SACRAMENTO METROPOLITAN
AIR QUALITY MANAGEMENT DISTRICT

TRIENNIAL REPORT AND AIR QUALITY PLAN REVISION

PREPARED IN COMPLIANCE WITH
THE CALIFORNIA CLEAN AIR ACT

MAY 28, 2015

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This California Clean Air Act Triennial Plan evaluates the progress made towards attaining the state air quality standards in Sacramento County and revises its air quality plan to mitigate ozone transport and to pursue the expeditious adoption of all feasible control measures.

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1. EXECUTIVE SUMMARY

1.1 Introduction

The California Clean Air Act (CCAA) requires the districts to assess the progress made towards attaining the state air quality standards every three years. This "Triennial Report" for Sacramento County describes the historical trends in ambient air quality levels, provides updates to the emission inventories, and evaluates the implementation of stationary and mobile source control measures in reducing air pollutant emissions. In addition, ozone transport mitigation requirements for upwind districts are addressed.

1.2 Air Quality Trends

Air quality indicators show significant progress toward reducing exceedances of the ambient ozone standards and region-wide exposure to unhealthy concentrations since the late 1980's. The number of days Sacramento County exceeds the State 1-hour Ozone Standard decrease from 208 days (1986-1988) to 50 days (2011-2013). For the State 8-hour ozone standard, Sacramento County had 270 exceedance days in the period of 1986-1988. This number of days is reduced to 132 for the period of 2011-2013 (Table 4.1).

The California Air Resources Board (CARB) developed an expected peak day concentration (EPDC) indicator to assess air quality trends for triennial reporting to minimize the variability due to meteorology in ambient ozone concentration. The indicator is based on a robust statistical calculation to minimize the influence of year-to-year changes in meteorology. EPDC indicators show that the expected peak day concentrations have reduced approximately 30% for monitoring sites that have been operated since 1986 (Table 4.2).

Ozone exposure indicators measure the potential for chronic adverse health impacts. Exposure indicators consolidate ozone measurements from all sites to characterize air quality into a single value that is weighted by the population exposed to high ozone concentrations or the geographic area that has high ozone concentrations. The population and area exposure indicators improved by 96% or more since the base period of 1986-1988. The results indicate that Sacramento County is making expeditious progress towards attaining California's ozone air quality standards.

1.3 Emission Inventories

Emission inventories for ozone precursor pollutants, reactive organic gases (ROG) and nitrogen oxides (NO_X), take into account stationary sources, area-wide sources, and mobile sources. The majority of emissions in Sacramento County come from on-road motor vehicles and other mobile source emission categories. On-road Motor vehicle and other mobile source emissions account for 54% of ROG emissions and 89% of NO_X emissions for Sacramento County in 2013 (Tables 5.1 and 5.2).

Emissions inventory trends show continuous decline for both ROG and NO_X emissions in Sacramento County. Between 2000 and 2013, ROG emissions reduced 37% from 86 tons per day (tpd) to 54 tpd and NO_X emissions reduced 46% from 84 tpd to 45 tpd. The largest emission reductions are from on-road vehicles and other mobile sources. Emission forecasts through 2025 project 9% reduction in ROG emissions and 41% reduction in NO_X emissions from 2014 to 2025. During the same period, Sacramento County is projected to have a 14% increase in vehicle population and 15% increase in vehicle miles travelled (VMT) (Figure 5.3).

From 2011 to 2013, the overall rate of NO_X emission reductions in Sacramento County have averaged 4.2% per year and ROG emission reductions have averaged 3.3% per year, which are less than the 5% per year measure of progress requirement. Therefore, the District must implement an "all feasible measures" control strategy. From 2014-2016, reductions in both categories are projected to remain below the 5% per year measure of progress requirement, with NO_X emission reductions projected to average 4.7% per year and ROG emission reductions projected to average 1.9% per year.

1.4 Stationary Source Control Programs

Sacramento's attainment strategy relies on ROG and NO_X emissions reductions. The 2009 Triennial Report included six stationary source measures. Two were amended (Rule 414: Natural Gas Fired Water Heater and Rule 459: Automotive Refinishing) and achieved emission reductions of 0.69 ton per day of ROG and 0.32 ton per day of NO_X by 2013. Rule 461: Natural Gas and Production and Processing was not recommended for adoption because the emission reductions will be achieved a regulation being developed by ARB for Oil and Natural Gas Production, Processing and Storage. Rule 471: Asphaltic Concrete was not recommended for adoption at this time because of low emission reductions and high costs. Two measures, Rule 412: Stationary internal combustion engine and Rule 442: Architectural Coatings were not completed because staff were redirected to other high priority work, including the New Source Review and Prevention of Significant Deterioration rules, the 2013 Sacramento Regional 8-hour Ozone Attainment Demonstration and Reasonable Further Progress Plan for the 1997 National Ambient Air Quality Standard, and the $PM_{2.5}$ Maintenance/Implementation Plan and Redesignation Request.

Staff evaluated potential stationary source control measures for their cost effectiveness and emission reductions. Staff recommends evaluating five control measures for potential consideration by the Board of Directors. The measures include Rule 460 (Adhesive and Sealants), Rule 419 (NO_X from miscellaneous combustion source), Rule 467 (Metalworking Fluids and Direct Contact Lubricants), Rule 489 (Composting Operations), and Rule 490 (Liquid Petroleum Gas Transfer and Dispensing). Initial

estimates of the total emission reductions for the potential stationary source measures are 1.53 tons per day of ROG and 0.20 ton per day of NO_X.

1.5 District Mobile Source Control Programs

The District Mobile Source Control Programs use market-based incentives to promote the accelerated introduction of low emission vehicle, engine, and fuel technologies to the Sacramento region. The Vehicle and Engine Technology Program focuses on reducing NO_X emissions from heavy-duty diesel engines associated with on-road vehicles, self-propelled off-road vehicles, and agricultural pump engines.

The on-road program spent approximately $48 million between 2009 and 2013 and achieved 1.11 tons per day of NO_X reductions from replacing or retrofitting 1,410 heavy-duty vehicles in the Sacramento region. The off-road mobile portion spent $49 million decreasing NO_X emissions by 1.76 tons per day region-wide from 777 vehicles and agricultural water pumping engines. This amounts to a total of 2.87 tons per day of NO_X reductions from the District's mobile source NO_X control strategy from 2009 to 2013.

Other District efforts included evaluating one further study mobile source measure. The Accelerated Vehicle Retirement measure is an incentive program to buy back old vehicles. Staff determined that the Bureau of Automotive Repair (BAR) vehicle retirement program is more competitive than a District program can be under cost effective limitations in place under the Moyer program. This Accelerated Vehicle Retirement program will not be considered in this triennial period. District staff may reconsider this program in future plan updates if the measure becomes more cost effective than the BAR program.

For the next triennial period through 2016, the District will continue to implement its Mobile Source Incentive Programs. Funding is expected to be about $9 million annually, and the resulting emission reduction benefits will be approximately 0.11 tons per day ROG and 0.67 tons per day NO_X for on-road and off-road mobile projects on a region-wide basis.

1.6 Land Use and Transportation Programs

The District's Land Use and Transportation Programs include mitigation measures that reduce air pollutant emissions during construction and operational phases of land use development projects. The existing land use mitigation programs rely on the California Environmental Quality Act (CEQA) for their implementation. Although District staff evaluated indirect source review rules to require land use mitigation, they did not recommend approval by the Board of Directors because the emissions reductions were lower than expected, would occur under CARB rules or SB375 (2008).

Mitigated construction projects must achieve a minimum 20 percent NO_X reduction from diesel construction equipment compared to a calculated statewide average emission

rate. Associated construction NO_X emissions reduced between 2009 and 2013 in Sacramento County averaged about 0.32 tons per day. Proponents of major development projects prepare an operational mitigation plan by selecting from a menu of over 30 recommended mitigation measures to achieve a minimum 15 percent reduction of ROG and NO_X emissions. The operational mitigation measures were applied to dwelling unit phase completions for one major development project in Sacramento County during 2009-2013, resulting in reductions of about 0.01 tons per day of ROG and 0.02 tons per day of NO_X.

District staff is working with land use jurisdictions to evaluate additional transit projects and the implementation of bicycle and pedestrian programs. For the next triennial period through 2016, the District will continue to implement its Land Use and Transportation Programs.

1.7 Community Education Programs

The District's Community Education Programs have continued the "Spare The Air" and voluntary driving curtailment strategies. The Spare The Air program includes daily air quality ozone forecasts, hourly-updated web site ozone maps, and personal electronic messages to alert subscribers about impending unhealthy air quality episodes. The program also includes production and placement of commercials and advertisement for Spare The Air Day announcements in mass media, development of education programs, and participation in school and community events throughout the region.

Public outreach using multi-media approaches along with employer and community participation increase regional awareness of the air quality problem and solutions. The Spare The Air program emission reduction benefits in Sacramento County each year from 2009 to 2013 were estimated to be about 0.04 tpd of ROG and 0.03 tpd of NO_X. Expected future funding for the on-going operation of Spare The Air will provide continued benefits for the next triennial period through 2016.

1.8 Ozone Transport Mitigation

The ozone transport mitigation regulations require specified upwind districts to adopt and implement "all feasible measures" as expeditiously as practicable, regardless of their attainment status, until their downwind districts attain California's ozone standard. This Triennial Report and Air Quality Plan updates recent control measure evaluations and identifies potential emission reduction opportunities.

1.9 Conclusions

Sacramento County has made considerable progress in reducing ozone precursor emissions from stationary and mobile sources. Air quality indicators show significant reductions of peak ambient ozone concentrations and region-wide exposure to unhealthy concentrations since the late 1980's.

From 2009 to 2013, the District achieved emission reductions of 3.91 tons NO_X per day, exceeding the expected estimate of 1.68 tons per day, mainly due to additional funding in the mobile source control program. The actual ROG emission reductions total of 1.30 tons per day, is slightly less than the expected 1.32 tons per day (Table 11.1).

District staff recommends further evaluation and consideration of eight stationary control measures in the triennial period of 2014-2016. In addition, the District will continue to implement mobile source control programs, land use and transportation control measures, and community education programs. The measures under consideration or implemented during the next triennial period are identified in Tables 11.3 and 11.4. The estimated emission reductions from these measures are 1.98 tons ROG per day and 1.47 tons NO_X per day.

The control strategies in this plan satisfy the “all feasible measures” requirement. The District control efforts and overall air quality indicators demonstrate expeditious progress in accordance with the California Clean Air Act requirements and the State ozone transport mitigation regulations.

2. OVERVIEW OF AIR QUALITY PLANNING PROCESS

2.1 California Clean Air Act (CCAA) and 1991 Air Quality Attainment Plan

The Health and Safety Code Section 40910 requires that "air districts shall endeavor to achieve and maintain the state ambient air quality standards by the earliest practicable date and develop plans for attaining the state ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide standards by the earliest practicable date." In developing the Plan, air districts should focus "on reducing emissions from transportation and areawide emission sources. Districts shall also consider the cost-effectiveness of their air quality programs, rules, regulations, and enforcement practices in addition to other relevant factors, and shall strive to achieve the most efficient methods of air pollution control." In compliance with CCAA, the Sacramento Metropolitan Air Quality Management District (SMAQMD or District) prepared and submitted the 1991 Air Quality Attainment Plan (AQAP) (SMAQMD, 1991) to address Sacramento County's nonattainment status for ozone and carbon monoxide (CO). The 1991 AQAP was designed to make expeditious progress toward attaining the state ozone standard and contained preliminary implementation schedules for control programs on stationary sources, transportation, and indirect sources, and a vehicle/fuels program. Since the implementation of CCAA, the Sacramento County does not violate the state ambient air quality standards for sulfur dioxide and nitrogen dioxide; therefore, they have never been included in our air quality plans and subsequent triennial reports.

CARB re-designated the District to attainment for the State CO standard during their board hearing on November 21, 1996 (CARB, 1996). Sacramento continues to attain California's CO standard, so this report no longer includes CO (CARB, 2013).

2.2 Triennial Progress Report Requirement

The CCAA Section 40924 also requires that beginning in 1994, every three years districts assess their progress toward attaining the air quality standards. The triennial assessment is to report the extent of air quality improvement and the amounts of emission reductions achieved from control measures for the preceding three-year period. The District must also review and revise its attainment plan, if necessary, to correct for deficiencies in meeting progress goals and to incorporate new data or projections. This Triennial Report and Plan Revision was prepared to fulfill these requirements.

2.2.1 CCAA 1994 Triennial Progress Report

The 1994 Triennial Progress Report was the first triennial report and it was incorporated as part of the Sacramento Area Regional Ozone Attainment Plan. California Air Resources Board (CARB) proposed that districts use the Federal ozone attainment plan

to meet state requirements to avoid duplicating efforts. The Sacramento Area Regional Ozone Attainment Plan satisfied both federal and state planning requirements.

The plan proposed new control measures that were not envisioned in the 1991 state plans and revised the rulemaking schedule. The Sacramento Area Regional Ozone Attainment Plan (SMAQMD et al, 1994) included thirteen new stationary source control measures and one stationary source control measure amendment for the Sacramento County. It also included two new regional mobile source control measures for the Sacramento Federal Ozone Nonattainment Area: Off-road Heavy-Duty Motor Vehicle and On-road Heavy Duty Vehicle. These rules were scheduled for adoption and amendment between 1995 and 1998. The attainment plan also reported the rules in the 1991 AQAP that had been adopted.

2.2.2 CCAA 1997 Triennial Progress Report

The 1997 Triennial Report was prepared in compliance with CCAA in order to assess the progress in adopting and implementing the control measures during the 1994-1996 triennial period. The report demonstrated that the District had adopted or amended twelve stationary source control measures in the 1994 Plan and one additional measure (Rule 407: Opening Burning). These control measures were projected to achieve 4.36 tons per day (tpd) of Reactive Organics Gaseous (ROG) and 1.39 tpd of Nitrogen Oxides (NO_X) emission reductions by 2005. One rule, the Synthetic Organic Chemical Manufacturing Industry Batch Plants & Distillation Reactors (Rule 464), was rescheduled for adoption in 1998, and portions of the Surface Preparation and Clean Up control measure were scheduled to be amended as part of the Graphics Arts (Rule 460) and Aerospace Coatings (Rule 456) rules.

The 1997 Triennial Progress Report showed that implementation of transportation programs and land use strategies, low emission vehicle and fuels technologies, and public education programs had begun. The mobile source control programs introduced 385 low emitting vehicles to the Sacramento region between 1995 and 1997.

The 1997 Triennial Progress Report was an abbreviated update. CARB determined that it was unnecessary for the District to prepare a comprehensive plan update in 1997 (Kenny, 1997) since an adequate federal SIP was in place to make progress toward achieving the state and federal ozone standards, so that the District could focus on implementing control strategies.

2.2.3 CCAA 2000 Triennial Progress Report

The 2000 Triennial Report was prepared to assess the progress adopting and implanting control measures during the 1997-1999 period. The remaining controls from the 1994 Plan were adopted and implemented, which included the organic chemical manufacturing rule (Rule 464) and the surface preparation and cleanup solvent rule

amendments (Rules 460 and 456). Control measures adopted or amended since 1994 were estimated to achieve 8.8 tpd of ROG and 2.4 tpd of NO_X emission reductions in 2000. District staff reviewed existing stationary source control measures and evaluated feasible control measures, and included anticipated 12 additional rule amendments.

The District's Mobile Source NO_X Control Program for the accelerated introduction of low emission vehicle and engine technologies to the Sacramento area expanded each year and added significant state funding in 2000. Through 2000, the Mobile Source NO_X control program replaced or retrofitted 341 on-road heavy-duty vehicles, 82 off-road self-propelled vehicles, and 279 agricultural water pumping engines and achieved over 1 tpd of NO_X emissions reduction.

The Sacramento Area Council of Governments (SACOG) and the District designed and began implementing over 20 transportation and land use strategies that provided increasing potential emission reduction benefits. The transportation programs include incentive programs promoting alternate transportation mode for commuters or encouraging bicycle usages. Land use programs included the Aerojet Land Use Mitigation, General Plan Land Use Mitigation, and Land Use Project Reviews.

The District's Community Education Program broadened efforts pertaining to innovative "Spare The Air" activities and voluntary driving reductions that have increased regional awareness of the air quality problem and solutions. The emissions reductions from the transportation programs, land use strategies, and community education program were not quantified in the 2000 Triennial Report.

2.2.4 CCAA 2003 Triennial Progress Report

During the 2001-2003 triennial period, two control measures (Rule 442: architectural coatings and Rules 454/466: degreasing operations/solvent cleaning) were adopted and implemented achieving an additional 1.8 tons per day (tpd) of ROG emission reductions by 2003. The amendment for internal combustion engines at non-major sources (Rule 412) to achieve additional NO_X reduction was still being developed. Eight other potential control categories or measures were evaluated, but only one, (Rule 461: fugitive emissions from petroleum production and processing facilities), was deemed viable for future adoption.

The District's Mobile Source NO_X Control Incentive Program spent $48 million during the 2001-2003 triennial period, including new funding from the Sacramento Emergency Clean Air and Transportation (SECAT) funds, Congestion Mitigation and Air Quality (CMAQ), and Lower-Emission School Bus Program funds (funding from California Proposition 1B). The program achieved 3.4 tons per day NO_X reductions region-wide from retrofitting or replacing the engines of 1,548 on-road heavy-duty vehicles, 131 off-road vehicles, and 583 agricultural pump engines.

The 2003 Triennial Report included further study measures for two new mobile source measures: Accelerated Vehicle Retirement and Free Gas Cap. It also anticipated developing three model ordinances (Model Low Emission Vehicle and Fleet Ordinance, Model Low Emission Vehicle "Green" Contracting Ordinance, and Model Limitation on Engine Idling Ordinance) for adoption by local jurisdictions to promote low-emission vehicle fleets and to reduce diesel vehicle idling emissions.

The District continued to implement the construction, land use, and transportation programs and developed methodologies to quantify their emissions reductions. The 2003 Triennial Report showed that the CEQA Mitigation Construction and Land Use Operational Programs and the Highway 99 carpool lane project achieved a combined 0.10 tpd of ROG and 0.19 tpd of NO_X emissions reduction in Sacramento County. In an effort to broaden the scope of these beneficial air quality land use policies, the District initiated a process to evaluate and develop "indirect source" rules. These rules would allow the District more direct control of air quality mitigation efforts for construction and operational land use development activities. The District also planned to evaluate additional transit, bicycle, and pedestrian programs as further study measures in the following triennial period.

Community Education Programs continued the "Spare The Air" and voluntary driving curtailment strategies using multi-media approaches and enhanced public survey methods. New survey methodologies allowed the District to quantify the number of trip reductions and emission reductions from the Spare The Air Program. The Sacramento Region was estimated to achieve on average 0.45 tpd of ROG and 0.41 tpd of NO_X emissions reduction during the triennial period of 2001-2003.

2.2.5 CCAA 2009 Triennial Progress Report

The District combined reporting of the 2003-2005 and 2006-2008 triennial periods into the 2009 Triennial Progress Report. Two control measures, Rule 411 (Boilers, Steam Generators, and Process Heaters/ Space Heaters) and Rules 454/466 (Degreasing Operations/ Solvents Cleaning), were amended in 2005 and 2008 respectively. One further study measure, Rule 496 (Concentrated Animal Feeding Operations), was adopted in 2005. These control measures achieved 0.56 tpd of ROG and 0.09 tpd of NO_X emission reductions respectively. Three other control measures Rule 440: General Surface Coating, Rule 460: Adhesives and Sealants, and Rule 447: Organic liquid Loading) and one further study measure (Rule 465: Polyester Resins were evaluated and not recommend for adoption due to minimal emission reductions. Three remaining control measures in the 2003 Triennial Report; Rule 412: Stationary IC engines, Rule 414: Natural Gas Fired Water Heaters, and Rule 461: Natural Gas Production and Processing) were not completed and instead scheduled for adoption in the next triennial period from 2009 to 2012. The further study measure for Rule 459: Automotive

Refinishing was evaluated and scheduled for adoption in 2010.The District included two additional control measures, Rule 442 (Architectural Coating) and Rule 471 (Asphaltic Concrete.

The District continued the implementation of the Mobile Source Control Program, spending over $55 million between 2004 and 2008. The program achieved 3.16 tpd of NO_X emissions reduction and replaced or retrofitted 804 on-road heavy-duty vehicle, 189 off-road self-propelled vehicles, and 451 agricultural water pumping engines. The District also evaluated two further study mobile source measures and staff recommended including the Accelerated Vehicle Retirement measure to buy back old vehicles, but rejected the Free Gas Caps program because it duplicated a similar program implemented by the California Bureau of Automotive Repair.

Land Use and Transportation Programs continued the CEQA Construction Mitigation and Operational Mitigation programs during the period of 2004-2008. The Operational Mitigation Program achieved 0.14 tpd of ROG and 0.14 tpd of NO_X emission reductions. During 2006, 2007, and 2008, the District achieved an average of 0.56 tpd of NO_X emission reductions from mitigated construction projects. The Districts also worked with local jurisdictions to evaluate the air quality benefits of additional transit projects and the bicycle and pedestrian programs.

The District continued its public outreach efforts to increase regional awareness of the air quality problems and solutions. Improved survey methodologies of the Spare The Air Program also led to more accurate quantification of the emission reductions. The Sacramento region achieved more than 0.10 ton of ROG and NO_X each per Spare The Air day in 2004, 2005, and 2006. However, the emission reductions declined below 0.05 tpd for both ROG and NO_X in 2007 and 2008, possibly because fewer Spare The Air days were called.

2.3 References

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3. Triennial Assessment and Transport Mitigation Plan Legal Requirements

3.1 Triennial Assessment

Pursuant to Section 40924(b) of the Health and Safety Code (H&SC), once every three years the District must assess its progress toward attainment of the state ambient air quality standards. Each triennial assessment shall contain, at a minimum, both of the following:

- The extent of air quality improvement achieved during the preceding three years, based upon ambient pollutant measurements, best available modeling techniques, and air quality indicators identified by the California Air Resources Board (CARB).
- The expected and revised emission reductions for each measure scheduled for adoption in the preceding three-year period.

3.2 Triennial Plan Revision

Pursuant to Section 40925 of the H&SC, at least once every three years, the District must review and revise its attainment plan to:

- Correct for deficiencies in meeting the interim measures of progress incorporated into the attainment plan under Section 40914.
- Incorporate new data or projections into the attainment plan, including, but not limited to: 1) the quantity of emission reductions expected from the control measures adopted in the preceding three-year period and the dates those reductions will be achieved, and 2) the rates of population-related, industry-related, and vehicle-related emissions growth actually experienced in the district and projected for the future.
- Compare the new data to the rate of emission reductions and growth projected in the previous triennial plan revision.

A district may modify the emission reduction strategy or alternative measure of progress for subsequent years based on this assessment if the modified strategy is at least as effective in improving air quality as the strategy being replaced.

3.3 Measure of Progress Requirement

Section 40914 of the H&SC requires districts to achieve at least a 5 percent annual reduction in emissions unless CARB approves an alternative measure of progress. Because the District is nonattainment for the federal and state ozone standards, the 5 percent reduction in emissions must be calculated with respect to the emissions that existed during the baseline year used in the state implementation plan (SIP) required by

the federal Clean Air Act.[1] If the 5 percent annual reduction requirement is not met, an alternative measure of progress that incorporates the expeditious adoption of an "all feasible measures" control strategy is applied.[2]

3.4 Ozone Transport Mitigation Regulations

The California Clean Air Act (CCAA), Section 39610 of the H&SC, directs CARB to update its transport analysis every three years in terms of the contribution of ozone and ozone precursors from upwind regions to ozone concentrations in downwind regions (CARB, 2001). In addition, the CCAA directs CARB to establish mitigation requirements for upwind districts commensurate with their contributions to downwind air quality problems (CARB, 2004).

3.4.1 Emission Control Requirements

CARB first adopted regulations[3] in 1990 which established mitigation requirements for upwind areas found to have either overwhelming or significant impacts on downwind areas. The primary mitigation requirement was to accelerate application of best available retrofit control technology (BARCT) for major stationary sources in upwind districts.

CARB conducted a transport analysis (CARB, 2001) and, in May 2003, amended its transport mitigation regulations[4] to include: 1) the all feasible measures requirement for both ROG and NO_X regardless of the upwind area's attainment status, 2) a more stringent no net increase threshold requirement, and 3) a downwind district consultation process and triennial finding requirement. The 2003 amendments state that at a minimum, the attainment and transport mitigation plans for districts within the Broader Sacramento Area must:

a) Require the adoption and implementation of all feasible measures as expeditiously as practicable.

b) Require the adoption and implementation of best available retrofit control technology, as defined in Section 40406 of the Health and Safety Code, on all existing stationary sources of ozone precursor emissions as expeditiously as practicable.

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1 "…For each district that is designated nonattainment for both state and federal ambient air quality standards for a single pollutant, reductions in emissions shall be calculated with respect to the actual level of emissions that exist in each district during the baseline year used in the state implementation plan required by the federal Clean Air Act…." H&SC §40914(b)(2)(C).

2 California Health and Safety Code §40914(b)(2).

3 Title 17, California Code Regulations, §§ 70600 and 70601.

4 Title 17, California Code Regulations, §§70600 and 70601.

c) Require the implementation, by December 31, 2004, of a stationary source permitting program designed to achieve no net increase in the emissions of ozone precursors from new or modified stationary sources that emit or have the potential to emit at least 10 tons per year of an ozone precursor.

d) Include measures sufficient to attain the state ambient air quality standard for ozone by the earliest practicable date within the Upper Sacramento Valley and that portion of the Mountain Counties Air Basin north of the Calaveras-Tuolumne County border and south of the Sierra-Plumas County border during air pollution episodes that the state board has determined meet the following conditions:

   i) Are likely to produce a violation of the state ozone standard in the Upper Sacramento Valley or that portion of the Mountain Counties Air Basin north of the Calaveras-Tuolumne County border and south of the Sierra-Plumas County border; and

   ii) Are dominated by overwhelming pollutant transport from the Broader Sacramento Area; and

   iii) Are not measurably affected by emissions of ozone precursors from sources located within the Upper Sacramento Valley or that portion of the Mountain Counties Air Basin north of the Calaveras-Tuolumne County border and south of the Sierra-Plumas County border.

e) Consult with downwind districts[5] including Mountain Counties, San Joaquin Valley, San Francisco Bay Area, and Upper Sacramento Valley.(See Figure 3.1)

3.4.2 Implementation Requirements

Implementation requirements in Section 70600(c) of the California Code of Regulations, state that prior to revising its attainment and transport mitigation plans, each upwind district subject to the ozone transport mitigation regulations “shall, in consultation with the downwind districts, review the list of control measures in its most recently approved attainment plan [prepared for the CCAA] and make a finding as to whether the list of control measures meets the requirements of Section 70600(b). The district shall include the finding in its proposed triennial plan revision.”

3.4.3 Conditions for Limiting the Mitigation Requirements

Under Section 70601 of the California Code of Regulations, specific sources may be excluded from the all feasible measures or the best available retrofit control technology transport mitigation strategy, if:

[5] Defined in Title 17 California Code of Regulations §§ 70500

a) The emissions from the source, because of its location, do not contribute to ozone violations in any downwind area; or

b) Emissions reductions from the source are not needed to attain the ozone standard in any downwind area; or

c) The district is implementing an alternative emissions reduction strategy pursuant to Section 40914 of the H&SC; or

d) The most recent CARB transport assessment demonstrates that the district's transport impact is inconsequential.

Figure 3.1 Downwind Air Districts to the Broader Sacramento Area

3.5 Conclusion

The requirements and regulations discussed in this chapter are addressed in the following chapters of this Triennial Report:

Chapter 4 discusses air quality improvement indicators. (H&S Code 40924(b)(1))

Chapter 5 compares the emissions inventory in this report to the inventory projections in the 2009 Triennial Report and determines whether emissions decline at least 5 percent per year. (H&S Code 40914 and 40925)

Chapters 6 through 9 discuss the status of measures included in the 2009 Triennial Report and evaluates measures to meet the "all feasible measures requirements. (H&S Code 40924(b)(2) and 40925)

Chapter 10 discusses how the District meets the requirements of the ozone transport mitigation regulations, including the "all feasible measures," no net increase threshold, and downwind district consultation requirements. (CCR 70600 et. seq.)

3.6 References

CARB. *Assessment of the Impacts of Transported Pollutants on Ozone Concentrations in California*. California Air Resources Board: Sacramento, CA. April, [2001.]

CARB. *Status Report: Ozone Transport Mitigation in California*. California Air Resources Board: Sacramento, CA. April, [2004.]

4. AIR QUALITY TRENDS

4.1 State Ambient Air Quality Standards for Ozone

The State ambient air quality standard for 1-hour ozone was set at 0.09 parts per million (ppm) concentrations in 1988. Monitored hourly concentrations that are 0.095 ppm or greater are considered exceedances due to rounding procedures. In 2005, the Air Resources Board approved an air quality standard for 8-hour ozone of 0.070 ppm. (California Code of Regulation Title 17 §70200) Exceedances of this standard occur when monitored hourly ozone averaged over an 8-hour period is equal to or greater than 0.071 ppm (CARB, 2005, p2-9).

The California Health and Safety Code Section 39607(f) requires the California Air Resources Board (CARB) in consultation with air districts to establish air quality-related indicators to measure and evaluate progress in the attainment of state standards. There are many different ways to evaluate how ozone levels have changed over time, and assess progress in attaining the State ozone standard. The CARB guidance (CARB, 1993) identified three different air quality indicators that are appropriate for summarizing the improvement in air quality required in the triennial progress reports. These indicators are expected peak day concentration (EPDC), population-weighted exposure indicator (PWE), and area-weighted exposure indicator (AWE). In addition to these indicators, this chapter also evaluates the number of ozone exceedance days.

4.2 Ozone Exceedances

The statistics below summarize the number of days that any single monitor in Sacramento County violates the State Ambient Air Quality Standard. It is one of the simplest methods for evaluating ozone air quality improvement. Table 4.1 shows the total number of exceedance days for both 1-hour and 8-hour ozone standards for each triennial period since 1986-1988.

Sacramento County recorded the highest number of 1-hour ozone violation days in the three year period of 1986-1988 with 208 days over the state standard but the number of 1-hour ozone violation days in the last three years (2011-2013) reduced to 50 days.

Table 4.1 Summary of the number of days exceeded the California Ozone Standard for triennial periods since 1986-1988

Triennial Period	Number of Days exceeded the CA 1-hour Ozone Standard	Number of Days exceeded the CA 8-hour Ozone Standard
1986-1988	208	270
1989-1991	145	217
1992-1994	114	169
1995-1997	109	165
1998-2000	113	161
2001-2003	110	198
2004-2006	88	164
2007-2009	78	152
2010-2012	56	140
2011-2013	50	132

Note: Ozone data were obtained from CARB's iADAM database (CARB, 2013a) for 1986-2012 and EPA AQS for 2013 data (EPA, 2014a).

The 8-hour ozone exceedance days show a similar downward pattern as the 1-hour ozone exceedance days. The highest number of days over the 2005 State 8-hour ozone standard occurred in the triennial period of 1986-1988 with 270 days. The total number of 8-hour exceedance days in the last three years of 2011-2013 was down to 132, which was the lowest among all the recorded triennial periods.

Figures 4.1 and 4.2 show bar charts with linear trend lines of the number of exceedance days for 1-hour and 8-hour ozone in Sacramento County since 1986. Both 1-hour and 8-hour trends show improvement of ambient ozone air quality in Sacramento County with declining rates of 1.5 days per year for 1-hour ozone and 1.1 days per year for 8-hour ozone.

Figure 4.1 Number of Days Exceeding State 1-Hr Ozone (O_3) Standard (> 0.09 ppm) in Sacramento County

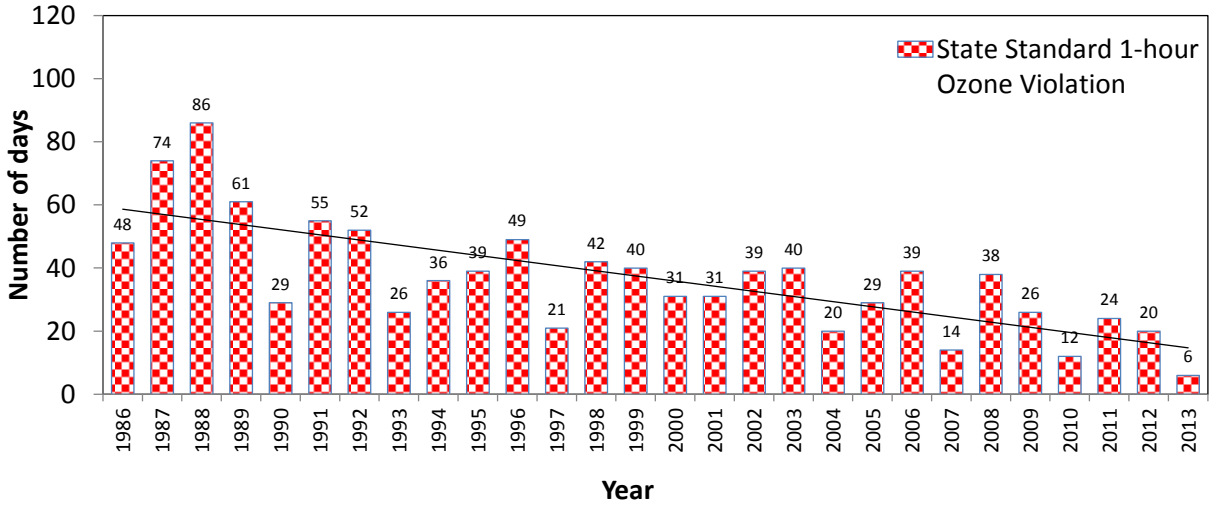
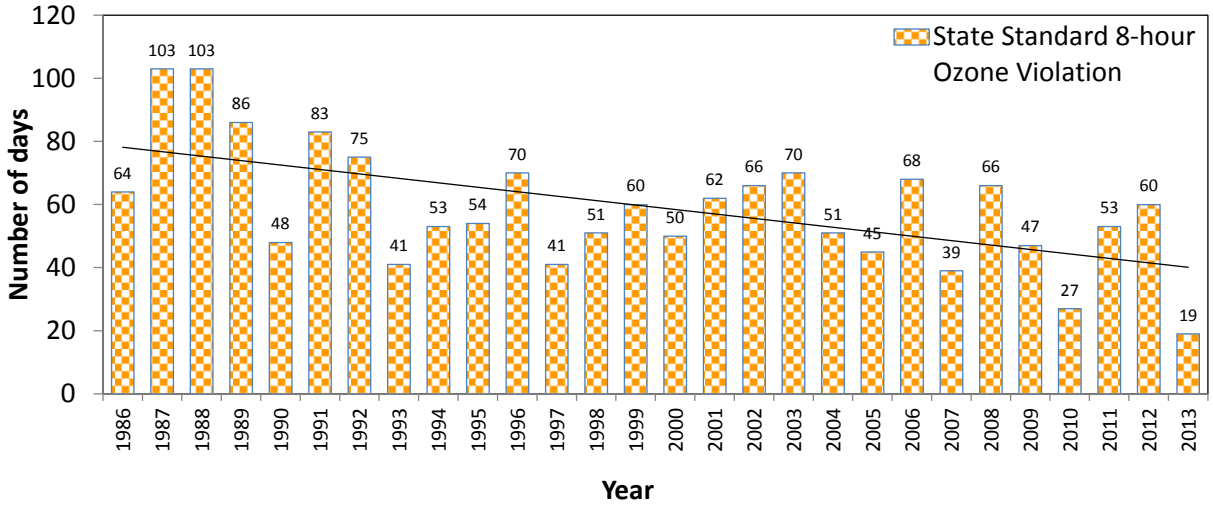


Figure 4.2 Number of Days Exceeding State 8-Hr Ozone (O_3) Standard (> 0.070 ppm) in Sacramento County



Note: Ozone data were obtained from CARB's iADAM database (CARB, 2013a). Wildfire events in 2008 are not excluded from the data showing in the chart.

The general patterns for number of ozone exceedance days for State 1-hour and 8-hour standards are decreasing but variability exists from year to year. The variability in the observed pattern is possibly due to meteorology[6] and wildfire events[7] impacting the

[6] Scientific studies found that certain weather conditions favor high ambient ozone concentrations, such as hot summer days and stagnant air conditions (EPA, 2013). In addition, wildfires could cause high ambient ozone concentrations. In summer 2008, Northern and Central California experienced dry weather condition and dry lightning, which caused more than 2,000 wildfires in Northern and

Sacramento region. Hot summer day with more than 100 degree Fahrenheit during day time and stagnant airflow are favorable conditions for ozone formation. If the region experiences a warm summer day with no wind, an exceedance day would likely be observed. However, wildfires increase ozone precursors and can cause exceedances on days below 100^{o}F, such as the wildfires that occurred in the summer of 2008.

4.3 Ozone Expected Peak Day Concentrations

CARB identified the expected peak day concentration (EPDC) as one of the indicators to assess air quality trends for ozone for triennial progress reporting. The EPDC represents the maximum ozone concentration expected to occur once per year on average. It is based on a statistical calculation and uses ambient ozone data collected at each monitoring site in the District. The EPDC is useful for tracking air quality progress at individual monitoring locations. Since it is based on a robust statistical calculation, it is relatively stable, thereby providing a trend indicator that is not highly influenced by year-to-year changes in meteorology.

The EPDC calculation uses daily maximum 1-hour ozone observations for a three-year period (the summary year and the two prior years). The EPDC is computed using a statistical procedure that fits an exponential-tail model to the upper tail of the distribution of concentrations. The fitted distribution then is used to determine analytically, the concentration that is expected to occur once per year on average.

Table 4.2 summarizes the EPDC indicators for 1-hour ozone for the base period to the most recent triennial period (2011-2013) for monitoring sites in Sacramento County. Data are obtained from CARB's iADAM database (CARB, 2013a) and CARB's Air Quality Analysis Section (CARB, 2014). Documented Progress is the difference in EPDC from the base period to the end period (2011-2013). The documented progresses EPDC for Folsom, Del Paso Manor, North Highlands, T Street, Bruceville Road, Goldenland Court, and Sloughhouse monitors were decreases of 29%, 34%, 33%, 19%, 16%, 18%, and 24% respectively. Figure 4.3 displays the EPDC for each site since their base periods to most current year (2011-2013).

Central California. These wildfires generated additional ozone precursors and resulted in more ozone violation days and higher ambient ozone concentrations.

[7] EPA approved certain days in 2008 as exceptional events for comparison to the federal 1-hour ozone standard (EPA, 2011a, b); however, the actual air quality data monitored during wildfires was not excluded from the information shown in Figures 4.1 and 4.2.

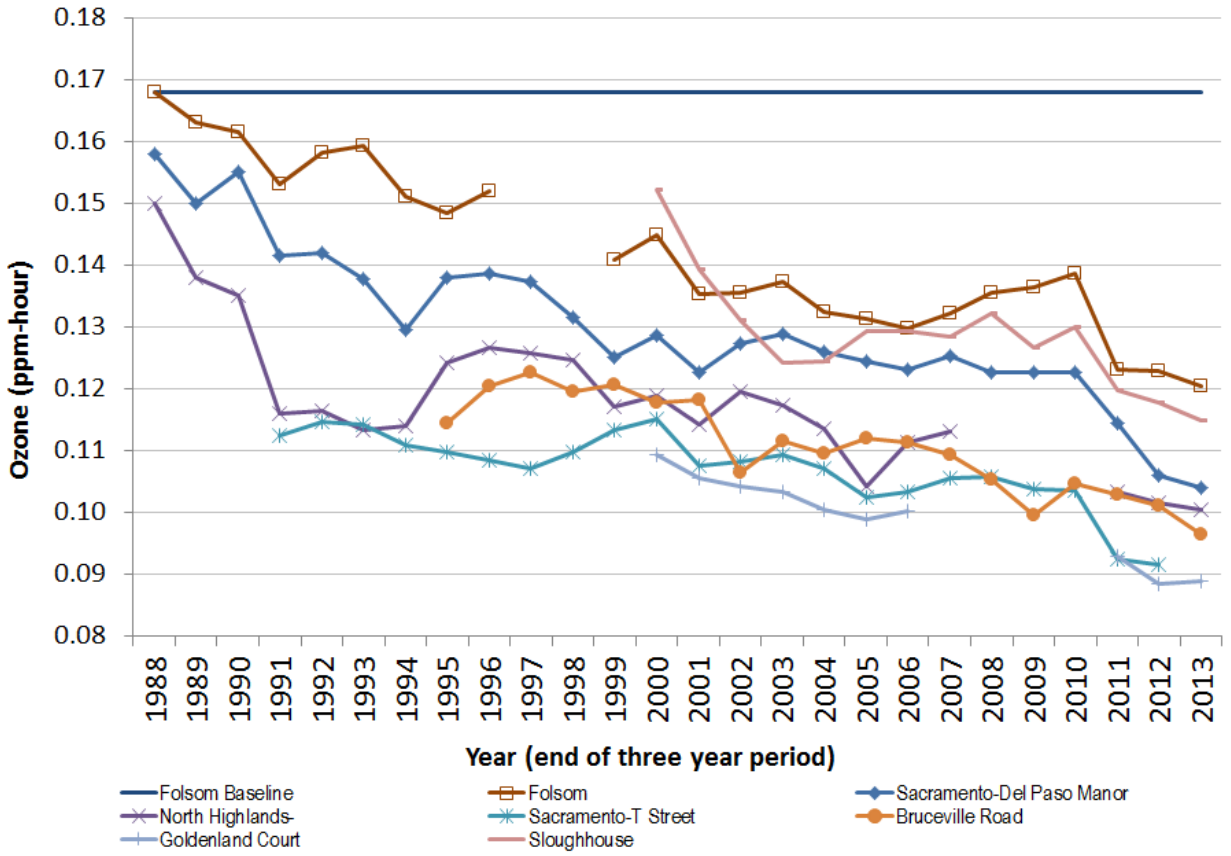
Table 4.2 Summary of Expected Peak Day Concentrations for 1-Hour Ozone

Site	EPDC (ppm) Base Period	EPDC (ppm) End Period (2011-2013)	Difference (Base – End)	Documented Progress
Folsom	0.168 (‘86-‘88)	0.120	0.048	-29%
Del Paso Manor	0.158 (‘86-‘88)	0.104	0.054	-34%
North Highlands	0.150 (‘86-‘88)	0.100	0.050	-33%
T Street	0.112 (‘89-‘91)	0.091	0.021	-19%
Bruceville Road	0.114 (‘93-‘95)	0.096	0.018	-16%
Goldenland Court	0.109 (’98-’00)*	0.089	0.020	-18%
Sloughhouse	0.152 (’98-’00)	0.115	0.037	-24%

* Goldenland Court started operation in 2008. The base year EPDC was from Airport Road monitor. Data were retrieved from CARB iADAM.

The expected peak day concentrations are gradually declining in all the peak ozone sites in Sacramento County. On average, the three monitors operating since 1986 recorded approximately 30% of decrease of EPDC since the triennial period of 1986-1988.

Figure 4.3 Expected Peak Day Concentration (EPDC) Ozone Trend at the Sacramento Monitoring Sites[8]



4.4 Ozone Exposure Indicators

There are two other ozone exposure indicators: the population-weighted exposure (PWE) indicator and the area-weighted exposure (AWE) indictor. These indicators relate to potential adverse health impacts. Unlike the EPDC, which tracks progress at individual locations, the population-weighted and area-weighted exposure indicators consolidate hourly ozone measurements from all sites within the District into a single exposure value. The resulting value represents the average potential exposure in the District. The term "potential" is used, because daily activity affects an individual's

[8] Folsom monitor was relocated from City Corporation Yard to Natoma Street in 1997. Insufficient data from Folsom do not allow calculation of EPDC in 1997 and 1998.
The air monitoring station at North Highland Monitoring Site experienced air conditioning malfunction during the summer of 2008. The EPDC calculations require three years of data; therefore, 2008, 2009, and 2010 data are not available.
Airport Road monitor was relocated to Goldenland Court in 2008. Insufficient data from Airport/Goldenland Court do not allow EPDC calculation between 2006 and 2010.

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

The population-weighted exposure indicator characterizes the potential average annual outdoor exposure per person, to concentrations above the California's 1-hour ozone standard. It represents a composite of exposures at individual locations that have been weighted to emphasize equally the potential exposure for each individual in the district. It can be thought of as the annual sum of the number of hours above the state health standard.

In contrast, the area-weighted exposure indicator characterizes the potential average annual outdoor exposure per unit area. The area-weighted exposure indicator represents a composite of exposures at individual locations that have been weighted to emphasize equally, the potential exposure in all parts of the District. It is used to assess trends in the average annual exposure per unit area (square kilometers) to 1-hour ozone concentrations above California's standard.

For example, a measured concentration of 0.13 ppm for two hours represents an exposure of 0.08 ppm-hours [(0.13 ppm - 0.09 ppm) × 2 hrs] above the state ozone standard of 0.09 ppm. The details of the exposure indicator calculations can be found in Appendix B.

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, California's 1-hour ozone standard. The PWE and AWE consider both the level and the duration of hourly ozone concentrations above the 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).

Table 4.3 and Figures 4.4 and 4.5 summarize the population-weighted and area-weighted exposure indicators for the 3-year average base period (1986-1988) and the 3-year average end period (2011-2013) within Sacramento County. The population-weighted ozone and area-weighted ozone exposure indicators show 97% and 96% decreases from the baseline year (1986-1988) respectively.

The results indicate that after removing much of the variability due to meteorology and isolating the effects from the District's emission reduction control program, a definite downward trend in ozone concentrations is exhibited. Thus, real progress has been made in reducing the peak ozone concentrations and ozone exposure above the standard, especially between the late 1980's to the early 1990's.

Table 4.3 Summary of Exposure Indicators for 1-Hour Ozone Sacramento County

Exposure Indicator	Population-Weighted (ppm-hrs/person)	Area-Weighted (ppm-hrs/sq km)
Base Period (1986-1988) 3-Yr Avg	1.485	1.067
End Period (2011-2013) 3-Yr Avg	0.046	0.039
Difference (Base – End)	1.439	1.028
Documented Progress	-97%	-96%

- The exposure data was prepared California Air Resources Board (CARB, 2013b)

Figure 4.4 Population-Weighted Exposure Ozone Trend - Sacramento County

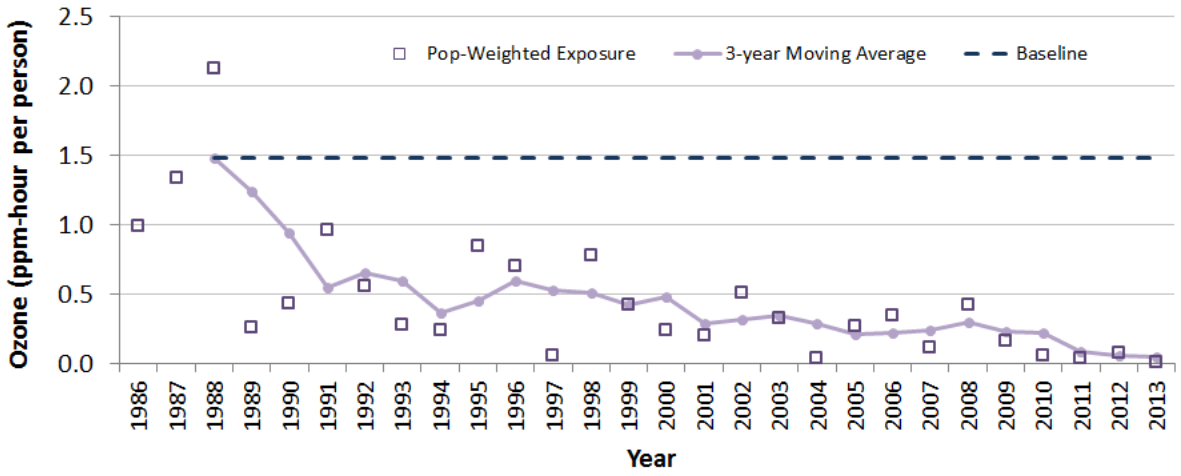
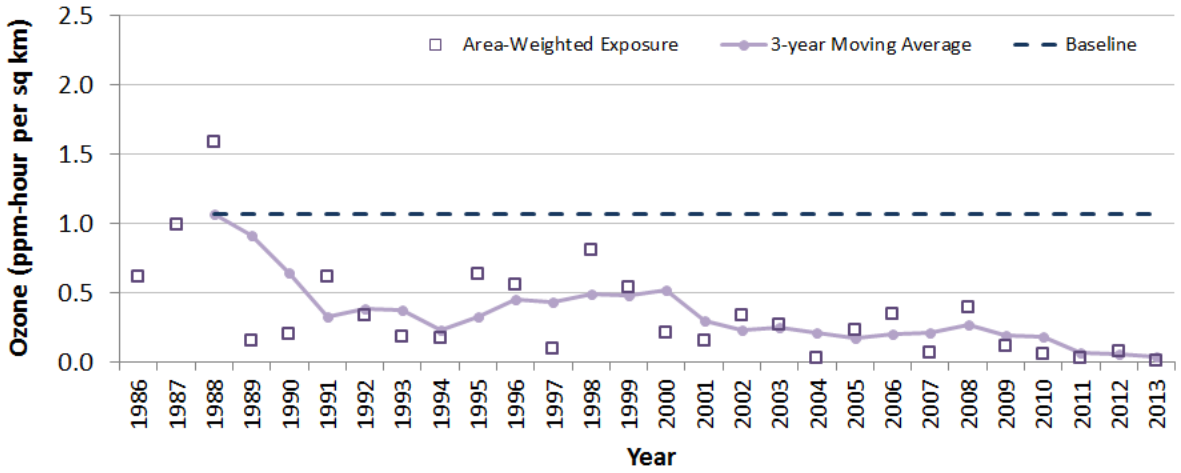


Figure 4.5 Area-Weighted Exposure Ozone Trend - Sacramento County



4.5 References

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5. EMISSION INVENTORIES

5.1 Development of Emission Inventories

Emission inventories have been developed for the two ozone precursor pollutants; reactive organic gases (ROG) and nitrogen oxides (NO_X). These two pollutants are produced by wide varieties of emission sources that have been categorized into: 1) stationary sources, such as industrial equipment, 2) area-wide sources, such as consumer products and pesticides, and 3) mobile sources, which include on-road motor vehicles, such as cars and trucks, and other mobile sources, such as trains and off-road equipment.

The emission inventory represents estimates of actual emissions that are calculated using reported or estimated process rates and emission factors. Mobile source emission calculations include consideration of the fleet mix, vehicle miles traveled, trip starts, speeds, and vehicle emission factors.

To derive past and future year emission inventories, a current base year inventory is projected backward and forward in time, based on prior and expected growth rates of population, travel, employment, industrial or commercial activity, and energy use. The emission projections also take into account the historical and anticipated emission reduction effects from previously adopted control measures.

5.2 Sacramento County Emission Inventory Updates

Emission inventories are constantly being updated and improved to better determine the contribution of various sources of air pollution. The updated inventories presented in this report are based on 2005 base year emission estimates.[9]

5.2.1 Stationary and Area-Wide Source Categories

The emissions from stationary sources are mainly from cleaning and surface coatings and petroleum production/marketing for ROG emissions and fuel combustion for NO_X emissions. The emissions from area-wide source categories are primarily from consumer products and architectural coating solvents for ROG and residential fuel combustion for NO_X.

5.2.2 On-Road Motor Vehicle and Other Mobile Source Categories

The majority of emissions in Sacramento County come from on-road motor vehicles, especially automobiles and the various truck categories. The Other Mobile Sources

[9] California Health and Safety Code Section 40914(c) requires the baseline year to be the same as that used in the State Implementation Plan (SIP) in areas that are nonattainment for national ambient air quality standards, like Sacramento. This inventory uses the same baseline year as the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan, 2013 SIP Revisions, September 26, 2013.

emission category consists mostly of recreational boats, off-road construction and industrial equipment, farm equipment, and trains.

Motor Vehicle Emission Models

The California Air Resources Board (ARB) promotes and protects public health, welfare and ecological resources by identifying ecological concerns, determining methods for efficient reduction of air pollutants, and making informed decisions based on the data at hand. To help in this effort, ARB developed an EMission FACtors (EMFAC) model to calculate emission rates from all motor vehicles, from passenger cars to heavy-duty trucks operating on highways, freeways, and local roads in California. In the EMFAC model, the emission rates are multiplied with vehicle activity data provided by the Sacramento Area Council of Governments (SACOG) to calculate the District's emission inventories.

An emission inventory can be summarized as the 'product of an emission rate (e.g. grams per pollutant emitted over a mile) and vehicle activity (e.g. miles driven per day)'. Over the years, tougher emissions standards have been met with technological solutions of increasing complexity. As a result, the emission estimation models have also grown in size and complexity. The need for emission data to be accurate has not changed. These data can impact proposed regulations in California, and in some instances, the entire nation. This mobile source inventory incorporates ARB's latest on-road motor vehicle emission factors and activities included in ARB's EMFAC2011[10], significantly different from EMFAC2007 used in the 2009 Triennial Report. In order to incorporate new detailed data and methods to estimate emissions from diesel trucks and buses and future improvements, ARB employed a modular emissions modeling approach for EMFAC2011 that departs from previous EMFAC versions. Two models, EMFAC-LDV (Light-Duty Vehicle) and EMFAC-HD (Heavy-Duty), with default activity assumptions, were used to develop emissions estimates for planning purposes as part of the inventory shown in Tables 5.1 and 5.2. EMFAC-LDV, is used as the basis for estimating emissions from gasoline powered on-road vehicles, diesel vehicles below 14,000 pounds gross vehicle weight rating, and urban transit buses. EMFAC-HD is the basis for emissions estimates for diesel trucks and buses with a gross vehicle weight rating greater than 14,000 pounds operating in California.

ARB's OFFROAD[11] Model was designed to provide an overall structure to incorporate the various aspects of off-road source emissions modeling, such as the effects of various adopted and proposed regulations, technology types, and seasonal conditions

[10] EMFAC software and more detailed information can be found on CARB website (http://www.arb.ca.gov/msei/onroad/on-road.htm).

[11] Recent updates to the off-road mobile inventory, OFFROAD2007 Model, are posted on the CARB emissions inventory website (http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles).

on emissions. The emission estimates for off-road categories have been completely revamped using a modular approach and are being developed for specific regulatory support projects. The categories below are updated with new methods and data and, where available, new inventories and models are provided. For categories not listed below, OFFROAD2007 remains the tool for estimating emissions.

- Off-Road Diesel Equipment:
    - In-Use Off-Road Equipment (Construction, Industrial, Ground Support, and Oil Drilling)
    - Cargo Handling Equipment
    - In-Use Mobile Agricultural Equipment
    - Locomotives
    - Transportation Refrigeration Units
    - Commercial Harborcraft
    - Ocean-Going Vessels
- Off-Road Gasoline-Fueled Equipment
    - Recreational Vehicles
    - Pleasure Craft
    - Outboard Marine Tank
    - Portable Fuel Tanks
    - Lawn and Garden

Figures 5.1 and 5.2 provide the percentage breakdown of the inventory for stationary, area-wide, on-road mobile, and other mobile sources for the 2012 inventory year. Emissions for the major sub-categories within each category are included.

Tables 5.1 and 5.2 provide updated source category estimates of Sacramento County summer daily emissions of ROG and NO_X for 2000-2025, every five years, as well as 2011-2016 in order to provide a more refined view of the emission trend during the most recent two triennial periods.

Figure 5.1 2012 ROG Emissions (tons per day)

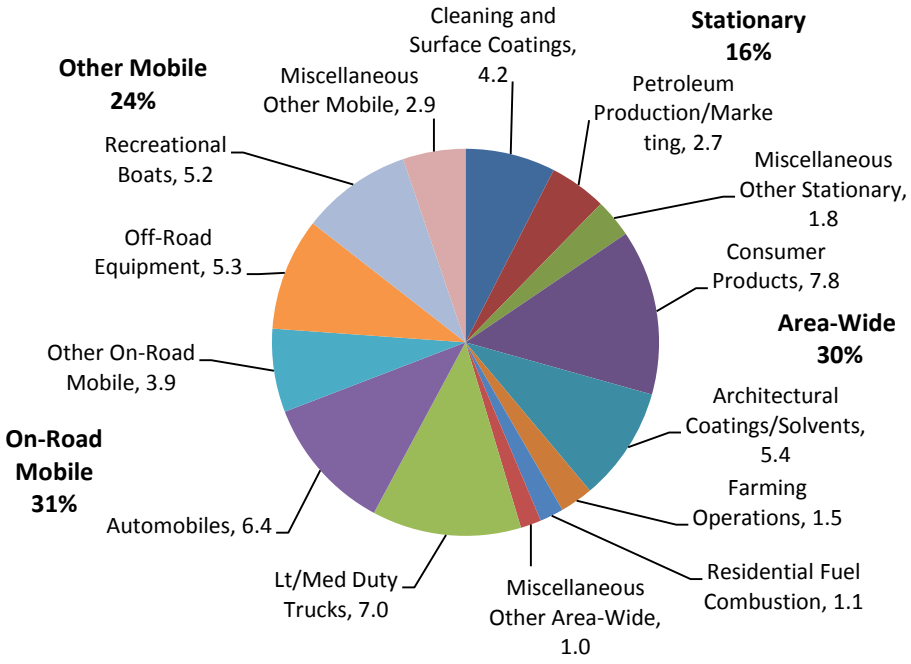
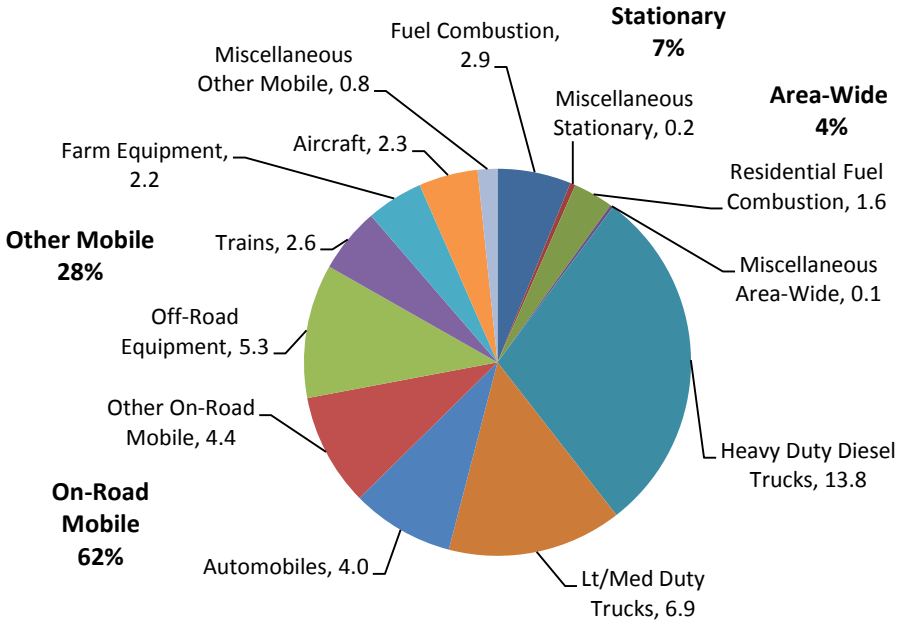


Figure 5.2 2012 NO_X Emissions (tons per day)



Data source: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emission Projections - Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver. 1.02 (accessed 3/7/14) for avg. summer day; on-road motor vehicle emissions are based on default EMFAC2011-SG activity.

Table 5.1 ROG Emissions (tons per day) – Sacramento County

	2000	2005	2010	2011	2012	2013	2014	2015	2016	2020	2025
TOTAL EMISSIONS	**86**	**69**	**60**	**58**	**56**	**54**	**53**	**52**	**51**	**49**	**48**
STATIONARY	**9**	**8**	**8**	**9**	**9**	**9**	**10**	**10**	**10**	**11**	**11**
AREA-WIDE	**19**	**17**	**17**	**17**	**17**	**17**	**18**	**18**	**18**	**19**	**20**
ON-ROAD MOTOR VEHICLES	**39**	**25**	**20**	**19**	**17**	**16**	**13**	**12**	**11**	**9**	**8**
OTHER MOBILE SOURCES	**19**	**18**	**14**	**14**	**13**	**13**	**13**	**12**	**12**	**10**	**10**
STATIONARY SOURCES											
Cleaning and Surface Coatings	4.5	3.8	4.1	4.2	4.2	4.3	4.7	4.8	4.8	5.1	5.1
Petroleum Production Marketing	2.6	2.4	2.6	2.6	2.7	2.7	3.0	3.0	3.1	3.2	3.4
Industrial Processes	0.7	0.8	0.9	0.9	0.9	0.9	1.0	1.1	1.1	1.3	1.4
Waste Disposal	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7
Fuel Combustion	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3
AREA-WIDE SOURCES											
Consumer Products	9.5	8.4	7.9	8.0	7.8	7.5	8.1	8.2	8.3	8.6	9.1
Architectural Coatings/Solvents	5.3	5.0	5.2	5.3	5.4	5.4	5.9	6.0	6.1	6.4	6.9
Pesticides/Fertilizers	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Farming Operations	1.6	1.6	1.5	1.5	1.5	1.5	1.7	1.7	1.7	1.7	1.7
Miscellaneous	2.6	2.1	1.8	1.8	1.8	1.8	2.0	2.0	2.0	2.0	1.9
MOBILE SOURCES											
ON-ROAD MOTOR VEHICLES											
Automobiles	18.8	10.9	8.2	7.2	6.4	5.6	4.3	3.8	3.4	2.2	1.6
Light/Medium Duty Trucks	14.1	9.0	7.8	7.4	7.0	6.6	5.5	5.2	4.9	4.1	3.5
Heavy Duty Gas Trucks	3.1	2.2	1.8	1.7	1.6	1.5	1.2	1.1	1.0	0.8	0.7
Heavy Duty Diesel Trucks	1.0	1.2	0.9	0.9	0.8	0.7	0.6	0.6	0.5	0.5	0.5
Motorcycles	1.1	1.6	1.4	1.3	1.3	1.3	1.1	1.1	1.1	1.1	1.2
Buses	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Motor Homes	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER MOBILE SOURCES											
Aircraft	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5
Trains	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Recreational Boats	7.3	6.5	5.6	5.4	5.2	5.0	4.8	4.6	4.5	3.9	3.3
Off-Road Recreational Vehicles	0.4	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8
Off-Road Equipment	7.4	7.5	5.7	5.5	5.3	5.1	4.9	4.8	4.6	4.0	4.1
Farm Equipment	0.7	0.7	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.2	0.2
Fuel Storage & Handling (Gas Cans)	2.5	1.9	1.2	1.2	1.1	1.1	1.0	1.0	0.9	0.8	0.8

Data source: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emission Projections - Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver. 1.02 (accessed 3/7/14) for avg. summer day; on-road motor vehicle emissions are based on default EMFAC2011-SG activity.

Table 5.2 NO_X Emissions (tons per day) – Sacramento County

	2000	2005	2010	2011	2012	2013	2014	2015	2016	2020	2025
TOTAL EMISSIONS	**84**	**71**	**51**	**49**	**47**	**45**	**44**	**41**	**39**	**31**	**26**
STATIONARY	**4**	**3**	**3**	**3**	**3**	**3**	**4**	**4**	**4**	**4**	**3**
AREA-WIDE	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
ON-ROAD MOTOR VEHICLES	**57**	**46**	**33**	**31**	**29**	**27**	**25**	**23**	**21**	**15**	**11**
OTHER MOBILE SOURCES	**21**	**19**	**13**	**13**	**13**	**13**	**13**	**13**	**12**	**11**	**10**
STATIONARY SOURCES											
Cleaning and Surface Coatings	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Petroleum Production Marketing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Industrial Processes	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3
Waste Disposal	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Fuel Combustion	3.4	3.1	2.8	2.8	2.9	2.9	3.5	3.3	3.3	3.2	3.1
AREA-WIDE SOURCES											
Consumer Products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Architectural Coatings/Solvents	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pesticides/Fertilizers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Farming Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous	1.9	1.8	1.8	1.7	1.7	1.6	2.0	1.9	1.8	1.6	1.6
MOBILE SOURCES											
ON-ROAD MOTOR VEHICLES											
Automobiles	14.9	7.5	5.1	4.6	4.0	3.6	3.1	2.8	2.5	1.7	1.2
Light/Medium Duty Trucks	17.8	10.7	8.0	7.4	6.9	6.3	5.7	5.3	4.8	3.5	2.4
Heavy Duty Gas Trucks	2.3	2.4	2.2	2.2	2.1	2.1	2.0	1.9	1.8	1.6	1.3
Heavy Duty Diesel Trucks	19.1	22.8	15.1	14.5	13.8	13.0	12.0	10.9	9.9	6.8	4.6
Motorcycles	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Buses	2.3	2.4	1.9	1.8	1.8	1.7	1.6	1.6	1.5	1.3	1.1
Motor Homes	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1
OTHER MOBILE SOURCES											
Aircraft	1.8	1.8	2.2	2.2	2.3	2.4	2.5	2.7	2.7	2.9	2.9
Trains	4.9	3.8	2.5	2.5	2.6	2.6	2.7	2.7	2.7	2.6	2.3
Recreational Boats	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Off-Road Recreational Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Off-Road Equipment	10.4	9.8	5.4	5.3	5.3	5.1	4.9	4.8	4.6	3.4	2.8
Farm Equipment	3.6	3.1	2.5	2.4	2.2	2.1	1.9	1.8	1.7	1.2	0.8
Fuel Storage & Handling (Gas Cans)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Data source: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emission Projections - Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver. 1.02 (accessed 3/7/14) for avg. summer day; on-road motor vehicle emissions are based on default EMFAC2011-SG activity.

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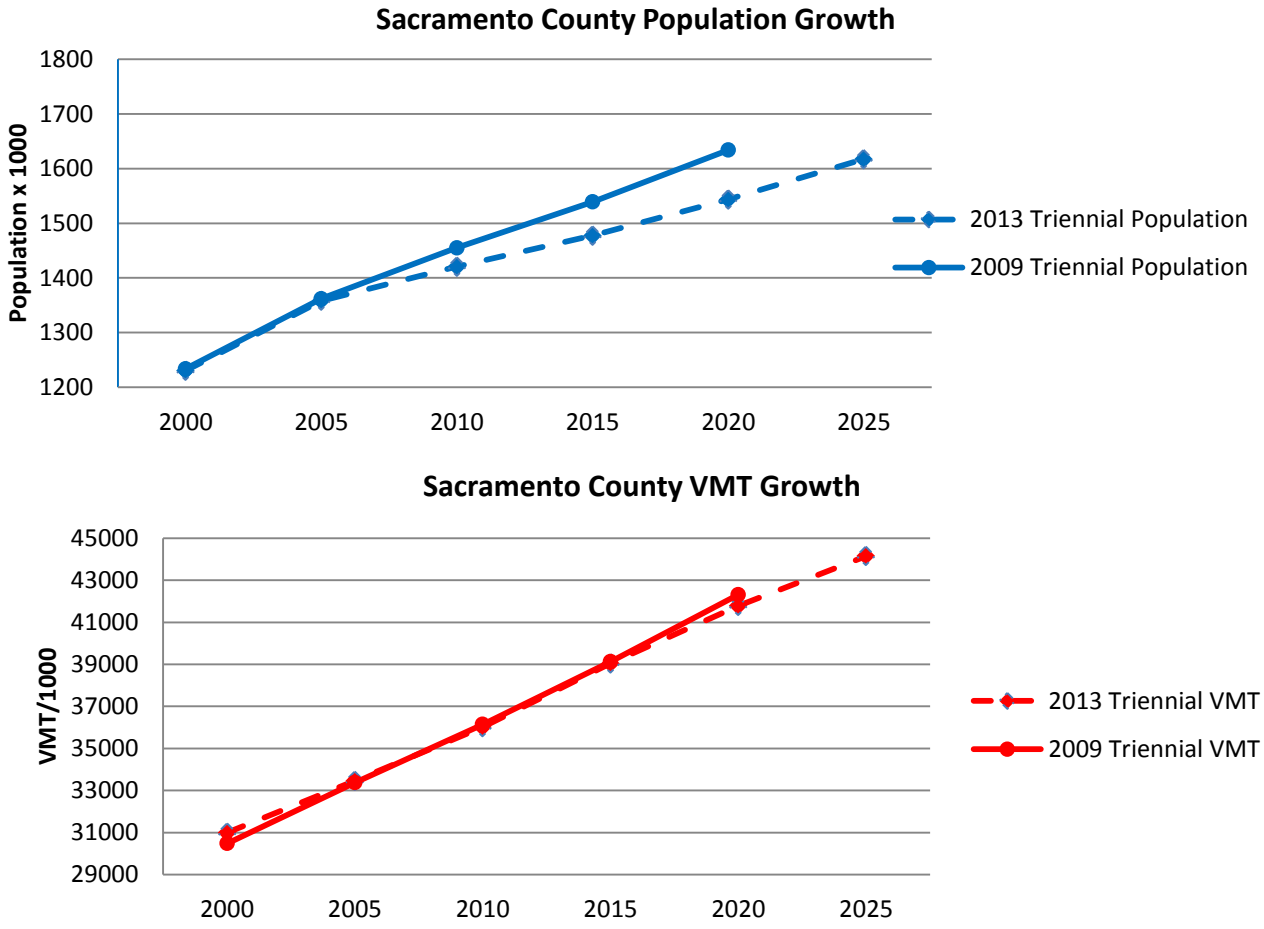
5.3 Updates to Vehicle Population and Vehicle Miles Traveled (VMT)

Figure 5.3 contains two graphs comparing the updated data for vehicle population and VMT growth.

Figure 5.3 Sacramento County Vehicle Population and Vehicle Miles Traveled (VMT) Growth



Data source:
2009 Triennial VMT: from 2009 Triennial Report and Plan Revision, from SACOG MTP2035 travel data (interpolated).
2013 Triennial VMT: California ARB, CEPAM: 2009 Almanac – Population and Vehicle Trends Tool. EMFAC2011 for Sacramento County using SACOG MTP2035 vehicle travel data submitted to ARB February 2011.
2009 Triennial Population: from 2009 Triennial Report and Plan Revision. 2000 from DOF; 2005-2020 from SACOG.
2013 Triennial population: California ARB, CEPAM: 2009 Almanac – Population and Vehicle Trends Tool. Sacramento County Human Population, developed using reports from the California Department of Finance (DOF)

5.4 Comparing Previous and Updated Emission Inventories

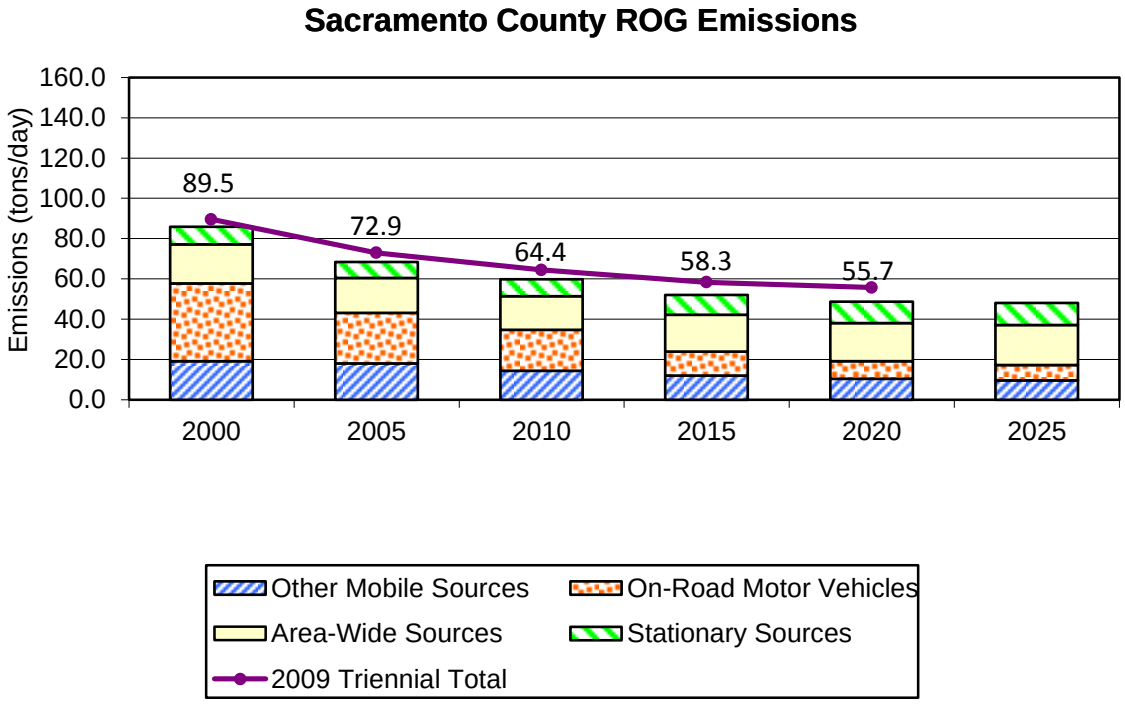
The graphs in Figure 5.4 illustrate how the Sacramento County daily emissions inventory for ROG and NO_X compare to the previous 2009 Triennial Report emissions inventory. Estimates are provided in 5-year increments. Overall, the revised total ROG emissions of 2000-2020 are slightly lower than the previous inventory estimates, about 7-13% lower for 2010-2020. The updated total NO_X emissions are significantly lower than the previous estimates, about 23-26% for 2010-2020. These emission differences are mainly due to reductions in on-road emissions of ROG and off-road emissions of NO_X.

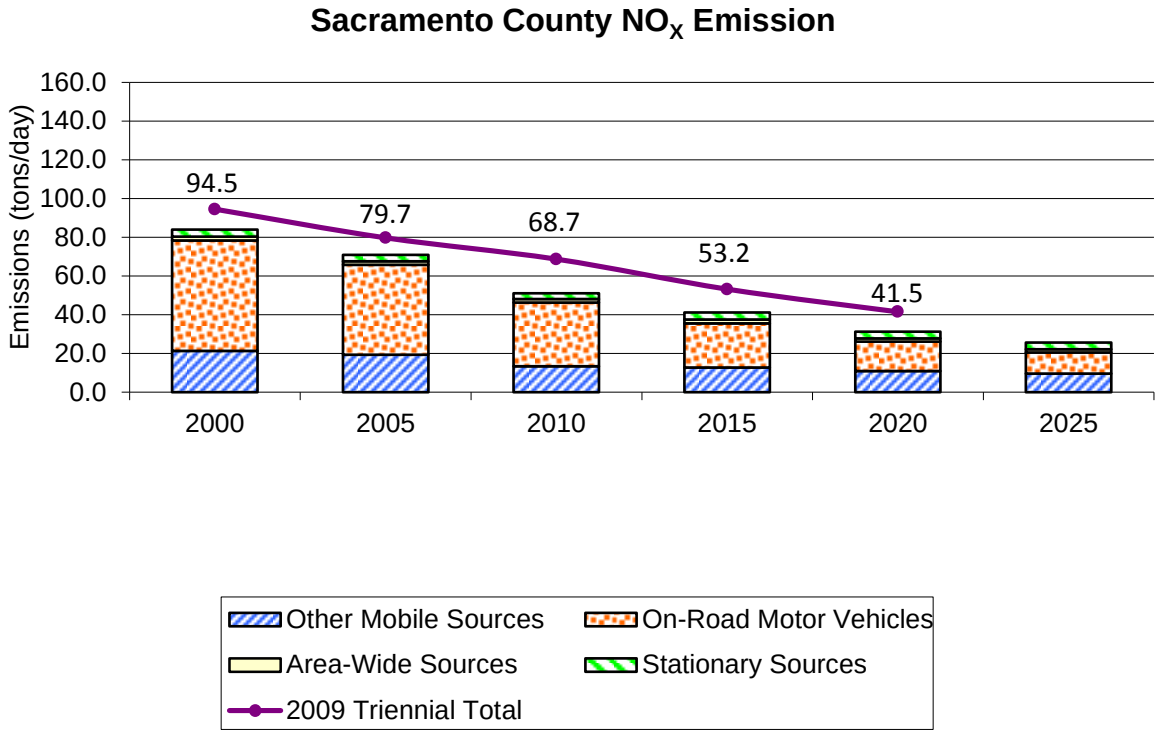
5.5 Emission Inventory Trends

5.5.1 2000-2025 Emission Reductions

Projected emission forecasts to 2025 continue to show a declining trend for ROG and NO_X emissions, with the relative decline in ROG emissions less than the decline in NO_X emissions. Emission reductions from the largest emission category, on-road mobile sources, provide the most emission reductions. Figure 5.4 contains two charts showing the ROG and NO_X inventory trends from 2000-2025.

Figure 5.4 Sacramento County ROG and NO_X Emission Inventory Trends





Notes:

a. 2009 Triennial Totals shown with the line graph are the ROG and NO_X totals per year from 2009 Triennial Report and Plan Revision, Tables 5-1 and 5-2.
b. Data source: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emission Projections - Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver. 1.02 (accessed 3/7/14) for avg. summer day; on-road motor vehicle emissions are based on default EMFAC2011-SG activity.

5.5.2 Measure of Progress

The California Clean Air Act under Section 40914(a) of the Health and Safety Code (H&SC) requires districts to achieve a 5% or more annual reduction for each nonattainment pollutant or its precursors, averaged every consecutive three-year period. Otherwise, ARB may approve an alternative measure of progress that includes the expeditious adoption of all feasible control measures.

Tables 5-1 and 5-2 show that emissions for ROG and NO_X are both declining. From 2011 to 2013, the overall rate of NO_X emission reductions in Sacramento County have averaged 4.2% per year[12] and ROG emission reductions have averaged 3.3% per

[12] NO_X reduction from 2010 to 2011 = 3.9%, 2011 to 2012 = 4.1%, 2012-2013 = 4.6%, and Average = 4.2%.

year[13], which are less than the 5% per year measure of progress requirement. Therefore, the District must implement an “all feasible measures” control strategy. From 2014-2016, reductions in both categories are projected to remain below the 5% per year measure of progress requirement, with NO_X emission reductions projected to average 4.7% per year and ROG emission reductions projected to average 1.9% per year.

The ozone transport mitigation regulations, discussed in chapter 10, also require upwind districts to adopt and implement “all feasible measures” as expeditiously as practicable (17 CCR § 70600(b)(1)(A),[14] regardless of their attainment status, until their specified downwind districts attain the state ozone standard. The ozone transport mitigation regulations define "all feasible measures” as “…air pollution control measures, including but not limited to emissions standards and limitations, applicable to all air pollution source categories under a district's authority that are based on the maximum degree of reductions achievable for emissions of ozone precursors, taking into account technological, social, environmental, energy and economic factors, including cost-effectiveness.”[15]

See Chapter 10 for a discussion of how the District has complied with the “all feasible measures” requirement as part of the California Clean Air Act regulations for achieving an alternative measure of progress pursuant to H&SC Section 40914(a).

[13] ROG reduction from 2010 to 2011 = 3.0%, 2011 to 2012 = 3.4%, 2012-2013 = 3.5%, and Average = 3.3%.
[14] California Code of Regulations, Title 17, §70600(b)(1)(A).
[15] California Code of Regulations, Title 17, §70600(a)(1).

6. STATIONARY SOURCE CONTROL PROGRAMS

6.1 Evaluation of 2009 Triennial Report

The 2009 Triennial Report contained six stationary source rules scheduled to be considered for adoption or amendment by 2012 and estimated their total emission reductions to be 1.04 ton per day of reactive organic gases (ROG) and 0.21 ton per day of oxides of nitrogen (NO_X). Table 6.1 contains a summary of the evaluation or disposition of each of the 6 stationary source measures. The estimates of actual emission reductions from adopted rules total 0.69 ton per day of ROG and 0.32 ton per day of NO_X by 2013.

Table 6.1 Evaluation of 2009 Triennial Report : Stationary Source Measures

Stationary Source Control Category (Rule No.)	Anticipated Schedule[a]	2009 Triennial Report Anticipated Emission Reductions[a] (tons/day)		Emissions Reductions Achieved (tons/day)	
		ROG	NO_X	ROG	NO_X
Natural Gas Fired Water Heaters (414)	To be amended 2010	---	0.20	Amended Mar 2010 ---	Amended Mar 2010 0.32[c]
Automotive Refinishing (459)	To be amended 2010	0.10	---	Amended Aug 2011 0.69[c]	Amended Aug 2011 ---
Natural Gas Production and Processing (461)	To be adopted 2011	0.11	---	No recommended due to a new CARB regulation for Oil and Natural Gas Production	
Asphaltic Concrete (471)	To be adopted 2012	---	0.12[b]	Not recommended due to minimal emission reductions	
Architectural Coatings (442)	To be adopted 2010	0.83	---	In development; reschedule to 2015	
Stationary IC Engines (412)	To be amended 2011	---	0.01	In development; reschedule to 2015	
Total Reductions		**1.04**	**0.21**	**0.69**	**0.32**

[a] SMAQMD 2009 Triennial Report, December 2009, Table 6-2.
[b] The Asphaltic Concrete rule (Rule 471) emissions reductions were expected in 2014.
[c] Emissions Reduction expected in 2013

The Board of Directors of the Sacramento Air District adopted Rules 414 (Water Heater, Boilers, and Process Heaters Less Than 1,000,000 BTU per Hour) and 459 (Automotive, Mobile Equipment, and Associated Parts and Components Coating Operations) in 2010 and 2011 respectively.

Rule 414 was amended in March 2010 and is expected to achieve 0.7 tpd of NO_X emission reduction by 2018. The control measure reduces NO_X emission from water heaters, boilers, and process heater between 75,000 and 1 million BTU/hr. It strengthened the emissions standards for the smaller heater units that were not regulated previously.

Rule 459 was amended in August 2011 and was expected to achieve about 0.68 ton per day (tpd) of ROG emission reductions by 2012. The control measure applies to coating, stripping, and solvent use for automotive, truck or heavy equipment or refinishing operations and the sale of coatings within the District. The amendments incorporated California Air Resources Board's (CARB) Suggested Control Measures (SCM). It established coating limits that require low VOC coatings, solvents, and other motor vehicles refinishing materials.

Rule 461 (Natural Gas Processing and Production) was dropped from consideration because the emission reductions from this rule is expected to be achieved by a regulation being developed by CARB for Oil and Natural Gas Production, Processing, and Storage under the authority of AB32[16].

Rule 471 (Asphaltic Concrete) was not recommended to be adopted because of insufficient emissions reduction benefits and higher cost effectiveness than originally estimated, $17,600-$42,300 per ton. The actual cost effectiveness was estimated to be approximately $160,000 per ton of NO_X reductions (SMAQMD, 2011). This control measure was also removed from the Sacramento Federal Ozone State Implementation Plan (SIP) in 2011.

A detailed discussion of the above control measures are included in Appendix A.

The remaining two control measures were postponed because of the following high priority and resource intensive work:

- New Source Review rules (Rules 202, 214, and 217) and Rule 203 - Prevention of Significant Deterioration.
- 2013 Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan and

[16] AB32: California Global Warming Solutions Act

- $PM_{2.5}$ Implementation/Maintenance Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area.

The updated rule development schedule for the two control measures is:

- Architectural Coating (Rule 442) is scheduled for consideration in 2015.
- Stationary Internal Combustion Engines (Rule 412) is scheduled for consideration in 2015.

A detailed discussion of emissions inventory, expected emissions reduction, cost effectiveness, implementation date, and authority of each control measure is included in Appendix A.

Further Study Measures

No further study measure was proposed in the 2009 Triennial Report.

6.2 Future Outlook - Potential Measures Through 2016

In addition to the two control measures from the 2009 Triennial Report, District staff evaluated stationary source control measures from 33 different emission categories[17]. Staff anticipates proposing for Board consideration amendment to one existing rule (Rule 460: Adhesive and Sealants) and adoption of four new control measures (Rule 419: NO_X from miscellaneous combustion source; Rule 467: Metalworking Fluids and Direct Contact Lubricants; Rule 489: Composting Operations; and Rule 490: Liquid Petroleum Gas Transfer and Dispensing). The new control measures are currently implemented in San Joaquin Valley Air Pollution Control District (SJVAPCD) or South Coast Air Quality Management District (SCAQMD). Staff anticipates that these control measures may be cost effective and may achieve sufficient emissions reductions. However, the ultimate staff recommendations regarding rulemaking actions will be based on a more thorough evaluation conducted during the rule development process. If the emissions reductions and cost effectiveness are consistent with staff's initial estimates, then these control measures will be scheduled for consideration between 2015 and 2016.

[17] These 33 emissions categories included: Adhesives and Sealants (Including Solvent Requirements), Architectural Coatings, Asphaltic Concrete, Boilers, Brandy and Wine Aging, Chipping and Grinding Operations, Commercial Cooking Equipment, Composting Operations, Confined Animal Facilities, Consumer Paint Thinners/Multi-Purpose Solvents, Dryers, Ovens, and Kilns, Flares, Furnaces (Residential), Gasoline Loading and Bulk Terminals, Graphic Arts, Indirect Source Review, Internal Combustion Engines, LPG Transfer and Dispensing, Metal Melting, Metal Working Fluids, Miscellaneous Coatings, Mold Release Agents, Municipal Solid Waste Landfills, Oil and Natural Gas Production, Open Burning, Organic Liquid Storage, Polyester Resin Operations, Polymeric Cellular (Foam) Manufacturing, Soil Decontamination Operations, Storage Tank and Pipeline Cleaning and Degassing, Turbines, Wastewater Separators, and Wood Coatings.

Following are brief descriptions of the control measures being considered. A detailed discussion of each control measure is included in Appendix A.

NO_X from Miscellaneous Combustion Sources (Rule 419)

Combustion equipment is widely used in different businesses and industries. Currently, the District only regulates emissions from boilers, water heaters, process heaters, engines, and turbines. The control measure could establish emission limits for dryers, dehydrators, heaters, kilns, calciners, furnaces, crematories, incinerators, heated pots, cookers, roasters, heated tanks, evaporators, distillation units, afterburners, degassing units, vapor incinerators, catalytic, thermal oxidizer, and remediation units. The emissions limits will be evaluated based on the device type, process temperature, and equipment age. The proposal will consider requirements and information from the SCAQMD Rule 1147 – NO_X Reductions from Miscellaneous Sources and SJVAPCD Rule 4309 – Dryers, Dehydrators, and Ovens.

Adhesive and Sealants (Rule 460)

Adhesives are bonding agents adhering one surface to another and sealants are substances used to fill, seal, waterproof, or weatherproof gaps or joints between two surfaces. Adhesives and sealants are widely used in furniture manufacturing, automotive, and construction industries. This control measure may lower the VOC[18] emission limits for adhesives and sealants. Staff will consider the 2010 amendments of the SJVAPCD Rule 4653 – Adhesives and Sealants.

Metalworking Fluids and Direct Contact Lubricants (Rule 467)

Metalworking fluids and direct contact lubricants include varnishing oils, rust inhibitors, and honing oils and they are widely used in metal manufacturing processes. The control measure may establish VOC emissions limits for metalworking fluids and direct-contact lubricants. Staff will consider requirements and information from SCAQMD Rule 1144 - Metalworking Fluids and Direct Contact Lubricants.

Composting Operations (Rule 489)

Composting various organic wastes emits reactive organic gases from the biological reactions of bacteria and organic materials. Currently, the District does not have a rule governing composting operation emissions. The control measure could reduce ROG emissions by requiring specified process management practices or emission

[18] Although ROG is the term used in this report, the rule requirements uses an equivalent term “Volatile Organic Compound (VOC) as defined in Rule 101 – General Provisions and Definitions.

control technology. Staff will consider requirements and information from SCAQMD Rule 1133.3 – Emissions Reductions from Green Waste Composting Operations and recent work by other air districts and the California Air Resources Board.

Liquid Petroleum Gas Transfer and Dispensing (Rule 490)

The control measure could reduce ROG emissions from the transfer and dispensing of liquid petroleum gas (LPG) into cargo tanks, stationary storage tanks, and portable containers. Emissions controls at large LPG facilities may include a vapor recovery or equalization system to capture displaced vapors. Smaller dispensing operations may be required to use fixed liquid level gauges or improved filling technology to prevent overfilling. Staff will consider the requirements and information from SCAQMD Rule 1177 – Liquefied Petroleum Gas Transfer and Gas Dispensing and SCAQMD Control Measure FUG-02.

Table 6.2 contains the summary of the potential stationary source control measures. This list includes the anticipated control measure development schedule, and initial estimates of potential emission reductions and cost effectiveness. The total emission reductions for the next triennial period may be up to 1.53 tons per day of ROG and 0.20 ton per day of NO_X. This analysis satisfies the “all feasible measures” requirement.

Table 6.2 Potential Stationary Source Measures Through 2016

Stationary Source Control Category (Rule No.)	Anticipated Schedule	Initial Emission Reductions Estimates (tons/day)		Initial Cost Effectiveness Estimates
		ROG	NO_X	
Stationary IC Engines (412)	2015	---	0.01	$10,800/ton
NO_X from miscellaneous combustion source (419)	2016	---	0.19	$8,000/ton
Architectural Coatings (442)	2015	1.1	---	$2,480/ton
Adhesive and Sealants (460)	2016	0.02	---	$0/ton[a]
Metalworking Fluids and Direct-Contact Lubricants (467)	2016	0.06	---	$2,860/ton
Composting Operations (489)	2016	0.05	---	$1,920/ton
Liquid Petroleum Gas Transfer and Dispensing (490)	2016	0.3	---	$1,700/ton
Total Reductions		**1.53**	**0.20**	

[a] Compliant products have been available for several years at similar price range as higher VOC adhesives and sealants. No additional costs are anticipated for manufacturer or seller switching to low VOC products. (SJVAPCD, 2010)

6.3 References

SJVAPCD. *Rule 4653 (Adhesive and Sealants) Final Draft Staff Report.* Fresno, CA; San Joaquin Valley Air Pollution Control District. September 16, 2010.

SMAQMD. Staff report: "*Revision to the 2009 Sacramento Regional 8-hour Ozone Attainment and Reasonable Further Progress Plan: Removal of control measures (SMAQMD – 412, IC Engines and SMAQMD – 471, Asphaltic Concrete).*" Sacramento, CA: Sacramento Metropolitan Air Quality Management District. July 19, 2011.

7. DISTRICT MOBILE SOURCE CONTROL PROGRAMS

7.1 Vehicle and Engine Technology Program

The Vehicle and Engine Technology Program achieves emission reductions from mobile sources, particularly heavy-duty vehicles, through market-based incentive programs that accelerate introduction of lower emission technologies into the Sacramento region. The program focuses on reducing NO_X emissions from heavy-duty diesel engines associated with on-road vehicles, self-propelled off-road vehicles, and agricultural pump engines. The major strategies for achieving the desired NO_X emission reductions are:

- Introducing new, low-emission certified vehicles when older vehicles are being replaced or when new vehicles are being added to a fleet;
- Replacing an older existing engine with a newer, lower emission engine, referred to as repowering;
- Replacing an older truck with a newer truck when the older truck's owner would not otherwise purchase a newer truck;
- Retrofitting an older engine to operate at a lower emission level;
- Using a lower emission fuel.

7.2 2009 Triennial Report

The 2009 Triennial Report anticipated spending $5 million annually to fund on-road and off-road mobile projects through 2012 and achieving 0.94 tpd for NO_X and 0.19 tpd of ROG emissions reduction. An Accelerated Vehicle Retirement element was anticipated to be included in the on-road vehicle incentive program beginning in 2010. Ultimately, staff determined that the Accelerated Vehicle Retirement program cost effectiveness was not competitive with the state's Bureau of Automotive Repair (BAR) retirement program funded under AB118[19]. (BAR, 2013)

7.3 Evaluation of Vehicle and Engine Technology Program

Funding Sources

There are a variety of revenue sources that fund the District's Vehicle and Engine Technology Program, listed in Table 7.1. Between 2009 and 2013, approximately $108.6 million was received.

[19] (http://www.smogcheck.ca.gov/80_BARResources/01_CAP&GoldShield/cap_program.html)

Table 7.1 Funding Sources -- Vehicle and Engine Technology Program

Funding Sources	Funds Received ($ million)				
	'09	'10	'11	'12	'13
AB118 – Air Quality Improvement Program (AQIP) Demo		0.2			
Congestion Mitigation and Air Quality (CMAQ) Improvement- and SECAT	3.4	6.2		3.6	3.6
Carl Moyer Memorial Air Quality Standards Attainment Program	13.7	5.8	0.8	4.6	3.8
Department of Motor Vehicles (DMV) Surcharge Fee	2.2	2.0	2.0	2.0	2.0
EPA Diesel Emissions Reduction Act (DERA) Lower-Emission School Bus Program	0.1				
CARB-Proposition 1B Lower-Emission School Bus Program	0.8	17.5			10.0
EPA HEP/Locomotive [1]	0.1				
EPA Hybrid [2]			0.1		
EPA Diesel Emissions Reduction Program (DERA) Ag Pump Grant				1.1	
EPA DERA Grant for tractors and Compressed Natural Gas (CNG) Refuse Trucks					0.5
Total	**20.3**	**36.9**	**20.2**	**11.3**	**19.9**

[1] EPA Head End Power (HEP) units – locomotive repower

[2] EPA Hybrid is an incentive grant for hybrid vehicle technology – funding was used for school bus and medium-heavy duty trucks. Funding in 2011 was shifted from hybrid to electric vehicle pursuant to a modification of the grant with EPA and funded 3 United Parcel Services (UPS) electric delivery vehicles.

Emission Reductions

The District mobile source market-based incentive program has achieved NO_X emission reductions of 2.87 tons per day from projects initiated since last triennial report as shown in Table 7.2. The NO_X reductions from over 1410 on-road heavy-duty vehicles accounted for 1.11 tpd. The off-road mobile portion has been more successful, decreasing NO_X emissions from 777 vehicles and agricultural water pumping engines by 1.76 tpd.

Due to the nature of mobile source emissions and the operation of the mobile source market-based incentive program, the emission reductions from on-road and off-road vehicle project categories in Table 7.2 occur throughout the Sacramento federal ozone nonattainment region and not just in Sacramento County. About 39% of the total businesses receiving funds for on-road projects during 2009-2013 were based in Sacramento County. Also, about 8% of the total businesses receiving funds for off-road

vehicle projects during 2009-2013 were based in Sacramento County. Approximately 6% of the agricultural water pump engines funded in the program during 2009-2013 were located in Sacramento County.

Table 7.2 Estimated Emission Reductions - Vehicle and Engine Technology Program

Project Categories	Number of Engines					
	'09	**'10**	**'11**	**'12**	**'13**	**Total[d]**
On-Road Heavy-Duty Vehicles [a]	282	147	312	601	68	1410
Off-Road Self-Propelled Vehicles [a]	49	55	103	114	168	485
Agricultural Water Pumping Engines [b]	210	78	4	c	c	292
Total	**541**	**280**	**419**	**615**	**232**	**2187**

Project Categories	NO_X Reductions achieved (tons/day)					
	'09	**'10**	**'11**	**'12**	**'13**	**Total[d]**
On-Road Heavy-Duty Vehicles [a]	0.23	0.20	0.25	0.30	0.13	1.11
Off-Road Self-Propelled Vehicles [a]	0.22	0.17	0.24	0.24	0.28	1.15
Agricultural Water Pumping Engines [b]	0.48	0.13	0.00	c	c	0.61
Total [d]	**0.93**	**0.50**	**0.49**	**0.54**	**0.41**	**2.87[e]**

[a] Emission reductions from on-road and off-road vehicle project categories occur throughout the Sacramento federal ozone nonattainment region.

[b] These agricultural pump engines are region-wide about 6 percent located in Sacramento County.

[c.] Ag pumps are included in the broader category of off-road equipment beginning in 2012.

[d] The total emissions achieved in the last row are the reductions achieved from contracted projects initiated in each of the 5 years. The emission reductions of each project are good for 5 years.

[e] These emission reductions represent the contracts remaining in effect through 2013, the sum of the emissions reductions for 5 years.

Funding Spent

Table 7.3 summarizes the amount of funding spent in the last triennial period for the District's Vehicle and Engine Technology Program.

Table 7.3 Funding Spent - Vehicle and Engine Technology Program

Project Categories	Funding Spent* ($ million)					
	'09	'10	'11	'12	'13	Total
On-Road Heavy-Duty Vehicles	9.8	7.7	3.9	23.7	3.0	48.1
Off-Road Self-Propelled Vehicles	9.1	5.6	5.6	18.2	10.8	49.3
Agricultural Water Pumping Engines	3.4	1.1	0.1	**	**	4.6
Total	**22.4**	**14.4**	**9.6**	**41.9**	**13.8**	**102.0**

* Funding spent was rounded to a tenth of million dollars.

** Ag Pumps are included in the broader category of off-road as of 2012 forward.

Further Study Measures

The 2009 Triennial Report anticipated an Accelerated Vehicle Retirement measure to buy back old vehicles beginning in 2010. Staff determined that the BAR Retirement

program is more competitive than a District program can be under cost effective limitations in place under the Moyer program. The BAR program pays up to $1,500 per vehicle and is not based on cost effectiveness. Under the Moyer program, a vehicle retirement program would average approximately $500 per vehicle. Establishing a program that competes with the BAR program and pays less would not achieve emission reductions. Therefore, staff did not implement a vehicle retirement program.

7.4 Evaluation Summary of 2009 Triennial Report Mobile Source Programs

Table 7.4 contains an evaluation summary of the District mobile source programs. The actual mobile source NO_X emission reductions achieved since the last Triennial Report (2009-2013) were 2.87 tpd from the incentive-based Vehicle and Engine Technology Program.

Table 7.4 Evaluation of 2009 Triennial Report - Mobile Source Programs

Control Measure Categories	2009 Proposed Action and Schedule[a]	Expected Emission Reductions[a] (tons/day)		Actual Reductions Achieved (tons/day)	
		ROG	NO_X	ROG	NO_X
Vehicle and Engine Technology Market-Based Incentive Program - On-Road Heavy-Duty Vehicles - Off-Road Vehicles and Ag. Pumps	To be implemented through 2012	To be implemented through 2012 $5 million funds 0.16 (On-Road) 0.03 (Off-Road) 0.19 (Total)	To be implemented through 2012 $5 million funds 0.73 (On-Road) 0.21 (Off-Road) 0.94 (Total)	2009-2013 $102.1 million funds 0.15 (On-Road) 0.45 (Off-Road) 0.60 (Total)	2009-2013 $ 102.1 million funds 1.11 (On-Road) 1.76 (Off-Road) 2.87 (Total)
Accelerated Vehicle Retirement	To be considered as added option to on-road incentive program by 2010	Further study	Further study	This program is determined to be uncompetitive with BAR program and will not be considered in this triennial period. District may revisit this program if changes happen in BAR program or funding.	
Total Reductions		**0.19**	**0.94**	**0.60**	**2.87**

[a] From the SMAQMD 2009 Triennial Report Tables 7.4 and 7.5.
[b] http://www.arb.ca.gov/msprog/truck-idling/board-presentation.pdf

7.5 Future Outlook Through 2016

Regarding funding through 2016, about $5 million annually is expected to be available for on-road and off-road mobile projects (SECAT $3 million annually for on-road and Department of Motor Vehicle fees of $2 million annually for off-road). In addition, the Carl Moyer Program adds approximately $4 million annually through 2016; also, the District anticipates additional funding for locomotives in 2015.

The resulting emission reduction benefits based on the $9 million SECAT, DMV, and the Carl Moyer funding are estimated to be 0.05 ton per day ROG and 0.45 ton per day NO_X for on-road mobile projects and 0.06 ton per day ROG and 0.22 ton per day NO_X for off-road mobile projects on a region-wide basis. Table 7.5 summarizes the estimated emission reductions and cost effectiveness of the Vehicle and Engine Technology Market-Based Incentive Program through 2016.

Table 7.5 Mobile Source Control Programs Through 2016

Control Measure Categories	Schedule	Estimated Emission Reductions(tons/day)		Cost Effectiveness[a] ($/ton)
		ROG	NO_X	
Vehicle and Engine Technology Market-Based Incentive Program - On-Road Measures - Off-Road Measures	through 2016	0.05 (On-Road) 0.06 (Off-Road) 0.11 Total	0.45 (On-Road) 0.22 (Off-Road) 0.67 Total	$17,724 (On-Road) $17,724 (Off-Road)

[a] Cost effectiveness assumed from The Carl Moyer Program Guidelines (CARB, 2014, Appendix G-3, Table G-1).

7.6 References

BAR. *Consumer Assistance Program.* Web. 11 December 2013. <http://www.smogcheck.ca.gov/80_BARResources/01_CAP&GoldShield/cap_program.html>.

CARB. *Smog Check Program.* 22 February 2010. Web. 11 December 2013. <http://www.arb.ca.gov/msprog/smogcheck/smogcheck.htm>.

CARB. *The Carl Moyer Program Guidelines. Approved Revision 2011.* California Air Resources Board: Sacramento, CA. 2014. Web. 22 August 2014. <http://www.arb.ca.gov/msprog/moyer/guidelines/2011gl/2011cmp_appg_04_01_14.pdf>

8. LAND USE AND TRANSPORTATION PROGRAMS

8.1 District Programs

The District's Land Use and Transportation Programs include mitigation measures and transportation control measures (TCMs) that reduce air pollutant emissions during construction and operational phases of land development projects. The existing land use mitigation programs rely on the California Environmental Quality Act (CEQA) for their implementation. Most major land use development projects currently under construction were approved with air quality mitigation plans and construction mitigation plans. Due to market conditions, many of these development projects have only been partially constructed and occupied, thus much of the emission benefits have not yet been fully realized.

8.2 2009 Triennial Report

The 2009 Triennial Report included land use development mitigation strategies. Estimated emission reductions expected from the CEQA mitigation of construction activities were predicted to be 0.45 ton per day of NO_X by 2012. The CEQA mitigation of the operational phase of land use development projects was estimated to achieve an additional 0.03 ton per day of ROG and 0.03 ton per day of NO_X by 2012. The District planned to develop a Construction Mitigation indirect source rule by 2010 with implementation in 2011 and develop a Land Use Operational Phase indirect source rule by 2012 with implementation in 2014. In addition, there was a commitment to continue to evaluate and track transit projects as TCM further study measures, and to continue to promote and assist local jurisdictions with bicycle and pedestrian projects.

8.3 Evaluation of Land Use and Transportation Programs

CEQA Construction Mitigation Program

The District continued efforts to reduce NO_X emissions through the implementation of mitigation measures applicable to the construction phase of land use development projects under the California Environmental Quality Act (CEQA). This CEQA Construction Mitigation Program is an on-going District initiative. All mitigated projects must achieve a minimum of 20 percent NO_X reduction from diesel construction equipment compared to a calculated statewide average emission rate. The construction mitigation plans identify actual equipment used during construction, and the total emission reduction associated with the equipment. Table 8.1 lists the number of mitigated construction projects and associated average daily NO_X emissions reduced during 2009 through 2013 in Sacramento County.

Table 8.1 CEQA Construction Mitigation Program

Sacramento County	2009	2010	2011	2012	2013	Average
No. of Construction Projects	25	30	20	26	29	26
NO_X Emission Reductions (tons/day)	0.40	0.36	0.30	0.29	0.27	0.32

CEQA Land Use Operational Mitigation Program

CEQA mitigation measures were also applied to the operational phase of land use development projects to reduce ROG and NO_X emissions. Proponents of major development projects prepare an operational mitigation plan by selecting from a menu of over 30 recommended mitigation measures approved by SMAQMD staff. District staff updated the menu of operational mitigation measures in June 2014 (SMAQMD, 2014) to reflect the latest research and quantification methods. The general types of mitigation measures include:

(1) land use, neighborhood, and site enhancement,
(2) parking policy/pricing,
(3) transit improvement,
(4) school and commute vehicle trip reduction,
(5) low VOC architectural coatings and other consumer products,
(6) landscape equipment,
(7) clean efficient energy use for buildings and hearths,
(8) water supply and use efficiency,
(9) solid waste recycling and composting.

In most cases, operational mitigation plans must achieve a minimum 15 percent reduction of ROG and NO_X emissions. Generally, the operational mitigation plan is adopted as part of a CEQA document (environmental impact report, mitigated negative declaration, etc.). The CEQA lead agency is responsible for monitoring and enforcing operational mitigation plans, and SMAQMD staff often provides assistance and support in that effort.

The operational mitigation measures were applied to dwelling unit phase completions for one major development project in Sacramento County during 2009-2013: The 65th Street Center Target. The estimated ROG and NO_X emission reductions from the operational mitigation measures implemented during 2009-2013 are listed in Table 8.2.

Table 8.2 CEQA Land Use Operational Mitigation Program

Major Development Projects Completed in Sacramento County (mitigation years)[b]	Emission Reductions[a] (tons/day)									
	2009[c]		2010		2011[c]		2012[c]		2013	
	ROG	NO_X	ROG	NO_X	ROG	NO_X	ROG	NO_X	ROG	NO_X
65th Street Center Target ('10)	---		0.009	0.014	0.009	0.014	0.009	0.014	0.009	0.014
SMUD East Campus Operations Center ('13)	---		---		---		---		0.002	0.008

[a] Accounts for incremental increase in operational emission reductions from land use projects over reductions previously credited.

[b] Projects listed in the 2009 Triennial Report were not completed due to the economic recession. These projects are carried over to the next triennial period for evaluation. The projects listed here were not anticipated when the District prepared the 2009 Triennial Report; therefore, they were not listed in the 2009 Triennial Report.

[c] No projects with operational air quality mitigation plans were constructed in 2009, 2011, and 2012.

Indirect Source Rules (ISR)

The District began the process to develop a Construction Mitigation indirect source rule (SMAQMD, 2009) in 2010. In August 2011, rule development was terminated at the direction of the District's Board of Directors because:

1) The expected emission reductions were lower than originally estimated because the California Air Resources Board established rule reducing emissions from the construction fleet, and
2) the District's CEQA program was similar to the rule being developed and achieving similar reductions without the need for a rule.

The Land Use Operational indirect source rule was removed from consideration by the District's Board of Directors in October 2011. The District learned that EPA would not accept that the San Joaquin Valley Air District's Land Use Operational indirect source rule emission reductions could be credited towards their State Implementation Plan (SIP)(EPA, 2010)(EPA, 2011). EPA's determination eliminated the District's key purpose for adopting an operational ISR rule to achieve SIP credit for our land use programs. Additionally, the District determined that design improvements for land development projects would occur as a result of other regulations/requirements (such as SB375), making a District rule unnecessary.

8.4 Review of Transportation Control Measures

Additional Light Rail and Bus Rapid Transit

Transportation control measures reduce vehicle trips and vehicle miles traveled, and provide transportation alternatives. The 2009 Triennial Report included a transportation further study measure that would extend the Regional Transit light rail system to

Richards Boulevard (Township 9) and Cosumnes River College, as well as a streetcar system between West Sacramento and Sacramento.

Sacramento Regional Transit plans to extend the light rail transit system 13 miles from downtown Sacramento through Natomas to the Sacramento International Airport (known as the Green Line project). The extension to Richards Boulevard (Township 9) and the Sacramento Intermodal station, completed June 15, 2012, added 1.1 miles to the Regional Transit Rail system at a cost of $44 million. Emission reduction information is available from existing environmental documents (SacRT, 2009, p.4.12-11). The Program Environmental Impact Report indicated that the Green Line project will result in a daily vehicle miles traveled (VMT) reduction from the regional fleet of 17,232 miles when it is completed in 2027.

The South Line Phase II project, a 4.3 mile extension of the Blue line to Cosumnes River College is under construction and anticipates beginning revenue service in September 2015. An environmental impact analysis was done and determined that the South Line Phase II project will reduce daily VMT by about 39,000 miles (SacRT, 2008, p.4-17).

The Streetcar is currently unfunded and does not have a projected opening date. As no new rail extensions began revenue service during 2009- 2013, no operational benefits from them can be claimed in this reporting period.

Bicycle and Pedestrian Programs

Bicycle and pedestrian programs continue to be implemented, primarily through the implementation of Bicycle Master Plans and Pedestrian Master Plans adopted by each local jurisdiction, listed in Tables 8.3 and 8.4. The District has been involved in the development of these plans and has worked to ensure their consistency and interconnectivity. In addition, SACOG integrated their Regional Bicycle, Pedestrian, and Trails Master Plan with the 2035 Metropolitan Transportation Plan / Sustainable Communities Strategy and continues to fund projects through the Regional Bicycle and Pedestrian Funding Program. Implementation of the projects identified in the plans improve air quality by encouraging people to walk or ride a bicycle rather than use a vehicle for some trips. Considered cumulatively, the projects can result in an additional reduction in emissions (CAPCOA, 2010). However, it is not currently feasible to quantify specific emission reductions in this report due to considerable staff resources that would be necessary to track the construction and use of individual bicycle and pedestrian projects.

The District is also involved in promoting the Million Mile May bicycling activity in the Sacramento region. Since 2005 during the month of May, there has been an organized

community effort to increase bicycle-riding awareness as a feasible alternative transportation mode. Participating individuals, organizations and employers report their bicycle miles to Transportation Management Agencies (TMAs) who compile and track this information. In May 2009, 2010, 2011, 2012, and 2013, the region logged more than 7.5 million bicycle miles traveled for the period 2009-2013.

In 2013, SACOG approved the District's Congestion Management and Air Quality grant application for $4.3 million to launch a bike share system in the Sacramento Region. The District is partnering with jurisdictions and other organizations, including the cities of Sacramento, West Sacramento, and Davis, SACOG, Sacramento Regional Transit, Yolo Transportation District, Capitol Corridor Joint Powers Authority, University of California (Davis), and Yolo Solano AQMD, to design the system. The system is expected to be operational in late 2015.

Table 8.3 Jurisdictions with Bicycle Master Plans in Sacramento County (SACOG, 2013)

Jurisdiction	Bicycle Master Plan
County of Sacramento	Adopted 1991. Updated April 2011. Amended January 2012
City of Sacramento	Adopted 1991. Updated 2011.
City of Rancho Cordova	Adopted March 2011.
City of Elk Grove	Adopted July 2004. Update expected 2014 (Joint Bicycle/Pedestrian Plan).
City of Citrus Heights	Adopted December 2008. Updated March 2011.
City of Folsom	Adopted November 2002. Updated July 2007.
City of Galt	Adopted May 2002. Updated March 2011.
SACOG	Regional Bicycle, Pedestrian, and Trails Master Plan adopted November 2004. Amended July 2007 and August 2009. Updated June 2013.

Table 8.4 Jurisdictions with Pedestrian Master Plans in Sacramento County

Jurisdiction	Pedestrian Master Plan
County of Sacramento	Adopted 2007.
City of Sacramento	Adopted July 2006 Updated in February 2008
City of Rancho Cordova	Adopted March2011.
City of Elk Grove	Adopted July 2004. Update expected 2014 (Joint Bicycle/Pedestrian Plan).
City of Folsom	Adopted 2007.
SACOG	Regional Bicycle, Pedestrian, and Trails Master Plan adopted November 2004. Amended July 2007 and August 2009. Updated June 2013.

8.5 Evaluation Summary of 2009 Triennial Report Land Use and Transportation Programs

Table 8.5 summarizes the actual emission reductions for the District's Land Use and Transportation Programs compared to its expected emission reductions. Emission reductions from all implemented land use projects and transportation control measures in the District total about 0.03 tons per day of ROG and 0.34 tons per day of NO_X from 2009 to 2013, slightly less than the anticipated reductions of 0.03 tons per day ROG and 0.45 tons per day NO_X. In addition, SMAQMD staff is working with appropriate land use jurisdictions to ensure that air quality mitigation measures continue to be monitored and enforced.

Table 8.5 2009 Triennial Report - Land Use and Transportation Control Measures

Control Measure/Program Categories	Previously Proposed Action and Schedule[a]	Expected Emission Reductions[a] (tons/day)		Actual Reductions Achieved (tons/day)	
		ROG	NO_X	ROG	NO_X
Land Use Measures					
CEQA Construction Mitigation Program	To be implemented through 2012	n/a	0.45	n/a	0.32 (avg.)
CEQA Land Use Operational Mitigation Program[b] -Laguna Ridge Specific Plan (6.8% complete) -Sunridge Specific Plan (13.7% complete) -Elverta Specific Plan (0% complete) -Natomas Central (33.5% complete) -Capital Village (87% complete)	To be implemented through 2012	0.03	0.03	0.01	0.02
Indirect Source Rule for Construction	Recommended for rule development in 2010 and implementation in 2011	tbd	tbd	Rule determined not feasible and not adopted	
Indirect Source Rule for Land Use Operational Phase	Recommended for rule development in 2012 and adoption in 2014.	tbd	tbd	Rule determined not necessary and duplicative of other programs and not developed	
Land Use Measures Subtotal		**0.03**	**0.48**	**0.01**	**0.34**
Transportation Control Measures					
Additional Transit: Light Rail and Bus Rapid Transit	To be evaluated through 2012	Further study	Further study	tbd	
Promote Bicycle and Pedestrian Programs	To be evaluated through 2012	Further study	Further study	tbd	
Transportation Control Measures Subtotal		**tbd**	**tbd**	**tbd**	**tbd**
Total Land Use & TCM Reductions		**0.03**	**0.48**	**0.01**	**0.34**

n/a – not applicable
tbd – to be determined
[a] From the SMAQMD 2009 Triennial Report, Table 8-5.
[b] Accounts for incremental increase in operational emission reductions from land use projects over reductions previously credited.

8.6 Future Outlook Through 2016

Additional emission reductions are expected from existing and new land use projects in the future. The construction phase mitigation program is anticipated to continue achieving NO_X reductions. As market conditions improve and land use projects develop, additional reductions can be achieved in Sacramento County.

For the next triennial period 2014 through 2016, emission reductions from the CEQA Construction Mitigation Program are expected to average about 0.27 ton per day of NO_X. The anticipated emission reductions from the CEQA Land Use Operational Mitigation Program would be about 0.30 ton per day of ROG and 0.30 ton per day of NO_X.

Transit projects will be continue to be evaluated and tracked as TCM further study measures to provide and encourage alternative transportation modes. The District will continue to promote and help integrate additional bicycle and pedestrian projects and programs in local jurisdictions.

The District is working with other agencies and jurisdiction partners to design and build a Bike Share system to provide bicycles for shared public use at 80 stations in Sacramento, West Sacramento, and Davis. The bikes will be available to purchasers of daily, multiday, monthly, or annual memberships. Bike Share will help Sacramento's transit riders, residents, tourists, and workers access jobs, goods, services, meetings, and entertainment. The target project completion date is late 2015.

When feasible emission reduction quantification methodologies become available, emission reductions from transit, bicycle, and pedestrian projects will be included in future reports. However, it is expected that some projects with air quality benefits will not be quantifiable. Table 8.6 summarizes the list of anticipated Land Use and Transportation projects through 2016.

Table 8.6 Land Use and Transportation Control Measures Through 2016

Control Measure/Program Categories	Schedule	Estimated Emission Reductions (tons/day)		Estimated Cost Effectiveness ($/ton)
		ROG	NO_X	
Land Use Measures				
CEQA Construction Mitigation Program (on-going)	through 2016	n/a	0.27	$17,720
CEQA Land Use Operational Mitigation Program (on-going) -American River College Campus Master Plan -Capital Village -Continental Plaza -Elverta Specific Plan -Laguna Ridge Specific Plan -Natomas Central -North Watt Avenue Corridor Plan -Northwest Land Park -Suncreek -Sunridge Specific Plan -Walker Park and Quail Hollow Elementary School -Wal-Mart Supercenter in North Highlands -Folsom Blvd Transit Area Plans	through 2016	0.30	0.30	Unknown
Land Use Measures Subtotal		**0.30**	**0.57**	
Transportation Control Measures				
Additional Transit: Light Rail and Bus Rapid Transit (on-going)	through 2016	Further study	Further study	tbd
Promote Bicycle and Pedestrian Programs (on-going) - Bike Share	through 2016	Further study	Further study	tbd
Transportation Control Measures Subtotal		**tbd**	**tbd**	
Total Land Use & TCM Reductions		**0.30**	**0.57**	

n/a – not applicable
tbd – to be determined

8.7 References

CAPCOA. *Quantifying Greenhouse Gas Mitigation Measures, A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation.* California Air Pollution Control Officers Association: Sacramento, CA. August 2010.

EPA. *Technical Support Document for EPA's Rulemaking for the California State Implementation Plan Regarding San Joaquin Valley Unified Air Pollution Control District Rule 9510, Indirect Source Review (ISR).* Environmental Protection Agency, Region IX, San Francisco, CA. 10 May 2010.

EPA. *Revisions to the California State Implementation Plan, San Joaquin Valley Unified Air Pollution Control District.* Federal Register, Volume 76, No. 89 May 9 2011. p. 26609-26615.

SACOG. *Regional Bicycle, Pedestrian, and Trails Master Plan*. Sacramento Area Council of Governments: Sacramento, CA. 20 June 2013.

SacRT. *South Sacramento Corridor Phase 2 Project: Supplemental Final Environmental Impact Statement/Subsequent Final Environmental Impact Report.* Sacramento Regional Transit: Sacramento, CA. September 2008. Web 4 June 2014. <http://blueline2crc.com/wp-content/uploads/2013/08/FDEIR_Ch4-AffectedEnvironment.pdf>

SacRT. *Final Environmental Impact Report. DNA Light Rail Transit MOS-1 Project.* Sacramento Regional Transit: Sacramento, CA. April, 2009. Web. 4 June 2014. < http://www.sacrt.com/dna/news/default.html>

SMAQMD et al. *Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan*. Sacramento Metropolitan Air Quality Management District: Sacramento, CA. 26 March 2009.

SMAQMD. *Recommended Guidance for Land Use Emission Reductions Version 3.1 (for Operational Emissions).* Sacramento Metropolitan Air Quality Management: Sacramento, CA. June 2014. Web. 4 June 2014. < http://www.airquality.org/ceqa/RecommendedGuidanceLandUseEmissionReductions.pdf >

9. COMMUNITY EDUCATION PROGRAMS

9.1 Spare The Air (STA) Program

The Spare The Air Program is a year-round public education program with an episodic ozone reduction element during the summer ozone season, plus general awareness throughout the rest of the year. It is designed to inform people when air quality is unhealthy and achieve voluntary emission reductions by encouraging them to reduce vehicle trips on high ozone days. The STA Program has operated in the Sacramento federal ozone nonattainment region (which includes Sacramento County, Yolo County, and areas of El Dorado, Placer, Solano, and Sutter Counties) since 1995 and has been funded largely by Congestion Mitigation and Air Quality (CMAQ) funds and air districts' local matching funds.

Highlights of the program include:

- A website (www.SpareTheAir.com) with daily regional air quality forecasting, historical air quality data, pollutant health effects, transportation tips to drive less, and other ways to reduce pollution.
- Episodic STA advisories with free Air Alert notifications, consisting of an email or text message notification system that sends the daily air quality forecast and alerts subscribers when air quality reaches certain unhealthy AQI (Air Quality Index) levels.
- Mapping of daily real time air quality data (ozone and $PM_{2.5}$ maps), updated hourly and featured on local newscasts.
- Production and placement of television and radio commercials and print and Web advertisements.
- Development of educational programs, brochures, and other printed materials distributed to the public, schools, and business community.
- Participation in school and community events throughout the region.

The STA Program also conducts an annual awareness survey to gauge program awareness and effectiveness and quantify emission reductions from the decrease in light duty vehicle activity. The current STA Program is a transportation control measure (TCM) included in SACOG's Metropolitan Transportation Plan (MTP2035) (SACOG, 2012).

9.2 Evaluation of Spare The Air Program

Regional awareness of the air quality problem and the STA Program remains high. Each year, phone surveys in the Sacramento region are conducted immediately after STA days. The survey data and air quality benefits are evaluated for the entire Sacramento region, as well as the individual air districts (Sacramento Metropolitan Air Quality Management District, Yolo-Solano Air Quality Management District, El Dorado

County Air Quality Management District, and Placer County Air Pollution Control District).

The STA survey results for Sacramento County only (Sacramento Metropolitan AQMD) since 2009 are listed in Table 9.1. The results indicated an average of 26 percent of drivers knew the air was forecast to be unhealthy and said they reduced driving by one or more trips. In addition, the phone surveys showed that about 0.62 percent of all respondent drivers were purposefully driving less on STA days, because they were aware of the air pollution advisory and wanted to improve air quality in the region.

Employer and community participation remained strong. Over 3,100 businesses, community groups and schools were STA partners in 2013. In addition, 918 residents followed the STA campaign on Facebook and 889 followed the District on Twitter. These partners all assisted the District in communicating STA advisories plus general air quality information to their employees, customers, students, friends and family.

Table 9.1 Results of "Spare The Air" Survey Sacramento County Only

Year	Percent STA Respondents Who Drove Less on STA Days	Percent STA Respondent Drivers Purposefully Driving Less on STA Days
2009 (5 STA days)	23	1.2
2010 (6 STA days)	18	0.5
2011 (5 STA days)	22	0.8
2012 (6 STA days)	33	0.0
2013 (2 STA days)	32	0.6

Sources: Evaluation of the 2009 Sacramento Region Spare The Air Campaigns, Aurora Research Group, 2009.
Evaluation of the 2010 Sacramento Region Spare The Air Campaigns, Aurora Research Group, 2010.
Evaluation of the 2011 Sacramento Region Spare The Air Campaigns, Aurora Research Group, 2011.
Evaluation of the 2012 Sacramento Region Spare The Air Campaigns, Meta Research, 2013.
Evaluation of the 2013 Sacramento Region Spare The Air Campaigns, Meta Research, 2014.

9.3 Estimated Emission Reductions

As a result of extensive research conducted by EPA and CARB, enhanced procedures to adequately quantify participation in the STA Program were developed. That methodology is incorporated into STA surveys conducted by Aurora Research Group in 2009-2011 and Meta Research, Inc. in 2012 and 2013. District staff previously predicted 0.06 tons per day (tpd) of Reactive Organics Gaseous (ROG) and 0.05 tpd of Oxides of Nitrogen (NO_X) for the STA program.

Based on 2009-2013 survey data, the air quality benefits due to the efforts of the STA Program can be evaluated. For 2009-2013, the STA day emission reductions on average were about 0.04 tpd and 0.03 tpd for ROG and NO_X respectively. Table 9.2 contains the estimated number of Sacramento County trips reduced and associated emission reductions on a STA day during 2009-2013.

Table 9.2 Estimated Emission Reductions from "Spare The Air" Program Sacramento County Only

Year	STA Daily Trips Reduced[a]	ROG[b] Emission Factor (grams/trip)	NO_X[b] Emission Factor (grams/trip)	ROG Reductions (tons/day)	NO_X Reductions (tons/day)
2009 (5 STA days)	36,515	2.75	2.07	0.11	0.08
2010 (6 STA days)	13,818	2.50	1.86	0.04	0.03
2011 (5 STA days)	18,491	2.30	1.66	0.05	0.03
2012 (6 STA days)	0	2.17	1.54	0.00	0.00
2013 (2 STA days)	5,672	1.93	1.36	0.01	0.01

[a] The average number of trips reduced on STA days minus Control days are from STA Campaign Evaluation Reports for 2009, 2010 and 2011 prepared by the Aurora Research Group. The average number of trips reduced on STA days minus Control days are from STA Campaign Evaluation Reports for 2012 and 2013 prepared by Meta Research.

[b] Emission factors from EMFAC2007 (for 2009, 2010, & 2011) and EMFAC2011 (2012 & 2013) for average summer day emissions/trip for Sacramento County light duty automobiles and light duty truck categories for specific years indicated.

9.4 Evaluation Summary of 2009 Triennial Report for Community Education Programs

Table 9.3 contains an evaluation summary of the 2009 Triennial Report projections for District Community Education Programs. The estimated actual ROG and NO_X emission reductions achieved for the STA Program were within the expected range for an average STA day during 2009-2013.

Table 9.3 2009 Triennial Report - Community Education Programs

Control Measure/Program Categories	Schedule[a]	Previously Expected Emission Reductions[a] (tons/day)		Actual Reductions Achieved (tpd)[b]	
		ROG	NO_X	ROG	NO_X
Spare The Air	through 2012	0.06	0.05	0.00-0.11	0.00-0.08

[a] From the SMAQMD 2009 Triennial Report, Table 9-4.

[b] From Table 9.2.

9.5 Future Outlook Through 2016

The District will continue its regional STA Program and other various public outreach activities in the future. This program currently costs approximately $600,000 per year and is a Transportation Control Measure in the State Implementation Plan. The 2013/2016 MTIP (SACOG, 2012a) includes program funding through 2016 using annual federal CMAQ grants of $600,000 with required local matching funds provided by the District, the Placer County APCD, the Yolo-Solano AQMD, and the El Dorado County AQMD.

Future emission reductions are estimated for the STA Program based on previous participant survey results, and taking into account slightly declining fleet motor vehicle emission factors. The expected Sacramento County emission reductions on STA days during the next triennial period are estimated to be about 0.04 tpd of ROG and 0.03 tpd of NO_X.

In addition, the cost effectiveness of the STA Program is estimated. Assuming that a typical ozone season has 6 STA days, the cost effectiveness is approximately $953,000 per ton of combined ROG and NO_X emission reductions for the Sacramento region. The cost effectiveness will actually vary from year to year due to the variable emission reductions that are dependent on the number of STA days and public response.

The District has performed an All Feasible Measures analysis of community education activities being done by the Bay Area AQMD (2010 Clean Air Plan, Vol. 2 Section C-4), San Joaquin Valley Unified APCD (2007 Ozone Plan, Chapter 8; 2013 Plan for Revoked 1-hour Ozone Standard, Chapter 3.5), and the South Coast AQMD (2012 AQMP, Chapter 4 – EDU-01) as part of those agencies most recently submitted Ozone Plans. The analysis concluded there are no measures not already being undertaken by the District that are feasible measures for ozone reductions.

Table 9.4 summarizes the projected emission reduction benefits and cost effectiveness from the District's Community Education Programs through 2016.

Table 9.4 Community Education Programs Through 2016

Control Measure/Program Categories	Schedule	Estimated Emission Reductions Sacramento County in 2016 [a] (tons/day)		Cost Effectiveness ($/ton)
		ROG	NO_X	
Spare The Air (on-going)	through 2016	0.04	0.03	~$953,000[b]

[a] Based on estimated 1% of projected 1 million Sacramento County licensed drivers each reducing 3 trips per STA day in 2016 and using the interpolation of CARB's 2014 and 2017 Sacramento County on-road motor vehicle trip and emission forecasts which based on EMFAC2011 model runs with SACOG latest vehicle travel data.

[b] Used estimated regional emissions reductions per STA day in Sacramento Federal Ozone Nonattainment Area in 2016 (0.056 tpd of ROG and 0.049 tpd of NO_X), and 6 STA days per year at a projected annual cost of about $600,000 for the STA Program, i.e. 600,000 / (6 × (0.056 +0.049)) ≈ $953,000/ton.

9.6 References

SACOG. *Metropolitan Transportation Plan/Sustainable Communities Strategy 2035*. Sacramento, CA: Sacramento Area Council of Governments. [2012.]

SACOG. *2013/2016 Metropolitan Transportation Improvement Plan.* Sacramento, CA: Sacramento Area Council of Governments. [2012a.]

SMAQMD, et al. 2013 Revision to the *Sacramento Regional 8-Hour Ozone Attainment Demonstration and Reasonable Further Progress Plan*. Sacramento, CA: Sacramento Metropolitan Air Quality Management District, 26 September, 2013.

10. OZONE TRANSPORT MITIGATION

10.1 "All Feasible Measures" Control Strategy

The ozone transport mitigation regulations require upwind districts to adopt and implement "all feasible measures" as expeditiously as possible[20] regardless of their attainment status, until their specified downwind districts attain the state ozone standard. The ozone transport mitigation regulations define "all feasible measures" as "…air pollution control measures, including but not limited to emissions standards and limitations, applicable to all air pollution source categories under a district's authority that are based on the maximum degree of reductions achievable for emissions of ozone precursors, taking into account technological, social, environmental, energy and economic factors, including cost-effectiveness."[21]

The Sacramento Metropolitan Air Quality Management District (SMAQMD or District) also must comply with the "all feasible measures" requirement in the California Clean Air Act for achieving an alternative measure of progress, pursuant to Section 40914 of the Health and Safety Code (H&SC).

Chapters 6 through 9 discuss measures identified in the 2009 Triennial Report and summarize the evaluation or disposition of each measure, including estimates of emissions benefits. The chapters also include measures to be considered or implemented during the next triennial period, through 2016. Together, this Triennial Report satisfies the "all feasible measures" requirements.

10.2 BARCT Implementation

The transport mitigation regulations require the adoption and implementation of best available retrofit control technology (BARCT) on all existing stationary sources of ozone precursor emissions as expeditiously as practicable[22]. As defined in Section 40406 of the H&SC, BARCT "…means an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source."

The District has applied BARCT requirements to existing stationary sources with ROG and NO_X emissions as part of the overall control strategy to attain state and federal ozone standards as expeditiously as practicable.

[20] California Code of Regulations, Title 17, §70600(b)(1)(A).
[21] California Code of Regulations, Title 17, §70600(a)(1).
[22] California Code of Regulations, Title 17, §70600(b)(1)(B).

10.3 Status of No Net Increase Program

The transport mitigation regulations require specified upwind districts to update their no net increase emission threshold for new source review offset requirements by December 31, 2004, to be as stringent as the threshold for their downwind districts.[23] No net increase thresholds are part of a district's stationary source permitting program. New or modified stationary sources with emissions, or the potential to emit, above the threshold must offset their emissions increase with additional emission reductions from elsewhere at the source or from other sources. The purpose is to achieve no net increase in emissions within the District.

The District's no net increase threshold was set at 15 tons per year before CARB adopted the no net increase requirement. Since the San Joaquin Valley Air Pollution Control District is the downwind district with the lowest threshold level at 10 tons per year, the SMAQMD was required to lower its threshold to 10 tons per year. The SMAQMD approved the required change to Rule 202, New Source Review, in 2005. The changes to Rule 202, adopted 2012, maintain the no net increase requirements.

10.4 Measures Mitigating Transport to Downwind Areas

The transport mitigation regulations require that each specified upwind district "…shall, in consultation with the downwind districts, review the list of control measures in its most recently approved attainment plan and make a finding as to whether the list of control measures meets the requirements…" in the regulations.[24] The Sacramento air district's downwind areas include the Upper Sacramento Valley, the Mountain Counties Air Basin, the San Joaquin Valley, and the San Francisco Bay Area.

Staff will consult with the downwind air districts on the compiled list of control measures in this Triennial Report and Plan Revision.

This Triennial Report and Plan Revision Chapters 6 through 9 discuss control measure evaluations, the results of which are summarized in:

- Stationary Source measures in Table 6.2,
- Mobile Source measures in Table 7.5,
- Land Use and Transportation in Table 8.5, and
- Spare The Air Program in Table 9.4.

This Triennial Report and Plan Revisions meets the "all feasible measures" requirement for satisfying the ozone transport mitigation regulations.

[23] California Code of Regulations, Title 17, §70600(b)(1)(C).
[24] California Code of Regulations, Title 17, §70600(c)(1).

11. SUMMARY AND CONCLUSIONS

Air quality indicators show on average a 30% improvement in ozone concentrations since the late 1980's and a 96% or more improvement in exposure to unhealthy ozone levels. ROG and NO_X emissions have been reduced by an average of 3.3% and 4.2% per year, respectively, over the period 2011-2013, and are projected to continue to decline by approximately 1.9% and 4.7% per year, respectively, over the period 2014-2016. This represents expeditious progress toward attaining the state air quality standards pursuant to the California Clean Air Act. This plan also satisfies requirements to mitigate the District's transported pollutants impact on downwind areas.

11.1 Control Programs Summary

This Triennial Report and Air Quality Plan Revision evaluates and reports the amounts of emission reductions achieved from control measures implemented since 2009 and anticipated emission reductions in future years.

11.1.1 Stationary Source Control Program

The 2009 Triennial Report included six stationary source measures. Two were amended with expected emission reductions of 0.69 ton per day of ROG and 0.32 ton per day of NO_X by 2013. Rule 461: Natural Gas Production and Processing and Rule 471: Asphaltic Concrete were evaluated and not recommended for adoption at that time. Two rules were not completed, Rule 412: Stationary IC Engines and Rule 442: Architecture Coatings and are now scheduled to be considered by the Board of Directors in 2015. These delays were due to the following high priority and resource intensive work requirements:

- New Source Review rules (Rules 202, 214, and 217) and Rule 203 Prevention of Significant Deterioration.
- 2013 Revision to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan and
- $PM_{2.5}$ Implementation Plan and Re-designation Request for Sacramento $PM_{2.5}$ Nonattainment Area.

District staff evaluated the feasibility of control measures adopted rules by other air districts in California. The results of the evaluation suggest potentially cost effective emissions reductions from changes to Rule 460 Adhesive and Sealants, and four new emission categories that are not currently regulated. The new categories miscellaneous combustion sources, Metalworking Fluids and Direct Contact Lubricants, Composting Operations, and Liquid Petroleum Gas Transfer and Dispensing. Initial estimates of potential emission reductions of 1.53 tons ROG per day and 0.20 tons NO_X per day.

However, costs and emissions reductions will be further evaluated during the rule development process.

11.1.2 District Mobile Source Control Programs

Mobile Source Control Programs use market-based incentives to promote the accelerated introduction of low emission vehicle, engine, and fuel technologies to the Sacramento area. The Vehicle and Engine Technology Program focuses on reducing NO_X emissions from heavy-duty diesel engines associated with on-road vehicles, self-propelled off-road vehicles, and agricultural pump engines.

The program spent $48 million since 2009 and achieved 1.11 tons NO_X per day emissions reductions from replacing or retrofitting over 1,410 on-road heavy-duty vehicles in the Sacramento Federal Nonattainment Area (SFNA). The off-road program spent over $54 million decreasing NO_X emissions by 1.76 tons per day in the SFNA from 777 vehicles and agricultural water pumping engines. This amounts to a total reduction of 2.87 NO_X tons per day from the mobile source NO_X programs since 2009.

Staff evaluated an Accelerated Vehicle Retirement program but did not include it as an option in the on-road incentive program because it could not compete with the Bureau of Automotive Repair (BAR) vehicle retirement program.

Mobile Source Incentive programs will continue through 2016 with anticipated funding of about $9 million annually from SECAT, DMV, and the Carl Moyer Program. Initial estimates of the emission reduction benefits from SECAT and DMV funding are approximately 0.05 tons per day ROG and 0.45 tons per day NO_X for on-road mobile projects and 0.06 ton per day ROG and 0.22 ton per day NO_X for off-road mobile projects in SFNA. The Carl Moyer program is a State program and the estimated emission reductions for Sacramento County are not certain at this time.

11.1.3 Land Use and Transportation Programs

The District's Land Use and Transportation Programs include mitigation measures that reduce air pollutant emissions during construction and operational phases of land use development projects. District staff reviewed projects subject to CEQA and recommend mitigation if a project has potential air quality impacts.

Mitigated construction projects must achieve a minimum 20 percent NO_X reduction from diesel construction equipment compared to a calculated statewide average emission rate. Construction mitigation achieved NO_X emissions reductions of about 0.32 tons per day since 2009.

Proponents of major development projects prepare an operational mitigation plan by selecting from a menu of over 30 recommended mitigation measures to achieve a

minimum 15 percent reduction of ROG and NO_X emissions. The operational mitigation measures were applied to dwelling unit phase completions for one major development project in Sacramento County during 2009-2013, resulting in reductions of about 0.01 tons per day of ROG and 0.02 tons per day of NO_X.

Staff evaluated Indirect Source Review (ISR) rules in 2010 and 2011. In late 2011, the District's Board of Directors approved staff's recommendation to not adopt ISR rules because they were not feasible or duplicated ARB rules, SB375 (2008), and district programs.

District staff is continuing their efforts to work with local jurisdictions in Sacramento County to evaluate transit projects and to implement bicycle and pedestrian programs. For the next triennial period through 2016, the District will continue to implement its Land Use and Transportation Programs.

11.1.4 Community Education Programs

The District's Community Education Programs have continued to lead and coordinate efforts pertaining to "Spare The Air" and other voluntary driving curtailment strategies. The voluntary driving curtailment strategies include the daily air quality ozone forecasts, hourly-updated Web site ozone maps, and personal electronic messages to alert subscribers about impending unhealthy air quality episodes. The program also includes production and placement of commercials and advertisement for upcoming Spare The Air Day announcement in mass media, development of education programs, and participation in school and community events throughout the region.

Continued public outreach using multi-media approaches along with employer and community participation have increased regional awareness of the air quality problem and solutions. The Sacramento County emission reduction benefits during 2014-2016 are estimated to be about 0.04 tons per day (tpd) of Reactive Organic Gases (ROG) and 0.03 tpd of Nitrogen Oxides (NO_X) for the Spare The Air program. Expected future funding for the on-going operation of Spare The Air will provide continued benefits for the next triennial period through 2016.

11.2 Ozone Transport Mitigation

The Ozone Transport Mitigation regulations require upwind districts to adopt and implement "all feasible measures" as expeditiously as practicable, regardless of their attainment status, until the downwind districts attain the State ozone standard. Based on recent extensive control measure evaluations, new potential emission reduction opportunities were identified. Staff will consult with downwind districts on the control measures to satisfy the "all feasible measures" requirement.

11.3 Conclusions

Sacramento Air District has made considerable progress in reducing ozone precursor emissions from stationary and mobile sources. Air quality indicators show 16-43% improvement in expected peak day 1-hour ozone concentrations and 96% or more improvement in exposure to unhealthy 1-hour ozone concentrations since the late 1980's. ROG and NO_X emissions have also been reduced by average of 3.3% and 4.2% per year, respectively, over the period 2011 through 2013.

Table 11.1 is a summary of the stationary source, mobile source, land use, transportation, and community education measures in the 2009 Triennial Report comparing projected emission reductions to actual emission reductions achieved, and actual rule adoption dates. This summary shows that the actual NO_X emission reductions of 3.53 tons per day exceeded the projected estimate of 1.68 tons per day. The actual ROG emission reductions achieved of 1.30 tons per day fell slightly short of the projected 1.32 tons per day due to delays in adopting and implementing two rules.

Table 11.2 is a summary of 2009 Triennial Report further study measures. The Accelerated Vehicle Retirement Program was not implemented because it was determined to be uncompetitive with the BAR program.

Table 11.3 is the list of the potential control measures that will be evaluated or implemented through 2016. The projected emission reductions from this Triennial Report and Plan Revision measures is 1.98 tons ROG per day and 1.47 tons NO_X per day.

Table 11.4 lists further study measures implemented or evaluated by other jurisdictions or agencies.

This Triennial Report and Plan Revision satisfies the "all feasible measures" requirement. Air quality indicators and emissions projections demonstrate expeditious progress towards attaining California's ozone standards. This Triennial Report and Plan Revision satisfies the California Clean Air Act requirements and transport mitigation regulations.

Table 11.1 2009 Triennial Report Measures

District Control Programs [a]	Schedule	Previously Expected Emission Reductions (tons/day)		Actual Adoption Date and Emission Reductions Achieved (tons/day)	
		ROG	NO_X	ROG	NO_X
Stationary Source Measures (Rule No.)					
Natural Gas Fired Water Heaters (414)	To be amended 2010	---	0.20	Amended Mar 2010 ---	0.32
Automotive Refinishing (459)	To be amended 2010	0.10	---	Amended Aug 2011 0.69	---
Natural Gas Production and Processing (461)	To be adopted 2011	0.11	---	Not recommended due to a new regulation being developed by CARB	
Asphaltic Concrete (471)	To be adopted 2012	---	0.12 [b]	Not recommended due to minimal emission reductions	
Architectural Coatings (442)	To be adopted 2010	0.83	---	Not completed	
Stationary IC Engines (412)	To be amended 2011	---	0.01	Not completed	
District Mobile Source Control Programs					
Vehicle and Engine Technology Market-Based Incentive Program - On-Road Heavy-Duty Vehicles - Off-Road Vehicles and Ag. Pumps	To be implemented through 2012	To be implemented through 2012 $5 million funds annually 0.16 (On-Road) 0.03 (Off-Road) 0.19 (Total)	 0.73 (On-Road) 0.21 (Off-Road) 0.94 (Total)	2009-2013 $102.1 million funds 0.15 (On-Road) 0.45 (Off-Road) 0.60 (Total)	 1.11 (On-Road) 1.76 (Off-Road) 2.87 (Total)
Land Use and Transportation Control Measures					
CEQA Construction Mitigation Program	To be implemented through 2012	n/a	0.45	n/a	0.32 (avg)
CEQA Land Use Operational Mitigation Program - Laguna Ridge Specific Plan - Sunridge Specific Plan - Elverta Specific Plan - Natomas Central - Capital Village	To be implemented through 2012	0.03	0.03	0.01	0.02
Indirect Source Rule for Construction	Recommended for rule development in 2010 and implementation in 2011	tbd	tbd	Rule determined not feasible and not adopted	
Indirect Source Rule for Land Use Operational Phase	Recommended for rule development in 2012 and adoption in 2014.	tbd	tbd	Rule determined not necessary and duplicative of other programs and not developed	

District Control Programs [a]	Schedule	Previously Expected Emission Reductions (tons/day)		Actual Adoption Date and Emission Reductions Achieved (tons/day)	
		ROG	NO_X	ROG	NO_X
Community Education Programs					
Spare The Air	To be implemented through 2012	0.06	0.05	0.00-0.11	0.00-0.08
Total Reductions		**1.32**	**1.68**	**1.30**	**3.53**

[a] Compiled from Tables 6.1, 7.4, 8.5, and 9.3.

[b] Asphaltic concrete measure was proposed to be implemented in 2014. Therefore, NO_X reductions were not included in the original estimate.

Table 11.2 Further Study Measures

District Control Programs	Previously Proposed Action and Schedule	Previously Expected Emission Reductions (tons/day)		Triennial Evaluation or Updated Schedule
		ROG	NO_X	
District Mobile Source Control Programs				
Accelerated Vehicle Retirement	To be considered as added option to on-road incentive program by 2010	Further study	Further study	Determined to be uncompetitive with BAR program
Land Use and Transportation Control Measures				
Additional Transit: Light Rail and Bus Rapid Transit	To be evaluated through 2012	Further study	Further study	See Section 8.4 for details
Promote Bicycle and Pedestrian Programs	To be evaluated through 2012	Further study	Further study	See Section 8.4 for details

[a] Summary evaluation compiled from Tables 7.4 and 8.6.

Table 11.3 Potential Control Measures Through 2016

District Control Programs	Schedule	Initial Estimated Emission Reductions[b] (tons/day)		Cost Effectiveness[b] ($/ton)
		ROG	NO_X	
Stationary Source Measures (Rule No.)				
Stationary IC Engines (412)	2015	---	0.01	$10,800
NO_X from miscellaneous combustion source (419)	2016	---	0.19	$8,000
Architectural Coatings (442)	2015	1.1	---	$2,480
Adhesive and Sealants (460)	2016	0.02	---	$0
Metalworking Fluids and Direct-Contact Lubricants (467)	2016	0.06	---	$2,860
Composting Operations (489)	2016	0.05	---	$1,920
Liquid Petroleum Gas Transfer and Dispensing (490)	2016	0.3	---	$1,700
District Mobile Source Control Programs				
Vehicle and Engine Technology Market-Based Incentive Program (on-going) - On-Road Heavy-Duty Vehicles - Off-Road Vehicles and Ag. Pumps	Through 2016	0.05 (On-Road) 0.06 (Off-Road) 0.11Total	0.45 (On-Road) 0.22 (Off-Road) 0.67Total	$17,724
Land Use Control Measures				
CEQA Construction Mitigation Program (on-going)	Through 2016	n/a	0.27	$17,720
CEQA Land Use Operational Mitigation Program[a] (on-going)	Through 2016	0.30	0.30	Unknown[c]
Community Education Programs				
Spare The Air Program[d] (on-going)	Through 2016	0.04	0.03	~$953,000
Total Reductions		**1.98**	**1.47**	

[a] Summary of measures compiled from Tables 6.2, 7.5, 8.6, and 9.4.

[b] Emission reductions and cost effectiveness are preliminary estimates. A measure may not be implemented if determined to not cost effective or feasible. See control measure descriptions in Appendix A.

[c] Cost effectiveness data not quantified and depends on project-specific emission reduction measures selected by the developer.

[d] Actual emission reductions & cost effectiveness are dependent on the number of Spare The Air days and public response each year.

Table 11.4 Summary of Proposed Further Study Measures Through 2016

District Control Programs	Proposed Action and Schedule	Expected Emission Reductions (tons/day)		Cost Effectiveness ($/ton)
		ROG	NO_X	
Transportation Control Measures				
Additional Transit: Light Rail and Bus Rapid Transit (on-going)	through 2016	Further study	Further study	tbd
Promote Bicycle and Pedestrian Programs (on-going)	through 2016	Further study	Further study	tbd

tbd – to be determined
[a] compiled from Table 8.6