix A. For emission reduction estimates and projections as they relate to the specified source category of emissions, please refer to Appendix B.

TABLE 4-2: PROPOSED EMISSION CONTROL MEASURES FOR THE 2016 PLAN

Rule	Description	2013 Plan Adoption Schedule	2016 Plan Adoption Schedule	2016 Plan Cost-Effectiveness ($/Ton)	2016 Plan Emission Reductions, Tons/Day (Tons/Year)	
					ROC	NO_X
360	**Boilers, Water Heaters, and Process Heaters (0.075 - 2 MMBtu/hr)** Revisions to reduce the NOx limits to 20 ppmv at 3% oxygen for newly installed natural gas fired units.	Proposed 2015 - 2016	2017	$2,800 to $11,300	-	0.05 (19.8)
361	**Boilers, Steam Generators, and Process Heaters (2 - 5 MMBtu/hr)** Revisions to reduce the NOx limits to 9 or 12 ppmv at 3% oxygen for newly installed natural gas fired units. Higher limits for other fuels.	Further Study	2017	$13,100 to $17,300	-	0.03 (10.42)
342	**Boilers, Steam Generators, and Process Heaters (5+ MMBtu/hr)** Revisions to reduce the NOx limits to 9 or 15 ppmv at 3% oxygen for newly installed natural gas fired units. Higher limits for other fuels.	Further Study	2017	$8,700 to $21,000	-	0.02 (6.36)
321	**Solvent Cleaning Machines and Solvent Cleaning** Revisions to lower the general cleaning ROC limit from 50 grams per liter to 25 g/L.	Proposed 2015-2016	2018	$0 to $1,000	0.02 (6.35)	-
351	**Surface Coating of Wood Products** Revisions to include solvent cleaning provisions at 25 g/L.	Proposed 2015 - 2016	2018	$1,000 to $2,000	0.001 (0.42)	-
354	**Graphic Arts** Revisions to include solvent cleaning provisions at 25 – 100 g/L and additional requirements for Rotogravure, Flexographic, Lithographic, Letterpress, and Screen Printing operations. Existing facilities would have to be permitted to enforce the rule.	Proposed 2017-2019	2019	$1,000 to $3,100	0.27 (98.21)	-
				Totals:	**0.29 (104.98)**	**0.10 (36.58)**

Rule 360, Boilers, Water Heaters, and Process Heaters (0.075 – 2 MMBtu/hr)

Rule 360 is a point-of-sale rule that regulates NOx and CO emissions from boilers, water heaters, steam generators, and process heaters with a rated heat input capacity of 0.075 to 2.0 million British thermal units per hour (MMBtu/hr). The rule was initially adopted in 2002, and it implemented a NOx emission limit of 30 ppmv for units 0.4 - 2.0 MMBtu/hr and 55 ppmv for units with a rated heat input of 0.075 - 0.4 MMBtu/hr. To verify that these emission limits are met, Rule 360 requires manufacturers to certify their units through the District's certification program. The District also accepts units certified by the South Coast Air Quality Management District (South Coast AQMD) under their equivalent rule.

The focus of this amendment is to lower the rule emission limits for new units to the more stringent 20 ppmv NOx emission limit. The South Coast AQMD amended their equivalent rule in 2006 which required new units to meet 20 ppmv NOx by 2010 or 2012, depending on their size.[13] Since 2006, various other air districts across the state amended their rules to match the most recent South Coast AQMD standard.

The analysis for this amendment shows that the C/E values for this change to be between $2,800 and $11,300. These numbers are based on a survey of data from the Bay Area AQMD, South Coast AQMD, San Joaquin Valley Unified APCD, and Ventura APCD, all of which have already adopted the 20 ppmv standard.

Rule 361, Boilers, Steam Generators, and Process Heaters (2 – 5 MMBtu/hr)

Rule 361 applies to external combustion equipment with rated heat input capacities ranging from 2.001 MMBtu/hr to 4.999 MMBtu/hr. The rule was initially adopted in 2008, and it implemented a NOx emission limit of 30 ppmv for all new units, with all existing units (excluding low-use units) needing to meet the standard by January 1, 2020.

Since the initial adoption of the rule, there have been technological advances in ultra-low NOx burners. Using the new technology, most natural gas fired boilers can meet limits of 9 or 12 ppmv NOx, depending on the type of unit. These lower limits have already been adopted in various other air districts across the state, including the South Coast AQMD which adopted them in 2008.[14]

In 2012, the District looked into reducing the limit to 12 ppmv in Santa Barbara County. A survey was sent to various manufacturers to assemble cost data. The C/E for retrofitting or replacing each District permitted boiler was calculated, and the values for every boiler were

[13] South Coast Air Quality Management District *Rule 1146.2 (Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters)*; May 5, 2006.
[14] South Coast Air Quality Management District *Rule 1146.1 (Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters)*; September 5, 2008.

averaged together. The study indicated that the C/E of such an amendment would be $32,081 per ton, which was determined to not be cost-effective based on the range of costs for past District-adopted rules. At that time, the proposed revision to Rule 361 was considered infeasible and placed on the further study list.

However, the 2012 C/E calculations required retrofitting existing units, and this included two units which were only operating about 26 hours per year. When operated such a minimal amount, their individual C/E values were around $800,000/ton each, which substantially raised the average C/E value for the rule.

As part of the plan assessment and update process, the District reevaluated the proposed standards and the total C/E of this rule amendment. In this 2016 proposal, all natural gas units that are installed on or after January 1, 2020 would need to meet the more stringent standard of 9 or 12 ppmv. Existing units would not need to be retrofitted. Instead, the affected facilities would eventually meet the more stringent standard of 9 or 12 ppmv through the natural attrition of older units and the replacement with newer, lower emitting units.

Under the new proposal, the C/E values were determined to range from $13,100 to $17,300, which is cost-effective based on the range of past District-adopted rules. Hence, the rule has been taken off further study and placed on the rule adoption schedule for 2017.

Rule 342, Boilers, Steam Generators, and Process Heaters (5+ MMBtu/hr)

Rule 342 applies to external combustion equipment with rated heat input capacities of 5.0 MMBtu/hr and higher. The rule was initially adopted in 1992, and it implemented a NOx emission limit of 30 ppmv for all new gaseous-fueled units, with all existing units (excluding low-use units) needing to meet the standard by 1996.

Since 1992, there have been technological advances in burner design. Using new burners, most natural gas fired boilers can reach the new standard of 15 ppmv NOx. In addition, boilers that are 20 MMBtu/hr or larger will be required to meet the lower standard of 9 ppmv, which can be achieved by using a combination of flue gas recirculation (FGR) and ultra-low NOx burners. These lower standards have already been adopted in various other air districts across the state, including the South Coast AQMD, which adopted them in 2008.[15]

The District does not propose to go down to 5 ppmv NOx, which typically requires the use of selective catalytic reduction (SCR). SCR involves injecting aqueous ammonia into the exhaust stream. The ammonia reacts with the flue gas over a catalyst to reduce the NOx into nitrogen gas, water vapor, and carbon dioxide. These systems are quite expensive to install and

[15] South Coast Air Quality Management District *Rule 1146 (Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters)*; September 5, 2008.

maintain, with the preliminary estimates exceeding $50,000/ton of NOx reduced. Accordingly, such a requirement would not be cost-effective for Santa Barbara County.

Similar to Rule 361, the District looked into reducing the NOx limits of units subject to Rule 342 back in 2012. The study indicated that the C/E of such an amendment would be $470,000 per ton, which was determined to not be cost-effective based on the range of costs for past District-adopted rules. At that time, the proposed revision to Rule 342 was considered infeasible and placed on the further study list.

However, the 2012 C/E calculations were based on forcing all existing boilers to be replaced or retrofitted within two years of rule adoption. Such an amendment will greatly increase the C/E values, as some units are used very little and other units may still have a substantial amount of equipment life remaining.

As part of the plan assessment and update process, the District reevaluated the proposed standards and the total C/E of this rule amendment. In this 2016 proposal, all natural gas units that are installed on or after January 1, 2020 would need to meet the more stringent standard of 9 or 15 ppmv. Existing units would not need to be retrofitted. Instead, the affected facilities would eventually meet the more stringent standard of 9 or 15 ppmv through the natural attrition of the older units and the replacement with newer, lower emitting units.

Under the new proposal, the C/E values were determined to range from $8,760 to $21,000, which is cost-effective based on the range of past District-adopted rules. Hence, the rule has been taken off further study and placed on the rule adoption schedule for 2017.

Rule 321, Solvent Cleaning Machines and Solvent Cleaning

The District has a multitude of prohibitory rules that apply to specific coating operations, such as Automotive Coating, Aerospace Coating, and Wood Coating. Each of these rules have specific solvent cleaning provisions. Rule 321 applies to solvent cleaning operations that aren't subject to these other District prohibitory rules.

Rule 321 was amended in 2010 to reduce the general solvent reactive organic compound limit to 50 grams per liter (g/L). During this rule amendment process, the District informed the Community Advisory Council that a 25 g/L limit was feasible as the lower standard was already implemented in a few other districts. For example, the South Coast AQMD required a 25 g/L limit for most solvent cleaning applications back in 2003.[16] However, the CAC recommended to keep the limit at 50 g/L during the 2010 amendment of Rule 321. Accordingly, the District added the 25 g/L limit to the list of feasible measures in the 2010 Plan.

[16] South Coast Air Quality Management District *Rule 1171 (Solvent Cleaning Operations) Staff Report*; July 19, 2002.

Many industries are meeting the current limit of 50 g/L by using aqueous solvents. To meet the lower limit of 25 g/L, the facility will typically have to dilute the solvent with more water. Even when diluted to 50% of its current ROC content, the solvent still functions as an effective cleaner. According to both the 1999 South Coast AQMD staff report[17] and the 2007 San Joaquin Valley Unified APCD staff report,[18] there would be no expected cost increases to comply with this dilution method. District staff still anticipates a minimal cost to industry for employee training and recordkeeping changes.

Rule 351, Surface Coating of Wood Products

Rule 351 applies to all commercial wood coating operations and it was last amended in 1998. Currently, the rule has minimal solvent cleaning requirements, such as keeping containers closed when they are not in use. The proposed revisions will limit the ROC content of surface preparation and clean-up solvents to 25 grams per liter and any solvent cleaning machine used at the facility will need to comply with Rule 321. These revisions will be implemented to bring the rule on par with the other solvent rules in the District. As for the coating ROC limits, no further reductions were identified as the current coating limits are still consistent with the South Coast AQMD limits.[19]

In evaluating the C/E of this amendment, it is assumed that all current users of lacquer thinner will switch to acetone or aqueous solvents. It is anticipated that the C/E is approximately $1,000 - $2,000 per ton, which is similar to Ventura County's listed values in their 2006 amendment of Rule 74.30.[20]

Rule 354, Graphic Arts

Rule 354 was initially adopted in 1994 and it applies to two types of graphic art printing operations: rotogravure and flexographic printing processes. Small operations that emit less than 301 pounds per month of ROC are exempt from the rule's ROC content limits. The District only has one graphic arts operation that is subject to permit.

Since 1994, there have been many reformulations to lower ROC coatings, inks, and adhesives used in the graphic arts industry. Also, the 1994 rule was very narrow in scope as it did not include the other graphic arts operations, such as letterpress, lithographic, and screen printing operations. The District plans to update the rule to address the lower ROC limits for all of the

[17] South Coast Air Quality Management District *Rule 1171 (Solvent Cleaning Operations) Staff Report*; September 27, 1999.
[18] San Joaquin Valley Unified Air Pollution Control District *(Organic Solvent Cleaning) Final Draft Staff Report*; August 16, 2007.
[19] South Coast Air Quality Management District *Rule 1136 (Wood Products Coatings)*; June 14, 1996.
[20] Ventura County Air Pollution Control District *Rule 74.30 (Wood Products Coatings)*; April 20, 2006.

aforementioned graphic arts operations. Digital printing, which is a relatively new graphic arts operation, will be exempt from the rule since no other air districts have adopted ROC limits for it yet.

As part of the plan assessment and update process, staff reviewed the control measures that are being implemented at other air districts for this source type, including the types of solvents, usage amounts, and best practices. Many air districts have lowered their solvent provisions to 25-100 g/L, depending on the equipment application. These lower standards will be implemented to bring the rule on par with the various other solvent rules in the District.

Many districts have also lowered their permitting and rule applicability thresholds for graphic arts operations. The District anticipates lowering both thresholds to a 1 ton per year exemption level, which is consistent with other District permit thresholds. By lowering this limit, the District anticipates approximately 15 currently unpermitted sources would have to submit a permit application and comply with the amended rule. The District will refine this estimate as more public outreach is conducted during the rule development process.

The District anticipates these amendments would result in approximately 98 tons of ROC per year of inventory reductions, based on the District's 1996 methodology for assessing this category of emissions. The District expects the actual reductions from the rule amendment to be substantially less, but the District cannot accurately refine this estimate until more public outreach is conducted. Despite the uncertainty in the emission reductions, the rule is still feasible and cost-effective. The C/E is estimated to range from $1,000 to $3,100 per ton based on the EPA Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing[21] and Flexible Package Printing.[22]

Further Study Emission Control Measures

Further Study measures are potential control measures that the District plans to investigate further before making a commitment to adopt them. The proposed further study measures are shown in Table 4-3, below.

Of note, the control measure to add solvent cleaning provisions to Rules 325, 326, 343, and 344 has been moved from proposed to further study. This decision was made because the District could not identify many neighboring Air Districts with a similar control measure in place, as referenced in Appendix A. Also, the District would like to spend more time investigating the

[21] Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing, EPA-453/R-06-002. September 2006.
[22] Control Techniques Guidelines for Flexible Package Printing, EPA-453/R-06-003. September 2006.

emission impacts and the C/E of such a rule amendment prior to committing to the control measure.

For all of these control measures, District staff will continue to keep track of any new information that may warrant an official rule development proceeding. New information may show that these rules are necessary to achieve cost-effective emission reductions.

TABLE 4-3: FURTHER STUDY CONTROL MEASURES FOR THE 2016 PLAN

Rule	Description	2013 Plan Adoption Schedule
325 **326** **343** **344**	**Crude Oil Production and Separation;** **Storage of ROC Liquids;** **Petroleum Tank Degassing; and** **Petroleum Sumps, Pits and Well Cellars** Revisions to include solvent cleaning provisions.	Proposed 2017-2019
316	**Storage and Transfer of Gasoline** Delete the exemption for agricultural operations from vapor recovery system requirements if more than 50 percent of the annual throughput is used to fuel implements of husbandry. The District will also need to consider permitting or registering these agricultural gasoline tanks.	Further Study
—	**Organic Material Composting Operations** The composting measure would limit emissions of reactive organic compounds from commercial composting operations by requiring management practices for small facilities and control devices for larger facilities.	Further Study

The Effects of Potential Nonattainment-Transitional Status

As discussed in the "Emission Control Mandate" section of this chapter, the District is required to adopt feasible control measures as long as the County is designated nonattainment for the state ozone standard. If the District is designated as nonattainment-transitional, as described in Chapter 2, the District may refine the proposed control measure schedule. Under this scenario, some emission reduction control measures may no longer be necessary.

5 – ON-ROAD EMISSIONS AND TRANSPORTATION CONTROL MEASURES

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) 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 2016 Plan's on-road mobile source emission estimates and transportation control measures (TCMs). SBCAG also provides the socio-economic projections that form the basis for some of the stationary and area source growth forecasts in the 2016 Plan.

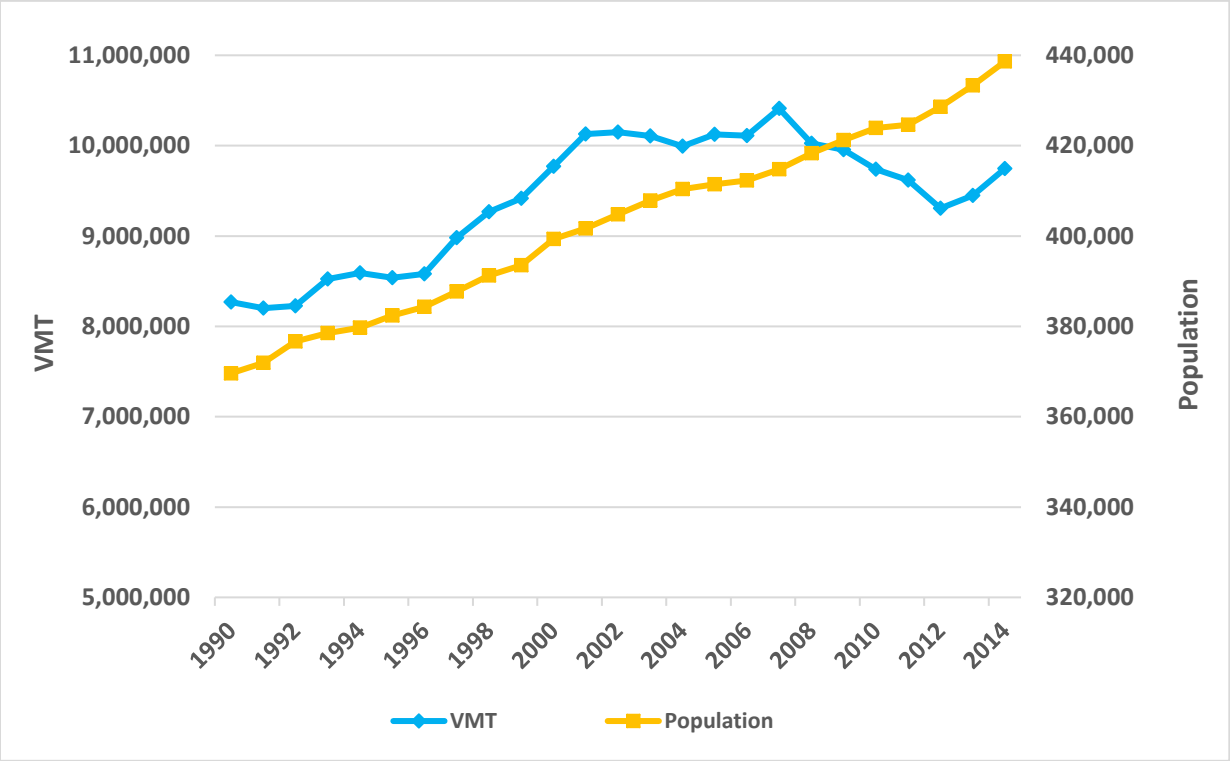
This chapter includes a discussion of vehicle activity trends, an update of the emissions inventory and projections for on-road mobile sources, and a summary of transportation control measures. The on-road mobile source inventory is also incorporated into the emission inventory information in Chapter 3.

The final section of this chapter includes a discussion of voluntary emission reduction measures that the District continues to pursue for marine shipping.

Vehicle Activity Trends

On-road mobile source emissions make up a large portion of the District's inventory as tens of thousands of cars and trucks are driven on the roadways every day. As each vehicle travels a different distance, the main trend to look at is the total amount of daily vehicle miles travelled (VMT) within the District. The total amount of daily VMT between 1990 and 2014 is shown in Figure 5-1. This data was compared against the population within the County. Although the relative amounts have varied over the period, the daily VMT growth for the entire period is fairly comparable to population growth (17.8% for VMT, 18.7% for population).

FIGURE 5-1: POPULATION AND DAILY VMT TRENDS
SANTA BARBARA COUNTY, 1990-2014



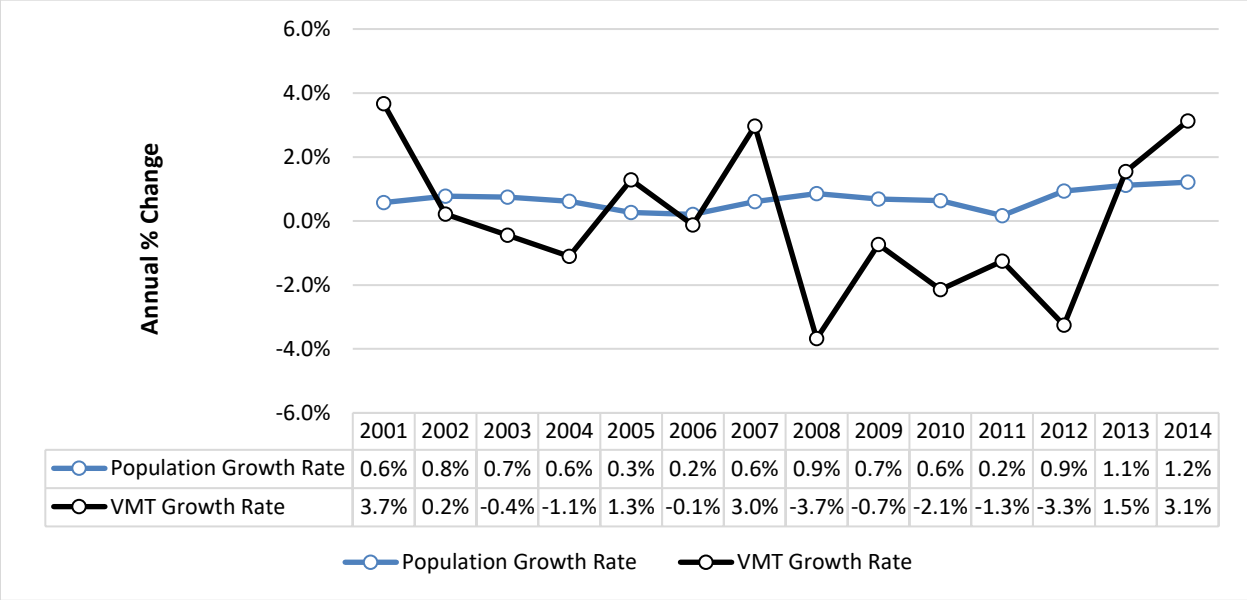
State law requires areas classified as having a "moderate" nonattainment classification for the state ozone standard, such as Santa Barbara County, to substantially reduce the rate of increase in passenger vehicle trips and VMT.[23]

Figure 5-2 shows annual growth rates for daily VMT and population for Santa Barbara County for the 14-year period between 2001 and 2014. Table 5-1 shows average annual growth rates for population and VMT over the last three decades (1990-2010). 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. 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.

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

FIGURE 5-2: HISTORICAL POPULATION GROWTH RATE VS. DAILY VEHICLE MILES TRAVELED GROWTH RATE, 2001-2014



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Population Growth Rate	0.6%	0.8%	0.7%	0.6%	0.3%	0.2%	0.6%	0.9%	0.7%	0.6%	0.2%	0.9%	1.1%	1.2%
VMT Growth Rate	3.7%	0.2%	-0.4%	-1.1%	1.3%	-0.1%	3.0%	-3.7%	-0.7%	-2.1%	-1.3%	-3.3%	1.5%	3.1%

TABLE 5-1: POPULATION AND VMT GROWTH RATES

Time Period	Population Average Annual Growth Rate	VMT Average Annual Growth Rate	Ratio (Population : 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

On-Road Mobile Source Emissions Analysis and Results

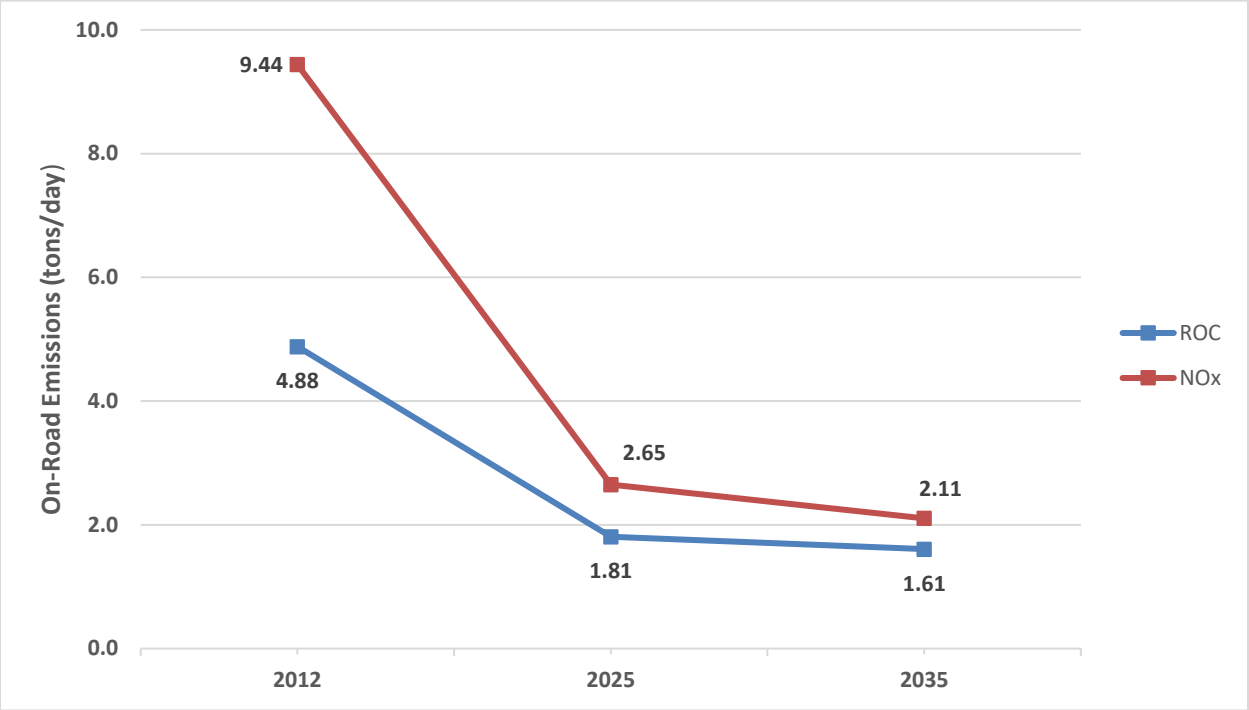
On-road mobile source emissions are estimated using the California Air Resources Board on-road mobile source emissions inventory model, EMFAC2014 v1.07. The Environmental Protection Agency approved the use of EMFAC2014 v1.07 for State Implementation Plan and conformity purposes on December 14, 2015. The on-road emission estimates were developed using the EMFAC2014 v1.07 model for 2012 (base year), 2025 and 2035. The transportation activity data (e.g., regional VMT, regional vehicle trips, and VMT by speed class distributions) generated by SBCAG's Countywide Regional Travel Demand Model provided the basis for the on-road mobile source emission estimates contained in this 2016 Plan. It should be noted that the transportation activity data is consistent with that used for the adopted 2040 Regional Transportation Plan/Sustainable Community Strategy (SBCAG, August 2013). In order to calculate 2012 base year trips and VMT, staff applied growth factors developed from the SBCAG Regional Travel Demand Model base year 2010 estimates of VMT and regional trips. For the year 2025 emission forecasts, on-road activity data was interpolated from the SBCAG Regional Travel Demand Model forecasts for years 2020 and 2035.

The 2016 Ozone Plan on-road mobile source emission results are summarized below in Table 5-2 and on Figure 5-3. The data from this analysis have been included in the overall emission inventory and forecast for Santa Barbara County, which is provided in Chapter 3 of this 2016 Plan (Tables 3-2 and 3-3).

TABLE 5-2: ON-ROAD MOBILE SOURCE EMISSION RESULTS

Pollutant	Baseline Year 2012 (tons/day)	Forecast Year 2025 (tons/day)	Forecast Year 2035 (tons/day)	Emissions Decrease 2012 to 2035 (tons/day)
ROC	4.88	1.81	1.61	3.27
NOx	9.44	2.65	2.11	7.33

FIGURE 5-3: ON-ROAD MOBILE SOURCE EMISSION RESULTS



Transportation Control Measures

SBCAG and the District have relied on the federal and state Clean Air Acts when determining the TCM strategy in ozone plans. The California Health & Safety Code defines transportation control measures as:

> *…any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions. (CA HSC §40717.g.)*

Under the federal Clean Air Act, a transportation control measure is any measure:

> *…listed in CAA section 108, or any other measure for the purpose of reducing emissions or concentrations of air pollutants from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions. Notwithstanding the first sentence of this definition, vehicle technology-based, fuel-based, and maintenance-based measures which control the emissions from vehicles under fixed traffic conditions are not TCMs for the purposes of this subpart. (40 CFR 93.101)*

SBCAG and the District have used the guidance provided by the U.S. Department of Transportation under Section 108(f)(1)(a) of the Clean Air Act when determining the appropriateness and criteria pollutant emission reduction potential of TCMs. Examples of potential TCMs listed in the Clean Air Act under Section 108(f)(1)(a) include: public transit

programs, restriction of roads to bus-only or high-occupancy vehicles, transportation demand management programs, trip-reduction ordinances, traffic flow improvement programs/projects, park-and-ride facilities, programs to limit or restrict vehicle use in downtown areas (e.g., congestion pricing), programs for the provision of shared-ride services, programs for the provision of areas for bicycle and pedestrian facilities and bicycle storage, programs to control extended vehicle idling, programs and ordinances to facilitate non-automobile travel and provision of mass transit for special events and activity centers, and programs that facilitate the voluntary removal of older light-duty autos and trucks.

Generally, 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) limiting those factors which promote single-occupant vehicle travel. While most on-road mobile source emission reductions 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 are an integral part of air quality plans and help meet multiple objectives (e.g., multimodal access, fuel efficiency, etc.).

SBCAG's 2040 Regional Transportation Plan – Sustainable Communities Strategy (RTP-SCS) established goals and objectives to guide and inform its development.[24] The goals and objectives outlined in the RTP-SCS are consistent with the implementation of TCMs as outlined in the federal and state Clean Air Acts. Chapter 4 of The RTP-SCS identifies plan goals, organized into five key areas. One of the goals is labeled *Environment*, and it aims to: "Foster patterns of growth, development and transportation that protect natural resources and lead to a healthy environment." Some of the objectives under the Environment goal include: reduce criteria pollutant emissions, reduce vehicle miles traveled, reduce greenhouse gas emissions, promote transit use and alternative transportation, and encourage affordable and workforce housing and mixed-use development within urban boundaries.[25] Additional information on how the RTP-SCS dovetails with the transportation control measures in this 2016 Plan is provided below, under "*Implementation Activities for Adopted TCMs.*"

[24] Santa Barbara County 2040 Regional Transportation Plan-Sustainable Community Strategy, Chapter 4, SBCAG, August 2013.
[25] See 2040 RTP-SCS, Table 27.

Adopted TCMs

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, 2010, and 2013 Plans. When an air district is in nonattainment with respect to a pollutant such as ozone, state law requires the District to include "every feasible measure" should the District not achieve a five percent annual reduction in District-wide emissions. The adopted TCMs meet this statutory provision.

As mentioned previously, the TCMs are developed and adopted by SBCAG prior to being incorporated into the District's Ozone Plan. Once the District has reviewed the TCMs, they are incorporated into the Ozone Plan, which is then approved by the District Board. All of the TCMs that were evaluated as part of the last triennial update and were included in the District's 2013 Clean Air 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

Adopted in 2013 Plan

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 plan (2013 Clean Air Plan) form the basis for the 2016 Plan on-road mobile source control strategy. Table 5-3 summarizes the implementation characteristics

of all currently adopted TCM categories in the county.

TABLE 5-3: SANTA BARBARA COUNTY TRANSPORTATION CONTROL MEASURES

TCM	TCM Designation	TCM Type	Adopting Agency	Implementing Agency	Commitments	Monitoring Mechanism (Agency)
T-1 T-2	Trip Reduction Program Employer-Based TDM Program	Voluntary; TDM Program; State AQAP	County and Cities	County/ Cities SBCAG Traffic Solutions	Resolution of Commitments from Affected Jurisdictions; City and County TDM Programs	Transportation Demand Management (TDM) Program (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	SBCAG, APCD, Other County Transit Operators	Federal Transportation Improvement Program (FTIP) and Regional Transportation Improvement Program (RTIP); Short Range Transit Plan (SRTP)	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	Voluntary; Programmed	County and Cities	County and Cities; Caltrans	FTIP and RTIP; Park and Ride Plan	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	APCD
T-14	Activity Centers	Voluntary	SBCAG	County, Cities, and SBMTD	Sustainable Community Strategy	SBCAG RTP/SCS (California Air Resources Board)
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;

Implementation Activities for TCMs

Once TCMs are adopted, they can be implemented through a variety of programs and projects, and over varying time periods. Since the last triennial update to the Ozone Plan, many activities, programs, and construction projects have been completed, or are currently being completed, to implement the existing adopted TCMs. TCMs can be regional in nature, or they can be implemented via projects or programs in specific jurisdictions. TCM implementation is subject to local planning efforts, goals and priorities, as well as funding constraints. Although not a complete listing, Table 5-4 lists several new and ongoing projects related to the adopted TCMs that have been implemented during the 2013-2016 reporting period. Following is a more detailed description of some of these projects/programs.

Santa Barbara County Sustainable Community Strategy

The SBCAG Sustainable Community Strategy was adopted as a TCM in the 2013 Plan under the Activity Centers (T-14) measure. In August 2013, SBCAG adopted the 2040 RTP-SCS, which shows how the region will achieve the required greenhouse gas (GHG) per capita emission targets as well as 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 RTP-SCS 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.

Consistent with the region's SCS, TCM T-14 emphasizes transit-oriented development, smart growth, and complementary investments in a multi-modal transportation network, which will result in reductions of ozone precursor emissions. It should be noted that the RTP-SCS does not intend to and has no authority to prescribe local land uses or to limit the authority and autonomy of local jurisdictions in any way to plan for their own land use needs. SB 375 expressly preserves local governments' right to plan their own land use (see Gov. Code Sec. 65080(b)(2)(K)). In May 2016, SBCAG staff prepared a summary report detailing countywide development trends and RTP-SCS implementation progress. The report noted that, while the

RTP-SCS had only been adopted less than three years ago, a review of recent development activity data by SBCAG staff in the report indicated that:

> *"A larger proportion of both residential and non-residential development has occurred in the North County rather than the South Coast. However, compared to past trends, the rate of future residential development in the South Coast has increased, providing more opportunities for local workers."*

A progress report on RTP-SCS Implementation is provided as a staff report for item 6 of SBCAG's May 5, 2016 Joint Technical Advisory Committee (JTAC) meeting, at the following webpage: meetings.sbcag.org/adcmeetings.html.

Alternative Fuels Planning and Infrastructure

The Plug-In Central Coast EV Readiness Plan, the District's EV Charging Station Infrastructure Program, and the other alternative fuels and hydrogen infrastructure planning efforts the District is currently undertaking, all complement and support the State of California's efforts in implementing zero emission vehicles (ZEVs) statewide. The California Air Resources Board's ZEV Rule (established in 1990) and subsequent amendments seek to reduce pollution by implementing technology improvements directly at the source by working with auto manufacturers. The program has been successful to date and has incentivized technology improvements in the auto sector and encouraged innovation and further development of fuel cell electric vehicles, battery electric vehicles, and other technologies. In addition, Governor Brown's Executive Order B-16-2012 established several milestones, one of which was: "By 2025, over 1.5 million ZEVs will be on California roadways and their market share will be expanding."

The District has taken a lead role in working with the air districts in Ventura and San Luis Obispo counties and the Community Environmental Council in securing grants to lay the ground work for planning electric vehicle infrastructure in the Central Coast region. These work efforts culminated in the preparation of the Plug-In Central Coast's Electric Vehicle Readiness Plan (EV Communities Alliance, April 2014) that includes a vision for electric vehicle adoption and infrastructure in the Central Coast region. The Electric Vehicle Readiness Plan includes siting recommendations for electric vehicle charging sites throughout the Central Coast, taking into consideration that US 101 serves as an inter-regional connection between Southern and Northern California. Locating DC fast chargers every 30 or 40 miles along the US 101, from Ventura County through Santa Barbara County and on to San Luis Obispo County, will enable battery electric vehicles (BEVs) to take longer trips and recharge from near empty to 80 percent charge in approximately 30 minutes. The Electric Vehicle Readiness Plan also includes recommendations for locating charging stations near workplaces, regional commercial centers, and major destination centers, as well as single-family and multi-family residences, and identifies outreach strategies for marketing, training, and education for local government implementation and for members of the public.

Another key initiative in this work effort is the continued implementation of the District's program to provide grants to public entities, tax-exempt non-profits, and/or private entities for electric vehicle charging stations. The grant program provides for up to $10,000 for a Level 2 charging station and up to $20,000 for a Level 3 charging station. For more information on the District's Electric Vehicle Charging Station Infrastructure Program, visit this webpage: www.ourair.org/ev-charging-program/

Starting in 2015, the District, with funding provided by a California Energy Commission grant, has been coordinating an effort to prepare the tri-counties region for hydrogen fuel cell electric vehicles. The plan development involves several agencies and organizations, with the District acting as the lead. Tasks will include preparing a hydrogen refueling infrastructure plan and a hydrogen station installation manual, meetings and workshops for civic leaders and other stakeholders, fire code and permitting training orientation, training for first responders, and assessing potential for early adoption of hydrogen fuel cell electric vehicles in municipal fleets.

TABLE 5-4: PROJECTS COMPLETED OR ONGOING UNDER PREVIOUSLY ADOPTED TCMS

TCM	Designation	Project Sponsor	Project
T-5	Public Transportation	City of Guadalupe	Guadalupe Flyer: Extended Saturday Service and new Sunday service added
		SBCAG, County, Private sector	Clean Air Express: New Saturday service between Santa Ynez Valley and South Coast added
T-6	High Occupancy Vehicle Lanes	SBCAG, Caltrans	U.S. 101 HOV Lanes – Mussel Shoals to Casitas Pass Rd.
T-10	Bicycle/Pedestrian	SBCAG, Cities, County	Measure A Bicycle, Pedestrian and Safe Routes to School Projects and Programs (various projects Countywide)
		SBCAG, Caltrans	Class I Bike Path at Santa Maria River Bridge – Connects San Luis Obispo and Santa Barbara Counties
		SBCAG, Caltrans	Class I Bike Path – Rincon Beach to Mussel Shoals
		SBCAG, Caltrans, County, Cities	SBCAG Regional Active Transportation Plan – Projects to be implemented as funding becomes available
T-13	Accelerated Retirement of Vehicles	SBCAPCD	The Old Car Buy Back Program pays Santa Barbara County vehicle owners $1,000 to voluntarily retire 1993 or older light or medium duty vehicles. The program has removed 4,386 vehicles from the fleet since the program's launch in May 2006.
T-14	Activity Centers	SBCAG, County, Cities, and SBMTD	Sustainable Community Strategy implementation (on-going)
T-18	Alternative Fuels	SBCAPCD and other agencies	Plug-In Central Coast EV Readiness Plan
		SBCAPCD	Tri-Counties Hydrogen Readiness Plan
		County, SBCAPCD	Alternative Fuels Plan

TCMs Proposed for Adoption

No new TCMs are proposed for adoption at this time. However, as described above, the District and SBCAG remain committed to implementing the TCMs that were adopted in previous air quality attainment plans, thereby continuing to reduce mobile source emissions through a variety of transportation control strategies, programs and projects.

TCMs Proposed for Further Study

The TCM "proposed for further study" in Table 5-5 below supplements an existing TCM that was included in previous ozone plans (T-7: Traffic Flow Improvements). SBCAG will be working with staff from the County, the City of Goleta, Caltrans, UCSB, and the Santa Barbara MTD on a Goleta Ramp Metering Study to determine the potential effectiveness of metering freeway access along US 101 through the City of Goleta and the unincorporated Eastern Goleta Valley to address current peak period traffic congestion. A review of the academic literature shows that implementation of ramp metering in congested, high-volume corridors (like the US 101) can lead to increased fuel efficiency and reduced vehicle emissions. The findings and recommendations made in the study may represent a potential TCM. Therefore, the ramp metering study is identified as a TCM proposed for further study.

TABLE 5-5: TCM PROPOSED FOR FURTHER STUDY

TCM	Designation	Project Sponsor	Project/Program Description	Process
T-7	Traffic Flow Improvement	SBCAG, Caltrans, County, City of Goleta	Goleta Ramp Metering Corridor Study	SBCAG Overall Work Program, Caltrans Transportation Planning Grant

Contingency TCM

An enhanced inspection and maintenance (Smog Check II) is listed as a contingency measure in Table 5-6. The purpose of retaining a contingency measure in the 2016 Plan is to consider this measure for further implementation should the region ever be designated as nonattainment for the federal ozone standard.

TABLE 5-6: CONTINGENCY TCM

TCM	Designation	Project Sponsor	Project/Program Description	Process
T-21	Inspection and Maintenance	Bureau of Automotive Repair	Enhanced I/M Program	Pending attainment status for federal ozone standard

Strategies to Reduce Emissions from Marine Shipping

As discussed in Chapter 3 of this 2016 Plan, ozone precursor emissions from marine shipping activities constitute a large portion of the emissions inventory for Santa Barbara County (primarily NOx emissions, but also ROCs). The District has worked for decades to raise awareness of the local impact 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 has the potential to undermine 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.

One strategy to significantly reduce NOx emissions from shipping is to reduce vessel speeds, which also increases vessel operational efficiency and reduces fuel usage. Vessel speed reduction (VSR) reduces emissions of NOx, particulate matter, air toxics, sulfur dioxide, and greenhouse gases. VSR can be implemented by all ships, without capital investments, and 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.

In 2014, the District, the Channel Islands National Marine Sanctuary, the Ventura County Air Pollution Control District, the National Marine Sanctuary Foundation, and the Environmental Defense Center implemented a trial incentive program to slow ships down in the Santa Barbara Channel to reduce air pollution and protect endangered whales. The trial was based on existing successful ship speed reduction programs at the Ports of Los Angeles and Long Beach.

Seven global shipping companies participated in the effort and slowed 27 transits to 12 knots or less from July through November in the reduced speed zone for an incentive payment of $2,500 per one-way transit. Most of the transits occurred between July and October, a time period that coincides with the busiest whale season and the prime period for high levels of ozone air pollution. Previous baseline speeds for the ships that participated in the program averaged between 14 and 18 knots. Slowing to 12 knots can typically increase transit time through the Channel by 3-4 hours. The program achieved emission reductions of approximately 12.4 tons of NOx emissions from the participating ships. The program also achieved more than 500 metric tons of regional greenhouse gas emission reductions. More detail is available in the report posted on the District's website: www.ourair.org/air-pollution-marine-shipping/.

The trial demonstrated the willingness of shipping companies to participate in a voluntary, non-regulatory, non-port program, and the feasibility of implementing such a vessel speed reduction program in the Santa Barbara Channel. The success of the trial also provided a solid

foundation for a future larger-scale program.

In 2015, the District participated in a Marine Shipping Working Group convened by the Channel Islands National Marine Sanctuary Advisory Council. The Working Group brought together a wide range of stakeholders representing the shipping industry, Coast Guard, US Navy, National Marine Fisheries Service, National Park Service, whale researchers, and Natural Resources Defense Council, among others. The process identified a range of potential management proposals to address the concerns of the stakeholders. The Working Group unanimously supported the concept of implementing a 2016 VSR Program to build on the success of the 2014 Trial.

The District is working with partners on this Program, which will explore additional on-board measures to protect whales, assess the effectiveness of different incentive amounts, and support additional assessment of emission impacts associated with the VSR Program. The ultimate goal of this series of programs is to identify a sustainable method to implement ongoing VSR offshore Santa Barbara County, and the District will continue to discuss with ARB, EPA and others possible funding avenues for a larger-scale VSR program.

In addition, we continue to track progress with 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 part of the Technology Advancement Program (further described in the San Pedro Bay Ports Clean Air Action Plan, updated in 2015), the Ports of Long Beach and Los Angeles continue to examine emission-reducing technologies such as engine retrofits, more efficient fuel injection, and techniques for operating main engines in a low-NOx emissions mode.

Proposed Control Measures

Rule	Description	Feasible Measure Based On [1]
360	**Boilers, Water Heaters, and Process Heaters (0.075 - 2 MMBtu/hr)** Revisions to reduce the NOx limits to 20 ppmv at 3% oxygen for newly installed natural gas fired units.	South Coast Rule 1146.2 (2006) San Joaquin Rule 4308 (2013) Sac-Metro Rule 414 (2010) Bay Area Rule 9-6 (2007) Ventura Rule 74.15.1 (2015)
361	**Boilers, Steam Generators, and Process Heaters (2 - 5 MMBtu/hr)** Revisions to reduce the NOx limits to 9 or 12 ppmv at 3% oxygen for newly installed natural gas fired units. Higher limits for alternative fuels.	South Coast Rule 1146.1 (2013) San Joaquin Rule 4307 (2011) Ventura Rule 74.15.1 (2015)
342	**Boilers, Steam Generators, and Process Heaters (5+ MMBtu/hr)** Revisions to reduce the NOx limits to 9 or 15 ppmv at 3% oxygen for newly installed natural gas fired units. Higher limits for alternative fuels.	South Coast Rule 1146 (2013) San Joaquin Rule 4306 & 4320 (2008) Sac-Metro Rule 411 (2007) Bay Area Rule 9-7 (2011)
321	**Solvent Cleaning Machines and Solvent Cleaning** Revisions to lower the general cleaning ROC limit from 50 grams per liter to 25 g/L.	South Coast Rule 1171 (2009) San Joaquin Rule 4663 (2007) Sac-Metro Rule 466 (2010) Ventura Rule 74.6 (2003) Yolo-Solano Rule 2.31 (2013)
351	**Surface Coating of Wood Products** Revisions to include solvent cleaning provisions at 25 g/L.	San Joaquin Rule 4606 (2008) Sac-Metro Rule 463 (2008) Bay Area Rule 8-32 (2009) Ventura Rule 74.30 (2006) Yolo-Solano Rule 2.39 (2008)
354	**Graphic Arts** Revisions to include solvent cleaning provisions at 25 – 100 g/L and additional requirements for Rotogravure, Flexographic, Lithographic, Letterpress, and Screen Printing operations. Existing facilities would have to be permitted to enforce the rule.	South Coast Rule 1130 (2014) San Joaquin Rule 4607 (2008) Sac-Metro Rule 450 (2008) Bay Area Rule 8-20 (2008) Ventura Rule 74.19 (2011)

[1] All rules listed represent the most recent rule version from the corresponding Air District. The similar feasible measure may have been incorporated into an earlier version of the rule.

Further Study Control Measures

Rule	Description	Feasible Measure Based On [2]
325 **326** **343** **344**	**Crude Oil Production and Separation;** **Storage of ROC Liquids;** **Petroleum Tank Degassing; and** **Petroleum Sumps, Pits and Well Cellars** Revisions to include solvent cleaning provisions.	San Joaquin Rule 4623 (2005)
316	**Storage and Transfer of Gasoline** Delete the exemption for agricultural operations from vapor recovery system requirements if more than 50 percent of the annual throughput is used to fuel implements of husbandry. The District will also need to consider permitting or registering these agricultural gasoline tanks.	South Coast Rule 461 (2012)
—	**Organic Material Composting Operations** The composting measure would limit emissions of reactive organic compounds from commercial composting operations by requiring management practices for small facilities and control devices for larger facilities.	San Joaquin Rule 4566 (2011)

[2] All rules listed represent the most recent rule version from the corresponding Air District. The similar feasible measure may have been incorporated into an earlier version of the rule.

APPENDIX B – PROJECTED EMISSION IMPACTS FOR RECENTLY ADOPTED AND PROPOSED CONTROL MEASURES

The following tables show the projected emission impacts for the recently adopted and proposed rules as they relate to the Plan's base year (2012) and two planning years (2025 and 2035). The impacts are assessed by comparing:

a) The emissions of the source category *before the control measure* is adopted;
b) The anticipated *reductions achieved* by the control measure; and
c) The emissions of the source category *after the control measure* is adopted.

Rule 323.1 – Architectural Coatings			**Adopted in 2014**			
ROC Inventory	**2012**		**2025**		**2035**	
	Tons/Day	**Tons/Year**	**Tons/Day**	**Tons/Year**	**Tons/Day**	**Tons/Year**
Before Control Measure	1.58	575.24	1.72	626.11	1.84	672.20
Reductions Achieved	---	---	0.43	158.52	0.47	170.18
After Control Measure	---	---	1.28	467.60	1.38	502.02

Rule 360 – Boilers (0.075 – 2 MMBTU/hr)			**Scheduled for 2017**			
NOx Inventory	**2012**		**2025**		**2035**	
	Tons/Day	**Tons/Year**	**Tons/Day**	**Tons/Year**	**Tons/Day**	**Tons/Year**
Before Control Measure	0.12	42.30	0.14	49.55	0.15	53.40
Reductions Achieved	---	---	0.02	8.12	0.06	21.24
After Control Measure	---	---	0.11	41.43	0.09	32.15

Rule 361 – Boilers (2 – 5 MMBTU/hr)			**Scheduled for 2017**			
NOx Inventory [1]	**2012**		**2025**		**2035**	
	Tons/Day	**Tons/Year**	**Tons/Day**	**Tons/Year**	**Tons/Day**	**Tons/Year**
Before Control Measure	0.11	40.91	0.06	20.14	0.06	21.70
Reductions Achieved	---	---	0.01	4.07	0.04	13.15
After Control Measure	---	---	0.04	16.07	0.02	8.55

[1] The Rule 361 inventory includes the currently adopted compliance schedule for existing units, which reduces emissions in 2020.

Rules 342 – Boilers (5+ MMBTU/hr)			Scheduled for 2017			
NOx Inventory	2012		2025		2035	
	Tons/Day	Tons/Year	Tons/Day	Tons/Year	Tons/Day	Tons/Year
Before Control Measure	0.04	14.40	0.04	13.75	0.04	14.52
Reductions Achieved	---	---	0.01	2.02	0.02	6.41
After Control Measure	---	---	0.03	11.73	0.02	8.11

Rule 321 – Solvent Cleaning			Scheduled for 2018			
ROC Inventory [2]	2012		2025		2035	
	Tons/Day	Tons/Year	Tons/Day	Tons/Year	Tons/Day	Tons/Year
Before Control Measure	0.53	195.03	0.65	235.53	0.65	235.53
Reductions Achieved	---	---	0.02	7.67	0.02	7.67
After Control Measure	---	---	0.62	227.86	0.62	227.86

Rule 351 – Wood Coating Operations			Scheduled for 2018			
ROC Inventory [3]	2012		2025		2035	
	Tons/Day	Tons/Year	Tons/Day	Tons/Year	Tons/Day	Tons/Year
Before Control Measure	0.04	13.90	0.05	19.86	0.05	19.86
Reductions Achieved	---	---	0.002	0.60	0.002	0.60
After Control Measure	---	---	0.05	19.26	0.05	19.26

Rule 354 – Graphic Arts			Scheduled for 2019			
ROC Inventory	2012		2025		2035	
	Tons/Day	Tons/Year	Tons/Day	Tons/Year	Tons/Day	Tons/Year
Before Control Measure	0.49	177.2	0.55	199.85	0.60	220.68
Reductions Achieved	---	---	0.30	110.76	0.34	122.31
After Control Measure	---	---	0.24	89.09	0.27	98.37

[2] The Rule 321 inventory consists of all solvents for degreasing and wipe cleaning. It does not include those solvents associated with coating operations.

[3] The Rule 351 inventory consists of all coatings and solvents associated with commercial wood coating operations.

APPENDIX C – EMISSIONS FROM NATURAL SOURCES

FIGURE C-1: 2012 NATURAL SOURCE ROC AND NOX (TONS PER DAY)

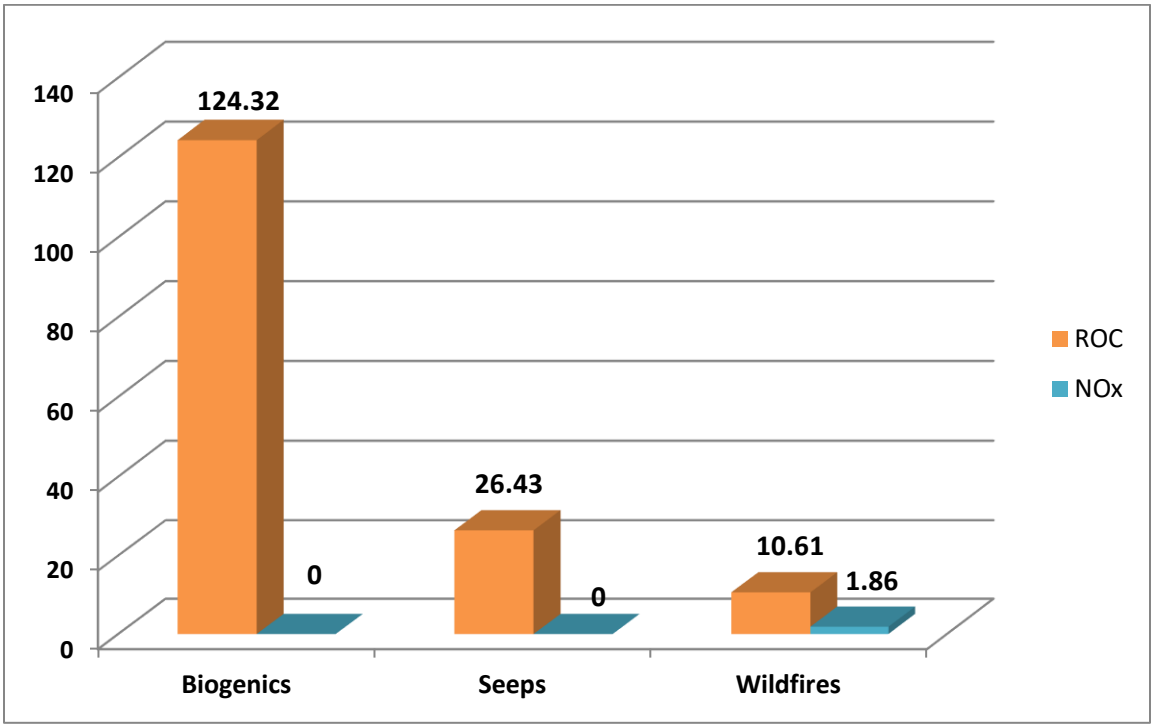


FIGURE C-2: 2012 ROC AND NOX EMISSIONS – ALL SOURCES (TONS PER DAY)