

## **CHAPTER 6**

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### **EMISSION FORECASTING**

**Introduction**

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## **6. EMISSION FORECASTING**

### **6.1 INTRODUCTION**

This chapter presents the three emission inventory forecasts used in the development of this 2001 Clean Air Plan (2001 Plan). These inventories are the 2005, 2010, and 2015 Planning Emission Inventory forecasts of reactive organic compounds (ROC) and oxides of nitrogen (NO<sub>x</sub>) emissions in Santa Barbara County and the Outer Continental Shelf (OCS), offshore of Santa Barbara County.

The 2005, 2010, and 2015 Planning Emission Inventory forecasts are based on the 1999 Planning Emission Inventory, which is described in Chapter 3, Emission Inventory. This 1999 Planning Emission Inventory is the base year for emission forecasting and was developed by modifying the 1999 Annual Emission Inventory, (also described in Chapter 3). A Planning Emission Inventory is essentially a modified subset of an Annual Emission Inventory and differs from an Annual Emission Inventory in three ways. First, the creation of the Planning Emission Inventory involves adjusting the Annual Emission Inventory to account for seasonal variation because most exceedances of the state and federal 1-hour ozone standards occur during the April to October ozone season. This is commonly referred to as a summer seasonal inventory. Second, the emissions from natural sources such as biogenics, oil and gas seeps, and wildfires that are part of the Annual Emission Inventory are excluded from the Planning Emission Inventory since they are not regulated or controlled through implementation of emission control measures. Finally, the annual emissions in the Annual Emission Inventory are converted to daily emissions in the Planning Emission Inventory.

### **6.2 EMISSION FORECAST**

The 1999 Planning Emission Inventory forecast of emissions is used to demonstrate that the emission control measures, described in Chapters 4 and 5 of this 2001 Plan, will reduce enough emissions to maintain the federal 1-hour ozone standard from 1999 out to 2015, while accounting for growth expected in the county. (Refer to Chapter 7, Redesignation Request and Maintenance Plan for a detailed discussion of this topic).

To forecast future year emissions, estimates of the changes in the level of pollution producing activities, known as “activity indicators”, are used to grow the 1999 Planning Emission Inventory. In addition, emission reductions resulting from local control rules adopted by the APCD Board of Directors and from statewide regulations adopted by the California Air Resources Board (ARB) are estimated and accounted for in the future year forecasts.

Since we are using a 1999 emission inventory base year, future year forecasted emission inventories must be adjusted to account for emission reduction credits (ERCs) that were in the Source Register prior to the base year emission inventory. ERC’s are previous reductions in emissions that can be credited to allow increased emissions from a new or modified stationary source. USEPA policy mandates that ERC’s must be treated as potential growth in forecast years. Total available ERC’s in the Source Register for Santa Barbara County, as of the 3<sup>rd</sup> quarter of 2001, were 0.1735 tons per day of ROC and 0.4378 tons per day of NO<sub>x</sub>. These total ERC values are included in the emission forecast tables presented at the end of this chapter. A detailed list of each source that owns these ERC’s are listed in the table below.

<b>SANTA BARBARA COUNTY SOURCE REGISTER ERC's</b> <b>(As of 3<sup>rd</sup> Quarter 2001) (Tons per day)</b>		
	<b>ROC</b>	<b>NO<sub>x</sub></b>
<b>Chevron</b>	0.0194	0.0000
<b>Grefco</b>	0.0070	0.0000
<b>Greka SMV, Inc.</b>	0.0755	0.0112
<b>McGhan Medical</b>	0.0032	0.0000
<b>Nuevo Energy Company</b>	0.0633	0.0338
<b>POPCO</b>	0.0004	0.0005
<b>US Air Force – VAFB*</b>	0.0047	0.3944
<b>TOTAL SOURCE REGISTER ERC's</b>	<b>0.1735</b>	<b>0.4399</b>

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\* ERC's for the US Air Force – VAFB are only allowed to be used for projects at Vandenberg Air Force Base.

### 6.2.1 ACTIVITY INDICATORS

Forecasting quantities of pollution in future years is accomplished by assuming that the amount of pollution is related to activity levels of selected *activity indicators*. Examples of activity indicators include population, housing, employment, oil production, number of producing oil wells, daily vehicle miles traveled, and daily vehicle starts. The Santa Barbara County Association of Governments (SBCAG) is the source for several of the activity indicator estimates. The California Air Resources Board, and other state and local agencies also contributed activity data. These data represent the best available estimates of future activity levels for the county. The *activity factor* is the ratio of the 2005, 2010, and 2015 forecast levels of activity to the 1999 level of activity. An activity factor greater than one indicates an increase in growth, while an activity factor of less than one indicates a decline in activity relative to 1999. Table 6-7 provides the 1999 level of activity, the predicted 2005, 2010, and 2015 levels of activity, the activity factors, and the source of the forecast for each of the activity indicators.

Note that the activity indicator for OCS (Outer Continental Shelf) Production has been set to 1.0 or “no-growth.” The recommendation to use a no-growth activity factor came from the Santa Barbara County Air Pollution Control District Community Advisory Council after deliberation of what the future projection of the OCS Production should be. The Community Advisory Council considered potential OCS growth scenarios identified in the Minerals Management Service’s California Offshore Oil and Gas Energy Resources (COOGER) study. The COOGER study presents several scenarios of future growth for the OCS, including a “future baseline” scenario that projects existing OCS platforms to decline steeply in production over the next fifteen years. The COOGER study also presents scenarios that project substantial growth and development of future platforms from existing undeveloped leases. The Council noted that, since any future oil and gas production on the OCS will be required to be permitted under New Source Review/Prevention of Significant Deterioration process, any potential increase in emissions must be offset to provide a net emission benefit from the new OCS production activity. This would also ensure consistency of these future projects with this Plan. Therefore, the Council recommended that, since future OCS emissions from oil and gas activities will be no greater than the levels identified in the 1999 base year emissions inventory, the

activity indicator for OCS Production should be set to no-growth as a reasonable assumption of future oil and gas production emissions on the OCS.

An activity indicator was assigned to each Stationary Source and Area-Wide Source category described in Chapter 3, with the exception of categories of On-Road Motor Vehicles and Other Mobile Sources, which are derived from ARB's EMFAC2000 and OFFROAD Models, respectively. The ARB has provided the APCD with emission forecasts for all of these source categories.

To forecast future year uncontrolled emissions, the quantity of emissions from each source in 1999 is multiplied by the activity factor of its assigned activity indicator. The assignments of activity indicators to emission sources are documented in Appendix A, Emission Inventory and Forecasting Documentation.

## 6.2.2 CONTROL MEASURES

The next step in forecasting future year emissions is to account for regulations and control measures scheduled for implementation since 1990. Emission reductions are achieved through implementation of federal, state and local controls on a variety of pollution sources, including Stationary Sources, Area-Wide Sources, and Mobile Sources.

The emissions from each source were reduced according to the expected efficiency of any control measures that apply to that source, taking into account any existing level of control. The efficiencies for each control measure and how they are calculated are provided in Appendix B, Stationary Source Emission Control Documentation. Estimated efficiencies take into account equipment (design) efficiencies, exemptions, phased implementations, and expected rates of compliance (assumed to be a default 80%, as recommended in USEPA guidelines). The resulting emissions after the application of control measures represent a seasonally adjusted emission inventory forecast. A detailed accounting of forecast emissions after control measure implementation for each source category is presented in Appendix A.

### 6.2.3 VANDENBERG AIR FORCE BASE CONFORMITY GROWTH ALLOWANCE

Vandenberg Air Force Base (VAFB) requested that the APCD include a conformity growth allowance into the 2001 Plan to account for an Airborne Laser (ABL) Mission that may potentially come to VAFB. On November 15, 2001, the APCD Board of Directors approved this request, with the condition that a portion of the emissions from the ABL Mission be offset by withdrawing Emission Reduction Credits (ERC's) from the VAFB Source Register. The remaining emissions from the ABL Mission are included in the 2001 Plan as a growth allowance and have been listed as line items in Tables 6-1, 6-3, and 6-5. The table below shows the emissions from the ABL Mission estimated by VAFB, the ERC's required from VAFB required to offset the ABL Mission, and the remaining emissions that would be added as line items in the 2001 Plan.

<b>VANDENBERG AIR FORCE BASE (VAFB) AIRBORNE LASER (ABL) MISSION</b>		
	<b>ROC</b>	<b>NO<sub>x</sub></b>
	<i>(Tons per day)</i>	<i>(Tons per day)</i>
<b>Projected 2005 Emissions for the ABL Mission by VAFB</b>	0.0552	0.0634
<b>Projected 2010 Emissions for the ABL Mission by VAFB</b>	0.0656	0.4867
<b>Projected 2015 Emissions for the ABL Mission by VAFB</b>	0.0656	0.4867
<b>Source Register ERC's required to offset the ABL Mission</b>	0.0000	0.1265
<b>2005 Emissions added to the 2001 Plan for the ABL</b>	0.0552	0.0000
<b>2010 Emissions added to the 2001 Plan for the ABL</b>	0.0656	0.3602
<b>2015 Emissions added to the 2001 Plan for the ABL</b>	0.0656	0.3602

## **6.3 EMISSION INVENTORIES**

The following is a summary of the 2005, 2010, and 2015 Planning Emission Inventory Forecasts, for both Santa Barbara County and the Outer Continental Shelf (OCS). These emissions are presented in greater detail in Tables 6-1 through 6-6 and Figures 6-1 through 6-6 located at the end of the chapter.

### **6.3.1 2005 PLANNING EMISSION INVENTORY FORECAST: SANTA BARBARA COUNTY**

#### 2005 Santa Barbara County ROC Planning Emissions: 32.83 tons per day

- 24% Stationary Sources (including Source Register ERC's): 7.76 tons per day
- 25% Area-Wide Sources: 8.18 tons per day
- 51% Mobile Sources (including VAFB ABL): 16.90 tons per day

#### 2005 Santa Barbara County NO<sub>x</sub> Planning Emissions: 40.96 tons per day

- 11% Stationary Sources (including Source Register ERC's): 4.38 tons per day
- 3% Area-Wide Sources: 1.20 tons per day
- 86% Mobile Sources (including VAFB ABL): 35.38 tons per day

### **6.3.2 2005 PLANNING EMISSION INVENTORY FORECAST: OUTER CONTINENTAL SHELF**

#### 2005 OCS ROC Planning Emissions: 2.69 tons per day

- 33% Stationary Sources: 0.89 tons per day
- 67% Mobile Sources: 1.80 tons per day

#### 2005 OCS NO<sub>x</sub> Planning Emissions: 34.27 tons per day

- 2% Stationary Sources: 0.66 tons per day
- 98% Mobile Sources: 33.61 tons per day

6.3.3 2010 PLANNING EMISSION INVENTORY FORECAST:  
SANTA BARBARA COUNTY

2010 Santa Barbara County ROC Planning Emissions: 28.26 tons per day

- 25% Stationary Sources (including Source Register ERC's): 7.02 tons per day
- 30% Area-Wide Sources: 8.41 tons per day
- 45% Mobile Sources (including VAFB ABL): 12.83 tons per day

2010 Santa Barbara County NO<sub>x</sub> Planning Emissions: 34.74 tons per day

- 13% Stationary Sources (including Source Register ERC's): 4.46 tons per day
- 3% Area-Wide Sources: 1.22 tons per day
- 84% Mobile Sources (including VAFB ABL): 29.05 tons per day

6.3.4 2010 PLANNING EMISSION INVENTORY FORECAST:  
OUTER CONTINENTAL SHELF

2010 OCS ROC Planning Emissions: 2.71 tons per day

- 33% Stationary Sources: 0.89 tons per day
- 67% Mobile Sources: 1.82 tons per day

2010 OCS NO<sub>x</sub> Planning Emissions: 39.31 tons per day

- 2% Stationary Sources: 0.67 tons per day
- 98% Mobile Sources: 38.64 tons per day



6.3.5 2015 PLANNING EMISSION INVENTORY FORECAST:  
SANTA BARBARA COUNTY

2015 Santa Barbara County ROC Planning Emissions: 26.52 tons per day

- 27% Stationary Sources (including Source Register ERC's): 7.22 tons per day
- 33% Area-Wide Sources: 8.77 tons per day
- 40% Mobile Sources (including VAFB ABL): 10.53 tons per day

2015 Santa Barbara County NO<sub>x</sub> Planning Emissions: 29.60 tons per day

- 15% Stationary Sources (including Source Register ERC's): 4.42 tons per day
- 4% Area-Wide Sources: 1.24 tons per day
- 81% Mobile Sources (including VAFB ABL): 23.95 tons per day

6.3.6 2015 PLANNING EMISSION INVENTORY FORECAST:  
OUTER CONTINENTAL SHELF

2015 OCS ROC Planning Emissions: 3.02 tons per day

- 29% Stationary Sources: 0.89 tons per day
- 71% Mobile Sources: 2.13 tons per day

2015 OCS NO<sub>x</sub> Planning Emissions: 47.95 tons per day

- 1% Stationary Sources: 0.67 tons per day
- 99% Mobile Sources: 47.28 tons per day

## **6.4 CONCLUSIONS**

This chapter presented the 2005, 2010, and 2015 Planning Emission Inventory Forecasts. The 1999 Planning Emission Inventory is used as the basis to calculate the 2005, 2010, and 2015 forecasts.

The following tables and figures display the detailed emissions in Santa Barbara County and the Outer Continental Shelf for the years 2005, 2010, and 2015. Tables 6-1, 6-3, and 6-5 show the Santa Barbara County emission inventories for the years 2005, 2010, and 2015, respectively. Mobile Sources, primarily On-Road Motor Vehicles (Light-Duty Passenger and Light-Duty Trucks) produce the majority of ROC and NO<sub>x</sub>, for each of these years, although the trend shows a large decline in these emissions from 1999 to 2015. Tables 6-2, 6-4, and 6-6 show the same data for the Outer Continental Shelf, offshore of the county. The majority of the ROC emissions are Stationary Sources, primarily Oil and Gas Production, with the bulk of NO<sub>x</sub> emissions from Other Mobile Sources, specifically Ships and Commercial Boats. The emission trend for the Outer Continental Shelf shows a gradual decline in ROC emissions. However, NO<sub>x</sub> emissions on the OCS increase during the forecast period due to increased shipping activity.

Figures 6-1, 6-3, and 6-5 graphically illustrate the relative contributions of the major emission categories to the emissions of ROC and NO<sub>x</sub> in the county in 2005, 2010, and 2015, respectively. Figures 6-2, 6-4, and 6-6 illustrate the same data for the Outer Continental Shelf offshore of the county. The implications of these forecasts on our ability to maintain the federal 1-hour ozone standard are discussed in Chapter 7, Redesignation Request and Maintenance Plan. Please refer to Appendix A for additional forecast emission inventory information and documentation.

**TABLE 6 – 1**

2005 Planning Emission Inventory - Santa Barbara County  
(Tons per day)

	ROC	NO <sub>x</sub>
<b>STATIONARY SOURCES</b>		
<b><i>FUEL COMBUSTION</i></b>		
010 ELECTRIC UTILITIES	0.0018	0.0826
020 COGENERATION	0.0239	0.0754
030 OIL AND GAS PRODUCTION (COMBUSTION)	0.6285	0.7085
040 PETROLEUM REFINING (COMBUSTION)	0.0013	0.0225
050 MANUFACTURING AND INDUSTRIAL	0.0377	0.5323
052 FOOD AND AGRICULTURAL PROCESSING	0.1375	1.8586
060 SERVICE AND COMMERCIAL	0.1498	0.3913
099 OTHER (FUEL COMBUSTION)	0.0000	0.0000
<b><i>FUEL COMBUSTION TOTAL</i></b>	<b>0.9805</b>	<b>3.6712</b>
<b><i>WASTE DISPOSAL</i></b>		
110 SEWAGE TREATMENT	0.0002	0.0086
120 LANDFILLS	0.3670	0.0269
130 INCINERATORS	0.0017	0.0133
140 SOIL REMEDIATION	0.0000	0.0000
199 OTHER (WASTE DISPOSAL)	0.0000	0.0000
<b><i>WASTE DISPOSAL TOTAL</i></b>	<b>0.3689</b>	<b>0.0488</b>
<b><i>CLEANING AND SURFACE COATINGS</i></b>		
210 LAUNDERING	0.0598	0.0000
220 DEGREASING	1.6307	0.0000
230 COATINGS AND RELATED PROCESS SOLVENTS	1.7019	0.0000
240 PRINTING	0.4837	0.0000
250 ADHESIVES AND SEALANTS	0.8007	0.0000
299 OTHER (CLEANING AND SURFACE COATINGS)	0.1057	0.0000
<b><i>CLEANING AND SURFACE COATINGS TOTAL</i></b>	<b>4.7825</b>	<b>0.0000</b>
<b><i>PETROLEUM PRODUCTION AND MARKETING</i></b>		
310 OIL AND GAS PRODUCTION	0.9613	0.0767
320 PETROLEUM REFINING	0.0094	0.0000
330 PETROLEUM MARKETING	0.2863	0.0000
<b><i>PETROLEUM PRODUCTION AND MARKETING TOTAL</i></b>	<b>1.2570</b>	<b>0.0767</b>

**TABLE 6 – 1**

2005 Planning Emission Inventory - Santa Barbara County  
(Tons per day)

	ROC	NO <sub>x</sub>
<b>INDUSTRIAL PROCESSES</b>		
410 CHEMICAL	0.0210	0.0000
420 FOOD AND AGRICULTURE	0.1298	0.0000
430 MINERAL PROCESSES	0.0053	0.0600
440 METAL PROCESSES	NA	NA
450 WOOD AND PAPER	NA	NA
499 OTHER (INDUSTRIAL PROCESSES)	0.0415	0.0839
<b>INDUSTRIAL PROCESSES TOTAL</b>	<b>0.1976</b>	<b>0.1439</b>
<b>STATIONARY SOURCES TOTAL</b>	<b>7.5865</b>	<b>3.9406</b>
<b>AREA-WIDE SOURCES</b>		
<b>SOLVENT EVAPORATION</b>		
510 CONSUMER PRODUCTS	2.5949	0.0000
520 ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	1.3479	0.0000
530 PESTICIDES/FERTILIZERS	2.1557	0.0000
540 ASPHALT PAVING/ROOFING	0.2131	0.0000
<b>SOLVENT EVAPORATION TOTAL</b>	<b>6.3116</b>	<b>0.0000</b>
<b>MISCELLANEOUS</b>		
610 RESIDENTIAL FUEL COMBUSTION	0.1326	0.5071
620 FARMING OPERATIONS	0.0000	0.0000
630 CONSTRUCTION AND DEMOLITION	0.0000	0.0000
640 PAVED ROAD DUST	0.0000	0.0000
645 UNPAVED ROAD DUST	0.0000	0.0000
650 FUGITIVE WINDBLOWN DUST	0.0000	0.0000
660 FIRES	0.0036	0.0012
670 WASTE BURNING AND DISPOSAL	1.7011	0.6869
690 COOKING	0.0282	0.0000
699 OTHER (MISCELLANEOUS PROCESSES)	0.0000	0.0000
<b>MISCELLANEOUS TOTAL</b>	<b>1.8655</b>	<b>1.1952</b>
<b>AREA-WIDE SOURCES TOTAL</b>	<b>8.1771</b>	<b>1.1952</b>

**TABLE 6 – 1**

2005 Planning Emission Inventory - Santa Barbara County  
(Tons per day)

	ROC	NOx
<b>MOBILE SOURCES</b>		
<b><i>ON-ROAD MOTOR VEHICLES</i></b>		
710 LIGHT DUTY PASSENGER (LDA)	5.00	4.30
722 LIGHT DUTY TRUCKS - 1 (LDT1)	2.21	2.25
723 LIGHT DUTY TRUCKS - 2 (LDT2)	1.75	2.46
724 MEDIUM DUTY TRUCKS (MDV)	0.98	1.48
732 LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.25	0.27
733 LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.11	0.11
734 MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.37	0.29
736 HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.39	0.92
742 LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.02	0.30
743 LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV1)	0.02	0.22
744 MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.05	1.52
746 HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.20	4.29
750 MOTORCYCLES (MCY)	0.30	0.08
760 HEAVY DUTY DIESEL URBAN BUSES (UB)	0.02	0.49
762 HEAVY DUTY GAS URBAN BUSES (UB)	0.11	0.12
770 SCHOOL BUSES (SB)	0.02	0.23
780 MOTOR HOMES (MH)	0.11	0.25
<b><i>ON-ROAD MOTOR VEHICLES TOTAL</i></b>	<b>11.91</b>	<b>19.59</b>
<b><i>OTHER MOBILE SOURCES</i></b>		
810 AIRCRAFT	0.6037	0.2571
820 TRAINS	0.0984	2.1345
830 SHIPS AND COMMERCIAL BOATS	0.1206	0.7253
840 RECREATIONAL BOATS	0.5696	0.1012
850 OFF-ROAD RECREATIONAL VEHICLES	0.3956	0.0270
860 OFF-ROAD EQUIPMENT	1.6907	5.4493
870 FARM EQUIPMENT	1.0928	7.0997
890 FUEL STORAGE AND HANDLING	0.3596	0.0000
<b><i>OTHER MOBILE SOURCES TOTAL</i></b>	<b>4.9310</b>	<b>15.7941</b>
<b>MOBILE SOURCES TOTAL</b>	<b>16.8410</b>	<b>35.3841</b>
<b>Vandenberg Air Force Base Airborne Laser (ABL) Mission</b>	<b>0.0552</b>	<b>0.0000</b>
<b>Source Register Emission Reduction Credits</b>	<b>0.1735</b>	<b>0.4399</b>
<b>SANTA BARBARA COUNTY EMISSION INVENTORY TOTAL</b>	<b>32.8333</b>	<b>40.9598</b>

**TABLE 6 – 2**

2005 Planning Emission Inventory – Outer Continental Shelf  
(Tons per day)

	ROC	NO <sub>x</sub>
<b>STATIONARY SOURCES</b>		
<i><b>FUEL COMBUSTION</b></i>		
030 OIL AND GAS PRODUCTION (COMBUSTION)	0.1338	0.6334
<i><b>FUEL COMBUSTION TOTAL</b></i>	<b>0.1338</b>	<b>0.6334</b>
<i><b>CLEANING AND SURFACE COATINGS</b></i>		
230 COATINGS AND RELATED PROCESS SOLVENTS	0.0508	0.0000
<i><b>CLEANING AND SURFACE COATINGS TOTAL</b></i>	<b>0.0508</b>	<b>0.0000</b>
<i><b>PETROLEUM PRODUCTION AND MARKETING</b></i>		
310 OIL AND GAS PRODUCTION	0.7048	0.0313
<i><b>PETROLEUM PRODUCTION AND MARKETING TOTAL</b></i>	<b>0.7048</b>	<b>0.0313</b>
<i><b>INDUSTRIAL PROCESSES</b></i>		
430 MINERAL PROCESSES	0.0000	0.0000
<i><b>INDUSTRIAL PROCESSES TOTAL</b></i>	<b>0.0000</b>	<b>0.0000</b>
<b>STATIONARY SOURCES TOTAL</b>	<b>0.8894</b>	<b>0.6647</b>
<b>MOBILE SOURCES</b>		
<i><b>OTHER MOBILE SOURCES</b></i>		
810 AIRCRAFT	0.0119	0.0096
830 SHIPS AND COMMERCIAL BOATS	1.2643	33.4982
840 RECREATIONAL BOATS	0.5252	0.1012
<i><b>OTHER MOBILE SOURCES TOTAL</b></i>	<b>1.8014</b>	<b>33.6090</b>
<b>MOBILE SOURCES TOTAL</b>	<b>1.8014</b>	<b>33.6090</b>
<b>OUTER CONTINENTAL SHELF EMISSION INVENTORY TOTAL</b>	<b>2.6908</b>	<b>34.2737</b>

**TABLE 6 – 3**

2010 Planning Emission Inventory - Santa Barbara County  
(Tons per day)

	ROC	NO <sub>x</sub>
<b>STATIONARY SOURCES</b>		
<b><i>FUEL COMBUSTION</i></b>		
010 ELECTRIC UTILITIES	0.0018	0.0826
020 COGENERATION	0.0154	0.0494
030 OIL AND GAS PRODUCTION (COMBUSTION)	0.4036	0.4605
040 PETROLEUM REFINING (COMBUSTION)	0.0008	0.0150
050 MANUFACTURING AND INDUSTRIAL	0.0424	0.6055
052 FOOD AND AGRICULTURAL PROCESSING	0.1487	2.0095
060 SERVICE AND COMMERCIAL	0.1494	0.4145
099 OTHER (FUEL COMBUSTION)	0.0000	0.0000
<b><i>FUEL COMBUSTION TOTAL</i></b>	<b>0.7621</b>	<b>3.6370</b>
<b><i>WASTE DISPOSAL</i></b>		
110 SEWAGE TREATMENT	0.0002	0.0089
120 LANDFILLS	0.4132	0.0303
130 INCINERATORS	0.0018	0.0137
140 SOIL REMEDIATION	0.0000	0.0000
199 OTHER (WASTE DISPOSAL)	0.0000	0.0000
<b><i>WASTE DISPOSAL TOTAL</i></b>	<b>0.4152</b>	<b>0.0529</b>
<b><i>CLEANING AND SURFACE COATINGS</i></b>		
210 LAUNDERING	0.0634	0.0000
220 DEGREASING	0.7703	0.0000
230 COATINGS AND RELATED PROCESS SOLVENTS	1.9042	0.0000
240 PRINTING	0.5133	0.0000
250 ADHESIVES AND SEALANTS	0.9019	0.0000
299 OTHER (CLEANING AND SURFACE COATINGS)	0.1190	0.0000
<b><i>CLEANING AND SURFACE COATINGS TOTAL</i></b>	<b>4.2721</b>	<b>0.0000</b>
<b><i>PETROLEUM PRODUCTION AND MARKETING</i></b>		
310 OIL AND GAS PRODUCTION	0.8277	0.0661
320 PETROLEUM REFINING	0.0060	0.0000
330 PETROLEUM MARKETING	0.2981	0.0000
<b><i>PETROLEUM PRODUCTION AND MARKETING TOTAL</i></b>	<b>1.1318</b>	<b>0.0661</b>

**TABLE 6 – 3**

2010 Planning Emission Inventory - Santa Barbara County  
(Tons per day)

	ROC	NO <sub>x</sub>
<b><i>INDUSTRIAL PROCESSES</i></b>		
410 CHEMICAL	0.0237	0.0000
420 FOOD AND AGRICULTURE	0.1385	0.0000
430 MINERAL PROCESSES	0.0060	0.0676
440 METAL PROCESSES	NA	NA
450 WOOD AND PAPER	NA	NA
499 OTHER (INDUSTRIAL PROCESSES)	0.1004	0.2036
<b><i>INDUSTRIAL PROCESSES TOTAL</i></b>	<b>0.2686</b>	<b>0.2712</b>
<b>STATIONARY SOURCES TOTAL</b>	<b>6.8498</b>	<b>4.0272</b>
<b>AREA-WIDE SOURCES</b>		
<b><i>SOLVENT EVAPORATION</i></b>		
510 CONSUMER PRODUCTS	2.7307	0.0000
520 ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	1.4167	0.0000
530 PESTICIDES/FERTILIZERS	2.1472	0.0000
540 ASPHALT PAVING/ROOFING	0.2401	0.0000
<b><i>SOLVENT EVAPORATION TOTAL</i></b>	<b>6.5347</b>	<b>0.0000</b>
<b><i>MISCELLANEOUS</i></b>		
610 RESIDENTIAL FUEL COMBUSTION	0.1394	0.5291
620 FARMING OPERATIONS	0.0000	0.0000
630 CONSTRUCTION AND DEMOLITION	0.0000	0.0000
640 PAVED ROAD DUST	0.0000	0.0000
645 UNPAVED ROAD DUST	0.0000	0.0000
650 FUGITIVE WINDBLOWN DUST	0.0000	0.0000
660 FIRES	0.0038	0.0013
670 WASTE BURNING AND DISPOSAL	1.7029	0.6869
690 COOKING	0.0301	0.0000
699 OTHER (MISCELLANEOUS PROCESSES)	0.0000	0.0000
<b><i>MISCELLANEOUS TOTAL</i></b>	<b>1.8762</b>	<b>1.2173</b>
<b>AREA-WIDE SOURCES TOTAL</b>	<b>8.4109</b>	<b>1.2173</b>



**TABLE 6 – 3**

2010 Planning Emission Inventory - Santa Barbara County  
(Tons per day)

	ROC	NOx
<b>MOBILE SOURCES</b>		
<b><i>ON-ROAD MOTOR VEHICLES</i></b>		
710 LIGHT DUTY PASSENGER (LDA)	3.00	2.67
722 LIGHT DUTY TRUCKS - 1 (LDT1)	1.59	1.55
723 LIGHT DUTY TRUCKS - 2 (LDT2)	1.41	1.91
724 MEDIUM DUTY TRUCKS (MDV)	0.80	1.17
732 LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.16	0.29
733 LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.09	0.10
734 MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.26	0.22
736 HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.29	0.56
742 LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.02	0.22
743 LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV1)	0.02	0.17
744 MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.04	1.18
746 HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.17	3.31
750 MOTORCYCLES (MCY)	0.27	0.09
760 HEAVY DUTY DIESEL URBAN BUSES (UB)	0.02	0.48
762 HEAVY DUTY GAS URBAN BUSES (UB)	0.11	0.12
770 SCHOOL BUSES (SB)	0.02	0.23
780 MOTOR HOMES (MH)	0.06	0.18
<b><i>ON-ROAD MOTOR VEHICLES TOTAL</i></b>	<b>8.32</b>	<b>14.44</b>
<b><i>OTHER MOBILE SOURCES</i></b>		
810 AIRCRAFT	0.6488	0.2658
820 TRAINS	0.1230	2.1788
830 SHIPS AND COMMERCIAL BOATS	0.1278	0.7627
840 RECREATIONAL BOATS	0.4175	0.1089
850 OFF-ROAD RECREATIONAL VEHICLES	0.4234	0.0286
860 OFF-ROAD EQUIPMENT	1.3806	4.1813
870 FARM EQUIPMENT	1.0179	6.7278
890 FUEL STORAGE AND HANDLING	0.3008	0.0000
<b><i>OTHER MOBILE SOURCES TOTAL</i></b>	<b>4.4398</b>	<b>14.2539</b>
<b>MOBILE SOURCES TOTAL</b>	<b>12.7598</b>	<b>28.6939</b>
<b>Vandenberg Air Force Base Airborne Laser (ABL) Mission</b>	<b>0.0656</b>	<b>0.3602</b>
<b>Source Register Emission Reduction Credits</b>	<b>0.1735</b>	<b>0.4399</b>
<b>SANTA BARBARA COUNTY EMISSION INVENTORY TOTAL</b>	<b>28.2596</b>	<b>34.7385</b>

**TABLE 6 – 4**  
2010 Planning Emission Inventory – Outer Continental Shelf  
*(Tons per day)*

	ROC	NO <sub>x</sub>
<b>STATIONARY SOURCES</b>		
<i><b>FUEL COMBUSTION</b></i>		
030 OIL AND GAS PRODUCTION (COMBUSTION)	0.1338	0.6357
<i><b>FUEL COMBUSTION TOTAL</b></i>	<b>0.1338</b>	<b>0.6357</b>
<i><b>CLEANING AND SURFACE COATINGS</b></i>		
230 COATINGS AND RELATED PROCESS SOLVENTS	0.0508	0.0000
<i><b>CLEANING AND SURFACE COATINGS TOTAL</b></i>	<b>0.0508</b>	<b>0.0000</b>
<i><b>PETROLEUM PRODUCTION AND MARKETING</b></i>		
310 OIL AND GAS PRODUCTION	0.7048	0.0313
<i><b>PETROLEUM PRODUCTION AND MARKETING TOTAL</b></i>	<b>0.7048</b>	<b>0.0313</b>
<i><b>INDUSTRIAL PROCESSES</b></i>		
430 MINERAL PROCESSES	0.0000	0.0000
<i><b>INDUSTRIAL PROCESSES TOTAL</b></i>	<b>0.0000</b>	<b>0.0000</b>
<b>STATIONARY SOURCES TOTAL</b>	<b>0.8894</b>	<b>0.6670</b>
<b>MOBILE SOURCES</b>		
<i><b>OTHER MOBILE SOURCES</b></i>		
810 AIRCRAFT	0.0119	0.0096
830 SHIPS AND COMMERCIAL BOATS	1.4410	38.5258
840 RECREATIONAL BOATS	0.3694	0.1089
<i><b>OTHER MOBILE SOURCES TOTAL</b></i>	<b>1.8223</b>	<b>38.6443</b>
<b>MOBILE SOURCES TOTAL</b>	<b>1.8223</b>	<b>38.6443</b>
<b>OUTER CONTINENTAL SHELF EMISSION INVENTORY TOTAL</b>	<b>2.7117</b>	<b>39.3113</b>

**TABLE 6 – 5**

2015 Planning Emission Inventory - Santa Barbara County  
(Tons per day)

	ROC	NO <sub>x</sub>
<b>STATIONARY SOURCES</b>		
<b><i>FUEL COMBUSTION</i></b>		
010 ELECTRIC UTILITIES	0.0018	0.0826
020 COGENERATION	0.0095	0.0316
030 OIL AND GAS PRODUCTION (COMBUSTION)	0.2491	0.2878
040 PETROLEUM REFINING (COMBUSTION)	0.0005	0.0092
050 MANUFACTURING AND INDUSTRIAL	0.0472	0.6727
052 FOOD AND AGRICULTURAL PROCESSING	0.1599	2.1604
060 SERVICE AND COMMERCIAL	0.1510	0.4305
099 OTHER (FUEL COMBUSTION)	0.0000	0.0000
<b><i>FUEL COMBUSTION TOTAL</i></b>	<b>0.6190</b>	<b>3.6748</b>
<b><i>WASTE DISPOSAL</i></b>		
110 SEWAGE TREATMENT	0.0002	0.0091
120 LANDFILLS	0.4636	0.0340
130 INCINERATORS	0.0018	0.0140
140 SOIL REMEDIATION	0.0000	0.0000
199 OTHER (WASTE DISPOSAL)	0.0000	0.0000
<b><i>WASTE DISPOSAL TOTAL</i></b>	<b>0.4656</b>	<b>0.0571</b>
<b><i>CLEANING AND SURFACE COATINGS</i></b>		
210 LAUNDERING	0.0667	0.0000
220 DEGREASING	0.8541	0.0000
230 COATINGS AND RELATED PROCESS SOLVENTS	2.1076	0.0000
240 PRINTING	0.5402	0.0000
250 ADHESIVES AND SEALANTS	1.0031	0.0000
299 OTHER (CLEANING AND SURFACE COATINGS)	0.1324	0.0000
<b><i>CLEANING AND SURFACE COATINGS TOTAL</i></b>	<b>4.7041</b>	<b>0.0000</b>
<b><i>PETROLEUM PRODUCTION AND MARKETING</i></b>		
310 OIL AND GAS PRODUCTION	0.7076	0.0565
320 PETROLEUM REFINING	0.0037	0.0000
330 PETROLEUM MARKETING	0.3102	0.0000
<b><i>PETROLEUM PRODUCTION AND MARKETING TOTAL</i></b>	<b>1.0215</b>	<b>0.0565</b>

**TABLE 6 – 5**

2015 Planning Emission Inventory - Santa Barbara County  
(Tons per day)

	ROC	NO <sub>x</sub>
<b>INDUSTRIAL PROCESSES</b>		
410 CHEMICAL	0.0263	0.0000
420 FOOD AND AGRICULTURE	0.1473	0.0000
430 MINERAL PROCESSES	0.0067	0.0751
440 METAL PROCESSES	NA	NA
450 WOOD AND PAPER	NA	NA
499 OTHER (INDUSTRIAL PROCESSES)	0.0580	0.1173
<b>INDUSTRIAL PROCESSES TOTAL</b>	<b>0.2383</b>	<b>0.1924</b>
<b>STATIONARY SOURCES TOTAL</b>	<b>7.0485</b>	<b>3.9808</b>
<b>AREA-WIDE SOURCES</b>		
<b>SOLVENT EVAPORATION</b>		
510 CONSUMER PRODUCTS	2.8486	0.0000
520 ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	1.4749	0.0000
530 PESTICIDES/FERTILIZERS	2.2955	0.0000
540 ASPHALT PAVING/ROOFING	0.2670	0.0000
<b>SOLVENT EVAPORATION TOTAL</b>	<b>6.8860</b>	<b>0.0000</b>
<b>MISCELLANEOUS</b>		
610 RESIDENTIAL FUEL COMBUSTION	0.1451	0.5469
620 FARMING OPERATIONS	0.0000	0.0000
630 CONSTRUCTION AND DEMOLITION	0.0000	0.0000
640 PAVED ROAD DUST	0.0000	0.0000
645 UNPAVED ROAD DUST	0.0000	0.0000
650 FUGITIVE WINDBLOWN DUST	0.0000	0.0000
660 FIRES	0.0039	0.0013
670 WASTE BURNING AND DISPOSAL	1.7048	0.6869
690 COOKING	0.0320	0.0000
699 OTHER (MISCELLANEOUS PROCESSES)	0.0000	0.0000
<b>MISCELLANEOUS TOTAL</b>	<b>1.8858</b>	<b>1.2351</b>
<b>AREA-WIDE SOURCES TOTAL</b>	<b>8.7718</b>	<b>1.2351</b>

**TABLE 6 – 5**

2015 Planning Emission Inventory - Santa Barbara County

*(Tons per day)*

ROC

NO<sub>x</sub>**MOBILE SOURCES*****ON-ROAD MOTOR VEHICLES***

710	LIGHT DUTY PASSENGER (LDA)	1.86	1.62
722	LIGHT DUTY TRUCKS - 1 (LDT1)	1.16	1.07
723	LIGHT DUTY TRUCKS - 2 (LDT2)	1.05	1.33
724	MEDIUM DUTY TRUCKS (MDV)	0.62	0.85
732	LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	0.15	0.29
733	LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	0.07	0.08
734	MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	0.17	0.14
736	HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	0.18	0.30
742	LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.01	0.14
743	LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV1)	0.01	0.11
744	MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.04	0.76
746	HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	0.13	2.04
750	MOTORCYCLES (MCY)	0.25	0.09
760	HEAVY DUTY DIESEL URBAN BUSES (UB)	0.02	0.45
762	HEAVY DUTY GAS URBAN BUSES (UB)	0.11	0.13
770	SCHOOL BUSES (SB)	0.02	0.22
780	MOTOR HOMES (MH)	0.03	0.12
<b><i>ON-ROAD MOTOR VEHICLES TOTAL</i></b>		<b>5.90</b>	<b>9.75</b>

***OTHER MOBILE SOURCES***

810	AIRCRAFT	0.6981	0.2753
820	TRAINS	0.1275	1.4151
830	SHIPS AND COMMERCIAL BOATS	0.1350	0.8001
840	RECREATIONAL BOATS	0.4175	0.1089
850	OFF-ROAD RECREATIONAL VEHICLES	0.4418	0.0301
860	OFF-ROAD EQUIPMENT	1.3806	4.1813
870	FARM EQUIPMENT	1.0625	7.0249
890	FUEL STORAGE AND HANDLING	0.3008	0.0000
<b><i>OTHER MOBILE SOURCES TOTAL</i></b>		<b>4.5638</b>	<b>13.8357</b>

**MOBILE SOURCES TOTAL 10.4638 23.5857**

<b>Vandenberg Air Force Base Airborne Laser (ABL) Mission</b>	<b>0.0656</b>	<b>0.3602</b>
<b>Source Register Emission Reduction Credits</b>	<b>0.1735</b>	<b>0.4399</b>

**SANTA BARBARA COUNTY EMISSION INVENTORY TOTAL 26.5232 29.6017**

**TABLE 6 – 6**  
2015 Planning Emission Inventory – Outer Continental Shelf  
*(Tons per day)*

	ROC	NO <sub>x</sub>
<b>STATIONARY SOURCES</b>		
<i><b>FUEL COMBUSTION</b></i>		
030 OIL AND GAS PRODUCTION (COMBUSTION)	0.1338	0.6357
<i><b>FUEL COMBUSTION TOTAL</b></i>	<b>0.1338</b>	<b>0.6357</b>
<i><b>CLEANING AND SURFACE COATINGS</b></i>		
230 COATINGS AND RELATED PROCESS SOLVENTS	0.0508	0.0000
<i><b>CLEANING AND SURFACE COATINGS TOTAL</b></i>	<b>0.0508</b>	<b>0.0000</b>
<i><b>PETROLEUM PRODUCTION AND MARKETING</b></i>		
310 OIL AND GAS PRODUCTION	0.7048	0.0313
<i><b>PETROLEUM PRODUCTION AND MARKETING TOTAL</b></i>	<b>0.7048</b>	<b>0.0313</b>
<i><b>INDUSTRIAL PROCESSES</b></i>		
430 MINERAL PROCESSES	0.0000	0.0000
<i><b>INDUSTRIAL PROCESSES TOTAL</b></i>	<b>0.0000</b>	<b>0.0000</b>
<b>STATIONARY SOURCES TOTAL</b>	<b>0.8894</b>	<b>0.6670</b>
<b>MOBILE SOURCES</b>		
<i><b>OTHER MOBILE SOURCES</b></i>		
810 AIRCRAFT	0.0119	0.0096
830 SHIPS AND COMMERCIAL BOATS	1.7446	47.1668
840 RECREATIONAL BOATS	0.3694	0.1089
<i><b>OTHER MOBILE SOURCES TOTAL</b></i>	<b>2.1259</b>	<b>47.2853</b>
<b>MOBILE SOURCES TOTAL</b>	<b>2.1259</b>	<b>47.2853</b>
<b>OUTER CONTINENTAL SHELF EMISSION INVENTORY TOTAL</b>	<b>3.01530</b>	<b>47.9523</b>

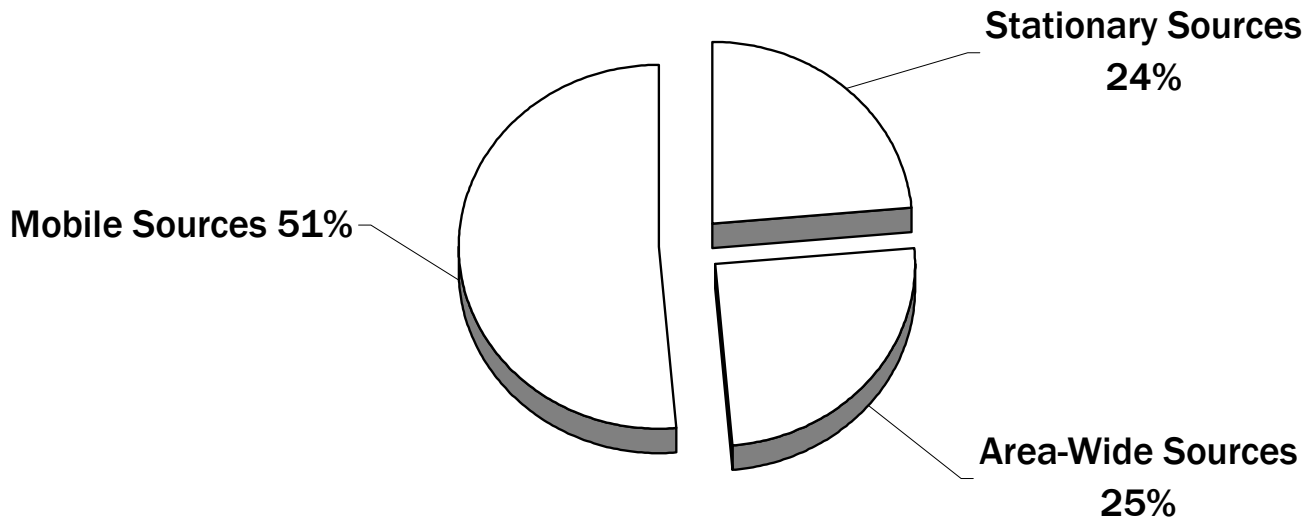
**TABLE 6 – 7****2001 CLEAN AIR PLAN ACTIVITY INDICATORS AND FACTORS FOR 2005, 2010 AND 2015**

ACTIVITY INDICATOR	UNITS	VALUE				FACTOR			INFORMATION SOURCE
		1999	2005	2010	2015	2005	2010	2015	
Agricultural Acres	Acres	128,475	136,708	147,810	158,912	1.064	1.150	1.237	Agricultural Commissioner's Crop Reports
Aircraft Operations	Operations	303,267	358,900	387,300	418,300	1.183	1.277	1.379	Airport Master Plans / SBCAG (Santa Barbara County Association of Governments)
Daily Vehicle Miles	1,000 Miles Traveled	9,460	10,148	10,718	11,288	1.073	1.133	1.193	SBCAG
EMP. - Commercial	Employees	88,586	96,200	102,700	109,200	1.086	1.159	1.233	SBCAG Draft 2001 Regional Growth Forecast
EMP. Industrial	Employees	27,455	31,800	35,820	39,840	1.158	1.305	1.451	SBCAG Draft 2001 Regional Growth Forecast
EMP. - Public Services	Employees	38,209	40,800	42,000	43,200	1.068	1.099	1.131	SBCAG Draft 2001 Regional Growth Forecast
Housing	Households	137,069	145,469	152,902	159,184	1.061	1.116	1.161	SBCAG Draft 2001 Regional Growth Forecast
Landfills	1,000 Tons in Place	16,124	18,638	20,983	23,545	1.156	1.301	1.460	Local Solid Waste Agencies
Locomotives	Annual Train Passages	6,023	8,030	10,038	10,403	1.333	1.667	1.727	CalTrans / AMTRAK / Union Pacific
No Growth	No Units	1	1	1	1	1.000	1.000	1.000	Santa Barbara County Air Pollution Control District
OCS Production	No Units	1	1	1	1	1.000	1.000	1.000	SBCAPCD Community Advisory Council
Pesticide Use	Tons Pesticide Applied	3,011	2,948	2,937	3,139	0.979	0.975	1.043	CA Air Resources Board
Petroleum Production	1,000 Barrels Oil	3,596	2,002	1,284	791	0.557	0.357	0.220	CA Division of Oil & Gas
Petroleum Wells	Producing & Inactive Wells	2,450	2,032	1,776	1,537	0.829	0.725	0.627	CA Division of Oil & Gas
Population	Residents	396,331	432,900	459,400	483,500	1.092	1.159	1.220	SBCAG Draft 2001 Regional Growth Forecast
Prescribed Fires	Acres	2,350	6,250	6,250	6,250	2.660	2.660	2.660	U.S. Forest Service
Ship Activity	Vessel Transits	6,479	7,701	8,887	10,926	1.189	1.372	1.686	Marine Exchange of Port of Los Angeles / Long Beach

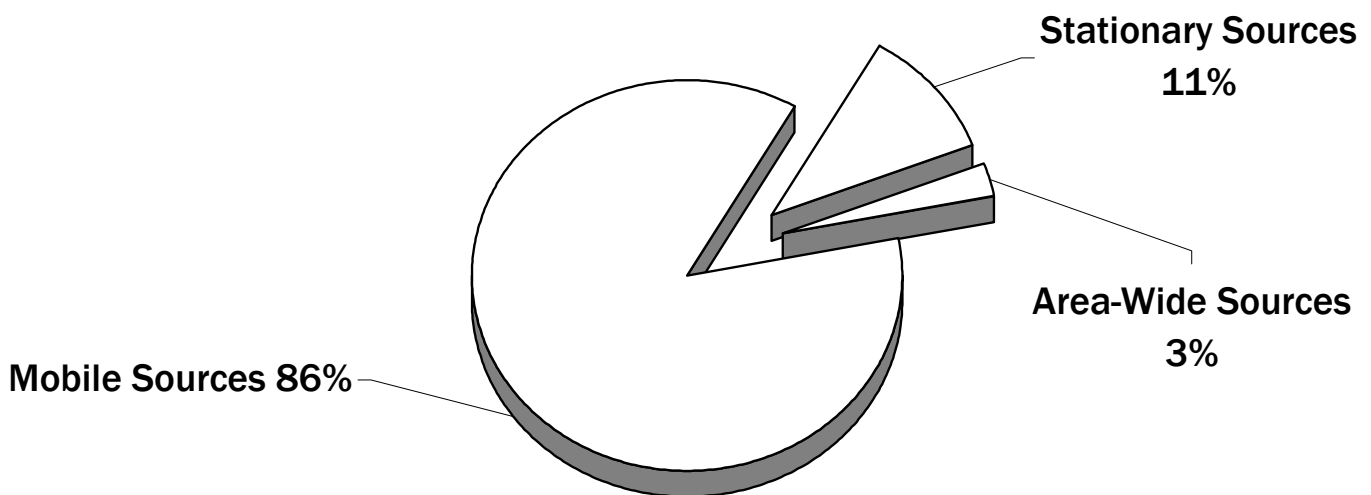
**Figure 6-1**

**2005 Santa Barbara County Planning Emission Inventory**

**ROC: 32.83 tons per day**



**NOx: 40.96 tons per day**

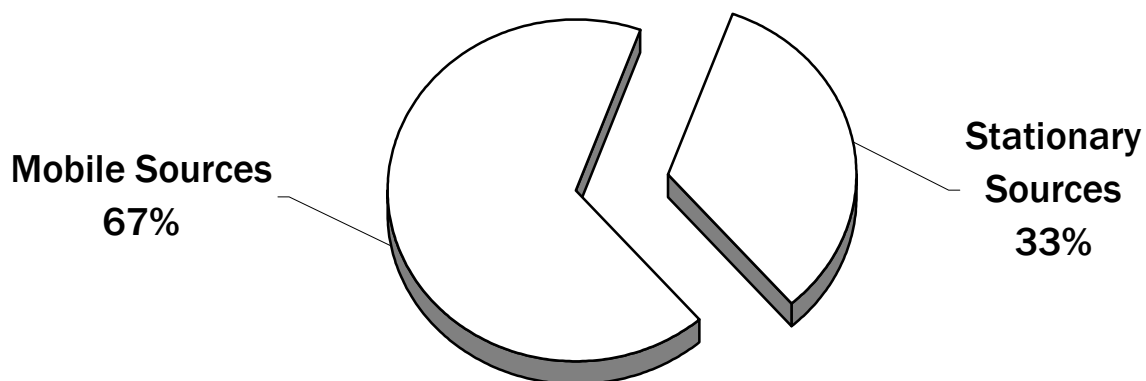




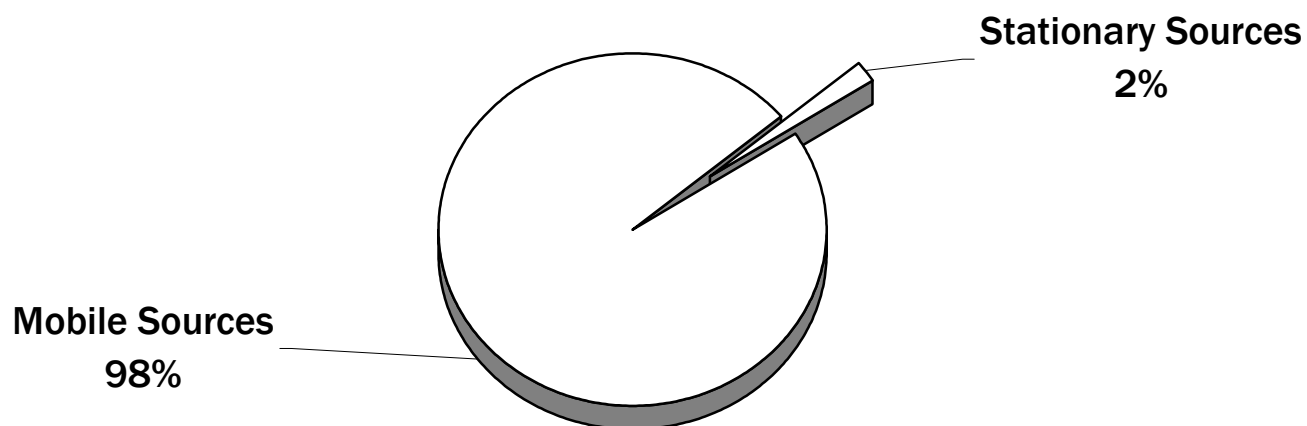
**Figure 6-2**

**2005 OCS Planning Emission Inventory**

**ROC: 2.69 tons per day**



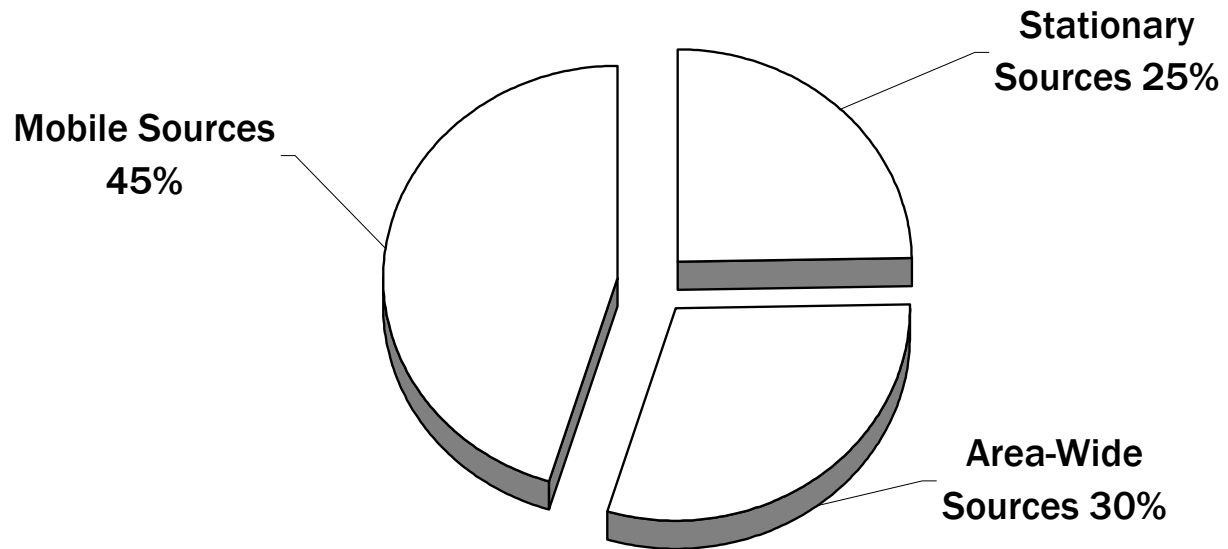
**NOx: 34.27 tons per day**



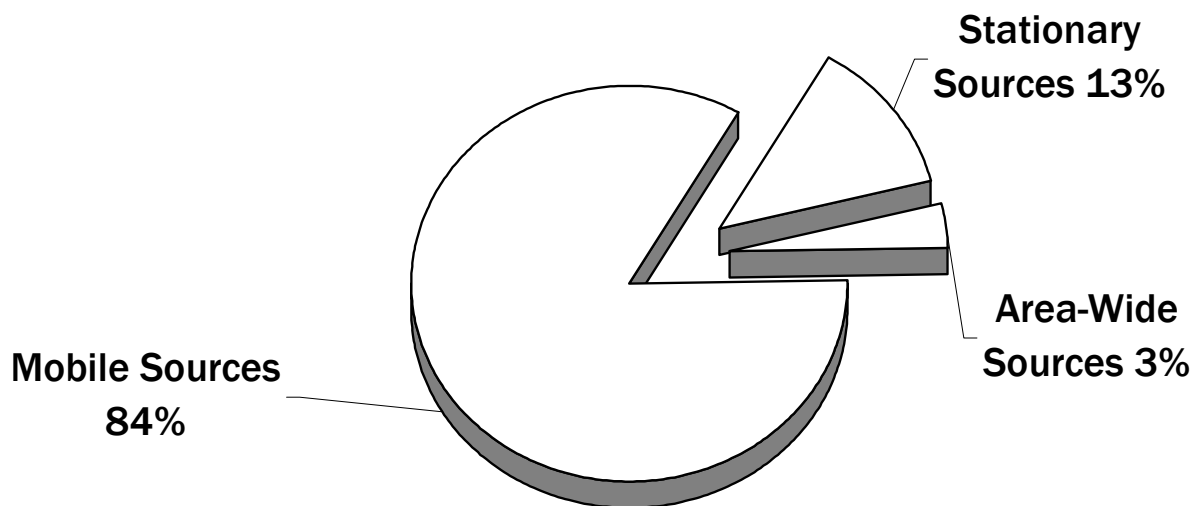
**Figure 6-3**

**2010 Santa Barbara County Planning Emission Inventory**

**ROC: 28.26 tons per day**



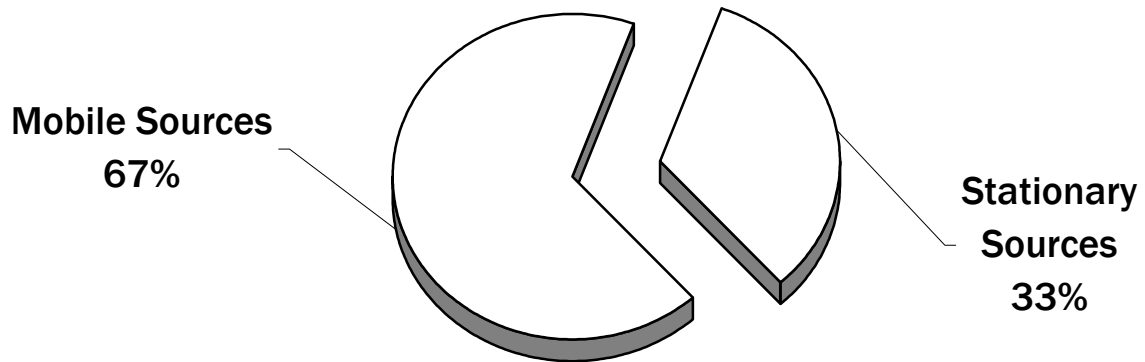
**NOx: 34.74 tons per day**



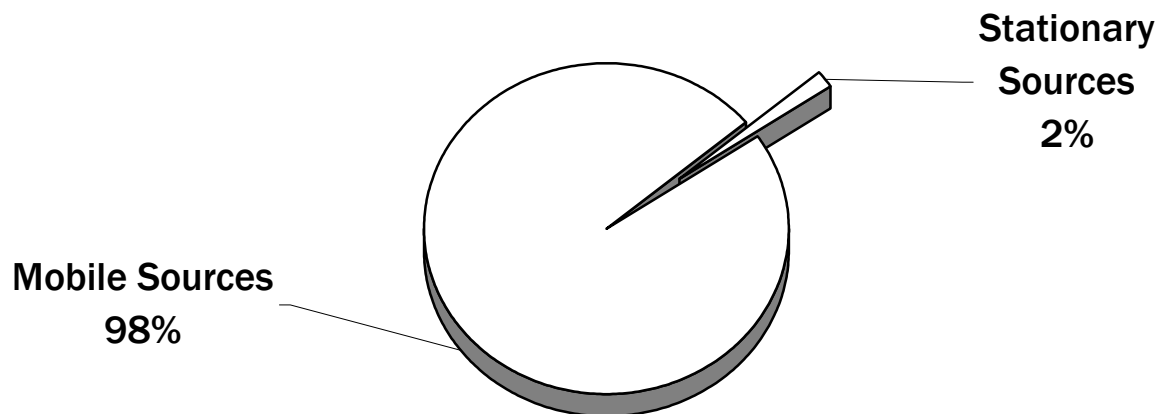
**Figure 6-4**

**2010 OCS Planning Emission Inventory**

**ROC: 2.71 tons per day**



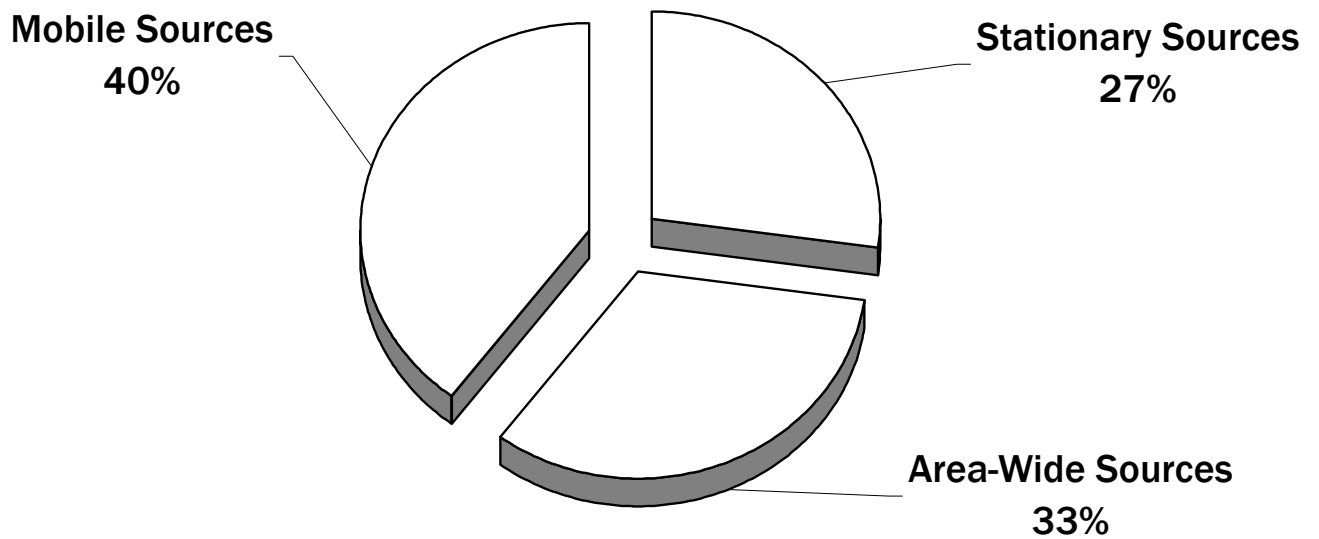
**NOx: 39.31 tons per day**



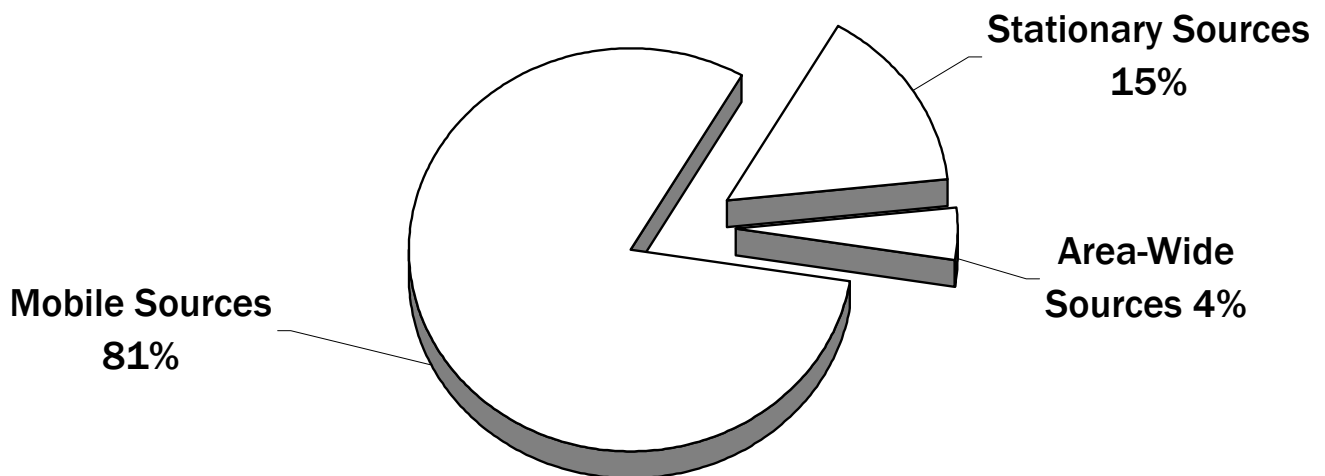
**Figure 6-5**

**2015 Santa Barbara County Planning Emission Inventory**

**ROC: 26.52 tons per day**



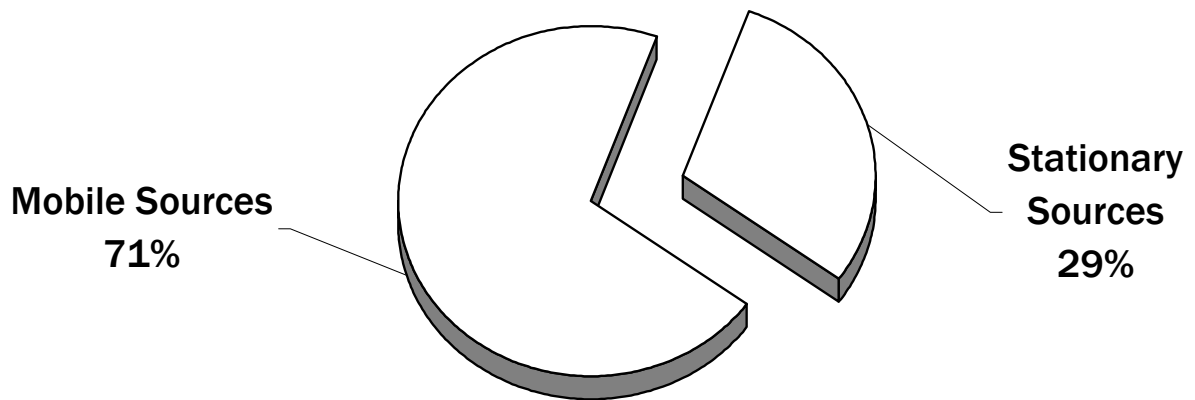
**NOx: 29.60 tons per day**



**Figure 6-6**

**2015 OCS Planning Emission Inventory**

**ROC: 3.02 tons per day**



**NOx: 47.95 tons per day**

