

# Bay Area 2005 Ozone Strategy



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of Bay Area  
Governments

**BAY AREA**  
**2005 OZONE STRATEGY**

**DRAFT**  
**SEPTEMBER 2005**



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## SUMMARY

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The Bay Area Air Quality Management District (Air District or BAAQMD), in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG), has prepared the Bay Area 2005 Ozone Strategy. The Ozone Strategy is a roadmap showing how the San Francisco Bay Area will achieve compliance with the State one-hour air quality standard for ozone as expeditiously as practicable and how the region will reduce transport of ozone and ozone precursors to neighboring air basins.

Ozone conditions in the Bay Area have improved significantly over the years. Ozone levels – as measured by peak concentrations and the number of days over the State one-hour ozone standard – have declined substantially as a result of aggressive programs by the Air District, MTC and our regional, State and federal partners. This represents great progress in improving public health conditions for Bay Area residents. The 2005 Ozone Strategy provides useful background information on topics including the Bay Area's emission inventory, historical ozone trends and the implementation status of past control measures.

However, there is still a need for continued improvement to meet the State one-hour ozone standard. Accordingly, the Ozone Strategy describes how the Bay Area will fulfill California Clean Air Act (CCAA) planning requirements for the State one-hour ozone standard and transport mitigation requirements through the proposed control strategy. The control strategy includes stationary source control measures to be implemented through Air District regulations; mobile source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with MTC, local governments, transit agencies and others. The Air District will continue to adopt regulations, implement programs and work cooperatively with other agencies, organizations and the public on a wide variety of strategies to improve air quality in the region and reduce transport to neighboring air basins.

The 2005 Ozone Strategy explains how the Bay Area plans to achieve these goals with regard to ozone, and also discusses related air quality issues of interest including our public involvement process, climate change, fine particulate matter, the Air District's Community Air Risk Evaluation (CARE) program, local benefits of ozone control measures, the environmental review process, national ozone standards and photochemical modeling.

The 2005 Ozone Strategy is a comprehensive document that describes the Bay Area's strategy for compliance with State one-hour ozone standard planning requirements, and is a significant component of our region's commitment to achieving clean air to protect the public's health and the environment.

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## ABBREVIATIONS AND TERMINOLOGY

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ABAG	Association of Bay Area Governments
AFM	All Feasible Measures
ARB	(California) Air Resources Board
ATCM	Airborne Toxic Control Measure
AQMD	Air Quality Management District
BAAQMD	Bay Area Air Quality Management District
BACM	Best Available Control Measures
BACT	Best Available Control Technology
BAR	Bureau of Automotive Repair
BARCT	Best Available Retrofit Control Technology
BART	Bay Area Rapid Transit District
BURDEN	Computer program that uses vehicle activity data along with EMFAC to calculate motor vehicle emissions
CAA	(Federal) Clean Air Act
CAP	Clean Air Plan (for State ozone standard)
CAPCOA	California Air Pollution Officers Association
CARE	Community Air Risk Evaluation program
CCAA	California Clean Air Act
CCOS	Central California Ozone Study
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CMA	Congestion Management Agency
CMAQ	Congestion Management and Air Quality (Improvement Program)
CMP	Congestion Management Program
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CTC	California Transportation Commission
DV	Design Value
DMV	(California) Department of Motor Vehicles
EIR	Environmental Impact Report
EMFAC	ARB model (including emission factors) to calculate motor vehicle emissions
EPA	(United States) Environmental Protection Agency
EPDC	Expected Peak Day Concentration
Fed. Reg.	Federal Register
FS	Further Study measure
HC	Hydrocarbons
HOV	High-Occupancy Vehicle
hp	Horsepower
I & M	(Motor Vehicle) Inspection and Maintenance Program ("Smog Check" program)

LEV	Low Emission Vehicle
LRT	Light Rail Transit
MAC	(BAAQMD) Modeling Advisory Committee
MPG	Miles Per Gallon
MS	Mobile Source measure
MTC	Metropolitan Transportation Commission
MTOS	Metropolitan Traffic Operations System
MVEB	Motor Vehicle Emissions Budget
NAAQS	National Ambient Air Quality Standards
NO <sub>x</sub>	Oxides of Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NSR	New Source Review
O <sub>3</sub>	Ozone
OBD	On-Board Diagnostic program
OWG	(BAAQMD) Ozone Working Group
PM <sub>2.5</sub>	Particulate Matter less than 2.5 microns in diameter
PM <sub>10</sub>	Particulate Matter less than 10 microns in diameter
ppb	Parts per billion
pphm	Parts per hundred million
ppm	Parts per million
PSI	Pollutant Standard Index
RACC	Regional Agency Coordinating Committee
RACM	Reasonably Available Control Measure
RFG	Reformulated Gasoline
RFP	Reasonable Further Progress
RM2	Regional Measure 2
ROG	Reactive Organic Gases
RTP	Regional Transportation Plan
RVP	Reid Vapor Pressure (measure of gasoline volatility)
SIP	State Implementation Plan
SS	Stationary Source measure
TAC	Toxic Air Contaminant
TCMs	Transportation Control Measures
TDA	Transportation Development Act
TFCA	(BAAQMD) Transportation Fund for Clean Air
TIP	Transportation Improvement Program
TLC/HIP	(MTC) Transportation for Livable Communities / Housing Incentive Program
tpd	Tons per day
VMT	Vehicle Miles Traveled
VOC	Volatile organic compounds
ZEV	Zero Emission Vehicle

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## **SECTION 1 - INTRODUCTION**

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The Bay Area Air Quality Management District (Air District or BAAQMD), in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG), has prepared the 2005 Ozone Strategy for the San Francisco Bay Area. The 2005 Ozone Strategy is a roadmap showing how the region will continue to make progress toward meeting the State one-hour ozone standard as expeditiously as practicable, and how the region will reduce transport of ozone and ozone precursors to neighboring air basins.

Ozone conditions in the Bay Area have improved significantly over the years. Ozone levels – as measured by peak concentrations and the number of days over the one-hour State standard – have declined substantially as a result of aggressive programs by the Air District, MTC and our regional, State and federal partners. This represents real progress in improving conditions affecting public health for Bay Area residents. However, the region has not attained yet the State one-hour ozone standard<sup>1</sup>, and also must reduce pollution transported to downwind regions as required by the California Clean Air Act. Therefore, the region must continue its long-term progress in reducing ozone levels by reducing emissions of pollutants that form ozone. That is the objective of this 2005 Ozone Strategy.

### **OZONE HEALTH EFFECTS AND BACKGROUND**

Ozone is the principal component of smog. It is highly reactive, and at high concentrations near ground level can be harmful to public health<sup>2</sup>. The San Francisco Bay Area air basin – consisting of all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo and Santa Clara counties, and the southern portions of Solano and Sonoma counties – periodically experiences ozone levels in excess of the standards.

Ozone is a highly reactive gas that can damage the tissues of the lungs and respiratory tract. High concentrations of ozone irritate the nose, throat and respiratory system and constrict the airways. Ozone also can aggravate other respiratory conditions such as asthma, bronchitis and emphysema. Repeated exposure to high ozone levels can make people more susceptible to respiratory infection and lung inflammation and permanently damage lung tissue. Children are most at risk, as they are active outdoors in the summer, when ozone levels are highest. Seniors and people with respiratory illnesses are also especially sensitive to ozone's effects. Even healthy adults, working or

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<sup>1</sup> In April 2005, ARB established a new eight-hour average ozone standard of 0.070 ppm. The new standard is expected to take effect in 2006. ARB is currently working on designations and implementation guidance for the new standard. The one-hour state standard has been retained. Previously EPA adopted a new federal eight-hour standard of 0.08 ppm and after several years of litigation is currently finalizing planning requirements for the new standard including revocation of the federal one-hour ozone standard. The San Francisco Bay Area has not attained either the federal or State eight-hour standards, and will be taking action as necessary to address those standards as appropriate once the planning requirements have been established.

<sup>2</sup> While ground level ozone is a harmful air pollutant, ozone in the upper atmosphere is beneficial because it blocks the sun's harmful ultraviolet rays. The 2005 Ozone Strategy focuses on reducing ground level ozone only.



exercising outdoors during high ozone levels, can be affected. Ozone also damages trees, agricultural crops and other plants.

Ozone is not emitted directly from pollution sources. Instead, ozone is formed in the atmosphere through complex chemical reactions between hydrocarbons (or “reactive organic gases”) and nitrogen oxides, in the presence of sunlight. Ozone levels are usually highest on hot, windless summer afternoons, especially in inland valleys. The main sources of hydrocarbons are motor vehicles and evaporation of solvents, fuels and other petroleum products. The main sources of nitrogen oxides are motor vehicles and combustion.

Ozone is a regional pollutant. Emissions of hydrocarbons and nitrogen oxides throughout the Bay Area contribute to ozone formation, and emissions in one part of the region can impact air quality miles away. Therefore, efforts to reduce ozone levels focus on reducing emissions of hydrocarbons and nitrogen oxides throughout the region.

### **STATE ONE-HOUR OZONE STANDARD**

The State government has established ambient air quality standards (AAQS) for ground level ozone (and other air pollutants) that are intended to protect human health from adverse effects. Air quality standards define the maximum amount of a pollutant that can be present in outdoor air without harm to public health. The standards are generally set at levels low enough to protect even the most sensitive individuals in our communities. State standards are set by the California Air Resources Board (ARB). The California one-hour ozone standard is set at 0.09 parts per million (ppm). In April 2005, ARB established a new eight-hour average ozone standard of 0.070 ppm. ARB plans to retain the current one-hour State ozone standard and is currently working on designations and implementation guidance for the new eight-hour standard.

The Air District operates a network of air quality monitoring stations throughout the region to constantly monitor air quality conditions. Data from the air monitoring stations allow the Air District to determine whether the region meets ambient air quality standards and to track progress in improving air quality.

An exceedance of the State one-hour standard occurs if the average ozone concentration measured over a one-hour period at any Air District monitoring station is higher than the standard. In recent years, the State standard has been exceeded an average of 16 days per year.

Over time, as more research is conducted on ozone’s health effects and more sophisticated analytical tools become available, scientists and health professionals learn more about ozone’s effects and the concentrations that may be harmful. State law requires ARB to periodically review air quality standards to assure that they are sufficiently stringent to protect public health, particularly for those members of the public who are most sensitive to the effects of air pollution. Recent State legislation requires ARB, working with the State Office of Environmental Health Hazard Assessment to specifically consider exposure of and effects on infants and children when reviewing air quality standards.

## **PURPOSE AND ORGANIZATION OF THE 2005 OZONE STRATEGY**

The most recent plan for the State ozone standard was the 2000 Clean Air Plan (or “2000 CAP”). With the 2005 Ozone Strategy the Air District is addressing the planning requirements for the State one-hour ozone standard.

Section 1 of the 2005 Ozone Strategy provides an introduction and general overview of the document. Section 2 addresses State one-hour ozone planning requirements and consists of the region’s triennial update to our strategy to achieve the California one-hour ozone standard. Section 3 discusses various ozone-related air quality issues of concern to the Air District and the public. It also describes the environmental review process as well as the District’s efforts to encourage and facilitate public involvement in the development of the ozone strategy. Appendices provide detail on the public involvement process, control measure review and evaluation process, control measure descriptions, further study measures, and other technical support information.

### **State Planning Requirements**

Because the San Francisco Bay Area violates<sup>3</sup> the State one-hour ozone standard, the region is considered a nonattainment area for the State standard.<sup>4</sup> The California Clean Air Act requires regions that do not meet the State ozone standard to prepare plans for attaining the standard and to update these plans every three years. These plans must include estimates of current and future emissions of the pollutants that form ozone and a control strategy that includes “all feasible measures” to reduce these emissions. The plans must also include measures to reduce transport of air pollutants to downwind regions.

The first Bay Area plan for the State ozone standard was the 1991 Clean Air Plan. Subsequently, the Clean Air Plan was updated and revised in 1994, 1997, and 2000. Each of these triennial updates proposed additional measures to reduce emissions from a wide range of sources, including industrial and commercial facilities, motor vehicles, and “area sources” (scattered, individually small sources such as water heaters or paints and varnishes).

Section 2 of this 2005 Ozone Strategy is the latest triennial update to the Bay Area strategy to achieve the State one-hour ozone standard, including new control measures. The draft control measures (summarized in Section 2 and set forth in more detail in the appendices) are proposed to satisfy State ozone planning requirements.

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<sup>3</sup> A violation is different than an exceedance. An exceedance is a day with a maximum ozone concentration that is higher than the standard. An exceedance does not necessarily cause a violation. A violation occurs when enough exceedances have occurred for the region to be considered not in attainment of the standard according to ARB methodology.

<sup>4</sup> Designating an area as nonattainment for a State standard indicates that air quality in that area violates the established State standard. Area designations for State standards are made using air quality data for the prior three year period. The highest measured value, excluding exceedances from “extreme concentration events” or “exceptional events,” becomes the designation value. If the designation value is higher than the level of the State standard, the area is nonattainment.

## **Preparation of the Ozone Strategy and Public Involvement**

The 2005 Ozone Strategy has been prepared by the Air District, in consultation with MTC and ABAG. The preparation of the 2005 Ozone Strategy has involved many methods of public involvement including extensive public outreach throughout which staff explained the ozone planning process and solicited input from the public. More detailed information on the public involvement process is provided in both Section 3 and Appendix A of this document. The Air District Board of Directors will consider adoption of the 2005 Ozone Strategy and, upon adoption, will transmit it to ARB for their review and approval.

## **Other Elements**

The 2005 Ozone Strategy also includes several other elements that are not required to attain the State one-hour ozone standard, but are related to ozone control efforts and are being included to help the public understand the relationship between ozone planning and other environmental programs. The Air District implements numerous programs that are related in some way to ozone planning, or are otherwise of interest to the Air District and the public. The 2005 Ozone Strategy will discuss these related topics of interest, including:

- Public involvement process;
- Climate change programs to reduce greenhouse gas emissions;
- Fine particulate matter (PM), its sources and health effects, and programs to reduce fine PM emissions;
- Community Air Risk Evaluation (CARE) program;
- Local benefits of ozone control measures;
- National ozone standards, attainment status and related planning requirements;
- Photochemical modeling;
- Environmental review.

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## **SECTION 2 - TRIENNIAL UPDATE OF STATE OZONE STRATEGY**

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### **INTRODUCTION**

For over 15 years, the 1988 California Clean Air Act (CCAA), and subsequent amendments, have guided efforts throughout California to achieve State ambient air quality standards. This section of the 2005 Ozone Strategy for the San Francisco Bay Area addresses State ozone planning requirements of the CCAA (as amended).

### **CCAA PLANNING REQUIREMENTS**

The basic goal of the CCAA is to achieve health-based State ambient air quality standards by the earliest practicable date. The CCAA requires regions that violate the State ozone standard to prepare attainment plans that identify a strategy to attain the standard. Regional air quality plans are required to achieve a reduction in district-wide emissions of 5 percent per year for ozone precursors (California Health and Safety Code Section 40914).<sup>5</sup> If an air district is unable to achieve a 5 percent annual reduction, the adoption of all feasible measures on an expeditious schedule is acceptable, as an alternate strategy (Sec. 40914(b)(2)).

California classifies ozone nonattainment areas based on their "expected peak day concentration," which is an ozone reading that the region should not exceed more than once per year, on average, excluding exceptional or extreme readings. Legal requirements vary according to the severity of a region's ozone problem. The Bay Area is subject to CCAA requirements for "serious" areas. (Secs. 40921.5(a)(2), 40919). The Bay Area's efforts to meet the applicable CCAA requirements for ozone include the following:

### **ALL FEASIBLE MEASURES**

No non-attainment area in the state has been able to demonstrate a 5% reduction in ozone precursor pollutants each year. Consequently, most areas in the state, including the Bay Area, have opted to adopt "all feasible measures" as expeditiously as possible to meet the requirements of the CCAA. The CCAA does not define "feasible," but the Health and Safety Code provides some direction to assist the District in making this determination. State law defines a related term, Best Available Retrofit Control Technology (BARCT), as "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." (sec. 40406) And the ARB defines "all feasible measures" in the Transport Mitigation Regulation, Section 70600 *et seq*, Title 17 California Code of Regulations, 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."

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<sup>5</sup> All references to Section numbers are for the California Health and Safety Code, unless otherwise noted.

## TRANSPORT MITIGATION REQUIREMENTS

The CCAA requires ARB to periodically assess transport of ozone and ozone precursors from upwind to downwind regions, and to establish mitigation requirements for upwind districts (Sec. 39610). The CCAA also requires air districts to address transport mitigation requirements in the triennial updates to strategies to achieve the State ozone standard (Sec. 40912).

ARB first adopted transport mitigation requirements in 1990, amended them in 1993, and further strengthened them in 2003. ARB's 2003 amended Transport Mitigation Requirements are in Title 17, California Code of Regulations, Sections 70600 and 70601. The requirements for transport mitigation state that upwind districts "shall include sufficient emission control measures in their attainment plans for ozone...to mitigate the impact of pollution sources within their jurisdictions on ozone concentrations in downwind areas commensurate with the level of contribution." Specifically, the Bay Area is required to:

- 1) adopt and implement all feasible measures as expeditiously as practicable;
- 2) adopt and implement best available retrofit control technology (BARCT) on all existing stationary sources of ozone precursor emissions as expeditiously as practicable;
- 3) implement, by December 31, 2004, 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 10 tons or greater per year of an ozone precursor, which the Bay Area Air Quality Management adopted on December 21, 2004; and
- 4) include measures sufficient to attain the state ambient air quality standard for ozone by the earliest practicable date within the North Central Coast Air Basin, that portion of Solano County within the Broader Sacramento Area, that portion of Sonoma County within the North Coast Air Basin, and that portion of Stanislaus County west of Highway 33 during air pollution episodes, provided that:
  - a) the areas are likely to violate the State ozone standard,
  - b) the areas are dominated by transport from the Bay Area, and,
  - c) the areas are not affected by emissions of ozone precursors within their borders.

In addition, the Air District is required to consult with downwind districts, review the list of control measures in the most recently approved attainment plan (2000 Clean Air Plan), make a finding as to whether the list of control measures meets the requirements of Section 70600 (b) and include the finding in the proposed triennial plan revision.

All of the above transport mitigation and consultation process requirements are addressed in "Addressing Transport Requirements" of the "Control Strategy" chapter in Section 2 of this document.

## OTHER REQUIREMENTS

In addition to requirements concerning all feasible measures and transport mitigation, the CCAA requires that strategies to attain the State ozone standard contain other elements, including the following:

Emissions inventory system (Sec. 40918(a)(5)). The Air District maintains an emissions inventory system. The emission inventory used as the basis for the State portion of the 2005 Ozone Strategy is included in the “Sources of Air Pollution – Emission Inventory” section of this document.

A permitting program designed to achieve no net increase in emissions from permitted sources with a potential to emit greater than 15 tons per year of a nonattainment pollutant or their precursors and to require the use of best available control technology (BACT) on new and modified sources with a potential to emit greater than 10 pounds per day (Sec. 40919(a)(2)). The Air District's permitting program, as spelled out in BAAQMD Regulation 2, Rule 2 — New Source Review — complies with the requirements of Health and Safety Code Section 40919(a)(2). Sufficient offsets have been provided for all permits that have been issued by the Air District. Furthermore, the Small Facility Banking account has sufficient credits to sustain withdrawals into the foreseeable future at the current withdrawal rate. The Air District's no net increase threshold was reduced to 10 tons per year to comply with transport mitigation requirements in December 2004.

Best available retrofit control technology (BARCT) on all existing permitted stationary sources (Sec. 40919(a)(3)). BARCT is implemented through the Air District's rule development, enforcement and permit review programs. Air District staff perform an assessment of BARCT requirements when proposing new rules or rule amendments and ARB reviews Air District rules and proposed rule amendments to insure that BARCT standards are implemented. Additionally, the Air District evaluates existing sources during the annual permit review process to ensure BARCT requirements are being met. Finally, the Air District, facility advisories, compliance assistance and enforcement programs help to make sure that BARCT standards in rules are being implemented.

Measures to achieve use of a significant number of low-emission vehicles in motor vehicle fleets (Sec. 40919(a)(4)). The proposed mobile source control measures Low Emission Vehicle Incentives and Green Contracting Ordinance address low emission vehicles and motor vehicle fleet emissions. TCMs 3 and 10 include clean fuel transit and school buses, respectively, and TCM 17 includes demonstration projects to promote low emission vehicles. The Air District's Transportation Fund for Clean Air, Carl Moyer and Low Emission School Bus programs provide funding for these TCMs.

Transportation control measures to substantially reduce the rate of increase in passenger vehicle trips and miles traveled per trip (Sec. 40918(a)(3)). It is expected that VMT and trips will grow at approximately 1.4% and 1.2% percent per year, respectively, a reduction from the previous rate of VMT and vehicle trip growth. These projected growth rates do not include the effects of the proposed TCMs; implementation of the 2005 Ozone Strategy TCMs are expected to result in even further reductions of past growth rates.

Indirect source and area source programs (Sec. 40918(a)(4)). TCM 15 — Local Land Use Planning and Development Strategies — addresses the indirect source requirement

by proposing a wide range of programs for promoting smart growth and reducing emissions through better coordination of land use and transportation planning. Management of area source emissions is addressed through existing Air District regulations, various proposed stationary source and mobile source control measures, and TCM 16 — Public Education/Intermittent Control Measures.

Regional public education programs (Sec. 40918(a)(6)). The Air District's "Spare the Air" public education program is aimed at curbing emissions from motor vehicles and other ozone precursor sources on days when weather conditions are conducive to high ozone levels. Other ongoing educational programs include the Bay Area Clean Air Partnership, Clean Air Cities and Counties, Clean Air Consortium, a youth campaign, a Speaker's Bureau, Smoking Vehicle Program and grassroots resource teams located throughout the Bay Area. The "Spare the Air Tonight" program is aimed at reducing emissions of particulate matter from woodburning during the winter.

An assessment of cost-effectiveness of proposed control measures (Sec. 40922). Cost-effectiveness is discussed in the Control Strategy section of this document.

Periodic requirements include the following:

An annual regulatory schedule (Sec. 40923). The Air District produces a regulatory schedule each December, listing regulatory measures scheduled or tentatively scheduled for consideration during the following year.

An annual progress report on control measure implementation and, every third year, an assessment of the overall effectiveness of the program (Sec. 40924). The Air District has submitted annual progress reports to ARB every year since 1993. Previous triennial assessments of overall plan effectiveness were submitted in 1994, 1997, and 2000. The 2005 Ozone Strategy provides the latest triennial assessment.

A review and update of the plan every three years to correct for deficiencies and to incorporate new data and projections (Sec. 40925). The 2005 Ozone Strategy incorporates new data and projections and updates the control strategy.

In addition, Health and Safety Code Section 40233 addresses TCMs in Bay Area ozone attainment plans. Section 40233 directs the Air District to estimate the quantity of emission reductions from transportation sources necessary to attain and maintain State and national ambient air quality standards. Section 40233 requires MTC to prepare and adopt a TCM plan to achieve that quantity of emission reductions. The TCM plan is then incorporated into the overall strategy for achieving the State ozone standard. The statute also requires MTC to develop and adopt a revised TCM plan whenever the Air District revises the emission reduction target.

The Air District and MTC complied with these requirements when preparing the first Bay Area plan for the State ozone standard, the 1991 Clean Air Plan, by adopting a TCM emission reduction target and plan in 1990. This triennial update to the strategy for the State ozone standard does not include a revised emission reduction target for transportation sources, and therefore, does not trigger a TCM plan revision.<sup>6</sup> The Air

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<sup>6</sup> Under Health and Safety Code Section 40233, State law leaves to the Air District's discretion whether and when to revise the emission reduction target for transportation sources set in 1990.

District and MTC have, however, comprehensively reviewed and augmented the TCMs during preparation of the 2005 Ozone Strategy to maximize their effectiveness.

## **SOURCES OF OZONE PRECURSORS – EMISSION INVENTORY**

Ozone is not emitted directly into the air we breathe. Instead, it is formed in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NO<sub>x</sub>). Simply stated, in the presence of sunlight, oxygen (O<sub>2</sub>) reacts with ROG and NO<sub>x</sub> to produce ozone (O<sub>3</sub>). There are literally millions of sources of ozone precursors in the Bay Area, including industrial and commercial facilities, motor vehicles, and consumer products such as household cleaners and paints. Even trees and plants produce ozone precursors. Sources of ozone precursors produced by human activity are called anthropogenic sources while natural sources, produced by plants and animals, are called biogenic sources. In the Bay Area, emissions from anthropogenic sources are higher than from biogenic sources.

The main sources of ROG are motor vehicles and evaporation of fuels, solvents and other petroleum products. NO<sub>x</sub> is produced mainly through combustion, and the major sources are motor vehicles and combustion at industrial and other facilities. Figures 1 and 2 show the major sources of ozone precursors in 2005.

An emission inventory is a detailed estimate of air pollutant emissions from a range of sources in a given area, for a specified time period. Table 1 presents the emission inventory for ozone precursors, ROG and NO<sub>x</sub>, for a typical summer day in the Bay Area in 2000, 2003 and 2005, and projections for 2010 and 2020. This inventory is referred to as a “planning inventory” because ozone levels are highest during the summer, and thus an estimate of typical summer emissions is needed for ozone planning purposes.

Anthropogenic sources can be broadly divided between stationary and mobile sources. Stationary sources can be further divided between point and area sources. Point sources are those that are identified on an individual facility or source basis, such as refineries and manufacturing plants. The Air District maintains a computer data base with detailed information on operations and emissions characteristics for nearly 4,000 facilities, with roughly 20,000 different sources, throughout the Bay Area. Data on the activity, seasonal variations, and hours of operation are collected at the process level from each facility. Parameters that affect the quantities of emissions are updated regularly. The emissions from general processes, such as combustion, are computed using generalized or specific emission factors. These factors are periodically reviewed and updated.

Area sources are stationary sources that are individually very small, but that collectively make a large contribution to the inventory. Many area sources do not require permits from the Air District, such as residential heating and the wide range of consumer products such as paints, solvents, and cleaners. Some facilities considered to be area sources do require permits from the Air District, such as gas stations and dry cleaners. Emissions estimates for area sources may come from the Air District’s data base, be calculated by ARB using statewide data, or be calculated based on surrogate variables such as population.

In addition to anthropogenic sources, there are significant quantities of biogenic emissions from natural sources like plants and animals. Vegetation emits large amounts



of isoprene, terpenes and other organic compounds which are ozone precursors. Emission rates depend upon species, season, biomass density, time of day, local temperature, moisture and other factors. Total reactive organic gas emissions from natural sources in the Bay Area amounts to roughly 200 tons per day. Biogenic emissions are not included in the planning emissions inventory because they are not subject to control, but these emissions do contribute to ozone formation.

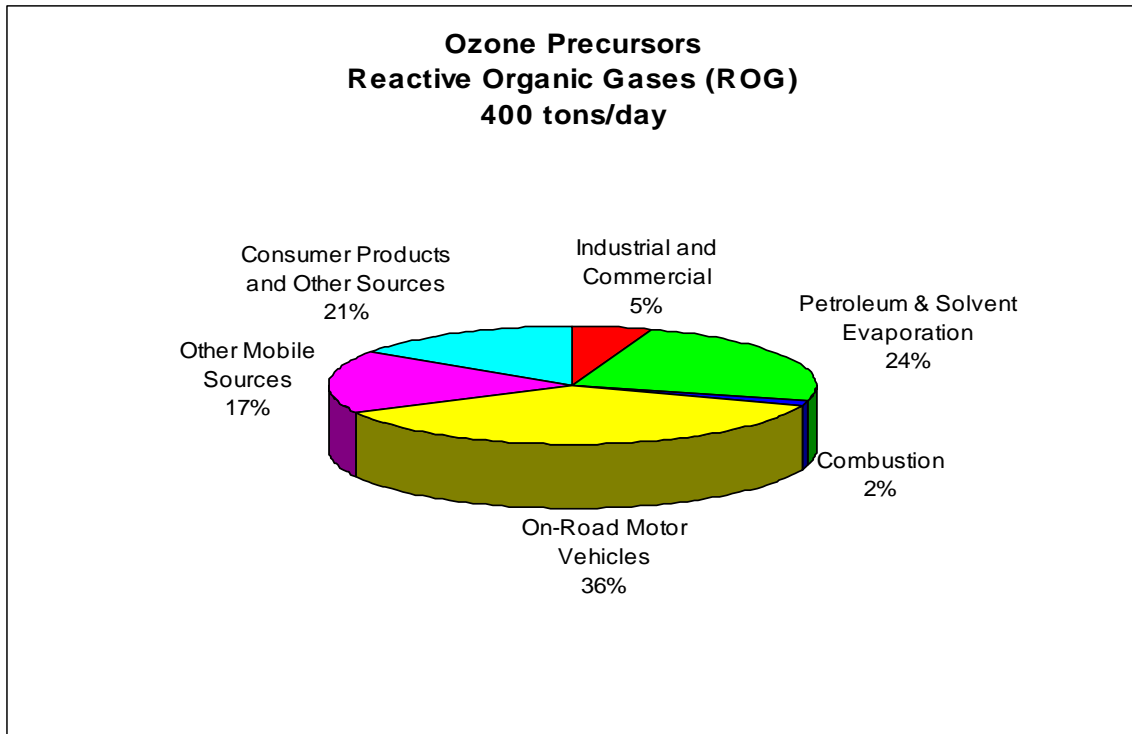
Mobile sources include on-road motor vehicles such as automobiles, trucks and buses, as well as off-road sources such as construction equipment; boats and ships, trains and aircraft; and small non-road engines including lawn and garden equipment. Estimates of on-road motor vehicle emissions include consideration of the number of vehicles and the fleet mix (vehicle type, model year, and accumulated mileage), miles traveled, ambient temperatures, vehicle speeds, and vehicle emission factors, as developed from comprehensive ARB testing programs. Some of these variables change from year to year, and the projections are based upon expected changes.

The on-road mobile source emission inventory includes motor vehicle activity assumptions provided by MTC based upon their regional travel demand model. In September 2003, MTC, the Air District and ARB reached an agreement on how the Bay Area's motor vehicle activity data would be used in the development of the Ozone Strategy and for federal transportation conformity emission budgets. ARB ran EMFAC 2002, version 2.2 (with April 2003 activity data) for the San Francisco Air Basin. In accordance with the agreement, MTC staff adjusted the EMFAC VMT data using growth rates developed from MTC's travel demand model data. The travel activity adjustments used in preparing the on-road mobile source inventory are the same as were used in the Transportation Air Quality Conformity Analysis for MTC's Transportation 2030. MTC's travel demand model utilizes regional demographic forecasts from ABAG's socio-economic and population projections, in this case, Projections 2003. The motor vehicle emissions estimates in Table 1 reflect this methodology and are based on ARB's latest emission factors (EMFAC 2002, version 2.2) and include the benefits of Enhanced Smog Check in the Bay Area.

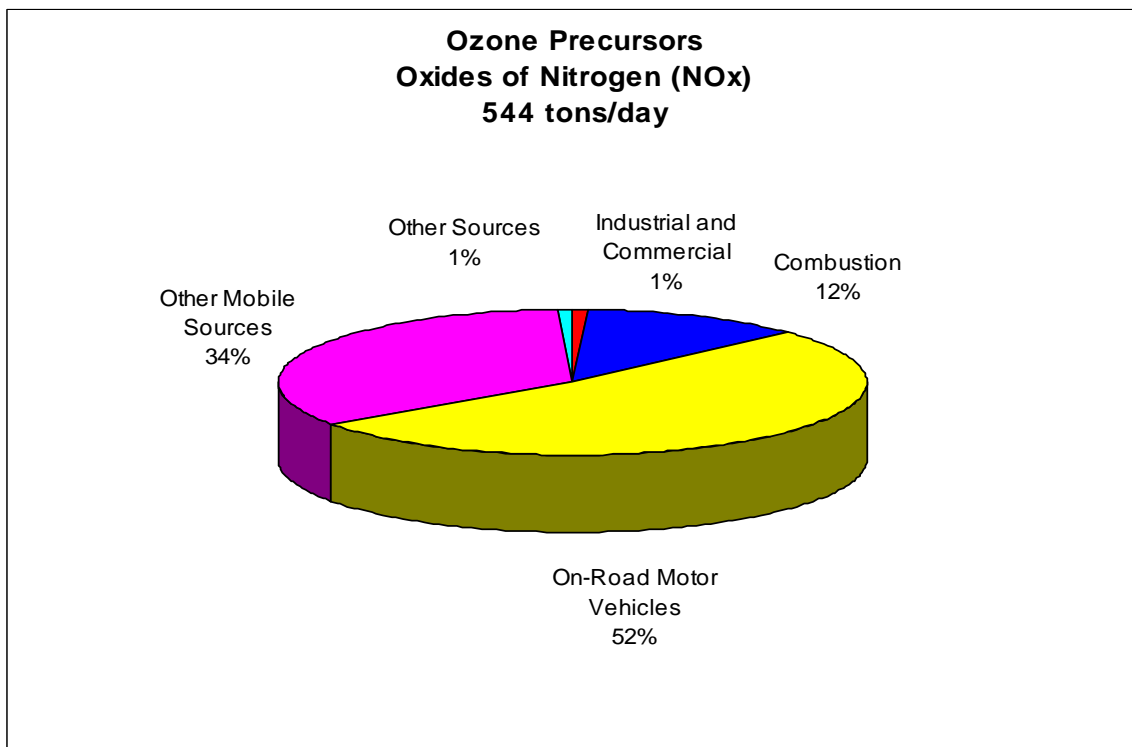
Off-road mobile sources include boats, ships, trains, and aircraft, as well as garden, farm and construction equipment. Various methodologies are used for compilation of emissions for these mobile sources. Emission factors and methodologies for off-road mobile sources are calculated from information provided by ARB and EPA. Aircraft mix and activity data specific to each Bay Area airport were used in estimating airport emissions.

Future emissions of ROG and NOx will be considerably lower than the past and current inventory. Figures 3 and 4 show recent and future trends for ROG and NOx emissions, demonstrating that future emissions of ROG and NOx in the Bay Area will continue to decline in future years. These estimates provide further assurance that the region will continue to move towards attainment of the State one-hour ozone standard.

**Figure 1: 2005 ROG Summer Emissions**



**Figure 2: 2005 NOx Summer Emissions**



**Table 1: Bay Area Baseline Emission Inventory Projections: 2000 – 2020  
Planning Inventory (Tons/Day)**

SOURCE CATEGORY	Reactive Organic Gases <sup>4</sup>					Oxides of Nitrogen <sup>5</sup>				
	2000	2003	2005	2010	2020	2000	2003	2005	2010	2020
<b>INDUSTRIAL/COMMERCIAL PROCESSES</b>										
PETROLEUM REFINING FACILITIES										
Basic Refining Processes	0.7	0.6	0.6	0.7	0.8	0.4	0.3	0.4	0.4	0.4
Wastewater (Oil-Water) Separators	5.3	4.0	3.6	1.7	2.0	--	--	--	--	--
Wastewater Treatment Facilities	0.1	0.2	0.2	0.2	0.3	--	--	--	--	--
Cooling Towers	1.7	0.4	0.5	0.5	0.6	--	--	--	--	--
Flares & Blowdown Systems	13.1	5.2	1.6	1.6	1.6	2.5	0.8	0.4	0.4	0.4
Other Refining Processes	0.3	0.3	0.3	0.3	0.4	--	--	--	--	--
Fugitives	5.3	1.9	1.9	2.0	2.4	--	--	--	--	--
<b>Subtotal</b>	<b>26.5</b>	<b>12.6</b>	<b>8.7</b>	<b>7.1</b>	<b>7.9</b>	<b>3.0</b>	<b>1.2</b>	<b>0.8</b>	<b>0.8</b>	<b>0.9</b>
CHEMICAL MANUFACTURING FACILITIES										
Coating, Inks, Resins & Other Facilitie	0.7	0.6	0.6	0.6	0.7	0.1	0.1	0.1	0.1	0.1
Pharmaceuticals & Cosmetics	0.9	0.8	0.9	0.9	1.0	1.9	1.8	1.8	2.0	2.3
Fugitives - Valves & Flanges	0.7	0.7	0.7	0.8	0.9	--	--	--	--	--
<b>Subtotal</b>	<b>2.3</b>	<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.6</b>	<b>1.9</b>	<b>1.8</b>	<b>1.9</b>	<b>2.0</b>	<b>2.4</b>
OTHER INDUSTRIAL/COMMERCIAL PROCESSES										
Bakeries	1.0	0.9	1.0	1.0	1.2	--	--	--	--	--
Cooking	1.0	1.1	1.1	1.2	1.3	--	--	--	--	--
Wineries & Other Food & Agr. Processes	1.3	1.1	1.2	1.2	1.5	--	--	--	--	--
Metallurgical & Minerals Manufacturing	0.3	0.2	0.2	0.3	0.3	1.0	1.0	1.0	1.0	1.2
Waste Management	2.6	2.8	2.9	3.0	3.1	--	--	--	--	--
Semiconductor Manufacturing	0.7	0.7	0.7	0.8	0.9	--	--	--	--	--
Fiberglass Products Manufacturing	0.4	0.4	0.4	0.4	0.4	--	--	--	--	--
Rubber & Plastic Products Manufacturing	0.4	0.5	0.5	0.5	0.6	--	--	--	--	--
Contaminated Soil Aeration	1.1	0.2	0.1	0.1	0.1	--	--	--	--	--
Other Industrial Commercial	1.4	1.3	1.4	1.5	1.6	0.1	0.1	0.1	0.1	0.1
<b>Subtotal</b>	<b>10.2</b>	<b>9.2</b>	<b>9.3</b>	<b>9.9</b>	<b>10.9</b>	<b>1.1</b>	<b>1.1</b>	<b>1.1</b>	<b>1.2</b>	<b>1.3</b>
<b>PETROLEUM PRODUCT/SOLVENT EVAPORATION</b>										
PETROLEUM REFINERY EVAPORATION										
Storage Tanks	3.6	3.8	3.9	4.2	4.8	--	--	--	--	--
Loading Operations	1.3	0.1	0.1	0.1	0.1	--	--	--	--	--
<b>Subtotal</b>	<b>4.9</b>	<b>3.8</b>	<b>4.0</b>	<b>4.2</b>	<b>4.9</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>

**Table 1 (continued)**  
**Bay Area Baseline <sup>1</sup> Emission Inventory Projections: 2000 – 2020**  
**Planning Inventory <sup>2</sup> (Tons/Day) <sup>3</sup>**

SOURCE CATEGORY	Reactive Organic Gases <sup>4</sup>					Oxides of Nitrogen <sup>5</sup>				
	2000	2003	2005	2010	2020	2000	2003	2005	2010	2020
<b>FUELS DISTRIBUTION</b>										
Natural Gas Distribution	0.5	0.5	0.6	0.6	0.7	--	--	--	--	--
Bulk Plants & Terminals	1.8	1.8	1.9	1.9	2.0	--	--	--	--	--
Gasoline Transport (Trucks)	3.3	3.4	3.4	3.6	3.8	--	--	--	--	--
Gasoline Filling Stations	15.4	10.0	7.9	6.6	6.3	--	--	--	--	--
Aircraft Fueling	3.0	3.0	3.0	3.0	3.0	--	--	--	--	--
Recreational Boat Fueling	0.9	0.9	1.0	1.0	1.1	--	--	--	--	--
Portable Fuel Container Spillage	18.5	11.9	7.6	5.0	5.0	--	--	--	--	--
Other Fueling	0.3	0.3	0.4	0.4	0.4	--	--	--	--	--
<b>Subtotal</b>	<b>43.7</b>	<b>31.8</b>	<b>25.7</b>	<b>22.1</b>	<b>22.3</b>	--	--	--	--	--
<b>OTHER ORGANIC COMPOUNDS EVAPORATION</b>										
Cold Cleaning	5.5	4.3	4.2	4.5	5.0	--	--	--	--	--
Vapor Degreasing	0.3	0.2	0.2	0.2	0.1	--	--	--	--	--
Handwiping	5.0	3.1	1.8	1.9	2.1	--	--	--	--	--
Dry Cleaners	0.1	0.1	0.1	0.1	0.1	--	--	--	--	--
Printing	5.7	3.8	3.9	4.0	4.3	--	--	--	--	--
Adhesives & Sealants	8.9	8.7	8.9	9.3	9.4	--	--	--	--	--
Structures Coating	26.1	25.6	25.5	26.6	28.3	--	--	--	--	--
Industrial/Commercial Coating	16.1	13.9	13.7	14.7	16.4	--	--	--	--	--
Storage Tanks	1.3	1.0	0.9	1.0	1.1	--	--	--	--	--
Lightering & Ballsting	1.3	1.7	1.8	2.0	2.5	--	--	--	--	--
Other Organics Evaporation	2.5	2.4	2.5	2.7	3.0	--	--	--	--	--
<b>Subtotal</b>	<b>72.8</b>	<b>64.8</b>	<b>63.3</b>	<b>66.8</b>	<b>72.3</b>	--	--	--	--	--
<b>COMBUSTION - STATIONARY SOURCES</b>										
<b>FUELS COMBUSTION</b>										
Domestic	2.3	2.3	2.4	2.4	2.6	9.1	8.3	8.5	8.9	9.4
Cogeneration	0.9	1.0	1.0	1.1	1.2	4.3	5.0	5.2	5.4	6.0
Power Plants	0.5	0.2	0.3	0.2	0.2	14.1	2.8	2.8	2.7	3.0
Oil Refineries External Combustion	0.4	0.4	0.4	0.5	0.5	37.9	19.2	19.7	20.9	23.8
Glass Melting Furnaces - Natural Gas	--	--	--	--	--	2.9	2.2	2.3	2.4	2.8
Reciprocating Engines	0.8	0.8	0.7	0.6	0.4	8.1	7.9	7.1	6.4	5.2
Turbines	0.1	0.1	0.1	0.1	0.1	1.6	1.7	1.7	1.8	2.0
Combustion at Landfills/Misc. Ext. Comb	1.1	1.0	1.0	1.1	1.2	17.2	17.6	18.0	19.1	21.1
<b>Subtotal</b>	<b>6.2</b>	<b>5.8</b>	<b>5.9</b>	<b>5.9</b>	<b>6.2</b>	<b>95.2</b>	<b>64.6</b>	<b>65.2</b>	<b>67.6</b>	<b>73.3</b>

**Table 1 (continued)**  
**Bay Area Baseline <sup>1</sup> Emission Inventory Projections: 2000 – 2020**  
**Planning Inventory <sup>2</sup> (Tons/Day) <sup>3</sup>**

SOURCE CATEGORY	Reactive Organic Gases <sup>4</sup>					Oxides of Nitrogen <sup>5</sup>				
	2000	2003	2005	2010	2020	2000	2003	2005	2010	2020
<b>BURNING OF WASTE MATERIAL</b>										
Incineration	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.4	0.4	0.4
Planned Fires	0.1	0.1	0.1	0.1	0.1	--	--	--	--	--
<b>Subtotal</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.4</b>	<b>0.4</b>	<b>0.4</b>	<b>0.4</b>	<b>0.4</b>
<b>Banked Emissions <sup>6</sup></b>	<b>0.0</b>	<b>11.2</b>	<b>11.2</b>	<b>11.2</b>	<b>11.2</b>	<b>0.0</b>	<b>8.1</b>	<b>8.1</b>	<b>8.1</b>	<b>8.1</b>
<b>Alternative Compliance Allowance <sup>7</sup></b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>3.5</b>	<b>7.2</b>	<b>4.3</b>	<b>4.3</b>
<b>Subtotal (District Jurisdiction)</b>	<b>166.7</b>	<b>141.6</b>	<b>130.4</b>	<b>129.7</b>	<b>138.5</b>	<b>101.5</b>	<b>80.6</b>	<b>84.6</b>	<b>84.4</b>	<b>90.6</b>
<b>COMBUSTION - MOBILE SOURCES</b>										
<b>ON-ROAD MOTOR VEHICLES</b>										
Passenger Cars	112.6	91.2	72.1	42.1	20.2	97.6	80.6	62.0	34.4	13.5
Light Duty Trucks<6000lbs	51.2	44.7	38.6	28.1	17.9	66.3	56.7	45.5	28.6	14.0
Medium Duty Trucks 6001-8500 lbs	14.5	12.5	10.9	8.9	6.5	24.3	21.0	17.5	12.5	6.5
Light Heavy Duty Trucks 8501-14000lbs	7.4	4.9	3.9	2.8	2.4	9.2	9.3	9.0	7.3	4.4
Medium Heavy Duty Trucks 14001-33000lbs	5.9	5.1	4.6	3.3	1.9	34.1	33.4	31.4	22.5	9.0
Heavy Heavy Duty Trucks>33000 lbs	7.0	6.6	6.1	4.3	2.4	97.6	92.0	86.9	58.0	21.9
School/Urban Buses	2.2	2.2	2.2	2.1	2.0	21.5	21.1	20.2	20.1	17.1
Motor-Homes	1.1	1.0	0.8	0.6	0.2	2.5	2.3	2.0	1.9	1.3
Motorcycles	5.6	4.5	3.9	2.7	1.6	1.0	0.9	0.9	0.7	0.5
<b>Subtotal</b>	<b>207.5</b>	<b>172.6</b>	<b>142.9</b>	<b>94.8</b>	<b>55.1</b>	<b>354.1</b>	<b>317.3</b>	<b>275.4</b>	<b>185.9</b>	<b>88.1</b>
<b>OFF-HIGHWAY MOBILE SOURCES</b>										
Lawn and Garden Equipment	31.7	25.1	20.6	15.5	13.6	2.8	3.0	3.1	1.9	1.3
Transportation Refrigeration Units	0.9	0.9	0.8	0.7	0.4	4.5	4.6	4.1	3.5	2.3
Agricultural Equipment	1.3	1.2	1.1	0.8	0.4	9.2	8.3	7.7	6.1	3.5
Construction and Mining Equipment	10.6	10.7	9.1	6.4	4.5	91.7	91.1	81.8	62.9	43.1
Industrial Equipment	3.2	3.3	2.8	1.6	1.0	20.6	20.2	16.7	10.8	7.8
Light Duty Commercial Equipment	6.6	6.6	5.6	4.4	3.6	10.8	10.9	10.0	9.1	7.8
Trains	0.6	0.7	0.7	0.6	0.6	14.9	13.1	11.3	9.7	9.5
Off Road Recreational Vehicles	0.8	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Ships	0.6	0.6	0.6	0.7	0.8	10.5	10.0	10.4	11.4	13.7
Commercial Boats	0.7	0.8	0.8	0.9	1.1	5.8	6.2	6.3	6.7	7.3
Recreational Boats	22.0	19.5	17.0	12.1	7.1	3.3	4.1	4.8	5.0	4.4
<b>Subtotal</b>	<b>79.1</b>	<b>69.5</b>	<b>59.2</b>	<b>43.7</b>	<b>33.2</b>	<b>174.3</b>	<b>171.5</b>	<b>156.3</b>	<b>127.1</b>	<b>100.7</b>

**Table 1 (continued)**  
**Bay Area Baseline <sup>1</sup> Emission Inventory Projections: 2000 – 2020**  
**Planning Inventory <sup>2</sup> (Tons/Day) <sup>3</sup>**

SOURCE CATEGORY	Reactive Organic Gases <sup>4</sup>					Oxides of Nitrogen <sup>5</sup>				
	2000	2003	2005	2010	2020	2000	2003	2005	2010	2020
<b>AIRCRAFT</b>										
Commercial Aircraft	2.9	2.1	2.4	3.1	4.8	14.4	13.9	15.9	20.8	25.8
General Aviation	0.9	0.8	0.8	0.9	0.9	0.3	0.3	0.4	0.5	0.6
Military Aircraft	4.2	3.4	3.4	3.5	3.5	4.8	4.9	4.9	5.0	5.1
Airport Ground Support Equipment	0.4	0.4	0.4	0.4	0.5	2.3	2.6	2.7	2.9	3.2
<b>Subtotal</b>	<b>8.3</b>	<b>6.7</b>	<b>7.0</b>	<b>7.8</b>	<b>9.8</b>	<b>21.8</b>	<b>21.8</b>	<b>23.9</b>	<b>29.2</b>	<b>34.7</b>
<b>MISCELLANEOUS OTHER SOURCES</b>										
Construction Operations	--	--	--	--	--	--	--	--	--	--
Farming Operations	--	--	--	--	--	--	--	--	--	--
Entrained Road Dust-Paved Roads	--	--	--	--	--	--	--	--	--	--
Entrained Road Dust-Unpaved Roads	--	--	--	--	--	--	--	--	--	--
Wind Blown Dust	--	--	--	--	--	--	--	--	--	--
Animal Waste	5.5	5.5	5.5	5.5	5.5	--	--	--	--	--
Agricultural Pesticides	1.1	1.3	1.2	1.1	1.1	--	--	--	--	--
Non-Agricultural Pesticides	0.3	0.2	0.2	0.2	0.2	--	--	--	--	--
Consumer Products(Excluding Pesticides)	52.2	49.1	46.9	48.9	51.9	--	--	--	--	--
Other Sources	4.9	10.7	6.8	6.8	6.9	2.7	5.9	3.8	3.8	3.8
<b>Subtotal</b>	<b>63.9</b>	<b>66.7</b>	<b>60.6</b>	<b>62.5</b>	<b>65.6</b>	<b>2.7</b>	<b>5.9</b>	<b>3.8</b>	<b>3.8</b>	<b>3.8</b>
<b>GRAND TOTAL EMISSIONS</b>	<b>526</b>	<b>457</b>	<b>400</b>	<b>338</b>	<b>302</b>	<b>654</b>	<b>597</b>	<b>544</b>	<b>430</b>	<b>318</b>

<sup>1</sup> Inventory and projections assume implementation of all control measures adopted as of December 31, 2003, including Smog Check II for the Bay Area.

<sup>2</sup> The planning inventory represents average summer day emissions. ABAG Projections 2003 were used to project future emissions from on-road motor vehicles. ABAG Projections 2002 was the regional population projections used for the remainder of the planning inventory.

<sup>3</sup> Entries are rounded to nearest whole number, totals may not equal to sums of column entries.

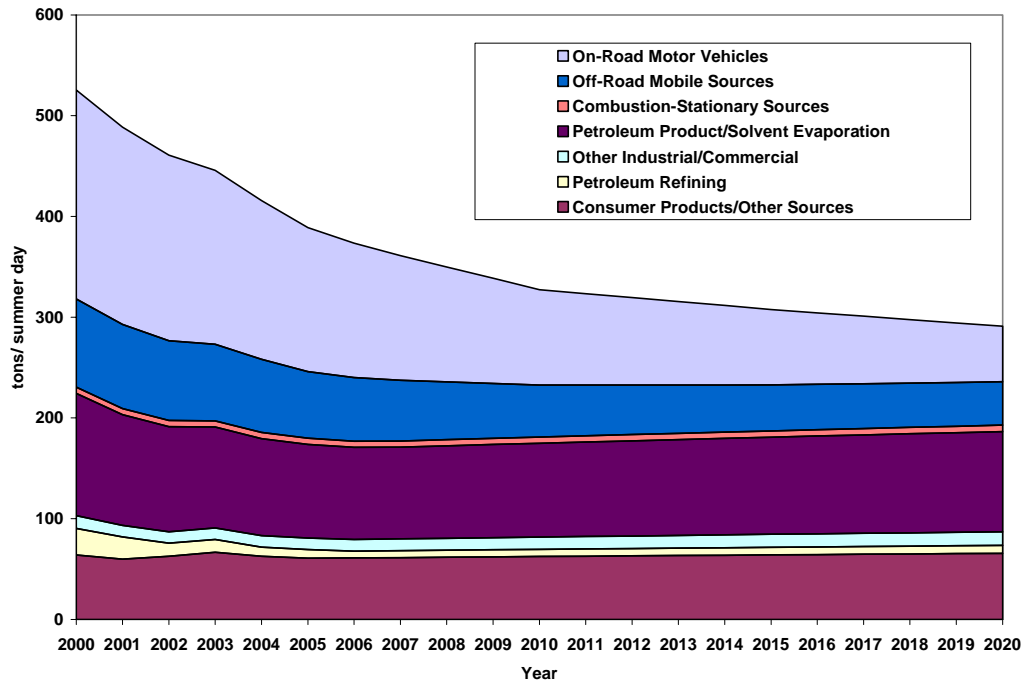
<sup>4</sup> Photochemically reactive organic compounds excludes methane and other non-reactives and roughly 200 tpd of ROG emissions from natural sources.

<sup>5</sup> Oxides of nitrogen (nitric oxide and/or nitrogen dioxide), NO<sub>x</sub> as NO<sub>2</sub>.

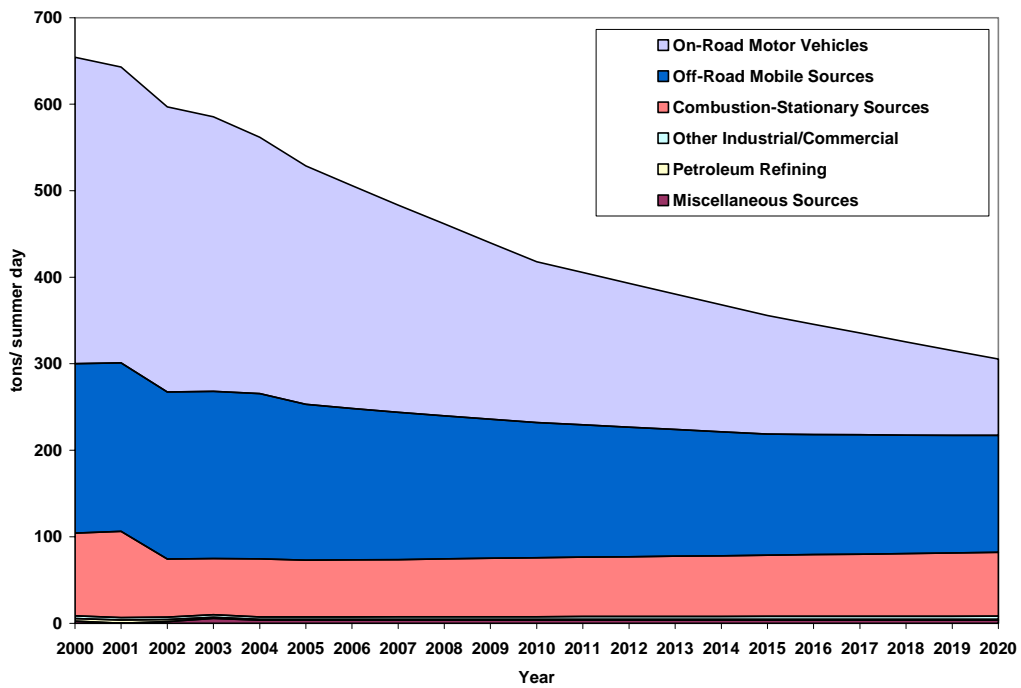
<sup>6</sup> Banked Emissions show the total current deposits in the District's emissions banking program as allowed by BAAQMD Regulation 2, Rules 2 and 4. These emissions were reduced (beyond regulations) and banked, but may be withdrawn from the bank and emitted in future years.

<sup>7</sup> Surplus emissions, voluntarily reduced, available for alternative compliance with BARCT requirements of selected rules, as prescribed by State law and BAAQMD Regulation 2, Rule 9.

**Figure 3: ROG Emissions Trend, 2000 – 2020**



**Figure 4: NOx Emissions Trend, 2000 – 2020**



## OZONE TRENDS

Health and Safety Code Section 40924(b)(1) requires the Air District to assess its progress toward attainment of the State ambient air quality standard for ozone during the most recent triennial period. The analysis in this section examines progress made during the triennial period, 2000<sup>7</sup> to 2002, and from 1988 (the base year) to 2004.

### Monitoring Data

A very basic indicator of air quality trends is the number of days on which the region exceeded air quality standards. The Bay Area has an extensive network of monitoring stations to measure ambient air quality. There are 33 stations throughout the region that measure air quality conditions, 22 of which measure ozone. A map of the network is provided in Figure 5, "Air Monitoring Network." Ambient ozone levels are in compliance with the State standard more than 99% of the time. This analysis is focused on those days and hours when the standard has been exceeded.

Table 2 provides the number of exceedances of the State one-hour ozone standard at each monitoring station for 1985-2004. Figure 6 shows the number of days over the standard at any station for 1985-2004. Exceedances of the State ozone standard have diminished considerably since 1985. This improvement is due to substantial reductions in emissions of ozone precursors from stationary and mobile sources. For the three years considered in this triennial update, the Bay Area has had a fairly consistent number of exceedances of the State one-hour ozone standard. In 2000, the Bay Area recorded excesses of the State standard on 12 days. In 2001, the region recorded excesses of the State standard on 15 days. In 2002, the region recorded excesses of the State standard on 16 days.

**Figure 5: Bay Area Ozone Air Monitoring Network**



<sup>7</sup> Each yearly value presented in this analysis represents an average of the value for that year and for the previous two years. These running three-year averages are used in this analysis to smooth the fluctuations that occur on a year-to-year basis due to factors such as weather. For example, the triennial period of 1999 averages the data for the years 1997, 1998 and 1999.



**Table 2: Bay Area Exceedances of the State 1-hr Ozone Standard by Monitoring Station, 1985 – 2004**

<i>STATIONS BY SUB-REGION</i>	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	
<b>North Counties</b>																					
Santa Rosa	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	
Sonoma	3	1	2	2	3	0	3	0	0	0	0	0									
Napa	3	0	6	1	2	0	3	0	2	0	4	0	0	3	4	0	1	1	2	0	
Vallejo	5	0	6	5	2	2	2	1	3	2	6	5	1	3	4	0	0	1	2	1	
San Rafael	1	0	1	1	0	0	0	0	0	0	0	2	1	0	2	0	0	0	0	0	
<b>Coast and Central Bay</b>																					
San Francisco	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Richmond	0	0	0	2	1	0	0	0	2	0	0	0									
San Pablo													1	0	1	0	0	0	0	1	
Oakland	1	0	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	
<b>South Central Bay</b>																					
Fremont	8	3	17	7	11	3	6	5	5	4	10	2	2	7	3	2	3	3	4	0	
Hayward**	5	1	12	9	1	0	2	1	0	1	7	2	2	4	4	1	2	0	3	0	
Mountain View***	2	1	16	13	6	1	3	1	2	0	2	3	1	2	7						
San Leandro	0	0	0	0	0	0	2	2	3	0	6	2	3	2	3	1	0	1	2	1	
Redwood City	5	1	2	2	1	0	0	0	1	0	5	1	0	0	0	0	1	0	1	1	
<b>Eastern District</b>																					
Concord	10	5	20	10	6	3	4	3	7	4	9	11	2	13	8	2	6	5	5	1	
Pittsburg	3	1	14	8	5	4	0	3	4	3	8	5	0	4	2	1	2	4	0	0	
Bethel Island	8	8	14	7	11	5	3	7	3	5	6	6	1	10	5	1	3	5	0	1	
Livermore	21	20	10	21	9	8	17	14	7	5	20	22	3	21	14	7	9	10	10	5	
Fairfield	4	0	9	3	4	1	3	3	3	2	10	5	0	9	9	1	3	4	0	1	
<b>Santa Clara Valley</b>																					
San Jose****	12	12	23	12	10	4	6	3	3	2	14	5	0	4	3	0	2		4	0	
Los Gatos	20	21	25	12	1	5	7	3	8	2	13	10	1	5	4	0	2	4	7	0	
San Jose East	16	5	22	13	9	1		5	5	3	15	5	1	5	2	1	0	0	2	0	
Gilroy*	18	5	19	23	10	5	5	12	6	3	10	15	1	10	3		3	6	6	0	
San Jose-Burbank						5	0	1	4	1											
San Martin										5	14	18	0	15	7	4	7	8	9	0	
Sunnyvale																0	0	0	4	1	
District Days	45	39	45	41	22	14	23	23	19	13	28	34	8	29	20	12	15	16	19	7	

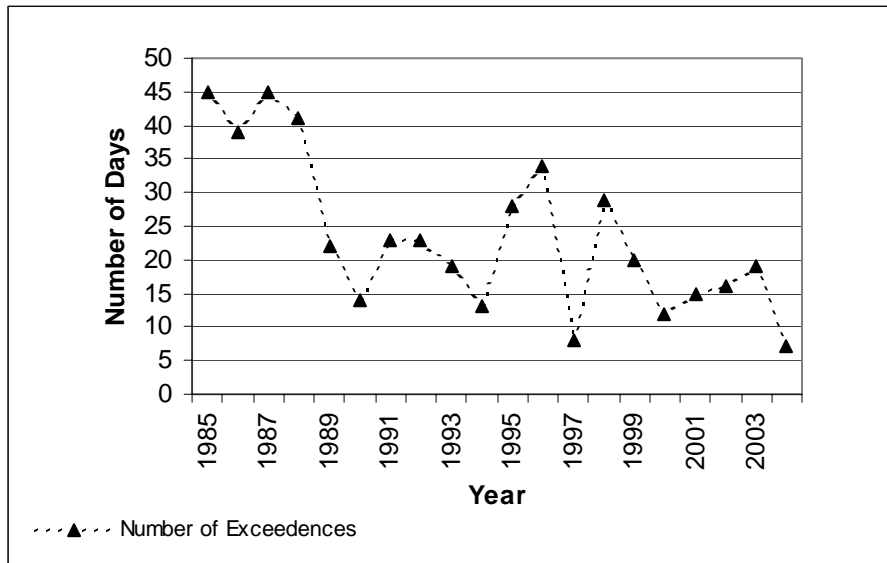
\* Gilroy closed from 11/1/99 to 3/31/01

\*\* Hayward closed from 4/96 to 8/23/96

\*\*\* Mountain View closed 12/3/99

\*\*\*\*San Jose 4th St closed 4/30/02; reopened as San Jose Central 10/5/02

**Figure 6: Exceedances of the State 1-hr Standard for Ozone in the Bay Area, 1985-2004**



**Peak Concentrations and Exposure**

ARB guidance requires the use of three air quality indicators to assess the extent of air quality improvements achieved in the Bay Area: (1) Expected Peak Day Concentration, which is an estimate of the ozone concentration that would be exceeded once per year on average, (2) population-weighted exposure to ozone levels that exceed the State standard, and (3) area-weighted exposure to ozone levels that exceed the State standard. Each of these three indicators has been computed for the Bay Area, documenting changes from 1988 to 2002.

The hourly ozone levels recorded at Air District monitoring stations are used in this analysis, which focuses on those hours when the State standard<sup>8</sup> is exceeded. The following three air quality indicator analyses document significant progress toward improving the region's air quality:

**Expected Peak Day Concentration**

The Expected Peak Day Concentrations (EPDC) at Bay Area monitoring sites are listed in Table 3, from lowest to highest EPDC for 2002. Over the 14-year timeframe from 1988 to 2002, there has been an average annual reduction in EPDC of 1.4 percent. All the monitoring sites had lower EPDCs over this period with the exception of the monitoring site in San Leandro. While the San Leandro EPDC has increased slightly it is

<sup>8</sup> The calculation methodology assumes that an “exposure” occurs when a person experiences a one-hour ozone concentration outdoors that is greater than or equal to 9.5 pphm, the effective level of the State standard. The Population-Weighted Exposure and Area-Weighted Exposure consider both the level and duration of ozone concentrations above the State standard. The annual exposure is the sum of all the hourly exposures during the year. The results are presented as an average per exposed person or average per exposed unit land area.

still below the State one-hour standard. Overall, Table 3 shows steady improvement in reducing peak ozone concentrations.

From 1999 to 2002, the average annual reduction in EPDC was 3.1 percent. Over this shorter period, the EPDC fluctuates more dramatically ranging from an increase of 3.5 percent in Pittsburg to decreases of 6.2 percent in San Leandro and San Jose. Air quality trends, such as EPDC, have a tendency to fluctuate more over the short term because the number of ozone-conducive days may vary significantly from one year to the next and mask trends in the underlying potential for air pollution. One of the major factors influencing the number of ozone-conducive days in a year is weather – with high temperatures, strong inversions and relatively still air being major contributors.

**Table 3: Expected Peak Day Concentrations**

Monitoring Site:	Expected Peak Day Concentration (pphm)			Annual Percentage EPDC Change	
	1988	1999	2002	1999 to 2002	1988 to 2002
San Francisco	7.4	5.9	5.7	-1.0	-1.6
Oakland	8.2	6.1	5.8	-1.9	-2.1
Richmond/San Pablo	8.3	8.0	6.9	-4.5	-1.2
San Rafael	9.3	8.5	7.0	-5.8	-1.8
Santa Rosa	8.7	8.6	7.1	-5.8	-1.3
Redwood City	9.7	7.1	7.9	3.4	-1.3
San Leandro	8.2	10.6	8.6	-6.2	0.4
Vallejo	10.9	9.8	8.7	-3.8	-1.5
San Jose	13.1	10.7	8.7	-6.2	-2.4
Napa	10.7	10.6	8.9	-5.4	-1.2
Mt. View/Sunnyvale	14.0	10.6	9.2	-4.5	-2.4
San Jose - East	14.7	10.9	9.6	-4.0	-2.5
Hayward	12.9	11.2	9.7	-4.5	-1.7
Fremont	13.2	10.7	9.8	-2.6	-1.8
Fairfield	11.1	12.2	10.4	-4.7	-0.4
Pittsburg	11.7	9.5	10.5	3.5	-0.7
Los Gatos	13.9	11.3	10.8	-1.4	-1.6
Bethel Island	11.1	11.7	10.9	-2.3	-0.2
Concord	12.8	12.7	11.3	-3.7	-0.8
Gilroy	14.2	11.3	11.5	0.7	-1.4
San Martin	*	12.5	12.1	-1.0	*
Livermore	14.5	14.3	12.5	-4.3	-1.0
<b>Averages</b>	<b>11.4</b>	<b>10.2</b>	<b>9.3</b>	<b>-3.1</b>	<b>-1.4</b>

\* The monitoring station at San Martin began collecting data on 4/30/1994; therefore, there is no 1988 or 1988 - 2002 annual percentage EPDC change data available for this site.

## Population-Weighted Exposure to Ozone

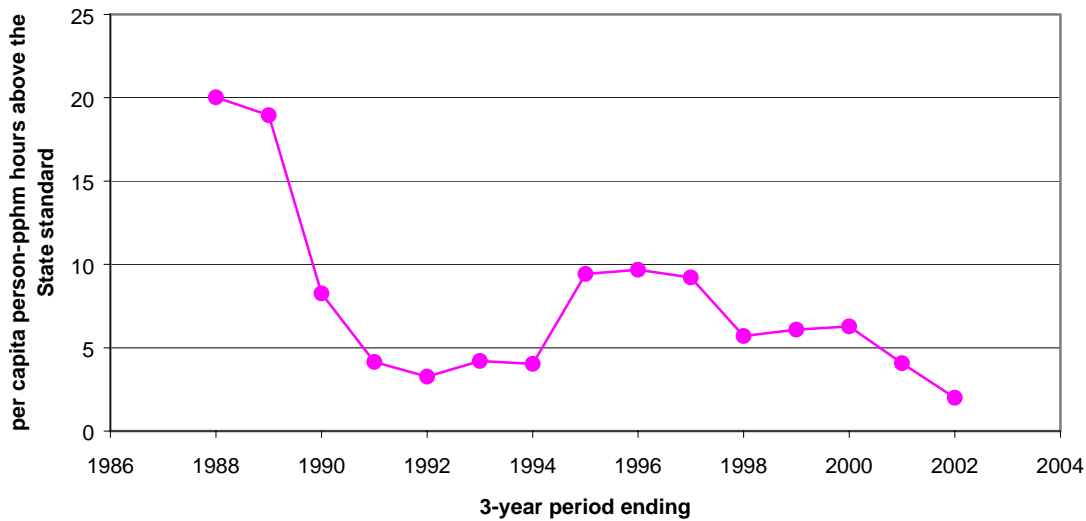
Data for peak ozone concentrations does not reflect how much of the Bay Area's population is exposed to high ozone levels. Population exposure provides a better indication of the extent and severity of ozone's impact on public health. Therefore, population-weighted exposure to ozone is another indicator used in assessing progress toward the State ozone standard. Table 4 shows that population-weighted exposure to unhealthy levels of ozone has decreased substantially everywhere in the Bay Area. The per capita exposure units (person-pphm-hours above 9.5 pphm/total population) show how many hours in a year each individual in a county is exposed to one pphm above the State ozone standard of 9.5 pphm. For example, a value of 5 pphm-hours might represent exposure for three hours at one pphm above the standard (i.e., 10.5 pphm) and one hour at 2 pphm above the standard (i.e., 11.5 pphm).

Population exposure to ozone in the Bay Area has decreased 90 percent on average between 1988 and 2002, as evidenced in Table 4 and Figure 7. From 1999 to 2002, the population exposure to ozone has declined 67 percent. The largest reduction in exposure to ozone from 1988 to 2002 occurred in Santa Clara County, with a 96 percent reduction.

**Table 4: Population-Weighted Exposure to Ozone**

<b>County</b>	<b>Per Capita Exposure (person-pphm-hours above 9.5 pphm/total population)</b>			<b>Percent Decrease</b>	
	<b>1988</b>	<b>1999</b>	<b>2002</b>	<b>1999 to 2002</b>	<b>1988 to 2002</b>
Alameda	18	7	3	54	83
Contra Costa	20	15	5	69	77
Marin	1	1	0	95	92
Napa	3	6	1	77	50
San Francisco	0	0	0	NA	NA
San Mateo	4	1	0	34	92
Santa Clara	48	7	2	71	96
Solano	8	10	2	84	80
Sonoma	1	1	0	81	83
<b>Bay Area</b>	<b>20</b>	<b>6</b>	<b>2</b>	<b>67</b>	<b>90</b>

**Figure 7: Population Exposure to Unhealthy Ozone Levels in the Bay Area, 1988-2002**



**Area-Weighted Exposure to Ozone**

The third indicator used in assessing progress toward the State ozone standard is area-weighted exposure to ozone. Reductions in area-weighted exposure are important because high ozone levels harm not only humans but also vegetation, animals, and most surfaces with which it comes in contact, such as architectural finishes and plastics. Table 5 indicates how many hours in a year each square kilometer in a county is exposed to one pphm above the State ozone standard. Table 5 shows that average Bay Area ozone exposure has decreased 82 percent from 1988 to 2002, and by 59 percent from 1999 to 2002.

**Table 5: Area-Weighted Exposure to Ozone**

County	Area-Weighted Exposure (pphm-hours above 9.5 pphm / total km <sup>2</sup> )			Percent Decrease	
	1988	1999	2002	1999 to 2002	1988 to 2002
Alameda	41	19	10	47	75
Contra Costa	26	18	7	60	72
Marin	1	1	0	89	87
Napa	3	6	1	79	63
San Francisco	0	0	0	NA	NA
San Mateo	12	1	1	46	93
Santa Clara	54	12	6	49	88
Solano	12	11	3	77	79
Sonoma	1	2	0	82	77
<b>Bay Area</b>	<b>20</b>	<b>9</b>	<b>4</b>	<b>59</b>	<b>82</b>

## IMPLEMENTED CONTROL MEASURES

The Air District has a long history of implementing control measures to reduce ozone precursor emissions from stationary, area, mobile and transportation sources. The Air District implements stationary source measures, and many area source measures, by adopting or amending Air District rules and regulations. Since the first Bay Area Clean Air Plan (prepared pursuant to the California Clean Air Act) was adopted in 1991, the Air District has adopted 55 rules and rule amendments to reduce ozone precursor emissions from stationary and area sources. Table 6 reports Air District rules adopted since 1991 and includes emission reductions.

**Table 6: Air District ROG and NOx Rules Adopted Since 1991**

District Regulation, Rule	Adoption Date	Emissions Reductions (tons/day)	
		ROG	NOx
<b>SURFACE COATING AND SOLVENT USE</b>			
COATINGS AND INK MANUFACTURING (b) Eliminate the small manufacturer exemption (c) Require reduced emissions from vat cleaning (Reg 8-35)	03/18/92	0.3-0.5	
ADHESIVES (a) Establish ROG limits for adhesives (b) Set transfer efficiency standards (c) Set standards for cleanup operations (Reg 8-51)	11/18/92	13.0	
AEROSPACE COATINGS (a) Set transfer efficiency standards (Reg 8-29)	02/03/93	0.02-0.03	
SURFACE COATING OF MISCELLANEOUS METAL PARTS AND PRODUCTS (a) Set transfer efficiency standards (Reg 8-19)	02/03/93	0.06-0.13	
SURFACE COATING OF PLASTIC PARTS AND PRODUCTS (a) Set transfer efficiency standards (Reg 8-31)	02/03/93	negligible	

**Table 6 (continued): Air District ROG and NOx Rules Adopted Since 1991**

District Regulation, Rule	Adoption Date	Emissions Reductions (tons/day)	
		ROG	NOx
GRAPHIC ARTS PRINTING OPERATIONS (a) Lower ROG limits for fountain solutions (c) Lower ROG limits for inks (Reg 8-20)	10/06/93	1.3	
GENERAL SOLVENT AND SURFACE COATING (b) Modify mass emission limits (Reg 8-4)	06/01/94	unknown	
ELIMINATION OF COATINGS RULES ALTERNATIVE EMISSION CONTROL PLANS (a) Eliminate or modify AECF provisions in Reg. 8 Rules (Reg 8-12, 8-13, 8-14, 8-19, 8-23, 8-29, 8-30, 8-31, 8-32 & 8-38)	06/15/94	unknown	
SOLVENT AND SURFACE COATING (Reg 8-3)	05/15/96	unknown	
ADHESIVES (a) Establish ROG limits for adhesives (Reg 8-51)	06/05/96	6.0	
WOOD FURNITURE AND CABINET COATINGS (a) Establish ROG limits for coatings (b) Eliminate small user exemption (Reg 8-32)	06/19/96	5.8-6.5	
MOTOR VEHICLE AND MOBILE EQUIPMENT COATING & POLYESTER RESIN (Reg 8-45, 8-50)	11/06/96	unknown	
ADHESIVE AND SEALANT PRODUCTS (Reg 8-51)	11/06/96	unknown	

**Table 6 (continued): Air District ROG and NOx Rules Adopted Since 1991**

District Regulation, Rule	Adoption Date	Emissions Reductions (tons/day)	
		ROG	NOx
CAN AND COIL COATING (a) Lower ROG limits for some coatings (Reg 8-11)	11/19/97	0.35	
ADHESIVE AND SEALANT PRODUCTS (Reg 8-51)	01/07/98	unknown	
SEMICONDUCTOR MANUFACTURING (a) Abate emissions from positive photoresist operations (b) Abate emissions from solvent cleaning performed with coating-type applicators (Reg 8-30)	10/07/98	unknown	
ARCHITECTURAL COATINGS (Reg 8-3)	11/04/98	unknown	
SUBSTITUTE SOLVENTS USED FOR SURFACE PREPARATION / CLEAN-UP OF COATINGS (a) Set ROG / volatility limits for surface preparation solvents (b) Set ROG / volatility limits for clean-up solvents (Reg 8-16, 8-20 & 8-45)	Reg 8-16 adopted 09/16/98  Reg 8-20 adopted 03/03/99  Reg 8-45 adopted 01/09/99	2.9	
POLYSTYRENE, POLYETHYLENE AND POLYPROPYLENE MANUFACTURING (Reg 8-52)	07/09/99	0.3	
ADHESIVE AND SEALANT PRODUCTS (Reg 8-51)	05/02/01	unknown	
SURFACE COATING OF MARINE VESSELS (Reg 8-43)	04/18/01	unknown	
AQUEOUS SOLVENTS (Reg 8-16)	10/16/01	2.2	



**Table 6 (continued): Air District ROG and NOx Rules Adopted Since 1991**

District Regulation, Rule	Adoption Date	Emissions Reductions (tons/day)	
		ROG	NOx
ARCHITECTURAL COATINGS (Reg 8-3)	11/21/01	3.8	
ADHESIVE AND SEALANT PRODUCTS (Reg 8-51)	07/17/02	unknown	
SURFACE PREPARATION AND CLEAN-UP SOLVENTS (Reg 8-4, 14, 19, 31, 43)	10/16/02	2.1	
<b>FUELS/ORGANIC LIQUIDS STORAGE AND DISTRIBUTION</b>			
STORAGE OF ORGANIC LIQUIDS (c) Require better tank seals/more frequent inspections (g) Require emissions to be controlled during tank cleaning (Reg 8-5)	01/20/93	2.0-3.0	
ORGANIC CHEMICAL TERMINALS & BULK PLANTS (a) Reduce emission standard for non-gasoline bulk terminals and plants (Reg 8-6)	02/02/94	0.01	
GASOLINE DISPENSING FACILITIES (Reg 8-7)	11/17/99	3.8	
ORGANIC LIQUID STORAGE (h) Low emitting retrofits for slotted guide poles (Reg 8-5)	12/15/99	0.9	
GASOLINE DISPENSING FACILITIES (Reg 8-7)	11/06/02	unknown	
ORGANIC LIQUID STORAGE (Reg 8-5)	11/27/02	0.13	
<b>REFINERY AND CHEMICAL PLANT PROCESSES</b>			
PUMP AND COMPRESSOR SEALS AT REFINERIES AND CHEMICAL PLANTS (a) Require leakless seals (b) Adopt a more stringent leak definition (Reg 8-18)	03/04/92	6.5	

**Table 6 (continued): Air District ROG and NOx Rules Adopted Since 1991**

District Regulation, Rule	Adoption Date	Emissions Reductions (tons/day)	
		ROG	NOx
VALVES AND FLANGES AT REFINERIES AND CHEMICAL PLANTS (a) Require leakless valves (b) Improve inspection and maintenance requirements (c) Adopt a more stringent leak definition (Reg 8-22 & 8-25)	03/04/92	Emissions reduction included in above rule amendment.	
PRESSURE RELIEF DEVICES AT REFINERIES AND CHEMICAL PLANTS (a) Require venting to abatement devices and/or rupture disks with tell-tale indicators (Reg 8-28)	12/17/97 & 3/18/98	0.13	
EQUIPMENT LEAKS AT REFINERIES AND CHEMICAL PLANTS (b) Control of Fittings (Reg 8-18)	01/07/98	1.2	
EQUIPMENT LEAKS AT REFINERIES AND CHEMICAL PLANTS (Reg 8-18)	11/27/02	unknown	
PETROLEUM REFINERY FLARE MONITORING (Reg 12-11)	06/04/03	none	
LOW EMISSION REFINERY VALVES (Reg 8-18)	1/21/04	0.2	
PROCESS VESSEL DEPRESSURIZATION (Reg 8-10)	1/21/04	unknown	
REFINERY WASTEWATER (OIL-WATER) SEPARATORS (REG 8-8)	9/15/04	2.1	
PETROLEUM REFINERY FLARE CONTROL (Reg 12-12)	07/20/05	TBD	
<b>COMBUSTION OF FUELS</b>			
RESIDENTIAL WATER HEATING (a) Adopt NOx standards for new residential and commercial water heaters (Reg 9-6)	04/01/92		3.3

**Table 6 (continued): Air District ROG and NOx Rules Adopted Since 1991**

District Regulation, Rule	Adoption Date	Emissions Reductions (tons/day)	
		ROG	NOx
BOILERS, STEAM GENERATORS, AND PROCESS HEATERS (a) Adopt NOx controls similar to existing SCAQMD Rule 1146 (2) Smaller units (less than 100 MMBTU/hr.) (Reg 9-7)	09/16/92		14.9
NON-UTILITY RECIPROCATING ENGINES (a) Adopt NOx controls similar to existing SCAQMD Rule 1110.2 (Reg 9-8)	01/20/93		8.3
CONTROL OF EMISSIONS FROM STATIONARY GAS TURBINES (a) Adopt NOx controls similar to existing SCAQMD Rule 1134 (Reg 9-9)	05/05/93		7.0
BOILERS, STEAM GENERATORS, AND PROCESS HEATERS (a) Adopt NOx controls similar to existing SCAQMD Rule 1146 (1) Large units (100 MMBTU/hr. or larger) (Reg 9-10)	01/05/94		21.0
GLASS MANUFACTURING PLANT MELTING FURNACES (a) Adopt NOx controls similar to existing SCAQMD Rule 1117 (Reg 9-12)	01/19/94		1.2
ELECTRIC POWER GENERATING BOILERS (a) Adopt NOx controls based on add-on flue gas controls (Reg 9-11)	02/16/94		10.0-25.0
BOILERS, STEAM GENERATORS AND PROCESS HEATERS (Reg 9-10)	07/17/02		unknown
<b>OTHER STATIONARY SOURCE CONTROL MEASURES</b>			
ENHANCED COMPLIANCE THROUGH PARAMETRIC MONITORING (Reg 1)	10/07/98	unknown	unknown
SOLID WASTE DISPOSAL (Reg 8-34)	10/06/99	unknown	

**Table 6 (continued): Air District ROG and NOx Rules Adopted Since 1991**

District Regulation, Rule	Adoption Date	Emissions Reductions (tons/day)	
		ROG	NOx
PROHIBIT AERATION OF PETROLEUM CONTAMINATED SOIL (Reg 8-40)	12/15/99	2.7	
<b>TOTAL EMISSION REDUCTIONS ACHIEVED</b>		<b>58 – 60 tpd</b>	<b>66 – 81 tpd</b>

The Air District, in cooperation with partner regional and local agencies, continues to make progress in reducing ozone precursor emissions from stationary, area, mobile, and transportation sources. Progress occurs through various means, including adoption and implementation of Air District rules as noted above, implementation of Air District incentive programs and public education programs, and transportation planning and programming processes.

**Stationary and Area Source Measures**

The triennial update of the plan for the State ozone standard must report progress on implementing the control measures in the 2000 Clean Air Plan. Of the nine stationary source measures proposed in the 2000 Clean Air Plan, four were adopted (A1 Architectural Coatings, A5 Surface Preparation and Clean-Up Solvents, B2 Organic Liquid Storage, and C4 Process Vessel Depressurization), two are carried over in the control strategy in the 2005 Ozone Strategy (A21 Automobile Refinishing and A22 Wood Products Coating), and three are proposed for deletion (discussed below). Table 7 reports Air District rules adopted and implemented since 2000, with the associated emission reductions.<sup>9</sup>

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<sup>9</sup> Note that some measures were included in the 2000 Clean Air Plan (for the State standard) and also in the 2001 Ozone Attainment Plan (for the national standard). Four measures in Table 7 were included only in the 2001 Ozone Attainment Plan. Even though these four measures were not included in the 2000 Clean Air Plan, they are included in Table 7 to provide a more complete picture of Air District rule development activity since 2000. Details on the history of Bay Area air quality planning for the national one-hour ozone standard can be found in Section 3 Other Issues.

**Table 7: Air District Rules Adopted Since 2000**

<b>Control Measure (Reg. – Rule)</b> Control Measure # <sup>1</sup>	Date Adopted	Emissions Reduced <sup>2</sup>
Architectural Coatings (Reg. 8-3) <b>A1</b> , SS-11	11/21/2001	3.8 tons/day
Organic Liquid Storage (Reg. 8-5) <b>B2</b> , SS-12	11/27/2002	0.1 tons/day
Surface Preparation and Clean-Up Solvents (Reg. 8-4, 13, 19, 31, 43) <b>A5</b> , SS-13	10/16/2002	2.1 tons/day
Aqueous Solvents (Reg. 8-16) SS-14	10/16/2001	2.2 tons/day
Petroleum Refinery Flare Monitoring (Reg. 12-11) SS-15	6/4/2003	none <sup>3</sup>
Low Emission Refinery Valves (Reg. 8-18) SS-16	1/21/2004	0.2 tons/day
Process Vessel Depressurization (Reg. 8-10) <b>C4</b> , SS-17	1/21/2004	unknown <sup>4</sup>
Refinery Wastewater (Oil-Water) Separators (Reg. 8-8), FS-9	9/15/2004	2.1 tons/day
10 Tons/Year No Net Increase Requirement (Reg. 2-2)	12/21/2004	unknown
Petroleum Refinery Flare Control (Reg. 12-12)	7/20/2005	unknown <sup>3</sup>
Total emission reductions		10.5 tons/day

<sup>1</sup> Control Measure numbers in **bold** are from 2000 Clean Air Plan. Other control measure numbers are from the 2001 Ozone Attainment Plan.

<sup>2</sup> All emissions are of ROG

<sup>3</sup> The flare monitoring rule does not result in direct emission reductions although refineries did reduce flaring emissions substantially in response to the monitoring rule development and implementation. The flare control rule (Reg 12-12) will capture the emission reductions from flaring and make them enforceable.

<sup>4</sup> The 2004 amendments greatly increase the number of refinery vessels subject to the rule requirements. Emission reductions have not been quantified.

### **Control Measures Proposed for Deletion**

In some cases, control measures are not implemented through rules, either because: there are negligible emissions in the source category; there is negligible emissions reduction potential; it is found that prospective control technology is either infeasible or too costly; or because potential emissions reductions are captured under another control measure. Previous triennial updates have deleted control measures due to one or more of these reasons. If, in the future, more information becomes available which indicates the potential viability of these deleted control measures, they will be reevaluated for consideration as future control measures at that time.

Three stationary and area source control measures from the 2000 Clean Air Plan are proposed for deletion: control measures addressing VOC emissions from concrete coating (A-23); NO<sub>x</sub> emissions from residential water heaters (D-8); and seasonal control

on cleaning of organic liquid storage tanks and wastewater separators and refinery shutdowns (G-3). The following is a summary evaluation of each of these control measures and the rationale for deletion:

- **A23: Concrete Coating Operations.** This measure was proposed because a review of the Air District's miscellaneous coatings inventory revealed a number of operations that coat concrete. At the time the 2000 CAP was developed, it appeared that some of these operations might be able to achieve emission reductions by using lower-VOC coatings and form release compounds. This control measure was evaluated again as part of the 2001 Bay Area Ozone Attainment Plan Reasonably Available Control Measure review. This review showed that emissions from concrete coating operations are currently less than 0.05 tons per day. Therefore, potential emission reductions from this control measure are de minimis.
- **D8: Improved Residential Water Heater Rule.** Residential water heaters are subject to the requirements of District Regulation 9, Rule 6: Nitrogen Oxide Emissions from Natural Gas Fired Water Heaters. The control measure recommended lower NO<sub>x</sub> limits found in the comparable South Coast rule. In 1999, amendments to South Coast Rule 1121 established a 20 nanogram NO<sub>x</sub> / joule of heat output standard effective in 2002 and a 10 nanogram / joule of heat output standard effective in 2005. These standards were described as technology forcing. The rule allowed manufacturers to pay a mitigation fee in lieu of meeting the 20 nanogram limit. On October 24, 2003, South Coast staff reported to the Stationary Source Committee of their Board on progress toward the new limits. All manufacturers paid a mitigation fee in lieu of meeting the interim rule limit. All four major manufacturers of water heaters were reported to be having difficulty meeting the final rule limit. The manufacturers cited competing federal requirements regarding safety and energy efficiency that they have had to meet for the national market. The competing requirements also affect NO<sub>x</sub> levels. As a result, the manufacturers sought a delay in the effective date of the standard. Manufacturers are not be making water heaters to meet the 20 nanogram limit, and the feasibility of the 10 nanogram limit remains uncertain. On September 3, 2004, South Coast Rule 1121 was amended to delay the effective date of the 10 nanogram limit to various dates in 2006 through 2008, depending upon the size and design of the water heater.
- **G3: Seasonal Limitations on Organic Liquid Storage Tank and Wastewater Separator Cleaning and Refinery Shutdowns.** This measure would require that discretionary activities such as organic liquid storage tank cleaning, wastewater separator cleaning, and refinery unit shutdowns be controlled or conducted outside the summer ozone season. The 2001 Ozone Attainment Plan Reasonably Available Control Measure review also evaluated this control measure. This review found that refineries maximize production during the summer and schedule these activities at other times, so few emission reductions are likely during summer months. Also, amendments to Reg. 8-10: Process Vessel Depressurization adopted in January, 2004 achieve part of the emission reduction that would be produced by this measure. Amendments to Reg. 8-8: Wastewater (Oil-Water) Separators adopted in September 2004 achieve an additional portion. Finally, more stringent organic liquid storage tank cleaning requirements, which are currently being studied as part of 2001 Ozone Attainment Plan further study measure FS-10, would achieve yet another portion. These proposals will achieve these emissions reductions on a permanent basis, not

just seasonally. Any remaining emission reductions that could be achieved through seasonal prohibitions are de minimis.

### **Mobile Source Programs**

Air District efforts to reduce emissions from mobile sources during the years 2001-03 have focused on incentive and education programs. The Air District's Transportation Fund for Clean Air (TFCA) program provides incentives for clean fuel buses, other clean air vehicle projects, retrofits and re-powers of on-road diesel engines, shuttle and feeder bus projects, ridesharing, bicycle facilities, smart growth, transit information and arterial management projects. The TFCA program also funds the Air District's Vehicle Buy Back program, the Smoking Vehicle program and the Spare the Air program. In coordination with the ARB, the Air District also administers the Carl Moyer program and the Lower Emission School Bus program. These programs are discussed in more detail in the Mobile Source Programs portion of the control strategy. Table 8 provides information on Air District mobile source programs during fiscal years 2000/01 - 2002/03.

**Table 8: Funding and Emission Reductions from Incentive Programs**

Fiscal Year	FY00/01		FY01/02		FY02/03	
	Funding	Emission Reductions*	Funding	Emission Reductions*	Funding	Emission Reductions*
Smoking Vehicle	\$508,490	36	\$545,864	60	\$522,008	61
Vehicle Buy Back	\$2,326,588	643	\$2,284,977	372	\$3,753,850	582
Vehicle Incentive Program	\$1,360,000	37	\$1,311,000	42	\$1,000,000	5
Spare the Air	\$622,329	25	\$649,426	20	\$667,690	23
Lawnmower Buy Back	\$125,000	5.3	\$129,200	5.5	\$158,800	6.7
Trip Reduction/Ridesharing	\$3,028,770	268	\$4,273,748	181	\$5,932,746	239
Telecommuting	\$41,496	2				
Smart Growth	\$938,375	36	\$550,000	13	\$995,186	34
Arterial Management	\$724,715	46	\$1,899,000	62	\$2,980,000	167
Bicycle Facilities	\$2,368,051	78	\$1,182,047	49	\$3,470,763	123
Shuttle and Feeder Buses	\$3,524,306	136	\$3,369,273	111	\$3,082,874	88
Transit Buses	\$1,534,535	123	\$3,921,396	248	\$1,463,370	58
School Buses	\$1,072,500	31	\$3,920,000	80	\$1,330,000	39
Natural Gas Vehicles	\$4,734,000	267	\$1,359,812	95	\$2,846,153	129
Infrastructure for CNG	\$895,544	N/A	\$1,373,739	N/A	\$375,615	N/A
Infrastructure for EV	\$93,000	N/A	\$9,000	N/A	\$57,000	N/A
Lower Emission School Bus Program	\$8,673,611	182	\$4,238,607	89	\$3,172,852	127
Carl Moyer Program	\$4,340,000	2859	\$1,570,344	906	\$1,573,102	906
<b>T O T A L</b>	<b>\$36,786,310</b>	<b>4,769</b>	<b>\$32,458,233</b>	<b>2,328</b>	<b>\$33,223,209</b>	<b>2,581</b>

\* Emission reductions are total tons of ROG, NOx and PM combined over the life of the project.

Highlights from the Air District grants programs during FY 00/01, FY 01/02, and FY 02/03 include:

- 271 school buses purchased or retrofit
- 9,769 older vehicles retired through the Vehicle Buy-Back program
- 68 bicycle projects funded
- 37 shuttle projects funded
- 58 low emission vehicle projects funded through the Carl Moyer program

### **Transportation Control Measures**

TCM implementation is ongoing, and significant progress was made during 2001-2003 in implementing the nineteen TCMs in the 2000 Clean Air Plan. The following discussion highlights significant TCM implementation efforts during the three-year period.

#### **TCM 1: SUPPORT VOLUNTARY EMPLOYER-BASED TRIP REDUCTION PROGRAMS**

- MTC continues to administer the Regional Ridesharing Program (trip reduction services were provided by RIDES for Bay Area Commuters during this period).
- Air District's Transportation Fund for Clean Air (TFCA) funds numerous regional and local voluntary ridesharing and trip reduction programs. TFCA funded approximately \$17.8 million in trip reduction projects during FY 01/02 – 03/04. (Trip reduction category includes funding for transit use incentives (TCM 13), vanpool incentives (TCM 14), and educational programs (TCM 16)).
- Air District's Spare the Air Employer Program works with employers, cities and counties to provide assistance and tools to educate employees about air quality and commute alternatives.

#### **TCM 3: IMPROVE AREAWIDE TRANSIT SERVICE**

- In the 2003 Transportation Improvement Plan (TIP), MTC programmed \$2.2 billion for public transit operations and capital expenses.
- AC Transit's enhanced rapid bus service on San Pablo Avenue started operation in 2003.
- MTC's Regional Express Bus program completed the purchase of 90 low emission buses, providing service on major commute corridors.
- TFCA funded approximately \$6.6 million for clean-fuel transit buses during FY 01/02 – FY 03/04.
- In December 2001, MTC programmed \$5 million in CMAQ funds, which were equally matched with local transportation and social service funds, to initiate the Low Income Flexible Transportation (LIFT) Program. The first round of LIFT funding supported 12 projects designed to implement projects identified in county plans. In December 2002, MTC programmed an additional 14 projects funded through a combination of Job Access and Reverse Commute funds (\$3 million), STA funds and local social service funds. These projects funded expanded fixed route services, children's shuttles, vanpool services and car share services that directly serve low-income communities.



#### TCM 4: IMPROVE REGIONAL RAIL SERVICE

- BART extension to SF International Airport opened in June 2003.
- Caltrain Baby Bullet express service began in June 2004.
- Santa Clara VTA completed the first phase of the Tasman East Light Rail extension project in May 2001 with construction of a 1.9 mile segment from Baypointe Transfer Station to I-880 in Milpitas. The second phase of the Tasman East and the Capitol Light Rail Extension Projects began service in June 2004.

#### TCM 5: IMPROVE ACCESS TO RAIL & FERRIES

- TFCA funded \$10.7 million for feeder bus and shuttle service to rail and ferries during FY 01/02 – FY 03/04.
- TFCA, TDA Article 3, and TEA-21 Enhancements funded bicycle access and bicycle storage facilities at BART, Caltrain, Muni, SCVTA LRT and AMTRAK stations. TFCA continued to fund attended bicycle parking at Palo Alto Caltrain and Downtown Berkeley BART stations and provided new funding at San Francisco Caltrain stations, and Fruitvale and Embarcadero BART stations.

#### TCM 6: IMPROVE INTERCITY RAIL SERVICE

- Five additional (for a total of twelve) Capitol trains began operation on weekdays between the Bay Area and Sacramento. Weekend service now includes nine roundtrips between Oakland and Sacramento.
- A third Altamont Commuter Express train began service between Stockton and San Jose in 2001.

#### TCM 7: IMPROVE FERRY SERVICE

- Since 2000, the Air District has provided approximately \$3 million in Carl Moyer funds to purchase new, lower emission engines for 6 commuter ferries operating in the San Francisco Bay.
- In 2001, Golden Gate Transit initiated service of a new high-speed catamaran vessel, operating from Larkspur to San Francisco.
- In 2003, the Water Transit Authority's long-range plan to operate and expand comprehensive ferry service across San Francisco Bay was approved by the California Legislature.
- Vallejo Transit's Baylink began operation of a new high-speed low emission vessel in July 2004.

#### TCM 8: CONSTRUCT CARPOOL/EXPRESS BUS LANES ON FREEWAYS

- Since 2000, the following new HOV facilities were constructed: HOV lanes on SR 4 in eastern Contra Costa County, HOV lane from the Bay Bridge to I-80, HOV lane/flyover to the Bay Bridge toll plaza, HOV lane on I-880 northbound from West Grand Avenue to the Bay Bridge toll plaza, HOV lanes on I-680 southbound over Sunol, HOV lane on Hwy 101 between Bernal to Cochrane in Santa Clara County, HOV Lane on Hwy 101 between Wilfred to SR 12 in Sonoma County.
- In FY 02/03, TFCA provided funds for the construction of a park & ride lot in the City of Windsor.
- In 2003, MTC adopted the 2002 HOV Lane Master Plan Update for the Bay Area.

#### TCM 9: IMPROVE BICYCLE ACCESS & FACILITIES

- In FY 01/02 – FY 03/04, MTC funded over \$21.2 million in bicycle and pedestrian projects through the TDA Article 3 program.
- TFCA funded \$8.2 million in bicycle projects during FY 01/02 – FY 03/04, including bicycle routes, lanes, bridges and lockers.

#### TCM 10: YOUTH TRANSPORTATION

- In 2001, the Air District began implementing ARB's Lower Emission School Bus Program in the Bay Area. During FY 00/01 – FY 02/03, funding for the Bay Area totaled \$8.2 million. All of the funding has been awarded, resulting in 172 low emission school buses in the Bay Area.
- In 2001, MTC committed up to \$2 million in Low Income Flexible Transportation (LIFT) funds to support a 2-year pilot program to provide free bus passes for low-income students throughout AC Transit's service area. TFCA allocated \$500,000 to support the program. TFCA also allocated \$178,000 for student transit subsidies in Marin County.
- TFCA funded various programs at schools and universities, including transit pass subsidies, trip reduction and ridesharing services, transit information programs, and Safe Routes to School projects.

#### TCM 11: INSTALL FREEWAY/ARTERIAL METRO TRAFFIC OPERATIONS SYSTEM

- Freeway Service Patrols reduce incident related congestion and has expanded service to 80 vehicles, covering 450 miles of freeway.
- In 2003, ramp meters began operation on eastbound I-580 in Pleasanton, and at I-880/237 interchange.

#### TCM 12: IMPROVE ARTERIAL TRAFFIC MANAGEMENT

- TFCA has funded \$6.7 million in signal prioritization and timing projects during FY 01/02 – FY 03/04.
- In FY 03/04, MTC programmed \$1.2 million for signal retiming, and \$250,000 in technical assistance to local jurisdictions to improve arterial operations.
- AC Transit's enhanced bus service on San Pablo Avenue started operation in 2003, relying on a number of arterial improvements to speed bus travel in the corridor.

#### TCM 13: TRANSIT USE INCENTIVES

- Over 80,000 Bay Area employees use pre-tax salary to pay for transit tickets. This service is provided by several vendors and annual sales through the Regional Transit Connection are approximately \$36 million.
- TFCA awarded \$365,000 for transit marketing projects in FY 02/03.
- VTA's EcoPass program continues to expand and now includes a residential component that provides transit passes for residents affiliated with housing developments. The EcoPass program currently includes 106 Employers and Residential Communities, and they represent about 120,000 employees and residents in Santa Clara County.
- Phase I of the TransLink® (universal fare card) program began in February 2002. More than 3,500 volunteers participated in a six-month pilot program in select stations and on select routes operated by six Bay Area transit

providers: AC Transit, BART, Caltrain, Golden Gate Transit, San Francisco MUNI and the Santa Clara VTA.

**TCM 14: IMPROVE RIDESHARE/VANPOOL SERVICES AND INCENTIVES**

- TFCA funds various vanpool incentive programs through the Regional Rideshare Program. The current vanpool fleet amounts to approximately 675 vans.
- In December 2002, MTC launched a regional on-line ridematching service.

**TCM 15: LOCAL CLEAN AIR PLANS, POLICIES AND PROGRAMS**

- In 2000, MTC created a new component of the Transportation for Livable Communities (TLC) program, the Housing Incentive Program (HIP), which provides incentives for the development of higher density housing near existing transit stations. Twenty-one cities have received HIP grants totaling \$9 million.
- During FY 01/02 – FY 03/04, MTC funded 17 TLC planning projects totaling \$911,000 and 12 capital projects totaling \$9.5 million
- In December 2003, MTC reaffirmed their commitment to a tripling of TLC funding to \$27 million/year for six years under the reauthorization of TEA-3.
- The Smart Growth Strategy/Regional Livability Footprint Project public workshops concluded in Spring 2002, and resulted in the development of a regionally approved Smart Growth Vision for the Bay Area. ABAG adopted policy-based demographic projections based on the Vision in March 2003. Population assumptions for the Regional Transportation Plan, Transportation 2030, are based on ABAG's Projections 2003.
- MTC created a new program for partnering with county Congestion Management Agencies (T-PLUS) to further the integration of transportation and land use decisions at the local level.
- In July 2000, AB 2864 created the Inter-Regional Partnership State Pilot Project, which was designed to develop, implement and evaluate incentive programs designed to change development patterns to improve the quality of life in the Bay Area and Central Valley by working to balance jobs and housing in the regions.

**TCM 16: INTERMITTENT CONTROL MEASURE/PUBLIC EDUCATION**

- Approximately 2,100 employers with over 1 million employees now participate in the Air District's Spare the Air program.
- Starting in 2003, the Air District partnered with Livermore Amador Valley Transit Authority to offer free service on all Spare the Air days. The program has continued in 2004. The Air District, BART and MTC funded a program to offer free morning commutes on BART on the first five weekday Spare the Air days between June 21 and Oct. 15, 2004. Free BART service was subsequently provided on September 7 and 8, 2004.
- In 2003, the Clean Air Consortium, comprised of 30 city and county agencies, formed to voluntarily curtail lawn and garden maintenance, painting, refueling and other polluting activities on Spare the Air Days.
- The Bay Area Clean Air Partnership (BayCAP) promotes voluntary actions to reduce emissions and meet the national ozone standard. In 2002, BayCAP undertook a comprehensive shuttles campaign to inventory existing

programs, provide coordination and assistance, and promote “best practices” among shuttle operators.

- Caltrans issues messages on freeway changeable message signs to cut down on high speed emissions by requesting that motorists observe the speed limit on Spare the Air days.

#### TCM 17: CONDUCT DEMONSTRATION PROJECTS

- TFCA has funded numerous clean fuel vehicle demonstration projects amounting to approximately \$8.2 million during FY 01/02 – FY 03/04.
- All lanes on Bay Area bridges are now equipped for FasTrak electronic toll collections. In addition, all bridges have either one or two dedicated lanes for use exclusively by vehicles with FasTrak transponders.
- From 2000 through 2003, the Air District’s Lawnmower Buyback programs resulted in approximately 1,200 – 1,300 gasoline-powered lawnmowers being exchanged for electric models each year. The program continued in 2004.
- In 2002, the Air District awarded \$250,000 in Carl Moyer Infrastructure Demonstration funds for the development of a liquefied natural gas refueling station in Oakland. The Air District also awarded \$57,000 to the Port of Oakland for a one-year demonstration of aqueous diesel fuel in Class 8 trucks.

#### TCM 18: TRANSPORTATION PRICING REFORM

- Regional Measure 2, a ballot measure to raise bridge tolls on state-owned Bay Area bridges by \$1, was approved in March 2004 by Bay Area voters in seven (7) Bay Area counties. The additional toll revenue will raise an estimated \$125 million each year to implement the Regional Traffic Relief Plan, a comprehensive strategy for addressing congestion in the transbay bridge corridors and enhancing the convenience and reliability of the Bay Area’s public transit system.

#### TCM 19: PEDESTRIAN TRAVEL

- MTC’s TLC program provides funding to assist pedestrian-friendly planning and projects (see TCM 15). TFCA also funded several pedestrian improvement projects (see TCM 20).
- MTC allocates TDA funds to pedestrian projects and provides incentives in the funding allocation process for capital improvements. About \$6.5 million of TDA Article 3 funds in FY01/02 and over \$67 million in the 2003 TIP were allocated to bicycle/pedestrian projects.
- The Regional Pedestrian Committee (formerly Pedestrian Safety Task Force) was established in early 2002 to provide support for pedestrian planning in five program areas: data analysis, technical assistance, educational programs, resource guide, and stable funding.

#### TCM 20: PROMOTE TRAFFIC CALMING

- MTC’s TLC and the Air District’s TFCA programs have funded numerous traffic calming projects. In FY 02/03, MTC awarded \$2.6 million in TLC capital grants to traffic calming projects in Alameda, El Cerrito, East Palo Alto, and Vacaville. Since FY 00/01, approximately \$1.7 million in TFCA regional funds have been awarded to traffic calming projects in the Bay Area.

## **CONTROL STRATEGY**

The control strategy outlines a program for further reducing ozone precursor emissions in order to reduce ozone levels in the Bay Area and reduce transport to downwind regions. It is the central element of the 2005 Ozone Strategy.

The control strategy for the 2005 Ozone Strategy is to implement all feasible measures on an expeditious schedule in order to reduce emissions of ozone precursors. This is consistent with California Clean Air Act requirements in the Health and Safety Code and pollutant transport mitigation requirements in the California Code of Regulations.

This section describes the proposed strategy for further reducing ozone precursor emissions in order to reduce ozone levels in the Bay Area and reduce transport to downwind regions. A discussion of the process for identifying and evaluating potential control measures is followed by a description of the control strategy, which includes stationary source measures, mobile sources measures and transportation control measures. More detailed control measure descriptions are provided in the appendices.

### **Control Measure and Further Study Measure Development**

To satisfy State requirements under the CCAA that the region adopt all feasible measures to reduce ozone precursor emissions, the Air District investigated a wide range of potential control measure ideas from many sources. Air District staff sought ideas for new sources to control, as well as ways to strengthen existing rules and programs. To identify potential control measures, the Air District:

- Participated in discussions as part of the Rule Development Managers subcommittee of the CAPCOA Engineering Managers Committee to develop a statewide “all feasible measures” list.
- Participated with staff from ARB, Yolo-Solano APCD, Sacramento Metropolitan AQMD, and San Joaquin Valley Unified APCD on a rule comparison project.
- Reviewed 39 suggested control measures developed by consultants for Sacramento Metropolitan AQMD.
- Investigated rules in other air districts throughout California.
- Investigated control measures and programs from plans in other districts and agencies, both within and outside the state.
- Considered comments and suggestions from the Ozone Working Group.
- Considered comments and suggestions from community meetings.
- Considered comments and suggestions from Air District Board members, Advisory Council members, and staff.

Additional detail on the Air District's processes for identifying and evaluating potential control measures is provided in Appendix B, Control Measure Review and Evaluation Process.

MTC took the lead in evaluating transportation control measures, and MTC and the Air District worked together in revising the TCMs. This process is discussed below, in the TCM section of the control strategy.

In total, Air District staff considered 390 control measure suggestions, not including transportation control measure suggestions evaluated by MTC. In evaluating a control measure, staff considered a variety of factors, including:

- Technological feasibility of proposed controls;
- Emission inventory of the source category and total likely emission reductions from proposed controls;
- Cost-effectiveness in dollars per ton of emissions reduced;
- Enforceability, including whether emission reductions are real, quantifiable, permanent, enforceable, and surplus;
- Rate (and timing) of emissions reductions;
- Public acceptability, including interests and concerns of community members;
- Pollutant reduced (volatile organic compounds, nitrogen oxides or both);
- Any potential adverse environmental impacts;
- Socioeconomic impacts.

In some cases, not all of these elements could be analyzed from readily available information. For example, emissions data for some source categories or the emissions reduction potential of some control measure may be uncertain. In these cases, further study may be warranted if the other aspects of a suggested control, such as public acceptability and adverse environmental impacts appear positive. These measures are discussed further below, under Further Study Measures.

Of the 390 control measure suggestions considered, not including the transportation control measure suggestions evaluated by MTC, Air District staff made preliminary determinations and presented them for discussion at three Ozone Working Group meetings on January 6, 2004, January 20, 2004, and March 23, 2004. Finally, based on input from the Ozone Working Group and members of the public, and on further evaluation by Air District staff, the potential control measures were distilled down to the measures identified in Tables 9 and 12. (TCMs are summarized in Table 13.)

### **Addressing Transport Requirements**

As noted above in the discussion of CCAA planning requirements, some of ARB's Transport Mitigation Requirements are also included among CCAA planning requirements for all nonattainment areas. To summarize the Transport Mitigation Requirements discussed above, the Air District must:

1. Adopt and implement all feasible measures.
2. Adopt and implement BARCT.
3. Adopt a no net increase permitting program for sources above 10 tons per year.
4. Include measures to attain the standard in specified downwind regions.

The 2005 Ozone Strategy addresses all of the above. The requirements to adopt all feasible measures, and implement BARCT on all existing stationary sources are necessary for the Bay Area to meet both attainment planning and transport mitigation requirements. These requirements are addressed in the control strategy as well as through Air District rule development and permitting processes. With respect to the no net increase requirement, the Air District adopted a 10 ton/year no net increase requirement for ozone precursors in District Regulation 2, Rule 2: New Source Review on December 21, 2004. Regarding measures sufficient to attain the State ozone

standard in specified transport areas, this is accomplished through the proposal to adopt all feasible measures as identified in the control strategy. As adoption of all feasible measures represents the most stringent control strategy that can be accomplished, this requirement is met with the approval of each triennial plan.

Regarding the consultation requirements in the transport mitigation requirements, the Air District has previously consulted with downwind districts, as discussed in Appendix A, and will conduct additional consultation meetings with downwind air districts.

### **Stationary and Area Source Measures**

The following table outlines the stationary and area source measures proposed for the 2005 Ozone Strategy. Most of these control measures represent strengthening of existing Air District requirements, and would be adopted by amending existing Air District rules. SS-3, High Emitting Spray Booths would be adopted as a new Air District rule. More complete descriptions of the stationary source control measures are included in Appendix C.

**Table 9: Proposed Stationary and Area Source Control Measures**

<b>CM #</b>	<b>BAAQMD Reg - Rule</b>	<b>Source Category</b>	<b>Description</b>	<b>Estimated ROG Reduction tons/day</b>	<b>Estimated NOx Reduction tons/day</b>
<b>Industrial – Commercial Processes</b>					
SS-1	8-45	Auto Refinishing	Reduce VOC limits for some coating categories	0.7	
SS-2	8-20	Graphic Arts Operations	Reduce VOC limits for flexographic ink and clean up solvent	0.15	
SS-3		High Emitting Spray Booths	Require additional controls on spray booths that emit > 20 tons ROG/yr	0.5	
SS-4	8-50	Polyester Resin Operations	Reduce allowable monomer content for some types of polyester resins	0.3	
SS-5	8-32	Wood Coating Operations	Reduce VOC limits for some coating categories	0.68	
<b>Petroleum Products Production and Distribution</b>					
SS-6	12-12	Flares	Minimize flaring (ADOPTED 7/20/05)	TBD*	TBD*
SS-7	8-33, 39	Gasoline Bulk Terminals and Plants	Require automatic shutoff and backpressure monitors, set more stringent leak, emission standards	0.14	
SS-8	8-44, 46	Marine Loading Operations	Control additional cargoes, set more stringent leak standards and/or control housekeeping emissions	0.7 – 1.0	
SS-9	8-5	Organic Liquid Storage	Tighten existing requirements and/or control lower vapor pressure liquids	TBD*	
SS-10	8-28	Pressure Relief Devices	Improve enforceability of rule	0.001	

**Table 9 (continued): Proposed Stationary and Area Source Control Measures**

<b>CM #</b>	<b>BAAQMD Reg - Rule</b>	<b>Source Category</b>	<b>Description</b>	<b>Estimated ROG Reduction tons/day</b>	<b>Estimated NOx Reduction tons/day</b>
SS-11	8-8	Wastewater Systems	Control emissions from wastewater collection systems (ADOPTED 9/15/04)	2.1	
<b>Combustion Processes</b>					
SS-12	9-7	Industrial, Institutional and Commercial Boilers	Extend existing limits to smaller boilers and/or set a more stringent standard		0.5 – 1.0
SS-13	9-6, 7	Large Water Heaters and Small Boilers	Require new, small boilers and large water heaters to meet NOx limits		0.39
SS-14	9-9	Stationary Gas Turbines	Implement BARCT NO <sub>x</sub> limits on existing turbines		1.2
<b>Education Programs</b>					
SS-15		Energy Conservation	Educate government, industry and the public in energy efficient choices	unknown	unknown

\*TBD – emissions reductions to be determined



## RULE DEVELOPMENT PROCESS

Most stationary source measures in the 2005 Ozone Strategy are implemented through the rule development process. The Bay Area Air District goes through a detailed process to adopt rules and regulations to impose standards on and limit emissions from Bay Area industry. The legal authority for these regulations and many of the requirements that establish the process are found in the California Health and Safety Code<sup>10</sup>. The Air District follows a set of guiding principles for the rule development program:

- Strengthen and refine our rules to do a better job of protecting the public health, environment and economy of the Bay Area
- Meet our environmental goals in the most efficient and effective manner
- Respect all different points of view and knowledge
- Identify every player with a stake in the outcome of our regulations
- Provide businesses maximum flexibility to meet air quality goals in a way that works best for them, allowing them to be cleaner at a lower cost

Air District staff take a number of steps to prepare a new rule or rule amendment for consideration by the Board of Directors. Following is a brief summary of the steps involved in developing a new or modified rule:

- **Internal Scoping Meeting** - staff conduct an internal meeting to discuss an identified air pollution problem, including divisions that may have relevant expertise. For example, the source test and laboratory departments in the Technical Services Division have input on appropriate test methods to create enforceable standards.
- **Technical Assessment Memorandum** - staff perform an analysis of the various options for addressing the problem, including technology available to achieve controls, cost effectiveness and potential environmental impacts. A technical assessment memorandum may precede or may be derived from a control measure.
- **Stakeholders Meetings** – staff conduct meetings with the affected businesses and other interested parties to discuss issues, exchange information, and ensure effective communication among the various parties. In some cases stakeholder meetings precede and assist in development of technical assessment memoranda. For example, for recent refinery further study measures, staff established technical workgroups consisting of representatives from the refineries, an environmental organization, Air District and CARB staff and other affected parties.
- **Initial Draft of the Proposed Rule** - if, after the technical assessment and stakeholders meetings, a new rule or rule amendment is warranted, the Air District, in consultation with the affected parties, develops a draft rule.
- **Workshops** - Air District staff conducts one or more public meetings for each new rule or rule modification so that all affected and interested parties can discuss, comment on, and ask questions about a proposed rule.
- **CEQA Determination** - as a draft rule is developed, a CEQA (California Environmental Quality Act) analysis is begun to determine whether a rule or rule amendment might have any adverse environmental impacts.

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<sup>10</sup> See e.g. California Health and Safety Code § 40702, 40703, 40725 *et seq.*

- **Socioeconomic Impact Analysis** – staff researches and prepares cost estimates for implementation of the control strategy and calculates cost effectiveness on a dollars/ton of emissions reduced basis. An analysis of the socioeconomic impact of the rule proposal is prepared to assess the impact of the costs of the rule on the impacted industry and the Bay Area economy, including jobs.
- **Staff Report** – staff incorporate the results of the CEQA determination and socioeconomic analysis into a staff report. The staff report explains the technical basis for the rule. It contains emission estimates, a description of the industry, control requirements, as well as rule amendments, costs, incremental costs, impacts on Air District staff resources, and the rule development process, and makes legal findings necessary for rule adoption. Comments and responses on the rule proposal and on the CEQA analysis are also included.
- **Public Hearing** - staff present the rule or amendments to the Air District's Board of Directors at one of the Board's regularly scheduled meetings. These meetings are always open to the public, noticed 30 days in advance and anyone may comment on the proposed rule or amendments during the meeting. At the conclusion of the hearing, the Board decides whether to adopt the rule or amendments.

Subsequent to rule adoption by the Board, staff work to implement the rule by preparing inspection protocols, policies and procedures and issuing compliance advisories to notify affected parties of the rule and compliance dates. Staff also forward the rule to ARB and, if appropriate, prepare a State Implementation Plan (SIP) submittal to EPA.

#### ANNUAL REGULATORY AGENDA

For this strategy, control measures are scheduled according to expected time to complete the rule development process based on data needs and other technical factors, as well as the need for participation in the rule development process by affected and interested parties. The amount of potential emissions reductions is a primary factor in determining the schedule, as well as the public acceptability of control measures, with due consideration for cost effectiveness and any adverse environmental impacts. The schedule is as expeditious as practicable. Any particular control measure may be advanced or delayed based on information discovered in the rule development process or Air District staff allocation priorities. Also, during the rule development process, it may be determined that a measure may not provide sufficient emission reductions to warrant regulation or may not be cost effective.

Table 10 shows the proposed scheduled for regulation adoption during 2005, 2006 and 2007.

**Table 10: Regulatory Agenda, 2005 - 2007**

**2005 Regulatory Agenda**

CM #	Control Measure (Reg and Rule)	ER Potential
SS 6	Flares (Reg 12-12) (ADOPTED 7/20/05)	TBD
SS 8	Marine Loading Operations (Reg 8-44, 46)	0.7 – 1.0 tpd
SS 10	Pressure Relief Devices (Reg 8-28)	0.001

**2006 Regulatory Agenda**

CM #	Control Measure (Reg and Rule)	ER Potential
SS 2	Graphic Arts Operations (Reg 8-20)	0.15 tpd
SS 7	Gasoline Bulk Terminals and Bulk Plants (Reg 8-33, 39)	0.14 tpd
SS 9	Organic Liquid Storage (Reg 8-5)	TBD
SS 13	Large Water Heaters and Small Boilers (Reg 9-6, 7)	0.39 tpd NOx
SS 14	Stationary Gas Turbines (Reg 9-9)	1.2 tpd NOx
SS 15	Energy Conservation	unknown

**2007 Regulatory Agenda**

CM #	Control Measure (Reg and Rule)	ER Potential
SS 1	Auto Refinish Operations (Reg 8-45)	0.7 tpd
SS 3	High Emitting Spray Booths	0.5 tpd
SS 4	Polyester Resin Operations (Reg 8-50)	0.3 tpd
SS 5	Wood Products Coating (Reg 8-32)	0.68 tpd
SS 12	Industrial, Institutional and Commercial Boilers (Reg 9-7)	0.5 - 1.0 tpd NOx

\* Emission Reduction, stated for VOC/ROG unless otherwise noted.

In addition to the control measures scheduled for adoption as listed above, two control measures from the 2001 Ozone Attainment Plan were adopted on January 21, 2004: amendments to Regulation 8, Rule 10: Process Vessel Depressurization and amendments to Regulation 8, Rule 18: Equipment Leaks. The amendments to Reg 8-10 require numerous additional refinery vessels to be controlled during depressurization. Emission reductions attributable to the new requirements have not yet been quantified. The amendments to Reg. 8-18 were calculated to reduce emissions of VOC/ROG by 0.2 tons/day.

**Mobile Source Programs**

The term "mobile source," as used in the CCAA and by the Air District, refers collectively to vehicular sources and other non-stationary sources. Mobile sources are defined in the CCAA as self-propelled devices that may travel upon a highway, including automobiles, trucks, construction equipment, farm equipment, and off-road vehicles. "Non-vehicular" mobile sources, or "non-road" sources as they are defined in the federal Clean Air Act (CAA), include ships, boats, aircraft, locomotives, and lawn and garden equipment. Mobile sources are by far the largest sources of ozone precursors, as shown in the emission inventory, Table 1, and in Figures 1 and 2.

## STATE AND NATIONAL MOBILE SOURCE PROGRAMS

The Air District does not have authority to regulate mobile sources. Mobile source regulatory authority is shared by the State and national governments. Hence, the State and national programs play a critical role in reducing air pollutant emissions from mobile sources.

Mobile source emissions are regulated by three general approaches: by establishing emission standards for equipment, by regulating the fuel used in the equipment, and through vehicle in-use performance standards. The federal CAA contains a special provision allowing California to set emission standards that are specific to the State. The California standards cover motor vehicles (including cars, motorcycles, and trucks), heavy industrial and construction equipment, off-highway vehicles such as dirt bikes and all-terrain vehicles, and lawn, garden and other utility engines. In California, these mobile sources are regulated primarily by the Air Resources Board (ARB). ARB is authorized to adopt standards, rules and regulations to achieve the maximum degree of emission reduction possible from vehicular and other mobile sources in order to accomplish the attainment of the State ambient air quality standards at the earliest practicable date.

Mobile source emissions are also controlled through fuel regulations. ARB adopts fuel specifications for motor vehicle fuels – gasoline, diesel and alternative fuels. The most current reformulated gasoline regulations went into effect on December 31, 2003, requiring Phase 3 reformulated gasoline standards and prohibiting the use of the fuel additive MTBE. Phase 3 Reformulated Gasoline (CaRFG3) regulations require refiners to produce gasoline that meets eight specifications to reduce air pollution from the gasoline used in motor vehicles. Recent amendments to the diesel fuel standards require that sulfur content of diesel fuel be reduced from the current 500 ppm to 15 ppm, beginning in June 2006.

Motor vehicle emissions are also controlled through in-use performance standards to ensure that the systems continue to operate properly. The State of California has had an inspection and maintenance (I&M) program since 1984 to test all on-road gasoline powered vehicles for compliance with the standards. The California Bureau of Automotive Repair (BAR) implements the I&M program. In 2002, AB 2637 (Cardoza) was signed into law and directed BAR to implement an Enhanced Area Smog Check Program in the urbanized regions of the San Francisco Bay Area. The program went into full effect in October 2003, and requires the use of a dynamometer to test the vehicle's emissions while in operation. In addition, the pass/fail cut points for emissions are more stringent for enhanced smog check areas and certain vehicles that tend to have higher emissions are directed to Test-Only stations.

The federal CAA prohibits all states, including California, from establishing emission standards for aircraft engines, new locomotive engines and new non-road engines less than 175 horsepower used in construction or farm equipment. Only EPA has authority to regulate these sources. EPA has promulgated regulations or otherwise established programs to control emissions from these important source categories. Gas turbines, used in almost all commercial aircraft, became subject to United Nations International Civil Aviation Organization (ICAO) NO<sub>x</sub>, hydrocarbons, CO and smoke standards in 1997.

In 1998, EPA adopted more stringent emission standards ("Tier 2" and "Tier 3") for NO<sub>x</sub>, hydrocarbons, and PM from new non-road diesel engines. This program includes the first set of standards for non-road diesel engines less than 50 hp, including marine engines in this size range. It also phases in more stringent "Tier 2" emission standards from 2001 to 2006 for all engine sizes and adds yet more stringent "Tier 3" standards for engines between 50 and 750 hp from 2006 to 2008.

In May 2004, as part of its Clean Diesel Programs, EPA finalized the Clean Air Non-road Diesel Rule, a comprehensive rule to reduce emissions from non-road diesel engines by integrating engine and fuel controls to optimize emission reductions. These fuel improvements will reduce PM from engines in the existing fleet of non-road equipment and makes it possible for engine manufacturers to use advanced emission control technologies.

State-established standards for motor vehicle engines and motor vehicles fuels have significant influence in reducing mobile source ozone precursor emissions in the Bay Area. Among mobile source categories, Passenger Cars and Light Duty Trucks are the two largest contributors to the ROG emission inventory and are also significant contributors to the NO<sub>x</sub> emission inventory. While federally established standards exist for these mobile source categories, ARB's more stringent regulations for new motor vehicle emission, reformulated gasoline and smog check are some of the most significant programs for reducing ozone precursor emissions in the Bay Area.

Other national and State programs which are also important in reducing ozone precursor emissions in the Bay Area include those aimed at off-road diesel construction equipment. Heavy Heavy Duty Diesel Trucks and Construction Equipment are the largest emitters of NO<sub>x</sub> in the Bay Area. ARB's diesel fuel regulations along with EPA's tiered emissions standards for non-road diesel engines will allow for significant emissions reductions over the next few years.

Table 11 below summarizes projected emissions reductions due to national and State-regulated mobile sources. Between 2005 and 2020, ROG emissions will experience a 111 ton per day decrease and NO<sub>x</sub> emissions will experience a 232 ton per day decrease. Ninety eight percent of the ROG reduction will be in mobile sources regulated by ARB while over 87% of the NO<sub>x</sub> reductions will be in mobile sources regulated by ARB.

**Table 11: Mobile Source Emissions Reductions due to State (ARB) and National (EPA) Mobile Source Programs**

SOURCE CATEGORY	Reduction 2005 to 2020	Reduction in ARB Regulated Sources	Reduction in EPA Regulated Sources
<b>Reactive Organic Gases (tons/day)</b>			
ON-ROAD MOTOR VEHICLES	87.8	87.8	0.0
OFF-HIGHWAY MOBILE SOURCES	26.0	20.8	5.2
AIRCRAFT (Emissions Increase)	-2.8	0.0	-2.8
<b>Total Emissions Reductions</b>	<b>111.0</b>	<b>108.6</b>	<b>2.4</b>
<b>Oxides of Nitrogen (tons/day)</b>			
ON-ROAD MOTOR VEHICLES	187.3	187.3	0.0
OFF-HIGHWAY MOBILE SOURCES	55.6	16.2	39.4
AIRCRAFT (Emissions Increase)	-10.8	0.0	-10.8
<b>Total Emissions Reductions</b>	<b>232.1</b>	<b>203.5</b>	<b>28.6</b>

Note: The following off-highway mobile sources are assumed to be EPA-regulated sources: Agricultural Equipment, Construction and Mining Equipment, Trains and Ships.

While emission reductions from all of ARB's ongoing and forthcoming mobile source programs may not be fully reflected in the emissions inventory, ARB's mobile source programs provide substantial emission reductions overall. A comprehensive list of ARB's mobile source programs follows below:

### **ARB PROGRAMS FOR ON-ROAD AND OFF-ROAD MOBILE SOURCES**

**Motor Vehicle and Engine Certification Program** – Certifies new motor vehicles and engines for emission compliance before they are legal for sale, use, or registration in California. Certification is granted annually to individual engine families and is good for one model year. The following mobile sources are presently subject to ARB's emission certification: passenger cars (PC), light-duty trucks (LDT), medium-duty vehicles (MDV), on-road and off-road motorcycles (ONMC and OFMC, respectively), all-terrain vehicles (ATV), heavy-duty engines and vehicles (HDE and HDV, respectively), off-road heavy-duty diesel engine (OFHDDE) over 175 horsepower, small off-road engine (SORE) less than 25 horsepower, large spark-ignition engine (LSIE) greater than 25 horsepower, and spark-ignition marine engine (SIME).

**Fuels Program** – Adoption of standards, rules and regulations to achieve the maximum degree of emission reduction possible from vehicular and other mobile

sources in the following four categories: reformulated gasoline; diesel fuel; alternative gasoline fuels; and alternative diesel. ARB adopted a clean fuel regulation that became effective in January 2001. ARB conducts ongoing verification of alternative diesel fuel emission benefits.

**Heavy-Duty Diesel In-Use Strategies Program** – Reduces emissions from existing on- and off-road diesel engines, with a special emphasis on reducing particulate emissions through the following three implementation programs: Retrofit Assessment and Implementation (solid waste collection vehicles and on-road heavy-duty public fleet vehicles); and Heavy-duty Testing and Field Support.

**The Carl Moyer Program** – Provides grants through participating air pollution control districts, including the Bay Area Air District, to cover the incremental cost of cleaner on-road, off-road, marine, and locomotive engines. Allocations to this program began in FY 1998/99.

**Diesel Risk Reduction Program** - Following diesel PM's identification as a toxic air contaminant in 1998, the ARB developed a plan to reduce emissions from diesel engines and vehicles. The program is made up of several strategies, like retrofits and control technology. Some of these strategies are part of other programs listed below.

## **ARB PROGRAMS FOR ON-ROAD VEHICLES**

### Programs for Passenger Cars and Light Duty Vehicles

**Low Emission Vehicle Program** – Establishes improved emission reduction standards for automobiles. LEV II regulations are the most recent and are effective from 2004 through 2010. The new standards extend passenger car emission standards to heavier sport utility vehicles and pickup trucks (with gross vehicle weight up to 8,500 pounds) which formerly had been regulated under less-stringent emission standards.

**On-Board Diagnostic (OBD) Program** - OBD II systems monitor components in 1996 and newer vehicles less than 14,000 lbs to ensure that a vehicle remains as clean as possible over its entire life, and assists Smog Check repair technicians in diagnosing and fixing problems with the computerized engine controls. ARB is currently developing OBD requirements for heavy-duty vehicles over 14,000 lbs.

**On-Road Motorcycle Regulation** - Standards adopted in December 1998. Apply to motorcycles with engines over 280cc manufactured for the 2004 model year and later.

**Zero Emission Vehicle Program** – Creates incentives to promote zero emission vehicles such as battery and fuel cell vehicles. Also certifies vehicles as such.

**Climate Change Program** – Requires reduction of greenhouse gas emissions from motor vehicles in California. The proposed regulation would be phased in between 2009 and 2014 and achieve CO<sub>2</sub> emission reductions of approximately 30%. New

regulation adopted in September 2004 imposes stricter automobile engine standards to reduce greenhouse gas emissions beginning with the 2009 model year.

**Smog Check** – Operational in California since 1984, the Bureau of Automotive Repair tests all on-road gasoline powered vehicles for compliance with in-use standards. Since October 2003, the Bay Area has used the Enhanced Area Smog Check Program, which tests vehicle emissions while the vehicle is in running.

**In-use Testing of Motor Vehicles** - Tests in-use passenger cars and light duty vehicles for compliance with standards. In the event of violations, ARB works with the vehicle manufacturer to correct the problem, usually in the form of a recall or statewide repair. A protocol is being developed to test Heavy Duty Diesel Vehicles as well.

**Smoking Vehicle Hotline** - Contacts owners of reported smoking vehicles. Works in partnership with smoking vehicle programs in various districts.

**California Hydrogen Highway** - Program working toward a transition to a clean, hydrogen transportation economy in California

**Carpool Lane Access** - Allows single occupancy use of HOV lanes by zero-emission and alternative fuel vehicles.

**Voluntary Accelerated Vehicle Retirement Program** - Pays owners of eligible vehicles to voluntarily retire their older, higher-emitting vehicle

#### Programs for Heavy Duty Vehicles

**On-Road Heavy-Duty Diesel New Engine Program** - Reduces emissions from new on-road heavy-duty diesel engines through emission control regulations and test procedures for these engines. Final approval for 2004 - 2005 and subsequent model year heavy-duty diesel engine standards were approved in 1999 and 2001.

**Public Transit Bus Program** - Reduces criteria pollutant emissions and toxic air contaminants from urban buses. In June 2004, the ARB adopted modifications to the fleet rule for transit agencies to allow the purchase of diesel hybrid electric buses by diesel-path transit agencies and allow for a delay in the implementation deadlines for the zero-emission bus demonstration project.

**School Bus Program** - Provides criteria for the purchase of new school buses and retrofits of existing school buses to reduce particulate matter emissions and reduce school children's exposure to harmful diesel exhaust emissions. Proposition 40, approved by voters in 2002, provided allocation for this program for two years with distributions beginning in FY 2002/03.

**Solid Waste Collection Vehicles** - The proposed airborne toxic control measure for diesel particulate matter (PM) from on-road heavy-duty diesel-fueled residential and



commercial solid waste collection vehicles is one in a series of rules designed to reduce diesel PM from most diesel-fueled heavy-duty vehicles in California.

**South Coast Fleet Rules** - ARB is proceeding with a new near-term rulemaking process to address four South Coast Air Quality Management District fleet rules, with a hearing scheduled for September 2005.

**Diesel Engine Software Upgrade** - The Air Resources Board (ARB) is working together with the California Trucking Association (CTA) to get low oxides of nitrogen (NOx) software installed on every eligible, electronically-controlled engine registered in California.

**Heavy Duty Vehicle Inspection Program** – Inspection of trucks and buses for excessive smoke. In June 1998, ARB resumed the Heavy Duty Vehicle Inspection Program (roadside and unannounced inspections). In July 1998 ARB began the Periodic Smoke Inspection Program, where diesel and bus fleet operators are required to annually self-inspect their vehicles and repair those with excessive smoke emissions.

**Border Inspection Program** - ARB, in cooperation with the California Highway Patrol, will establish inspection protocols of heavy duty vehicles entering this state to ensure that each vehicle has a certified engine. While enforcement is expected to take place near California borders, the Bay Area will still benefit from this program.

**Heavy-Duty Diesel Idling Control Measure** – On July 22, 2004, the ARB adopted a heavy-duty diesel idling control measure designed to limit idling of diesel-fueled commercial motor vehicles and allow the use of alternative technologies/strategies in order to provide heating and cooling for cab comfort, engine oil heating for easy engine start-up in cold ambient conditions, and electric power to charge batteries and operate on-board ancillaries.

**School Bus Idling Limit** – To reduce emissions and exposure to diesel exhaust particulate matter this regulation requires school bus engines be manually turned off upon arriving at a school and restarted no more than 30 seconds before departing. This measure became effective in July 2003.

**Mobile Source Emissions Reduction Credits** - Allows for credit when emissions reductions from cars, buses or other mobile sources exceed those required by federal, State or local law. ARB provides guidelines, but each district can tailor guidelines.

## **ARB PROGRAMS FOR OFF-ROAD VEHICLES**

**Off-Road Mobile Sources Emission Reduction Program** - Exhaust emission standards have been adopted by ARB and/or U.S. EPA for off-road engines included in the following categories: Small Spark-Ignition Off-Road Engines and Equipment Less Than 25 Horsepower (including Lawn and Garden Equipment, and Small Industrial Equipment); Off-Road Recreational Vehicles (including Motorcycles and All-

Terrain Vehicles); Off-Road Compression Ignition (Diesel) Engines and Equipment; Off-Road Large Spark Ignition (Gasoline and LPG) Engines and Equipment 25 Horsepower and Greater (including Industrial Equipment, Forklifts, and Portable Generators); Airport Ground Support Equipment; Locomotives; Commercial Marine Vessels; and Recreational Marine (including Personal Water Craft, Ski boats, Inboards, and Outboards)

**Recreational Marine Engines** – Reduces emissions of ROG and oxides of nitrogen (NO<sub>x</sub>) emissions for certain marine vessels with proposed regulations for other spark-ignition engines used in boats for propulsion. In 2001, all new outboards sold in California were required to meet the U.S. EPA 2006 emission levels. In 2002, ARB adopted regulations governing emissions from all for all 2003 model year and later inboard engines.

**Portable Fuel Containers** - Implementation of "spill-proof" portable refueling system (gas can) in order to reduce emissions associated with engine refueling spillage.

**Aftermarket, Performance, and Add-On Parts Regulations** - Regulates the installation of parts or modifications that are proven by their manufacturers and ARB not to increase vehicle emissions. This is an ongoing ARB program and includes certification of alternative fuel certified retrofit systems and verification of heavy-duty diesel retrofit device emission reduction systems. Regulations became effective in September 2000, on certification procedures for all aftermarket part and conversion systems for off-road vehicles, engines and equipment.

## AIR DISTRICT MOBILE SOURCE PROGRAMS

The Air District does not have the authority to regulate mobile sources, but can take steps to reduce mobile source emissions by providing grants or incentives to encourage the use of cleaner vehicles and fuels. The Transportation Fund for Clean Air (TFCA) is an Air District grant program that funds both mobile source and transportation control measures implemented by local public agencies. To fund these measures the State Legislature allows the Air District to impose a \$4 surcharge on motor vehicle registration fees paid for vehicles registered in the District. Mobile source measures funded through the TFCA program include purchase or lease of clean fuel vehicles, primarily through the Vehicle Incentive Program (VIP), as well as engine retrofits and repowers. Another TFCA-funded program, the Vehicle Buy Back Program, accelerates the voluntary retirement of older, high emitting vehicles from the region's roadways by providing financial incentives to scrap them.

The Carl Moyer Program provides incentives that cover the incremental cost of cleaner heavy-duty engines with a primary focus of reducing NO<sub>x</sub> emissions. Among the eligible projects are cleaner on-road, off-road, marine, locomotive and stationary agricultural pump engines, as well as forklifts, airport ground support equipment, and auxiliary power units. The Air District also has grant programs for low emission school buses and heavy-duty diesel PM<sub>10</sub> filter retrofits.

The Air District also reduces mobile source emissions through the Spare the Air (STA) program. The STA program is an intermittent, voluntary control program in which the Air

District encourages Bay Area residents, businesses and public agencies to reduce or postpone polluting activity on days when weather conditions are conducive to forming high ozone levels. STA advisories include recommendations to avoid discretionary driving, to use transit, carpooling, walking or cycling instead of driving alone, to link trips to avoid cold starts, and postpone refueling of vehicles.

In addition to State and federal regulations and Air District incentive and STA programs, the Ozone Strategy includes control measures that reduce emissions from on-road and off-road mobile sources. These control measures encourage the retirement of older, more-polluting equipment and the introduction of new, less-polluting equipment, or encourage operational changes (e.g. reduced idling) to reduce emissions. The measures would be implemented mainly through incentive programs and through development and promotion of model ordinances for cities and counties. Table 12 contains a summary of the proposed mobile source control measures, including their proposed implementation dates and estimates of the emission reductions they would achieve. While the focus of the Ozone Strategy is on reducing emissions of ozone precursors, many of the measures will also reduce emissions of fine particulate matter, and this additional benefit is noted as well. More detailed information on the control measures is available in Appendix C.

**Table 12: Proposed Mobile Source Control Measures**

Measure #	Source Category	Implementation Date	Estimated ROG Reduction (tpd)	Estimated NOx Reduction (tpd)
MS-1	Diesel Equipment Idling Model Ordinance	2006	0.13	1.96
MS-2	Green Contracting Model Ordinance	2006	N/A	N/A
MS-3	Low-Emission Vehicle Incentives	2005	0.03	0.6
MS-4	Vehicle Buy-Back Program	2005	0.48	0.31
<b>Total</b>			<b>0.64</b>	<b>2.87</b>

### **Transportation Control Measures**

Motor vehicles are the largest source of ozone precursors in the Bay Area, and reducing these emissions is essential to regional efforts to attain the State ozone standard and reduce transport. Motor vehicle emissions have dropped substantially over the years thanks to State and national regulations on vehicles and fuels, and motor vehicle emissions are expected to continue to decrease in the future as the vehicle fleet becomes cleaner. TCMs play a critical role in complementing State and national regulatory efforts by reducing motor vehicle use.<sup>11</sup> TCMs also help achieve other goals, including improved mobility and reduced congestion.

<sup>11</sup> TCMs are distinguished from mobile source measures in that mobile source measures reduce vehicle *emission rates*, while TCMs reduce vehicle *use* by reducing vehicle trips and/or vehicle miles traveled.

## CCAA TCM REQUIREMENTS

The California Clean Air Act (CCAA) emphasizes transportation control measures. CCAA legislative intent states that in developing attainment plans, air districts shall “focus particular attention on reducing the emissions from transportation and areawide emission sources.” (Sec. 40910.) The CCAA specifically requires air districts to “adopt, implement and enforce transportation control measures.” TCMs are defined as “any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions.” (Sec. 40717.) TCMs must be sufficient to substantially reduce the rate of increase in vehicle trips and vehicle miles traveled. (Sec. 40918.) As noted previously in the discussion of CCAA legal requirements, Health and Safety Code Section 40233 lays out a process that was used for developing a TCM emission reduction target and TCM plan for the 1991 Clean Air Plan. The Air District and MTC in 1991 complied with the required process. Under the CCAA, revision to the TCM emission reduction target in subsequent planning cycles is discretionary. While the TCM emission reduction target has not been revised in subsequent plans, the TCMs have undergone extensive revision and expansion (as described below) and represent the Bay Area’s all feasible measures approach in compliance with State one-hour ozone standard planning requirements.

## TCM DEVELOPMENT IN THE BAY AREA

The Bay Area has extensive experience with developing and implementing TCMs. The first regional plan prepared pursuant to the CCAA, the 1991 Clean Air Plan, included 23 TCMs to meet State planning requirements (State TCMs). Plan updates in 1994 and 1997 included revisions to the TCMs. The regional strategy for the State ozone standard now contains 19 TCMs that cover the full spectrum of transportation strategies, including:

- Bus transit
- Rail transit
- Ferry service
- Carpooling and vanpooling
- Bicycle and pedestrian enhancements
- Land use programs
- Pricing measures
- Traffic management
- Employer programs and youth programs
- Public education and episodic measures

The Air District, MTC and other regional and local partners have worked together over the years to develop one of the most comprehensive TCM plans to address the California ozone standard. This effort has continued during the preparation of the 2005 Ozone Strategy.

The control measure review and evaluation process included a thorough review of potential TCM enhancements (see Appendix B for more information). MTC and Air District staff considered a wide range of new or enhanced TCM programs, including:

- New initiatives deriving from the Smart Growth Strategy/Regional Livability Footprint Project and MTC's Transportation 2030 process;
- Input from the Ozone Working Group and community meetings;
- Input from cities, counties and other public agencies;
- Input from environmental, business and community groups;
- Suggestions from staff and Advisory Council members;
- Review of TCM programs in other regions.

All of the TCMs have been revised to reflect this input. The resulting TCMs take into consideration current fiscal and legal conditions but at the same time set an ambitious course for the future, particularly as additional revenues become available and land use changes occur over the long term.

### TCMS IN THE CONTROL STRATEGY

The TCMs proposed for the 2005 Ozone Strategy are summarized in Table 13 and are described more fully in Appendix D. The TCMs are divided into Phases 1 and 2 to reflect near-term and long-term implementation steps and benefits. Most projects in Phase 1 are either currently programmed or funding is otherwise expected to be available for full implementation. Some Phase 2 projects have substantial funding identified, while others are dependent on future funding sources. MTC estimated emission reductions for each phase. Phase 1 is defined as 2004-2006 and Phase 2 is defined as beyond 2006. 2015 was selected as an analysis year for emission reduction calculations, although many long-term TCM implementation steps will clearly occur before 2015, and continue beyond as well.

TCMs often have overlapping, complementary effects. For example, measures to enhance transit service, encourage development near transit, and improve bicycle and pedestrian safety all interact to make transit, walking and cycling more viable transportation options. Assumptions must be made about individual projects and programs when calculating emission reductions, but it is difficult to capture these synergistic effects.

TCMs have multiple benefits beyond air quality. In addition to reducing motor vehicle emissions, the projects and programs identified in the TCMs may improve mobility, especially for people with limited access to automobiles, and reduce traffic congestion. Other benefits include reduced gasoline consumption, reduced emissions of greenhouse gases, and reduced water pollution from urban runoff.

**Table 13: Proposed Transportation Control Measures**

TCM	Description	Implementing Agencies
TCM #1  SUPPORT VOLUNTARY EMPLOYER-BASED TRIP REDUCTION PROGRAMS	Phase 1 (2004 –2006):  <ul style="list-style-type: none"> <li>■ Provide assistance to regional and local ridesharing organizations; advocate legislation to maintain and expand incentives (e.g., tax deductions/credits)</li> <li>■ Provide assistance to employers, cities, counties:               <ul style="list-style-type: none"> <li>▪ Assistance in developing/enhancing employer programs; recognition of outstanding programs</li> <li>▪ Information and referral</li> <li>▪ Employer networks</li> </ul> </li> </ul>	MTC, BAAQMD, CMAs, Cities, counties,  MTC's Regional Rideshare Program, CMAs, MTC, BAAQMD
	Phase 2 (Beyond 2006):  <ul style="list-style-type: none"> <li>■ Continue Phase 1 programs and enhance where feasible</li> </ul>	Same as Phase 1
TCM #2  ADOPT EMPLOYER-BASED TRIP REDUCTION RULE	TCM deleted per Health and Safety Code Section 40929	N/A
TCM #3  IMPROVE LOCAL AND AREAWIDE BUS SERVICE	Phase 1 (2004 –2006):  <ul style="list-style-type: none"> <li>■ Replace older transit buses with clean-fuel buses and retrofit existing diesel buses with diesel emission control technology</li> <li>■ Sustain and expand the existing Regional Express Bus Program</li> <li>■ Assist further planning work on enhanced bus and Bus Rapid Transit concepts</li> <li>■ Sustain transit service to airports</li> </ul>	MTC, Transit operators, BAAQMD  MTC, Transit operators  MTC, Transit operators  MTC, Transit operators, Airports
	Phase 2 (Beyond 2006):  <ul style="list-style-type: none"> <li>■ Restore local bus routes that were recently eliminated due to funding cutbacks</li> <li>■ Implementation of new Enhanced Bus and Bus Rapid Transit services and additional Lifeline Transit services, and the expansion of Regional Express Bus Programs as funds become available</li> </ul>	MTC, Transit operators  MTC, Transit operators

TCM #4  UPGRADE AND EXPAND LOCAL AND REGIONAL RAIL SERVICE	Phase 1 (2004 –2006):	MUNI  Caltrain  SCVTA
	Phase 2 (Beyond 2006):	BART  MUNI  Caltrain, TransBay Terminal JPA  SCVTA  MTC, SMART  AMTRAK/Capitol Corridor  MTC, transit operators  MTC, San Joaquin Regional Rail, Alameda and Santa Clara County CMAs

<p>TCM #5</p> <p>IMPROVE ACCESS TO RAIL &amp; FERRIES</p>	<p>Phase 1 (2004 –2006):</p> <ul style="list-style-type: none"> <li>■ Develop demonstration program for station car and bike station concepts at select regional transit centers</li> <li>■ Determine long term funding needs for existing shuttles, encourage better coordination between shuttles and transit operators, and examine funding options for new and existing shuttles</li> <li>■ Implement Safe Routes to Transit to improve bicycle and pedestrian access</li> <li>■ Complete Regional Transit Connectivity Plan</li> </ul>	<p>Transit operators, MTC, BAAQMD</p> <p>MTC</p> <p>MTC, Transit operators</p> <p>MTC</p>
	<p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Continue and expand successful concepts from Phase 1 including Safe Routes to Transit improvements</li> <li>■ Develop a master plan for innovative secure bicycle storage strategies at key transit hubs</li> <li>■ Implement most cost effective new shuttles where funding is available</li> </ul>	<p>MTC, Transit operators</p> <p>MTC</p> <p>MTC, BAAQMD, Transit operators</p>
<p>TCM # 6</p> <p>IMPROVE INTER-REGIONAL RAIL SERVICE</p>	<p>Phase 1 (2004 –2006):</p> <p>No significant changes in interregional rail service are anticipated during this phase</p>	<p>N/A</p>
	<p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Implement additional interregional rail service in Capitol (Auburn - Sacramento - Oakland - San Jose) Corridor and track enhancements</li> <li>■ Implement Altamont Commuter Express (ACE) rail service expansion to 8 daily roundtrips and track enhancements</li> <li>■ Implement High Speed Rail Service between Los Angeles and the Bay Area</li> </ul>	<p>Capitol Corridor JPB, Amtrak, MTC, Southern Pacific</p> <p>MTC, San Joaquin Regional Rail Commission, Alameda and Santa Clara County CMAAs</p> <p>CA High Speed Rail Authority</p>
<p>TCM #7</p> <p>IMPROVE FERRY SERVICE</p>	<p>Phase 1 (2004 –2006):</p> <ul style="list-style-type: none"> <li>■ Conduct initial planning for new ferry service</li> <li>■ Implement new high-speed low emission ferry to service Vallejo to San Francisco route</li> </ul>	<p>WTA</p> <p>Vallejo Transit</p>



	<p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Expand existing ferry service between: <ul style="list-style-type: none"> <li>▪ Oakland/Alameda and San Francisco</li> <li>▪ Larkspur and San Francisco</li> </ul> </li>   <li>■ Implement new ferry service between: <ul style="list-style-type: none"> <li>▪ Berkeley/Albany and San Francisco</li> <li>▪ South San Francisco and San Francisco</li> </ul> </li>   <li>■ Implement new intermodal transit hub at Vallejo Ferry Terminal</li>   <li>■ Expand berthing capacity at the San Francisco Ferry Terminal</li>   <li>■ Implement hydrogen fuel cell ferry demonstration project from Treasure Island to San Francisco</li>   <li>■ Assist ferry operators in converting vessel engines to lower emission engines</li>   <li>■ Study and potentially implement new service between: <ul style="list-style-type: none"> <li>▪ Richmond, Hercules/Rodeo, Martinez, Redwood City and San Francisco</li> <li>▪ Port Sonoma and San Francisco</li> <li>▪ Oakland and San Francisco Airports</li> </ul> </li> </ul>	<p>WTA, Oakland/Alameda Ferry, Golden Gate Ferry,</p> <p>WTA</p> <p>WTA, City of Vallejo, Vallejo Baylink Ferry</p> <p>WTA, Port of San Francisco</p> <p>WTA, Treasure Island Redevelopment Authority</p> <p>WTA, Ferry operators, MTC, BAAQMD</p> <p>WTA</p>
<p>TCM #8</p> <p>CONSTRUCT CARPOOL / EXPRESS BUS LANES ON FREEWAYS</p>	<p>Phase 1 (2004 –2006):</p> <ul style="list-style-type: none"> <li>■ Expand existing HOV network, based on 2005 Transportation Improvement Program</li>   <li>■ Implement new HOV to HOV lane connector at Rt 101/85 interchange in Mountain View</li>   <li>■ Implement HOV support facilities such as park &amp; ride lots at various locations</li> </ul> <p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Implement additional HOV lanes and support infrastructure identified in the Regional Transportation Plan. Special attention should be paid to express bus operations to maximize benefits for transit. Monitor and adjust occupancy requirements and hours of operation to maximize air quality and mobility benefits.</li> </ul>	<p>Caltrans, MTC</p> <p>Caltrans, MTC</p> <p>Caltrans, MTC, Transit operators</p> <p>Caltrans, MTC</p>

<p>TCM #9</p> <p>IMPROVE BICYCLE ACCESS AND FACILITIES</p>	<p>Phase 1 (2004 –2006):</p> <ul style="list-style-type: none"> <li>■ Fund Regional Bike Plan and Safe Routes to Transit improvements</li> <li>■ Continue TDA Article 3, TLC and TFCA funding for bike improvements</li> <li>■ Develop on-line bicycle mapping tool as part of the regional 511 traveler information number</li> <li>■ Promote Bike to Work Week / Day</li> <li>■ Encourage local jurisdictions to develop safe and convenient bicycle lane and route networks, provide secure bike racks and storage, and require bicycle access and amenities as conditions of approval of development projects</li> <li>■ Explore innovative bicycle programs, such as “station bike” or bike sharing programs at transit stations, downtowns and activity centers</li> </ul>	<p>MTC, Cities, Counties, CMAs</p> <p>MTC, BAAQMD</p> <p>MTC</p> <p>MTC</p> <p>Cities, Counties, MTC, Transit operators, BAAQMD</p> <p>Cities, Counties, MTC, Transit operators, BAAQMD</p>
	<p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Continue Phase 1 programs</li> <li>■ Encourage public education about bicycle safety for both bicyclists and motorists</li> </ul>	<p>Same as Phase 1</p> <p>MTC</p>
<p>TCM #10</p> <p>YOUTH TRANSPORTATION</p>	<p>Phase 1 (2004 –2006):</p> <ul style="list-style-type: none"> <li>■ Encourage walking and bicycling to school through the Safe Routes to Schools Program</li> <li>■ Encourage carpooling among high school students with cars</li> <li>■ Establish special carpool formation services for parents, students and staff at Bay Area elementary and secondary schools</li> <li>■ Purchase older school buses with alternatively fueled vehicles, replace old diesel school buses with cleaner engines or retrofit older school bus engines</li> <li>■ Encourage shuttle programs to provide service to schools</li> <li>■ Target Bay Area schools for greater participation in the Spare the Air program</li> </ul>	<p>MTC’s Regional Rideshare Program, School districts, Cities and Counties</p> <p>MTC’s Regional Rideshare Program, School districts</p> <p>MTC’s Regional Rideshare Program, School districts</p> <p>BAAQMD, School districts</p> <p>MTC, BAAQMD, School districts</p> <p>BAAQMD, School districts</p>

	<p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Continue Phase 1 programs</li> <li>■ Support transit ride discounts to youth and students</li> </ul>	<p>Same as Phase 1</p> <p>Transit operators</p>
<p>TCM #11</p> <p>INSTALL FREEWAY TRAFFIC MANAGEMENT SYSTEMS</p>	<p>Phase 1 (2004 –2006):</p> <ul style="list-style-type: none"> <li>■ Integrate traffic management features into new freeway construction projects</li> <li>■ Maintain current level of Freeway Service Patrol</li> <li>■ Maintain 511 transit information service and improve and customer convenience</li> </ul>	<p>Caltrans</p> <p>Caltrans, MTC</p> <p>MTC, Caltrans</p>
	<p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Extend ramp metering in major freeway corridors</li> <li>■ Seek funding for full deployment of Caltrans' Traffic Operation System / Traffic Management Center project</li> <li>■ Expand FSP to other routes and times of the day</li> <li>■ Require traffic management elements in Caltrans freeway projects</li> </ul>	<p>Caltrans</p> <p>Caltrans</p> <p>Caltrans</p> <p>Caltrans</p>
<p>TCM #12</p> <p>ARTERIAL MANAGEMENT MEASURES</p>	<p>Phase 1 (2004 –2006):</p> <ul style="list-style-type: none"> <li>■ Maintain current technical assistance program for local jurisdictions that seek to retime signals, including the evaluation of bus priority treatments</li> <li>■ Continue TFCA program to fund arterial management projects</li> </ul>	<p>MTC</p> <p>BAAQMD</p>
	<p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Coordinate the timing of an additional 1,200 signals and continue updating timing plans</li> <li>■ Work with bus operators to provide priority treatment along major bus routes</li> </ul>	<p>Cities, Counties, Transit operators, CMAs</p> <p>Cities, Counties, Transit operators, CMAs</p>

TCM #13  TRANSIT USE INCENTIVES	Phase 1 (2004 –2006):	
	<ul style="list-style-type: none"> <li>■ Implement Translink® (universal fare card) on transit systems throughout the region</li> <li>■ Implement improvements to the 511 transit information service</li> <li>■ Encourage employers, transit operators, local governments and others to promote and expand employer-based transit subsidy programs like the Commuter Check and EcoPass programs</li> <li>■ Improve signage at transit transfer hubs</li> </ul>	<p>MTC, Transit operators</p> <p>MTC, Transit operators</p> <p>MTC's Regional Rideshare Program, transit agencies, Commuter Check Corps, employers</p> <p>MTC, Caltrans</p>
	Phase 2 (Beyond 2006):	
	<ul style="list-style-type: none"> <li>■ Deploy real-time transit arrival information</li> <li>■ Increase passenger amenities at transit hubs and stops</li> <li>■ Complete Alameda and Contra Costa County transit centers identified in AC Transit's <i>Comprehensive Service Plan</i></li> </ul>	<p>MTC, Transit operators</p> <p>MTC, Transit operators</p> <p>AC Transit</p>
TCM #14  CARPOOL AND VANPOOL SERVICES AND INCENTIVES	Phase 1 (2004 –2006):	
	<ul style="list-style-type: none"> <li>■ Maintain current programs of the Regional Ridesharing Program and increase efficiency in delivering services</li> <li>■ Explore innovative concepts such as real-time ridematching using the internet</li> <li>■ Explore possible provision of a regional incentive to increase ridesharing by implementing a demonstration project offering a cash incentive for new vanpools</li> <li>■ Explore options for expanding medium-distance (15 – 30 miles) vanpools</li> </ul>	<p>MTC's Regional Ridesharing Program</p> <p>MTC's Regional Ridesharing Program</p> <p>MTC's Regional Ridesharing Program</p> <p>MTC's Regional Ridesharing Program</p>
	Phase 2 (Beyond 2006):	
	<ul style="list-style-type: none"> <li>■ Maintain Phase 1 programs and enhance where feasible</li> </ul>	<p>MTC's Regional Ridesharing Program</p>

<p>TCM #15</p> <p>LOCAL LAND USE PLANNING AND DEVELOPMENT STRATEGIES</p>	<p>Phase 1 (2004 –2006):</p> <p>MTC will:  Implement its 5-point transportation and land use platform including a new planning grant program to fund station area plans around major transit facilities  Continue implementing the TLC planning and capital grant programs and HIP program  Continue providing “T-PLUS” funding to CMAs to promote community revitalization projects  Utilize a Caltrans grant to examine opportunities for transit-oriented development along major transit corridors.  Develop incentives and conditions to promote supportive land use policies around major new transit investments</p> <p>BAAQMD will:  Continue to fund bicycle projects, traffic calming, shuttles, low emission vehicles, trip reduction programs and other clean air projects through the TFCA program  Continue to provide technical assistance to local jurisdictions on air quality analyses in the environmental review process  Continue to encourage cities and counties to reduce emissions from sources other than motor vehicles including lawn and garden equipment, woodstoves and fireplaces, and residential and commercial uses</p> <p>ABAG will:  Periodically monitor and update its Smart Growth demographic projections  Promote multi-jurisdiction planning along select transit corridors to encourage transit-oriented development</p> <p>Develop financial and other incentives and technical assistance to encourage innovative parking strategies such as reduced parking, parking fees, parking cash-out, shared parking and other parking programs</p> <p>Pursue legislative changes to remove barriers and provide incentives for smart growth</p> <p>Promote carsharing as a way to reduce parking requirements</p> <p>Monitor indirect source mitigation programs in other regions for Bay Area feasibility</p> <p>Provide technical assistance to local government agencies</p> <p>Publicize noteworthy examples of local clean air plans, policies and programs, as well as endorse noteworthy development projects</p> <p>Study opportunities to promote location efficient mortgages (LEMs) to encourage home purchases near transit</p>	<p>MTC</p> <p>BAAQMD</p> <p>ABAG</p> <p>MTC, BAAQMD, ABAG in collaboration with cities and counties</p> <p>MTC, BAAQMD, ABAG in collaboration with cities and counties</p> <p>MTC, BAAQMD, ABAG, cities and counties</p> <p>BAAQMD</p> <p>MTC, BAAQMD, ABAG</p> <p>BAAQMD, MTC, ABAG</p> <p>MTC, BAAQMD, ABAG</p>
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	<p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Continue the programs in Phase 1 and refine and expand them as appropriate</li> </ul>	MTC, BAAQMD, ABAG in collaboration with cities and counties
<p>TCM #16</p> <p>PUBLIC EDUCATION / INTERMITTENT CONTROL MEASURES</p>	<p>Phase 1 (2004 –2006):</p> <ul style="list-style-type: none"> <li>■ Continue Spare the Air notices to media, employers, public agencies and individuals, with an emphasis on ROG reductions, obeying freeway speed limits in electronic freeway signs and other outreach efforts</li> <li>■ Continue to expand the Spare the Air employer network</li> <li>■ Provide free morning commutes to all riders of participating Bay Area transit providers up to 5 non-holiday, weekday Spare the Air Days</li> <li>■ Expand STA notices to add emphasis on ROG reductions, obeying freeway speed limits, and discouraging use of pleasure craft</li> <li>■ Expand the Clean Air Consortium to include more cities and counties, as well as other public agencies</li> <li>■ Target major commercial airports and their tenants for greater participation in the Spare the Air program</li> <li>■ Increase coordination between the Bay Area’s Spare the Air program with the San Joaquin Valley STA Program</li> <li>■ Continue public education program on the proper maintenance and operation of motor vehicles to reduce air pollution</li> <li>■ Continue the Bay Area Clean Air Partnership (BayCAP) shuttle project to inventory existing shuttle programs, provide coordination and assistance, and promote “best practices” among shuttle operators</li> <li>■ Discourage the use of recreational watercraft on STA days</li> <li>■ Continue gasoline-powered lawnmower buyback incentive programs</li> <li>■ Educate the public about ways to maintain and operate motor vehicles to reduce air pollution</li> </ul>	<p>BAAQMD</p> <p>BAAQMD</p> <p>BAAQMD, MTC and Transit operators</p> <p>BAAQMD</p> <p>BAAQMD</p> <p>BAAQMD, Airports</p> <p>BAAQMD, San Joaquin Valley STA Program</p> <p>BAAQMD</p> <p>BAAQMD</p> <p>BAAQMD</p> <p>BAAQMD</p> <p>BAAQMD</p>

	<p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Continue Phase 1 programs and expand depending on effectiveness and resources available</li> <li>■ Study effectiveness and costs of free transit on all Spare the Air days</li> <li>■ Explore possible legislative approaches to formalize and strengthen episodic approaches</li> </ul>	<p>BAAQMD</p> <p>BAAQMD, MTC and Transit operators</p> <p>BAAQMD, MTC</p>
<p>TCM #17</p> <p>CONDUCT DEMONSTRATION PROJECTS</p>	<p>Phase 1 (2004 –2006):</p> <p>Promote demonstration projects to develop new strategies to reduce motor vehicle emissions. Potential projects include</p> <ul style="list-style-type: none"> <li>▪ Low and zero emission vehicles and LEV refueling infrastructure</li> <li>▪ Hydrogen fuel cell technology</li> <li>▪ Gas cap replacement program for older cars</li> <li>▪ Heavy duty diesel vehicle idling</li> <li>▪ Refuse truck control technology</li> <li>▪ Carsharing</li> </ul>	<p>BAAQMD, MTC, Caltrans, FHWA</p>
	<p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Monitor Phase 1 projects and expand depending on effectiveness and resources available</li> </ul>	<p>Same as Phase 1</p>
<p>TCM #18</p> <p>IMPLEMENT TRANSPORTATION PRICING REFORM</p>	<p>Phase 1 (2004 –2006):</p> <ul style="list-style-type: none"> <li>■ Advocate for legislative authority to develop and promote measures to discourage driving, such as: <ul style="list-style-type: none"> <li>▪ Higher bridge tolls</li> <li>▪ Congestion pricing</li> <li>▪ Gas tax increase</li> <li>▪ Parking pricing</li> </ul> </li> </ul>	<p>BAAQMD, MTC, business community and other stakeholders</p>
	<p>Phase 2 (Beyond 2006):</p> <ul style="list-style-type: none"> <li>■ Advocate for legislative authority to develop and promote revenue measures for: <ul style="list-style-type: none"> <li>▪ Continuation of Phase 1 elements</li> <li>▪ High Occupancy Toll lanes</li> <li>▪ Gas tax increase / VMT fees</li> <li>▪ Taxes on diesel fuel</li> <li>▪ Emissions-based vehicle registration fees</li> <li>▪ Parking fees</li> </ul> </li> </ul>	<p>BAAQMD, MTC, business community and other stakeholders</p>

TCM #19  IMPROVE PEDESTRIAN ACCESS AND FACILITIES	Phase 1 (2004 –2006):	
	<ul style="list-style-type: none"> <li>■ Review and comment on general/specific plan policies to promote development patterns that encourage walking and circulation policies</li> <li>■ Emphasize pedestrian travel and encourage amending zoning ordinances to include pedestrian-friendly design standards</li> <li>■ MTC will continue to: <ul style="list-style-type: none"> <li>▪ Fund local pedestrian improvement projects through the TLC program</li> <li>▪ Support the Regional Pedestrian Committee and associated pedestrian safety programs</li> <li>▪ Support Safe Routes to Schools</li> </ul> </li> <li>■ TFCR program will continue to fund pedestrian improvement projects to reduce motor vehicle trips and emissions</li> </ul>	<p>BAAQMD, MTC, cities and counties</p> <p>BAAQMD, MTC, ABAG, cities and counties</p> <p>MTC</p> <p>BAAQMD</p>
	Phase 2 (Beyond 2006):	
	<ul style="list-style-type: none"> <li>■ Continue to identify and fund planning projects that enhance pedestrian movement in neighborhoods, downtowns and near transit stops</li> <li>■ Continue funding specific improvements through a variety of funding sources</li> <li>■ Continue to support Safe Routes to Schools</li> </ul>	<p>MTC, BAAQMD in collaboration with cities and counties</p> <p>MTC, BAAQMD in collaboration with cities and counties</p> <p>MTC, BAAQMD in collaboration with cities and counties</p>
TCM #20  PROMOTE TRAFFIC CALMING MEASURES	Phase 1 (2004 –2006):	
	<ul style="list-style-type: none"> <li>■ Implement traffic calming projects such as: <ul style="list-style-type: none"> <li>▪ Pedestrian-exclusive streets</li> <li>▪ Residential and neighborhood traffic calming measures</li> <li>▪ Arterial and major route traffic calming measures</li> </ul> </li> <li>■ Include traffic calming strategies in the transportation and land use elements of general and specific plans</li> <li>■ Encourage area-wide traffic calming plans and programs</li> <li>■ Include traffic calming strategies in capital improvements programs</li> </ul>	<p>MTC, BAAQMD, Cities, Counties</p> <p>MTC, BAAQMD, Cities, Counties</p> <p>MTC, BAAQMD, Cities, Counties</p> <p>MTC, BAAQMD, Cities, Counties</p>
	Phase 2 (Beyond 2006):	
	<ul style="list-style-type: none"> <li>■ Continue the programs in Phase 1 and refine and expand them as appropriate</li> </ul>	N/A



## EMISSION REDUCTIONS

A summary of emission reductions for stationary, area and mobile source measures is provided in Table 14 and a summary of emissions reductions for transportation control measures is provided in Table 15.

**Table 14: Emission Reductions for Stationary, Area and Mobile Source Control Measures**

#	Title	ROG Reductions (tons/day)	NOx Reductions (tons/day)
<b>STATIONARY AND AREA SOURCE MEASURES</b>			
Industrial - Commercial Processes			
SS 1	Auto Refinishing	0.7	
SS 2	Graphic Arts Operations	0.15	
SS 3	High Emitting Spray Booths	0.5	
SS 4	Polyester Resin Operations	0.3	
SS 5	Wood Products Coating	0.68	
Petroleum Products Distribution and Processing			
SS 6	Flares (ADOPTED 7/20/05)	TBD*	TBD*
SS 7	Gasoline Bulk Terminals and Plants	0.14	
SS 8	Marine Loading Operations	0.7 – 1.0	
SS 9	Organic Liquid Storage Tanks	TBD*	
SS 10	Pressure Relief Devices	0.001	
SS 11	Wastewater Systems (ADOPTED 9/15/04)	2.1	
Combustion Processes			
SS 12	Industrial, Institutional and Commercial Boilers		0.5 – 1.0
SS 13	Large Water Heaters and Small Boilers		0.39
SS 14	Stationary Gas Turbines		1.2
Education Programs			
SS 15	Energy Conservation	Unknown	Unknown
<b>MOBILE SOURCE MEASURES</b>			
MS 1	Diesel Equipment Idling Model Ordinance	0.13	1.96
MS 2	Green Contracting Model Ordinance	TBD*	TBD*
MS 3	Low-Emission Vehicle Incentives	0.03	0.6
MS 4	Vehicle Buy-Back Program	0.48	0.31

\* TBD – Emission reductions to be determined

**Table 15: Emission Reductions of Transportation Control Measures**

#	Title	ROG Reductions (tons/day) 2006	NO <sub>x</sub> Reductions (tons/day) 2006
<b>TRANSPORTATION CONTROL MEASURES</b>			
TCM 1	Support Voluntary Employer Based Trip Reduction Programs	0.53	0.57
TCM 3	Improve Local and Areawide Bus Service	0.42	1.13
TCM 4	Improve Regional Rail Service	0.23	0.21
TCM 5	Improve Access to Rail and Ferries	0.17	0.15
TCM 6	Improve Interregional Rail Service	0	0
TCM 7	Improve Ferry Service	0	0
TCM 8	Construct Carpool/Express Bus Lanes on Freeways	0	0
TCM 9	Improve Bicycle Access and Facilities	0.04	0.03
TCM 10	Youth Transportation	0.11	0.09
TCM 11	Install Freeway Traffic Management System	0.04	0.11-0.12
TCM 12	Arterial Management Measures	0.06-0.12	0.06-0.11
TCM 13	Transit Use Incentives	0.02-0.12	0.02-0.10
TCM 14	Carpool and Vanpool Services and Incentives	0.01	0.01
TCM 15	Local Land Use Planning and Development Strategies	0.09	0.14
TCM 16	Public Education/Intermittent Control Measures	1.9 *	2.0 *
TCM 17	Conduct Demonstration Projects	0	0
TCM 18	Transportation Pricing Reform	0	0
TCM 19	Improve Pedestrian Access and Facilities	0.04	0.02
TCM 20	Promote Traffic Calming	0	0

\* Emissions reduction figures for TCM 16: Public Education/Intermittent Control Measures were calculated in tons per day based on emissions reduced on Spare the Air days, which occur approximately 7 days per year.

### **COST-EFFECTIVENESS ESTIMATES**

Section 40922 of the CCAA requires an assessment of the cost-effectiveness of proposed control measures and a ranking of the control measures. Section 40913(b) requires a determination by the Air District Board that the Plan is a cost-effective strategy to achieve attainment of State standards by the earliest practicable date.

Cost-effectiveness can be estimated with confidence for some control measures where the source characteristics, pollution reduction technology, and economic factors are well known. Lacking any of these, the estimates are less certain. Best available estimates are provided in Table 16 below. In some cases, where uncertainties are great, the cost effectiveness is listed as "N/A."

Transportation control measures are especially difficult to analyze for cost-effectiveness for a number of reasons. First, the effectiveness of TCMs is dependent upon people's

travel choices, which are influenced by numerous factors and are often difficult to predict or measure. Second, the costs associated with each TCM may be significant, particularly if major capital investments and infrastructure improvements are included. Third, it is challenging to assign a cost to the emission reductions alone because TCMs are usually intended to meet multiple societal goals including congestion relief, mobility, safety, and other environmental and social benefits discussed in the section above. In addition, TCMs often have overlapping, complementary effects, and the rankings below cannot adequately reflect the synergistic outcomes of TCMs.

In calculating cost effectiveness for TCMs, assumptions were made about both emission reductions and costs for individual projects and programs. Cost effectiveness ratings for TCMs 3, 4, 5, 11, 12, 15 and 16 were calculated using specific project emission reduction and cost estimates as illustrative examples of each TCM. They do not include the fully array of potential transportation investments that could be funded under each TCM, and therefore may underestimate the impacts. Cost effectiveness ratings for TCMs 1, 9, 10, 13, 14 and 19 were assigned based upon a qualitative assessment of overall programmatic effectiveness. The remaining TCMs did not have emissions reduction or cost figures associated with their implementation; therefore, it was impossible to assign them cost effectiveness ratings.

**Table 16: Cost Effectiveness Estimates**

Measure		Cost Effectiveness
<b>Stationary Source Measures</b>		
SS 1	Auto Refinishing	Cost savings - \$2,000 per ton
SS 2	Graphic Arts Operations	\$800 per ton
SS 3	High Emitting Spray Booths	\$5,500 per ton
SS 4	Polyester Resin Operations	\$800 per ton
SS 5	Wood Products Coating	\$2,000 - \$3,700 per ton
SS 6	Flares (ADOPTED 07/05)	\$800 - \$1,600 per ton
SS 7	Gasoline Bulk Terminals and Plants	\$700 per ton
SS 8	Marine Loading Operations	\$5,700 - \$21,600 per ton
SS 9	Organic Liquid Storage Tanks	TBD
SS 10	Pressure Relief Devices	\$28,000 per ton (to be updated)
SS 11	Wastewater Systems (ADOPTED 09/04)	\$1,900 - \$2,400 per ton
SS 12	Industrial, Institutional and Commercial Boilers	\$5,000 per ton
SS 13	Large Water Heaters and Small Boilers	Cost savings - \$3,000 per ton
SS 14	Stationary Gas Turbines	\$5,000 - \$10,000 per ton
SS 15	Promote Energy Conservation	N/A

**Table 16 (continued): Cost Effectiveness Estimates**

Measure		Cost Effectiveness
<b>Mobile Source Measures</b>		
MS 1	Diesel Equipment Idling Ordinance	\$500 per ton
MS 2	Green Contracting	N/A
MS 3	Low Emissions Vehicle Incentives	\$5,000 per ton (Carl Moyer) \$30,000 - \$40,000 per ton (TFCA average)
MS 4	Vehicle Buy Back Program	\$8,600 per ton
<b>Transportation Control Measures</b>		
TCM 1	Voluntary Employer Based Trip Reduction Programs	Good*
TCM 3	Improve Local and Areawide Bus Service	Good
TCM 4	Improve Regional Rail Service	Good
TCM 5	Improve Access to Rail and Ferries	Good
TCM 6	Improve Interregional Rail Service	N/A
TCM 7	Improve Ferry Service	N/A
TCM 8	Construct Carpool/Express Bus Lanes on Freeways	N/A
TCM 9	Improve Bicycle Access and Facilities	Medium*
TCM 10	Youth Transportation	Medium*
TCM 11	Install Freeway Traffic Management System	Good
TCM 12	Arterial Management Measures	Good
TCM 13	Transit Use Incentives	Good*
TCM 14	Carpool and Vanpool Services and Incentives	Medium*
TCM 15	Local Land Use Planning and Development Strategies	Medium
TCM 16	Public Education/Intermittent Control Measures	Medium
TCM 17	Conduct Demonstration Projects	N/A
TCM 18	Transportation Pricing Reform	N/A
TCM 19	Improve Pedestrian Access and Facilities	Good*
TCM 20	Promote Traffic Calming	N/A

Notes: TCM Cost Effectiveness has been rated in dollars per ton of ROG and NOx emissions reduced using the following rating system:

Good = \$0 to \$1M/ton

Medium = \$1M to \$2M/ton

Poor = over \$2M/ton

\* Denotes cost effectiveness is qualitative.

## FURTHER STUDY MEASURES

Further study measures are measures for which insufficient information was available during the development of the control strategy to allow the agencies to commit to them as control measures. A measure may be proposed for further study because of a lack of emissions data on the source targeted, because the cost effectiveness of control may be questionable, or because technology to control the source may not have been adequately demonstrated. The 2005 Ozone Strategy commits the Air District to continue to evaluate the further study measures. However, the Ozone Strategy does not commit the Air District to continue evaluation of a measure if it is determined to be technically infeasible, not cost-effective, or inappropriate for any other reason, nor is the Air District committing, as part of this Strategy, to move forward with further study measure(s) deemed feasible as a result of the study unless and until the Air District specifically commits to the measure(s).

### 2000 Clean Air Plan Further Study Measures

The 2000 Clean Air Plan contained six further study measures. Two measures have been adopted by the Air District, two measures have negligible emissions reductions, one has been incorporated into the rule development process and one is ongoing. The following is an evaluation of each further study measure from the 2000 Clean Air Plan.

- **A3: Improved Aerospace Coating Rule.** BAAQMD Regulation 8, Rule 29 has less stringent standards than the corresponding South Coast rule for several categories of coatings, specifically fuel tank coating, surface preparation and cleanup solvent, paint stripping, PC board fabrication, strippers and maskants for electronic component fabrication, and high temperature adhesive bonding primer. Coating usage in several of these categories is so small that it would be subject to low usage exemptions under both the SCAQMD and BAAQMD rules. With the closure of Bay Area military bases and the transfer of much of United Airlines' maintenance work to facilities outside the Bay Area, aerospace coating VOC emissions are only 0.05 ton/day. Emission reductions from this measure would further reduce emissions by less than 0.01 tons per day. This is de minimis, and does not justify moving forward to propose a revised standard.
- **A6: Improved Surface Coating of Plastic Parts and Products Rule.** Plastic coating in the Bay Area is controlled by Reg 8, Rule 31: Surface Preparation and Coating of Plastic Parts and Products. The comparable South Coast Rule 1145: Plastic, Rubber and Glass Coatings, has two general limits for plastic coating and two for military applications. The general limits are 275 g/l VOC for one component coatings and 420 g/l for two component coatings. For military applications, the limits are 340 g/l VOC for one component coatings and 420 g/l for two component coatings. The Bay Area has one limit for all these applications, 340 g/l VOC. "One component" coatings are water based and achieve the 275 g/l standard in practice. Therefore, setting a 275 g/l standard in the Bay Area rule for one component coatings would not produce any emission reductions. The Bay Area rule, then, is more stringent as it requires 340 g/l VOC for all applications. Both rules have VOC limits for specialty coatings that vary, but the inventory of these specialty applications is insignificant. No facilities coat rubber products and only one coats glass products. The glass coating facility, a mirror manufacturer, is subject to permit conditions that limit VOC emissions, and emits less than 0.05 tons/day. Emissions reductions are de minimis, and would not justify rulemaking to establish a more stringent standard.

- **C7: Control of Emissions From Refinery Flares.** This further study measure was further iterated in further study measure FS-8 in the 2001 Ozone Attainment Plan. A study on flaring was released in December 2002. A technical workgroup was convened to discuss issues related to flare control. A flare control rule was adopted by the Air District Board of Directors on July 20, 2005.
- **C8: Draining of Liquid Products / Sumps and Pits.** This further study measure is also further study measure FS-9 in the 2001 Ozone Attainment Plan. The study recommended emissions controls on refinery wastewater collection systems. The measure has been adopted through amendments to Reg. 8-8: Wastewater (Oil-Water) Separators, approved by the Air District Board of Directors September 15, 2004.
- **F7: Easing of Administrative Requirements of Use of Lower Emitting Technology.** This further study measure has been implemented in several rules, and is considered as rule amendments are developed. There are constraints on easing recordkeeping and/or monitoring requirements imposed by EPA policies. However, regulatory elements such as leak detection and repair incentives to encourage self-monitoring and permit exemptions for low-emitting technologies can help drive user choices of equipment.
- **F8: Limitations on Solvents Based on Relative Reactivity.** This further study measure is ongoing. See further study measure FS 7.

### **2005 Ozone Strategy Further Study Measures**

Further study measures will be evaluated as expeditiously as practicable. If the results of the study indicate that the measures are viable control measures, they will be considered for implementation as regulatory amendments or programmatically (on a schedule to be determined). Table 17 shows the proposed schedule for completion of the further study measures included in the 2005 Ozone Strategy. Descriptions of the further study measures are provided in Appendix E. The results of the further study measures will be reported to ARB and to the Air District Board of Directors.

**Table 17: 2005 Ozone Strategy Further Study Measures**

**2005 Further Study Measures**

FS #	Further Study Measure (existing Reg. and Rule, if any)*
FS 10	Refinery Wastewater Treatment Systems (Reg 8-8)

**2006 Further Study Measures**

FS #	Further Study Measure (existing Reg. and Rule, if any)*
FS 3	Commercial Charbroilers
FS 5	Food Product Manufacturing and Processing
FS 6	Livestock Waste
FS 9	Emissions from Cooling Towers
FS 13	Wastewater from Coke Cutting Operations
FS 15	Stationary Internal Combustion Engines (Reg 9-8)
FS 19	Free Transit on Spare the Air Days

**2007 Further Study Measures**

FS #	Further Study Measure (existing Reg. and Rule, if any)*
FS 1	Adhesives and Sealants (Reg 8-51)
FS 2	Architectural Coatings (Reg 8-3)
FS 4	Composting Operations
FS 7	Limitations on Solvents Based on Relative Reactivity
FS 8	Solvent Cleaning and Degreasing (Reg. 8-16)
FS 11	Vacuum Trucks
FS 12	Valves and Flanges (Reg. 8-18)
FS 14	NO <sub>x</sub> Reductions from Refinery Boilers (Reg. 9-10)
FS 16	Encourage Alternative Diesel Fuels
FS 17	Mitigation Fee for Federal Sources
FS 18	Indirect Source Mitigation Program
FS 20	Episodic Measures

\* Indicates a source already subject to an Air District rule. Further study will evaluate the potential for additional emission reductions.

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## **SECTION 3 - OTHER ISSUES**

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### **INTRODUCTION**

This section of the Ozone Strategy summarizes various topics related to the ozone planning process or other Air District programs. Members of the public have expressed particular interest in these topics during the planning process. Specifically, this section discusses:

- Public involvement processes that have supported the preparation of the 2005 Ozone Strategy
- Climate change and potential benefits of ozone control measures on reducing emissions of global warming gases
- Fine particulate matter (PM), diesel PM, and current and future programs to reduce PM emissions
- Community Air Risk Evaluation (CARE) Program
- Local benefits of ozone control measures
- National ozone standards
- Photochemical modeling
- Environmental review process



## **PUBLIC INVOLVEMENT PROCESS**

### **Introduction**

The Air District's public involvement program for the 2005 Ozone Strategy has been very extensive. It has included a variety of outreach techniques, including public presentations, technical work group meetings, community meetings, email notices, and an ozone planning website. These efforts comprise the Air District's broad community outreach program to achieve the following goals:

- Include all the diverse stakeholders in the planning process (industry, community groups, environmental groups, local governments, neighboring air districts, and concerned citizens)
- Address stakeholder needs, issues and concerns
- Provide timely and accurate information
- Enhance communication between the Air District and all of the stakeholders
- Build understanding and support for ozone planning and related air quality programs and projects

### **Ozone Working Group**

During 2003-2004, the Air District, in cooperation with MTC and ABAG, convened a technical group called the Ozone Working Group (OWG) to help develop the Bay Area 2005 Ozone Strategy. The group was established as a way for members of the public and interested parties to be involved in all stages of the ozone planning process. All OWG meetings have been open to the public.

At OWG meetings, staff has presented updates on various aspects of the planning process, answered questions, and solicited discussion and public comment. Topics have included public involvement efforts, modeling, development and evaluation of control measures, regulatory and rule-making updates, MTC's Transportation 2030 process, and other items. OWG meetings are held approximately bi-monthly, during business hours, at MetroCenter in Oakland. OWG meetings are conducted by professional facilitators, with presentations primarily by Air District and MTC staff. OWG meeting notices are sent both via mail and email to environmental and community groups, business and industry groups, elected officials, local and regional agencies, State and federal agencies, neighboring air districts, and other interested parties.

### **Community Outreach Meetings**

The Air District has also conducted community meetings to discuss the 2005 Ozone Strategy. The first round of community meetings occurred in September 2003. Community meetings were held in the evening at community centers in Rodeo, East Palo Alto, Richmond, East San Jose, West Oakland, and southeast San Francisco. The community meetings were intended to provide background information on ozone health effects and regulatory programs, and to solicit suggestions on potential control measures. The Rodeo and East Palo Alto meetings also included Supplemental Environmental Projects (SEP) on the agendas.

The second round of community meetings occurred in September and October 2004. These community meetings were held in the evening at public facilities in Petaluma, Richmond, San Jose, Oakland, San Francisco, Livermore and Martinez. The second round of community meetings also provided background information on ozone health effects and regulatory programs, updates on the ozone planning process, and solicited input of draft ozone control measures and further study measures. The 2004 meetings also included discussion of the Air Districts new Community Air Risk Evaluation (CARE) program.

Professional facilitators assisted with both rounds of community meetings, and Spanish translation was provided. Outreach for the meetings included: mail and email notices to elected officials, other local and regional public agencies, community, environmental and business groups, and other interested parties; web posting by the Air District and MTC; flyer distribution through local schools; coordination with local community groups to help publicize the meetings; notices to local cable access and local newspaper community calendars; and press releases.

In addition to the community meetings, Air District staff worked with community groups to conduct "pre-meetings." Pre-meetings served as training sessions in which staff met with community members to provide background information on ozone planning, answered questions, and otherwise helped participants prepare for the community meetings. Two such pre-meetings were held in Richmond and San Jose prior to the 2003 community meetings, and one pre-meeting was held in Richmond prior to the 2004 community meetings.

## **Board of Directors Policy & Advisory Committees**

### *Board of Directors*

The Air District is governed by a 22-member Board of Directors. State law provides that the number of representatives from each county is determined by that county's population. Currently, the counties of Marin, Napa, and Solano have one representative; Sonoma, and San Mateo have two representatives; San Francisco has three representatives; and Alameda, Contra Costa, and Santa Clara each have four representatives. Occasionally through this planning process, Air District staff has made presentations to the Board and Board Committees to update them on the planning process and to receive comments and guidance from them about the Bay Area 2005 Ozone Strategy. All meetings of the Board and Board Committees are open to the public.

### *Policy Committees*

The Air District Board of Directors Executive Committee meets quarterly. Throughout this planning process, Air District staff has briefed the Executive Committee and received comments and guidance from them about the Bay Area 2005 Ozone Strategy. Air District staff has briefed the Air District Board of Directors Stationary Source Committee and received comments from them on proposed stationary source control measures and rule development activities. Air District staff has also made presentations to and received comments from the Air District Board of Directors Public Outreach Committee on public outreach conducted for this planning process. Meetings of all three committees are open to the public.

The Regional Agency Coordinating Committee (RACC) consists of elected officials representing the three regional agencies (MTC, ABAG and the Air District), and provides direction to staff on regional planning and smart growth strategies. Representatives of other agencies and interests may attend RACC meetings. RACC meets on a bi-monthly basis and meetings are open to the public. Throughout this planning process, the Bay Area 2005 Ozone Strategy has been a discussion item at RACC meetings, and Air District staff have briefed and received comments from the group.

#### *Advisory Committees*

The Air District Advisory Council and its various committees advise and consult with the Board of Directors and the Air Pollution Control Officer (APCO). Throughout the planning process, Air District staff has briefed the Advisory Council as a whole as well as the Air Quality Planning and Technical Committees, and received comments from them about the 2005 Ozone Strategy. All Advisory Council meetings are open to the public.

The Air District has hired consultants to conduct photochemical modeling and to analyze meteorology and emissions on high ozone days in the Bay Area in order to better understand ozone formation within the region and transport of emissions between the Bay Area and downwind neighbors. To oversee the work that consultants are doing and to give feedback on modeling issues and protocol, the Air District has convened a technical working group called the Modeling Advisory Committee (MAC). The MAC meets bi-monthly and its membership includes staff from the Air District, ARB, other air districts, MTC, members of the scientific community, business and environmental representatives, and other interested parties with technical expertise in ozone modeling.

#### **CAPCOA Engineering Managers Rule Development Subcommittee**

In 2003, the Rule Development Managers subcommittee of the California Air Pollution Control Officers Association (CAPCOA) Engineering Managers identified a list of all feasible measures to assist local air districts in ozone strategy development. In August 2003, the subcommittee identified 27 source categories and identified the most stringent existing rule applicable to the source category. Bay Area Air District staff participated in the discussions and analyzed each measure for applicability and feasibility for the Bay Area 2005 Ozone Strategy. Of the 27, the Air District has committed to control measure development in eight of the source categories, and six additional source categories were identified for further study. Bay Area rules were defined as the most stringent available for five source categories and equivalent to the most stringent available for the remaining categories. This process is described in more detail in Appendix A, Control Measure Review and Evaluation Process.

#### **ARB Rule Comparison Working Group**

In 2003 and early 2004, ARB convened a workgroup of staff from the Bay Area Air Quality Management District, Sacramento Metro Air Quality Management District, San Joaquin Valley Unified Air Pollution Control District, the Yolo-Solano Air Quality Management District and ARB to participate in a rule comparison project. The project compared the relative stringency of district rules regulating 11 source categories and compared each respective district rule to the most stringent in California in order to identify opportunities for emission reductions for each of the air districts. This workgroup first met in August 2003, and most work was coordinated through conference calls and

email correspondence. The project concluded in February 2004 with the development of a report including a rule comparison summary table. Based on this work, emission reduction opportunities were identified for the Bay Area in five source categories. Further study measures for five additional source categories were also identified. This process is described in more detail in Appendix A, Control Measure Review and Evaluation Process.

### **Interagency Consultations**

In February 2004, the Sacramento Metropolitan AQMD provided the Bay Area Air District with a list of control measures suggestions from TIAX Consultants, developed at the request of the Sacramento District. TIAX developed a list of 30 stationary, mobile and transportation control measure suggestions based on the inventory for the Central California Ozone Study, in addition to 19 measures under state or federal authority. Some suggestions were incorporated into existing measures proposed to be included in the Ozone Strategy or helped to make proposed control measures more stringent. In July 2004, the Bay Area Air District submitted a summary of the control measure evaluations to the Sacramento District and conducted a follow-up meeting to discuss the analysis.

The Bay Area Air District has continued to communicate with neighboring air districts about the Bay Area's ozone planning process. In October 2004, the Bay Area Air District held a consultation meeting inviting comments from neighboring air districts on the draft control measures proposed for the Ozone Strategy, as required by Transport Mitigation regulations. All neighboring air districts were invited to participate, and comments were received from the Sacramento Metro Air Quality Management District, San Joaquin Valley Unified Air Pollution Control District, Monterey Bay Unified Air Pollution Control District, and Northern Sierra Air Quality Management District.

### **Workshops**

Pursuant to the California Environmental Quality Act (CEQA), the Air District is preparing a Draft Environmental Impact Report (DEIR) to evaluate potential environmental impacts of the Bay Area 2005 Ozone Strategy. The Air District held a public scoping meeting on April 20, 2004 at MetroCenter Auditorium in Oakland. The purpose of the meeting was to identify the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in the DEIR.

On September 30, 2003, MTC held a Transportation Control Measure (TCM) Workshop at MetroCenter in Oakland. The TCM Workshop was intended to provide OWG participants and other interested parties with an opportunity to review MTC's progress on TCM evaluation and to suggest new transportation strategies for consideration. The TCM Workshop was open to the public.

### **2003-2004 Ozone Planning Website**

Throughout the 2005 Ozone Strategy process, the Air District has maintained a webpage with specific links to ozone planning information, meeting notices and materials. Interested parties can easily learn more about the ozone planning process by visiting the 2003-2004 Ozone Planning website ([http://www.baaqmd.gov/pln/plans/ozone/2003\\_04.asp](http://www.baaqmd.gov/pln/plans/ozone/2003_04.asp)), with a direct link from the Air

District's homepage (<http://www.baaqmd.gov>). The website includes detailed information about the Ozone Working Group, ozone modeling, the CEQA process and planning schedules. All OWG meeting materials can be downloaded through the website.

### **Rule Development**

Separate from but closely related to the Ozone Strategy process, the Air District Rule Development program conducts public processes for the development of regulations to improve air quality and protect public health. The Air District's Rule Development program develops rules based on control measures and further study measures from air quality plans and strategies. The Air District also sometimes adopts rules that are not based on control measures in air quality plans. Rule Development workgroups meet to discuss technical aspects of proposed rules as they are being developed, and include representatives of industry, environmental groups and other stakeholders. Rule Development workshops and hearings also provide the public with opportunities to participate in and comment on Air District rule adoption.

Concurrent with the 2003-04 Ozone Strategy planning process, several technical workgroup meetings, workshops and public hearings were conducted as part of the Air District's rule development process. Rule development public processes were conducted for rules related to organic liquid storage tanks, wastewater separators, process vessel depressurization, equipment leaks, marine tank and marine vessel loading terminals, flare monitoring and refinery flares. All workshops and hearings are open to the public.

### **Future Outreach**

The Air District will be conducting outreach to present, obtain input and receive public comment on the Draft 2005 Ozone Strategy and Draft EIR. Notices of meeting times and locations will be circulated to interested parties and posted on the Air District website.

After the close of the public comment period, staff will respond to comments, prepare the Proposed Final Bay Area 2005 Ozone Strategy and Proposed Final EIR, and release the documents for public review. The Air District Board of Directors will hold a public hearing to consider adoption of the Final 2005 Ozone Strategy and Final EIR. Members of the public will be notified of these meetings and encouraged to attend and provide comment.

## **CLIMATE CHANGE**

Continued warming threatens to potentially erode air quality improvements made in the Bay Area in the past 50 years and may make it more difficult for the region to meet ozone standards. This section on climate change is relevant to the 2005 Ozone Strategy because many of the proposed ozone strategy control measures have the additional benefit of also reducing harmful greenhouse gas emissions.

### **Background**

The Earth's natural climate is constantly changing. However, the International Panel on Climate Change concludes that the global climate is currently changing at a rate unmatched in the past one thousand years and that this change is due to human activity. The last several years have been the hottest on record and the rise in temperature is closely correlated to human activities, primarily the combustion of fossil fuels that are altering the chemical composition of the atmosphere through the emission and buildup of greenhouse gases. Greenhouse gases allow the sun's ultraviolet radiation to penetrate the atmosphere and warm the Earth's surface, but prevent some of the infrared radiation emitted from the Earth to escape back into outer space thereby keeping the planet's surface warm. Higher concentrations of greenhouse gases magnify this effect and further increase surface temperature.

Emissions of carbon dioxide (CO<sub>2</sub>) are the leading cause of global warming, with other air pollutants such as methane, nitrous oxide and hydrofluorocarbons also contributing. According to the California Energy Commissions, carbon dioxide concentrations, which ranged from 265 ppm to 280 ppm over the last 10,000 years, only began rising in the last two hundred years to current levels of 365 ppm, a 30% increase. California's CO<sub>2</sub> emissions in 1999 were approximately 356 million metric tons. In the last decade, transportation accounted for the largest portion of emissions, averaging 59% of total CO<sub>2</sub> emissions, followed by electricity generation at 16%, and industrial emissions of 12%.

In California, climate change indicators measured over the past 100 years such as air temperature, annual Sierra Nevada snow melt runoff, and sea level rise all indicate that California's climate is warming. Warming in the 21<sup>st</sup> century is expected to be much greater than in the 20<sup>th</sup> Century, with temperatures in the United States rising 5-9 degrees F. The climate change experienced in California so far has been gradual, as assumed in most climate change projections. However, paleoclimatological researchers, studying past changes in the climate system, are discovering that the Earth's climate has experienced sudden and violent shifts and that global warming may trigger thresholds resulting in dramatic changes in the climate.

Increased global warming is expected to result in more extreme precipitation and faster evaporation of water, disrupting water supplies, energy supply and demand, agriculture, forestry, natural habitat, outdoor recreation, air quality, and public health. Climate change affects public health because the higher temperatures result in more air pollutant emissions, increased smog, and associated respiratory disease and heart-related illnesses. According to one ARB report, 21 to 38% of the deaths occurring during a heat wave were attributed to elevated ozone and PM10 levels (Draft ARB Technical Support Document for Staff Proposal Regarding Reduction of Greenhouse Gas Emissions from Motor Vehicles, Climate Change Overview, July 21, 2004, pg 16-17).

## **Linkage to Existing Air District Programs**

Certain chemical precursors, such as nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs), react in the atmosphere to produce ozone and ammonium nitrate (a form of particulate matter). NO<sub>x</sub> emissions have increased as a result of power generation processes for energy consumption. Higher temperatures increase precursor VOC emissions (from evaporation of petroleum-based products and from biogenic sources), and also increase photochemical reactions forming ozone.

Reports from STAPPA/ALAPCO, U.S. EPA, and other organizations highlight the co-benefits of “harmonizing” existing air quality rules, regulations, and programs that address criteria and toxic air pollutants with the goals of reducing greenhouse gas emissions. Existing District rules and programs are already reducing greenhouse gas emissions; those reductions can be quantified and documented. For example, programs to reduce vehicle miles traveled (VMT) and energy efficiency measures reduce NO<sub>x</sub> and PM emissions because they reduce emissions from fossil fuels and they also reduce emissions of greenhouse gases.

## **Statewide Programs**

In response to growing concern about global warming, in July 2002, California legislation (AB 1493, Pavley) was enacted requiring ARB to adopt regulations that achieve the maximum feasible and cost-effective reduction in greenhouse gas emissions from on-road motor vehicles. In September 2004, ARB adopted regulations to control greenhouse gas emissions from passenger cars and light-duty trucks that will reduce emissions in 2009 model year and later vehicles. According to an ARB report, greenhouse gas emission reductions would be modest during the early phases of the regulation and would increase to 25 to 34% reduction in greenhouse gases by 2016 compared to a 2002 baseline (ARB Staff Report: Initial Statement of Reason for Proposed Rulemaking; Public Hearing to Consider Adoption of Regulations to Control Greenhouse Gas Emissions from Motor Vehicles, August 6, 2004, pg. 116). Implementation of this regulation would result in modest initial costs that ARB anticipates would be more than offset by operating cost savings over the life of the vehicle due to improved fuel economy.

The California Climate Action Registry (the Registry) was established by State law as a non-profit voluntary registry for greenhouse gas (GHG) emissions. The purpose of the Registry is to help companies and organizations with operations in the state to establish GHG emissions baselines against which any future GHG emission reduction requirements may be applied. The Registry encourages voluntary actions to increase energy efficiency and decrease GHG emissions. Using any year from 1990 forward as a base year, participants can record their GHG emissions inventory. The State of California, in turn, will offer its best efforts to ensure that participants receive appropriate consideration for early actions in the event of any future state, federal or international GHG regulatory scheme. Registry participants include businesses, non-profit organizations, municipalities, state agencies, and other entities.

## **Ozone Strategy Control Measures**

Various control measures in the 2005 Ozone Strategy will reduce greenhouse gas emissions as well as reduce emissions of ozone precursors. Although not quantified,

many of the mobile source measures and transportation control measures proposed in this Ozone Strategy will also reduce greenhouse gas emissions from motor vehicles. Those control measures that result in reducing or eliminating motor vehicle trips, or more efficiently operating motor vehicles, would help reduce greenhouse gas emissions in addition to reducing ozone precursor emissions. TCMs in particular aim to reduce vehicle trips and vehicle miles traveled, and thus reduce emissions of ozone precursors and greenhouse gases. In addition, the proposed Energy Conservation control measure (SS15) would directly target greenhouse gases while also reducing emissions of ozone precursors. This measure would reduce emissions of criteria pollutants and greenhouse gas emissions through the voluntary adoption and enforcement of a model ordinance by local government agencies to reduce energy consumption, and through new District programs and enhancements to existing District regulations to promote energy efficiency.

**Other Bay Area Programs**

A growing number of cities and counties in the Bay Area are participating in activities to reduce greenhouse gas emissions and combat climate change. Four counties and 14 cities in the Bay Area participate in the International Council for Local Environmental Initiatives’ (ICLEI) Cities for Climate Protection campaign. This program provides a framework for local governments to develop a strategic agenda to reduce global warming and air pollution emissions. The table below lists the cities and counties in the Bay Area that are among the 500 local government agencies throughout the world participating in ICLEI’s program.

*Bay Area Communities Participating in Cities for Climate Protection Campaign*

<b>Counties</b>	<b>Cities</b>		
Marin	Berkeley	Petaluma	Santa Rosa
Sonoma	Cotati	Rohnert Park	Sebastopol
Santa Clara	Fairfax	San Anselmo	Sonoma City
San Francisco	Novato	San Francisco	Windsor
	Oakland	San Jose	

The Cities for Climate Protection program consists of five milestones to reduce greenhouse gas and air pollution emissions throughout a community. These include:

- Conduct a greenhouse gas emissions inventory and forecast to determine the sources and quantity of greenhouse gas emissions in the jurisdiction;
- Establish a greenhouse gas emissions reduction target;
- Develop an action plan with both existing and future actions which, when implemented, will meet the local greenhouse gas reduction target;
- Implement the action plan; and
- Monitor to review progress.

The Air District is directly participating in a number of activities in support of local initiatives to address climate change. The Air District is currently working with Sonoma County to develop a model to help Sonoma and other counties in the Bay Area develop action plans for reducing greenhouse gases. Phase 1 of this project develops guidelines for conducting greenhouse gas emission inventories and identifies strategies to reduce those emissions. Phase 2 of this project will help in the development of model climate



protection programs or ordinances and integration of current air quality planning efforts with climate protection.

In October 2004, the Santa Clara County Board of Supervisors passed a resolution to form a partnership with the Air District to achieve the Cities for Climate Protection Program goals of reducing both greenhouse gas and air pollution emissions. The Air District has also been in contact with the City and County of San Francisco and Marin County to offer assistance in implementing climate change action plans adopted in these counties. In 2002, the Marin County Board of Supervisors adopted a resolution that recognizes both the gravity of global warming and the responsibility for local action. In June 2003, Marin County completed the first of the five Cities for Climate Protection milestones: an analysis of greenhouse gas emission levels. The County is currently working on the second milestone, developing an emissions reduction target. In addition, Marin County provided planning guidance on climate change in the Marin County General Plan.

In 2002, the San Francisco Board of Supervisors passed the Greenhouse Gas Emissions Reduction Resolution, committing the City and County of San Francisco to a greenhouse gas emission reduction goal of 20% below 1990 levels by the year 2012. In September 2004, San Francisco released its Climate Action Plan, which provides an inventory and reduction target of greenhouse gas emissions. The Plan also contains actions and implementation strategies to reduce greenhouse gas emissions from the transportation and solid waste sectors and through energy efficiency and renewable energy programs.

The Contra Costa County Board of Supervisors are also engaged in local efforts to reduce greenhouse gas emissions in Contra Costa County. Contra Costa County is taking a “best practices” approach to climate change issues by addressing fleet vehicle emissions, creating green building standards, improving energy efficiency, and by investing in businesses that do not harm human health and the environment.

Local initiatives to address climate change are also being pursued by the Sustainable Silicon Valley (SSV) Project, founded by the California Environmental Protection Agency, the Silicon Valley Leadership Group and the Silicon Valley Environmental Partnership. One element of the SSV program is the CO<sub>2</sub> Emissions Reduction Program. Public and private organizations in the counties of Santa Clara, San Mateo, and Alameda Counties are invited to participate in SSV’s program, including businesses, government, educational institutions, and non-governmental organizations.

### **Air District Programs**

The Air District is also developing a website focusing on climate change issues. The website will provide an overview of climate change, describe the pollutants that cause it and the potential impacts of climate change on California and the Bay Area, and summarize current programs to address climate change. The website will also provide links to local programs addressing climate change and links to other resources on the topic.

The Air District is also developing an emission inventory of greenhouse gas emissions from stationary, area and mobile sources to help determine the sources of greenhouse gases in the region. This data will be very useful to regional stakeholders for

determining the sources of GHGs in their jurisdictions and for beginning to set targets for emission reductions. In addition, the inventory will provide a baseline for the region against which future reduction efforts can be measured.

On June 1, 2005 the Air District Board of Directors adopted a resolution establishing a Climate Protection Program and acknowledging the link between climate protection and programs to reduce air pollution in the Bay Area.

The Air District is considering undertaking additional climate protection activities in the Bay Area during the near term:

- Sponsoring a symposium to discuss climate change issues for the region.
- Hosting a regional conference to help coordinate local climate protection initiatives and create guidance for new initiatives, such as a model ordinance.
- Providing technical assistance to local stakeholders and creating an information clearinghouse to assist local initiatives.
- Developing public education and outreach campaigns about climate protection, energy efficiency, and ways to reduce greenhouse gas emissions at home and in the workplace.
- Creating a curriculum for students in the region about the science of climate change and opportunities to reduce greenhouse gas emissions.

The Air District will continue to collaborate with local stakeholders on climate change issues through existing local initiatives in Sonoma County, Marin County, Silicon Valley, and Contra Costa County. The Air District will also work with individual Bay Area cities to quantify and reduce greenhouse gas emissions through the ICLEI Cities for Climate Protection Program as well as continue collaborating with the California Climate Action Registry and continue to evaluate the Air District's role in assisting local efforts to address climate change.

## **FINE PARTICULATE MATTER**

### **Introduction and Health Effects**

Particulate matter (PM) is a complex mixture of substances that includes elements such as carbon and metals; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and soil. PM can be emitted directly and can also be formed in the atmosphere through reactions between different pollutants. Fine particulate matter (PM<sub>10</sub>) refers to particles with an aerodynamic diameter of 10 microns or smaller. Ozone precursors can also be precursors to fine PM.

Exposure to PM<sub>10</sub> aggravates a number of respiratory illnesses and may cause early death in people with existing heart and lung disease. PM<sub>10</sub> includes the subgroup of finer particles with an aerodynamic diameter of 2.5 microns and smaller (PM<sub>2.5</sub>). These finer particles pose an increased health risk because they can deposit deep in the lungs and contain substances that are particularly harmful to human health.

### **Sources and Trends**

The State and national governments have set ambient air quality standards for fine particulate matter. These standards define the maximum concentrations of particles that can be present in outdoor air without threatening the public's health. The Bay Area is unclassified for the national PM<sub>10</sub> standard, and EPA recently designated the Bay Area as an attainment area for the national PM<sub>2.5</sub> standard.

The Bay Area does not meet California PM<sub>10</sub> standards, which are much stricter than the national standards. In June of 2002, the California Air Resources Board (ARB) adopted new, revised PM standards for outdoor air, lowering the annual PM<sub>10</sub> standard from 30 µg/m<sup>3</sup> to 20 µg/m<sup>3</sup> and establishing a new annual standard for PM<sub>2.5</sub> of 12 µg/m<sup>3</sup>. Any exceedence of these levels constitutes a violation of the standard. Currently, the California Clean Air Act does not require nonattainment regions to prepare plans for attainment of the state PM standards (as it does for ozone). However, recently enacted legislation (Senate Bill 656) specifies certain requirements for ARB and local air districts with regard to addressing PM emission reductions, as described below.

The Bay Area experiences its highest PM concentrations in the winter, especially during evening and night hours. Based on analysis of the chemical composition of airborne PM, the main sources of PM are combustion of fossil fuels, wood burning, airborne dust entrained by motor vehicles and construction, and cooking. Fine PM results almost entirely from the combustion of fossil fuels and wood. Woodburning results in about 20% of total PM emissions on an annual basis and approximately 30% of wintertime PM. Although fossil fuels are burned year-round, winter weather conditions convert much more of the NO<sub>x</sub> produced into particulate ammonium nitrate, representing a large fraction of wintertime PM. Finally, the lower levels of solar radiation in the winter lead to stronger temperature inversions that are conducive to the buildup of particulate matter in ambient air near ground level.

Direct emissions from fossil fuel combustion by on-road motor vehicles, construction equipment, ships, planes, refineries and power plants constitute about 35% the Bay Area's PM<sub>2.5</sub> on an annual basis. Secondary ammonium sulfate and ammonium nitrate,

formed from reactions in the atmosphere of nitrogen oxides and sulfur oxides from motor vehicle exhaust and other combustion processes, constitute another 30% of PM<sub>2.5</sub>.

In the Bay Area, exceedances of the 24-hour State PM<sub>10</sub> standard were recorded 22 times in the last three-year period, and 12 exceedances of the 24-hour national PM<sub>2.5</sub> standard were recorded in the last three years (see Table 18). In order to meet the 24-hour national PM<sub>2.5</sub> standard, ninety-eight percent of measured days at every monitoring site, over the most recent three-year period, must record a 24-hour average less than 65 µg/m<sup>3</sup>. The Bay Area met the national 24-hour standard for 1999-01, through 2002-04.

**Table 18: PM<sub>10</sub> and PM<sub>2.5</sub> Statistics for the Bay Area, 1999-2004**

Year	PM <sub>10</sub> (µg/m <sup>3</sup> )			PM <sub>2.5</sub> (µg/m <sup>3</sup> )		
	Measured days over state std *	Max 24-hour (CA Std = 50)	Maximum Annual average (CA Std = 20)	Days over Fed 24-hr std	Maximum 24-hour (F Std = 65)	Max Annual Average (F Std = 15, CA Std = 12)
1999	12	114	28.7	5	91	16.0
2000	7	76	26.7	1	67	13.6
2001	10	109	28.9	5	108	12.6
2002	6	80	25.4	7	77	13.8
2003	6	58	24.8	0	56	11.8
2004	5	63	25.3	1	74	11.6

\* PM<sub>10</sub> is only sampled every sixth day. Actual days over standard can be estimated to be six times the numbers shown.

The Bay Area has seen significant reductions in PM<sub>10</sub> levels since 1990, with peak concentrations down by approximately half and annual average values down by about one-third. Average ammonium nitrate values have dropped faster than PM<sub>10</sub> as a whole. This reduction is likely due to reductions in NO<sub>x</sub> emissions, and this represents an additional benefit of efforts to reduce NO<sub>x</sub> as an ozone precursor. Particles emitted from combustion of fossil fuels and wood have dropped faster than PM<sub>10</sub> as a whole also. PM<sub>2.5</sub> has only been measured since 1999, so quantitative trend analysis is currently not possible. However, because fine PM is almost completely combustion-related, it is likely that PM<sub>2.5</sub> has been reduced at least as much as PM<sub>10</sub>.

Recent reductions in motor vehicle emissions resulting from stricter national and State standards have resulted in lower tailpipe PM emissions as well. Also, there have been reductions in secondary PM pollutants, which appear to be the result of NO<sub>x</sub> and SO<sub>2</sub> reductions. However, because of fine PM's health effects, the Air District continues to be concerned about PM emissions from sources such as motor vehicles, woodburning, and other combustion processes.

## **Diesel Particulate Matter**

Diesel engines emit a complex mixture of air pollutants, with a major fraction consisting of particulate matter. These emissions include many carbon particles, as well as other gases that become PM as they cool and undergo chemical reactions. Overall, emissions from diesel engines are responsible for the majority of the potential airborne cancer risk in California. In 1998, ARB identified particulate emissions from diesel-fueled engines (diesel PM) as a toxic air contaminant (TAC) based upon its potential to cause cancer and other chronic adverse health effects. In 2000, ARB approved a comprehensive Diesel Risk Reduction Program to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. The Program aims to develop and implement specific statewide regulations designed to reduce diesel PM emissions and the associated health risk 75% by 2010 and 85% by 2020.

## **District PM Reduction Programs**

The Air District implements a number of regulations and programs to reduce PM emissions. These include rules limiting direct PM emissions from open burning of agricultural and non-agricultural waste, controlling dust from earthmoving and construction/demolition operations, limiting emissions from various combustion sources such as cement kilns and furnaces, and reducing PM from composting and chipping activities. In addition, the Air District also enforces rules that limit indirect PM precursor emissions such as NO<sub>x</sub> from industrial and other combustion sources and VOCs from coatings and solvents, product manufacturing, solid waste landfills, and fuel storage, transfer and dispensing activities.

The Air District also administers programs that deal specifically with emissions from wood-burning appliances such as fireplaces, wood stoves and heaters. In 1998, the Air District, with stakeholder input, developed a model wood smoke ordinance for fireplaces and woodstoves as a guidance document for cities and counties to regulate sources of particulate matter in their communities. The model ordinance does not ban wood burning in fireplaces, but seeks to take advantage of new, cleaner technologies that have been developed to effectively reduce wood smoke pollution. Since the ordinance was promulgated, Air District staff have worked with health agencies and interested residents in the Bay Area to advocate for the adoption of the ordinance. To date, a woodsmoke ordinance has been adopted by 37 cities and seven counties in the region.

Air District programs to control motor vehicle emissions also represent a significant commitment to reducing PM. Heavy-duty diesel engines are a significant source of diesel particulate matter (PM<sub>10</sub>) in California. Through several incentive-based programs, the Air District offers grants to reduce particulate matter emissions from motor vehicles. For example, the District implements the Carl Moyer program to fund replacement of old, dirty diesel equipment with newer, cleaner technology. The Air District's Transportation Fund for Clean Air (TFCA) program funds repowers and retrofits of heavy-duty diesel engines in public fleets. In fall 2004, legislation was enacted which 1) significantly increases funding for the Carl Moyer Program, and provides a stable funding source through the year 2014, and 2) authorizes local air districts to impose an additional \$2 per vehicle surcharge on motor vehicle registrations, to be used for projects to reduce emissions from heavy-duty vehicles and school buses, scrappage or repair of existing in-use vehicles, and agricultural sources. The new legislation will greatly increase the available funding to implement low-emission vehicle projects,

especially projects to reduce emissions of NO<sub>x</sub> and particulate matter from heavy-duty diesel engines.

Another Air District grant program is the Low Emission School Bus Program in which the Air District provides funding to public school districts, private schools and private school busing contractors to purchase cleaner replacement school buses and to install particulate matter control devices on school buses with diesel engines manufactured since 1991. The Air District's TFCA program also funds school bus replacement and retrofit projects.

To reduce air pollution, the Air District also operates a vehicle buy-back program to provide financial incentives to remove the oldest and most polluting vehicles from our roadways. Currently, the Air District will pay \$650 for an operating and registered 1985 and older vehicle, and vehicle dismantlers contracted by the Air District will scrap the vehicles. The vehicle buy-back program is a voluntary program that takes older vehicles off the road and is funded through the Air District's Transportation Fund for Clean Air.

In addition, the Air District's Smoking Vehicle Program began in December 1992 as a voluntary program for reporting smoking vehicles. Each year an average of 35,000 calls are received complaining about vehicles emitting excessive visible exhaust. The Air District sends letters to vehicle owners notifying them of the air quality consequences of smoking vehicles, warns them of the possibility of being cited, and encourages them to have their vehicle checked and repaired.

In 2004, the Air District launched a new program, the Community Air Risk Evaluation Program (CARE) that will help further the understanding of community level risk from air toxics in the Bay Area. The initial phase of the program is expected to last 2-3 years, and involves the development of a comprehensive gridded Bay Area air toxics inventory. This inventory will include stationary, area, and mobile sources and will provide new detailed information on diesel PM and other TACs. CARE will include the development of risk reduction measures for impacted communities. Community outreach and education are also important components of the CARE program. The CARE program is discussed in more detail below.

### **Discussion of PM benefits of Ozone Control Measures**

While the 2005 Ozone Strategy is intended to reduce ozone precursor emissions and does not specifically address PM, many of the proposed control measures are expected have the additional benefit of helping to reduced overall PM and diesel PM emissions.

Several stationary source control measures will reduce PM emissions. The flare control measure (SS-6 Flares, adopted as Regulation 12, Rule 12 on July 20, 2005) will result in decreased PM emissions from a reduction in incineration. The control measures aimed at combustion processes (boilers, large water heaters and stationary gas turbines) primarily reduce NO<sub>x</sub> emissions. NO<sub>x</sub> emissions from stationary (and vehicular) source fuel combustion are precursors to nitrates, which comprise a significant portion of ambient PM<sub>10</sub>. Therefore, these NO<sub>x</sub> measures will also lead to a reduction in PM.

All of the mobile source measures will help reduce PM emissions, with the diesel equipment idling ordinance measure (MS-1) and the low-emission vehicle incentives measure (MS-3) helping to reduce diesel PM in particular. All of the transportation

control measures, by reducing vehicle trips and vehicle miles traveled will have the additional benefit of reducing PM emissions from fossil fuel combustion and reentrained road dust.

### **SB 656**

Senate Bill 656, sponsored by Senator Byron Sher, was enacted in 2003. SB 656 requires ARB, in consultation with local air districts, to develop and adopt a list of the most readily available, feasible, and cost-effective control measures that could be employed by ARB and the air districts to reduce PM10 and PM2.5. The goal of SB 656 is to ensure progress toward attainment of State and federal PM10 and PM2.5 standards. The list of control measures is to be based on rules, regulations, and programs existing in California as of January 1, 2004 to reduce emissions from new, modified, or existing stationary, area, and mobile sources. ARB approved the list of control measures in November 2004. The bill also requires air districts to review the ARB list and develop implementation schedules for feasible control measures appropriate for the respective air basins based on the nature and severity of local PM conditions. The implementation schedules are to be developed by prioritizing adoption and implementation based on the effect each control measure will have on public health, air quality, emission reductions, as well as each control measure's feasibility, cost-effectiveness, and appropriateness for the respective region. The Air District has evaluated the ARB list of control measures, analyzed Bay Area PM sources, and will conduct a workshop and propose an implementation schedule in Autumn 2005.

### **COMMUNITY AIR RISK EVALUATION (CARE) PROGRAM**

Toxic air contaminants (TACs) are an area of serious concern in the Bay Area. TACs are substances that are either known or suspected carcinogens or cause other non-carcinogenic health effects. The Air District has long been involved in the reduction of air toxics in the Bay Area through a number of different programs including the preconstruction review of new and modified sources (New Source Review); the Air District's Air Toxics "Hot Spots" program to identify industrial and commercial emitters of toxic air contaminants and to encourage reductions in these emissions; and air pollution control measures designed to reduce emissions from categories of sources of TACs. Many of the Air District's regulations and programs aimed at reducing TACs also can reduce emissions of ozone precursors.

In July 2004, the Air District initiated a new program to address air toxics in the region from a community perspective. The Community Air Risk Evaluation (CARE) program was launched to determine health risk associated with toxic air pollutants in the Bay Area. The program has been designed to evaluate and reduce health risks associated with toxic air pollution in the Bay Area. When completed, studies from the CARE program will be tools the Air District can use to reduce toxic air pollution in areas with the highest health risk. The CARE program will address a variety of toxic air pollutants with an emphasis on diesel particulate matter, which is thought to be the major source of airborne cancer risk in California. The projected time frame for completion of the initial study phase of the CARE program is 2-3 years.

The Air District has formed a CARE Task Force to provide input to District staff throughout the term of the program. The Task Force will be composed of community and environmental representatives with experience working on air quality and/or health

issues, representative of various sectors of the regulated community, representatives of academic institutions in fields relevant to CARE as well as public health experts.

The CARE program includes a public outreach component. In addition to the Task Force, Air District staff will conduct community meetings to provide health risk information, update Bay Area residents about the results of the CARE studies, and to receive public comment. Information on the CARE program will also continue to be posted on the Air District's website. Any future regulatory actions will also require public notices and public workshops to solicit public comment.

The CARE program includes a number of technical and analytical quality assurance aspects. For example, Air District staff are using a new Thermal Optical Carbon Analyzer to determine the ratio of organic carbon to elemental carbon from the Air District monitors' particulate matter filters. Such enhanced air monitoring will better determine the relative contribution of air pollution sources, including vehicles, industrial emissions and/or wood burning to ambient particulate levels.

A significant step in the CARE program involves the development of criteria pollutant and air toxics emission density maps for the nine-county Bay Area. The Air District will develop emission inventories that will be mapped on 2 km x 2 km grids of the region using geographic information system (GIS) software. The "gridded" emission inventory will include emissions data from the District's area and point source inventories as well as the on-road motor vehicle emission inventory.

The CARE program will include an evaluation of risk reduction opportunities as well as the development and implementation of a risk reduction plan. The CARE program will provide technical information, so that the Air District can focus on reducing toxic pollutants in areas with the highest health risk through incentives, grant program funding and regulatory controls.

## **LOCAL BENEFITS**

Ground-level ozone is a regional air pollutant that affects public health in various locations in the nine-county Bay Area. The areas within our region that have historically exhibited higher local ozone levels include the Livermore-Amador Valley, Southern Santa Clara County and Eastern Contra Costa County. Demographically, these areas do not differ dramatically from the Bay Area as a whole, and residents in these areas tend to be of moderate to higher socio-economic levels. Reducing regional ozone formation will likely lead to lower localized ozone levels in these particular parts of the Bay Area. However, implementation of the proposed ozone control strategy will also result in localized benefits to other Bay Area communities that reside in close proximity to sources of air pollution.

Communities near major stationary sources, like refineries and gasoline bulk terminals, tend to have higher percentages of minority and lower-income residents. These communities will benefit from new control measures focused on these sources, especially with regard to toxic air contaminants (TACs). Toxic organic chemicals are often controlled directly by local, State and federal rules and permits. TAC emissions can also be reduced indirectly through ozone control measures. In evaluating potential control measures for the 2005 Ozone Strategy, local community benefit was a



consideration where ozone control measures additionally could reduce exposure of nearby residents to TACs. The majority of the petroleum products production and distribution stationary source control measures, such as those for flares, gasoline bulk terminals and plants, organic liquid storage tanks, pressure relief devices and wastewater systems, are examples of control measures that will result in such community benefits, as well as reducing regional emissions of ozone precursors.

Other stationary source measures aimed at reducing emissions from industrial and commercial processes will similarly have the additional benefit of reducing health risks to nearby residents. Control measures such as those for auto refinishing, graphic arts operations, polyester resin operations, and wood products coatings are aimed primarily at reducing emissions from smaller stationary sources, dispersed more evenly throughout the region. These sources are often located in light industrial areas, sometimes in close proximity to lower-income residential areas with sensitive receptors. Therefore, by reducing emissions from these sources, there will be an overall reduction in the health risk from toxics.

Increased particulate matter (PM) levels are highly correlated to areas with high traffic volumes, including freeways and heavily traveled roadways. Diesel PM is of particular concern because it has been identified by the California Air Resources Board as a toxic air contaminant. Sensitive receptors (residences, schools, hospitals, etc.) may be at higher risk of cancer and other adverse health effects if they are in close proximity to these roadways, as well as facilities with high volumes of diesel equipment such as ports and distribution centers. The 2005 Ozone Strategy's mobile source and transportation control measures should provide local benefit to these communities by reducing emissions of particulate matter and diesel PM.

## **NATIONAL OZONE STANDARDS**

The 2005 Ozone Strategy describes how the San Francisco Bay Area will make progress toward the State one-hour ozone standard as expeditiously as practicable and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The 2005 Ozone Strategy is not intended to meet any requirements related to the national ozone standard or planning requirements; this chapter has been included for informational purposes only.

### **Background**

The Bay Area has a complicated history with respect to national ozone standards. For many years, the region violated the national one-hour ozone standard. As significant emission reductions from aggressive controls on stationary and mobile sources resulted in a substantial downward trend in ozone precursor emissions, the Bay Area enjoyed five years of low ozone levels in the early 1990's, and EPA redesignated the region as an attainment area in 1995. Following two years of very hot weather and numerous exceedances of the standard, EPA redesignated the region back to nonattainment status in 1998. Since that time, further emission reductions from ARB and Air District programs led to further progress and resulted in the region's achieving an attainment record for the national one-hour ozone standard. Recently, EPA has implemented a new national 8-hour ozone standard, and has revoked the national one-hour ozone standard.

## **Recent History of Bay Area Attainment Planning for the National One-hour Ozone Standard**

Previous Bay Area elements of the State Implementation Plan (SIP) have included the 1982 Bay Area Air Quality Plan, the 1993 Redesignation Request and Maintenance Plan (amended 1994), and the 1999 Ozone Attainment Plan. The 2001 Ozone Attainment Plan is the most recent Bay Area portion of the SIP. The following is a brief summary of recent history of Bay Area planning efforts for the national one-hour ozone standard.

Redesignation to Attainment. EPA redesignated the Bay Area to attainment status for the one-hour national ozone standard on May 22, 1995. The agency did this because the Bay Area attained the ozone standard at the end of the 1992 ozone season (having three “clean” years – 1990, 1991 and 1992). The region maintained the standard in 1993 and 1994. At the same time EPA took action on the Bay Area’s ozone redesignation, EPA also approved an Ozone Maintenance Plan submitted by the Air District, MTC and ABAG (“co-lead” agencies) in 1993 and revised in 1994.

Redesignation Back to Nonattainment. In the summers of 1995 and 1996, the Bay Area experienced a number of episodes of hot, stagnant weather. This led to exceedances of the one-hour standard. EPA received two petitions requesting redesignation of the Bay Area to nonattainment status. EPA determined that the "contingency measures" in the Maintenance Plan were not adequate to bring the region back into compliance with the standard and that the region's adopted and projected actions would not be sufficient to reestablish attainment of the standard.

EPA revoked the region's ozone attainment status. The final notice for the revocation (July 10, 1998) called for the region to submit three plan elements: (1) a 1995 emissions inventory for Volatile Organic Compounds (VOC) and Nitrogen Oxides (NOx), (2) an attainment assessment (an analysis, based on available information, showing the VOC and NOx reductions necessary for the region to re-attain the one-hour national ozone standard), and (3) a control strategy, comprised of control measures that provide sufficient emission reductions to attain the ozone standard.

1999 Ozone Attainment Plan. The co-lead agencies prepared the 1999 Ozone Attainment Plan to comply with these requirements. The 1999 Plan was submitted to EPA in August 1999.

The deadline EPA set for attaining the one-hour national ozone standard was November 15, 2000. The region continued to experience a few exceedances of the one-hour standard in 1999 and 2000. Emission reductions from control measures in the 1999 Ozone Attainment Plan were not sufficient to bring the Bay Area back into compliance in that timeframe.

In March 2001, EPA proposed to make a formal finding that the Bay Area had not attained the national one-hour ozone standard. EPA finalized the March notice on August 28, 2001. EPA’s August 28, 2001 action approved some parts and disapproved other parts of the 1999 Plan.

EPA’s finding that the region had failed to attain the one-hour standard established a requirement for a new ozone attainment plan. The new plan was required to be

submitted by September 2002, and was required to show attainment of the one-hour standard by fall 2006.

The 2001 Ozone Attainment Plan. The co-lead agencies prepared the 2001 Ozone Attainment Plan to revise the elements of the 1999 Plan that EPA disapproved, and also added other elements triggered by the finding of failure to attain.

In July 2003, EPA proposed an interim final determination that the 2001 Plan corrected the deficiencies of the 1999 Plan and proposed approval of the 2001 Plan.

Finding of Attainment and Approval of the 2001 Ozone Attainment Plan. Following three years of low ozone levels (2001, 2002 and 2003), in October 2003, EPA proposed a finding that the Bay Area had attained the national one-hour standard and that certain elements of the 2001 Plan (attainment demonstration, contingency measures and reasonable further progress) were no longer required.

In April 2004, EPA made final the finding that the Bay Area had attained the one-hour standard and approved the remaining applicable elements of the 2001 Plan: emission inventory; control measure commitments; motor vehicle emission budgets; reasonably available control measures; and commitments to further study measures.

Revocation of the National One-hour Ozone Standard. EPA recently transitioned from the national one-hour standard to a more health protective 8-hour standard. In April 2004, EPA designated regions for the new national 8-hour standard (discussed below). The 8-hour standard took effect in June 2004. The one-hour standard was revoked on June 15, 2005.

## **National 8-hour Ozone Standard**

In July 1997, EPA established a new national ozone standard. The new 8-hour standard became effective in June 2004. Defined as “concentration-based,” the new national ozone standard is set at 85 parts per billion averaged over eight hours. The determination of whether a region attains the standard is based on the 3-year average of the annual 4<sup>th</sup> highest daily maximum 8-hour ozone concentration. The new national 8-hour standard is considered to be more health protective because it protects against health effects that occur with longer exposure to lower ozone concentrations.

In April 2004, EPA designated regions as attainment and nonattainment areas for the 8-hour standard. These designations took effect on June 15, 2004. EPA formally designated the Bay Area as a nonattainment area for the national 8-hour ozone standard, and classified the region as “marginal” according to five classes of nonattainment areas for ozone, which range from marginal to extreme. Compliance with the standard is determined at each monitoring station using an average of the 4<sup>th</sup> highest ozone reading for three years. A violation at any monitoring station results in a nonattainment designation for the entire region because ozone is a regional pollutant. Monitoring data for the San Martin station for the years 2001, 2002 and 2003 show an average of the 4<sup>th</sup> highest ozone values of 86 parts per billion (one part per billion above the standard), hence the Bay Area’s “marginal” nonattainment classification. Marginal, nonattainment areas must attain the national 8-hour ozone standard by June 15, 2007.

Specific planning requirements for 8-hour marginal nonattainment areas are not yet fully established, as EPA has not issued Phase 2 of the 8-hour implementation rule and certain elements of the Phase 1 are subject to legal challenge. It is not currently anticipated that marginal areas will be required to prepare attainment demonstrations for the 8-hour standard. Other planning elements may be required. As 8-hour planning requirements become clear, the Bay Area will address the requirements in subsequent documents. In addition, in anticipation of the implementation rule, the Air District is working in collaboration with ARB and other Northern California air districts through the Northern California Agencies SIP/Transport Working Group to address 8-hour planning requirements for other regions in Northern California.

## PHOTOCHEMICAL MODELING

The Bay Area is currently in attainment of the national one-hour ozone standard and is not required to use computer modeling to forecast future levels of ozone. The Bay Area is not in attainment of the more stringent California one-hour ozone standard, but at present ARB is not requiring air districts to conduct photochemical ozone modeling as part of the plans for attaining the California one-hour ozone standard. Consequently, the 2005 Ozone Strategy does not include computer modeling to forecast future ozone levels. However, the Air District is committed to working with downwind air districts and ARB on developing and refining photochemical ozone modeling for northern and central California in order to evaluate transport of ozone and ozone precursors among air districts. These activities are important also because we expect ARB to require modeling for the State one-hour ozone standard in future plan updates once modeling capability and resources are available to conduct such modeling throughout the state.

With the help of consultants, ARB, and members of our Modeling Advisory Committee (MAC), the Air District is developing a state-of-the-science photochemical ozone modeling system as a tool for future ozone planning for the Bay Area and for analyzing pollutant transport to downwind air basins. To date, the Air District has made significant progress in developing modeling results for recent periods of high ozone. This section provides an overview of our modeling progress and describes the Air District's future short-term objectives with respect to modeling ozone.

### **Background**

Ozone is not emitted directly into the air, but rather is formed secondarily from other precursor pollutants through a series of complex chemical reactions that take place in the presence of sunlight. Important precursor emissions include ROG and NO<sub>x</sub>. Further complicating the issue of understanding and reducing ozone is the fact that the chemical reactions that control ozone levels are nonlinear, which means that a reduction in precursor emissions under one set of background conditions could have a different effect on ozone than that same reduction with a different set of background conditions.

Previous modeling studies and analyses of observations have suggested that the production of ozone in the Bay Area is limited by the availability of ROG, which means ozone is most sensitive to reductions in ROG emissions. These studies further suggest that reductions in NO<sub>x</sub> emissions will continue to produce smaller reductions in ozone until the total inventory of NO<sub>x</sub> is significantly reduced. These studies also indicate that reductions in NO<sub>x</sub> emissions can increase ozone in areas near the source of those emissions. Previous studies have suggested that the air basins to the east and downwind of the Bay Area are more sensitive to NO<sub>x</sub> reductions.

Because of these complexities, a computer modeling system is needed to link precursor emissions to ozone levels. The basic steps required for the computer modeling are as follows:

- Identify and collect a set of observations suitable for creating inputs to the modeling system and for evaluating the system's performance. This set of observations is used to form a database that includes meteorological measurements both near the ground and aloft, day-specific activity data for determining emissions, and observations of ozone levels and levels of ozone

precursor pollutants both near the ground and aloft. The observational database defines the historic period that is used for the modeling.

- For the historic period defined by the observations, apply a computer model to generate the meteorological inputs, such as winds and temperatures. Wind inputs are needed to specify how air pollution is transported within the Bay Area and throughout Central California; temperature inputs help determine the rates of atmospheric chemical reactions.
- For the historic period defined by the observations, apply a computer model to compile and assign emissions from all the various sources of air pollutants including cars and trucks, industrial sources, solvents, lawn mowers and many others.
- Using the meteorological inputs and the emissions inputs, apply a computer model to predict ozone levels. Field observations are used to evaluate the modeling system. If the modeling system is judged to be reliably representing the formation of ozone in the Bay Area and surrounding air basins, then the system can be used as a planning tool to predict future ozone levels given future growth and controls in the emissions of precursor pollutants.

### **Observations from the Field**

The Central California Ozone Study (CCOS) was a large field study conducted during the summer of 2000. The study involved many sponsors and participants, with a budget of over \$15 million for measuring meteorological parameters (e.g., temperature, winds), emissions (e.g. ROG, NO<sub>x</sub>), and ozone concentrations throughout Central California. In addition, ARB and local air districts provided substantial in-kind contributions to the study. The CCOS field measurement program covered a domain that includes much of northern California, extending north of Redding, and all of central California, including the San Francisco Bay Area, and the Sacramento Area, and San Joaquin Valley. The study domain is similar to, but contained within, the domain used for modeling ozone shown in Figure 8. A summary report on the CCOS field operations has been completed and is available on-line: <http://www.arb.ca.gov/airways/ccos/docs/ccosv3fdS0.zip>.

The CCOS participants collected many special surface and upper-air meteorological and air quality measurements, in addition to the extensive permanent network of measurements that are routinely available. During the primary study period for CCOS, which extended from the beginning of July 2000 to the end of September 2000, there was one period, Monday July 31st, 2000, where ozone exceeded the national one-hour standard in the Bay Area. High ozone followed in the Sacramento Valley on August 1st and in the San Joaquin Valley on August 2<sup>nd</sup> (Table 19).

In general, one of the main problems with field studies is that, because the studies only occur during a limited window in time, the worst air quality episodes are often missed. One such episode occurred from July 11th to 12th in 1999. During this period, four sites in the Bay Area exceeded the national one-hour standard (Table 20). Because this was such an extreme event within the Bay Area and throughout Central California, these dates were also targeted for computer modeling. Since no special-study data were collected during this period, the modeling relied on the extensive network of routinely collected field measurements. ARB routinely archives air quality data for the entire State

and these data were used exclusively for 1999. ARB also collected and reformatted meteorological data from six different agencies within California for the 1999 episode. The Air District extensively reviewed and quality-assured these meteorological data.

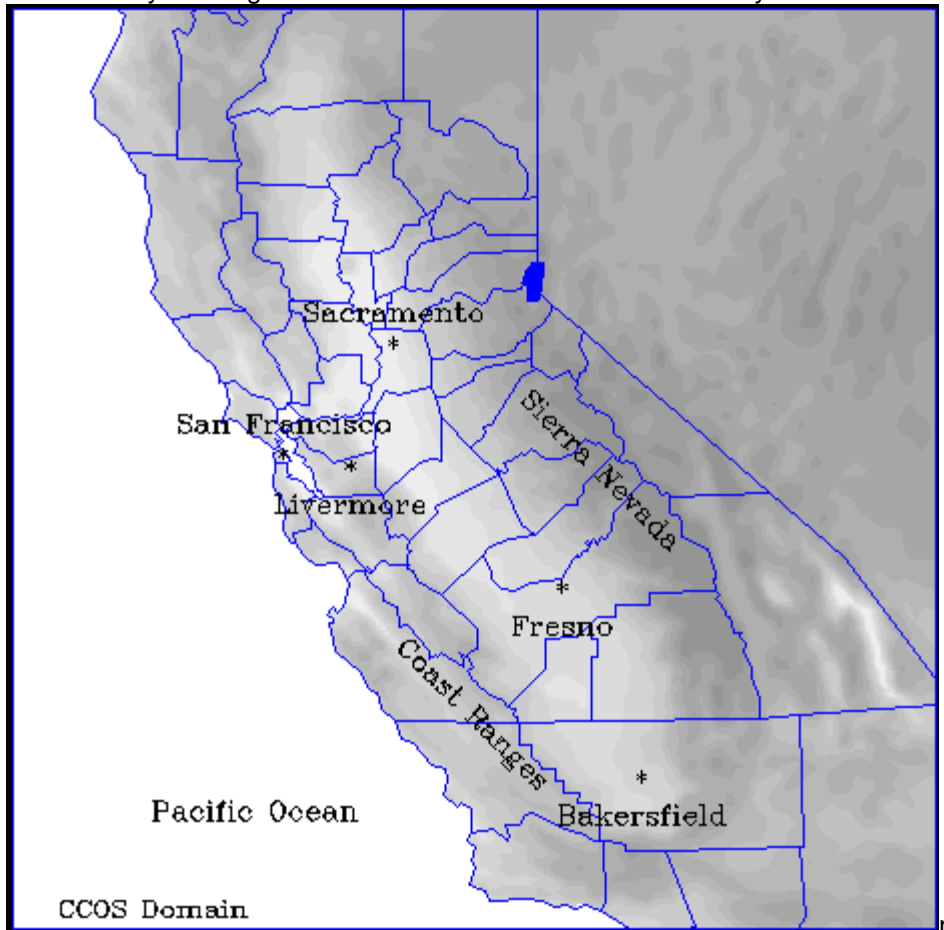
**Table 19: Observed High Ozone from July 31, 2000, to August 2, 2000, in Central California**

Day	7/31/2000									8/1/2000									8/2/2000								
	12	13	14	15	16	17	18	19	20	12	13	14	15	16	17	18	19	20	12	13	14	15	16	17	18	19	20
<b>SF Bay Area</b>																											
Livermore - Old 1st	68	88	116	123	126	73	53	34		73	86	92	81	68	65	52	37		88	93	98	84	69	57	49	46	
<b>Sacramento</b>																											
Sloughhouse		100	92	87	78	74	66	80		88	112	133	126	119	112	95	82		98	102	101	103	98	66	77	69	
<b>San Joaquin</b>																											
Edison	15	10	106	94	81	74	38	19		113	109	93	102	102	96	83	73		129	151	139	121	76	51	45	39	
Turlock	75	91	104	105	96	88	64	52		100	101	97	104	86	85	73	61		98	95	114	117	116	131	106	79	
Modesto - 14th	74	87	94	90	84	81	60	41		80	84	99	87	94	91	70	53		90	94	95	113	131	128	85	64	

**Table 20: Observed High Ozone from July 11-12, 1999, in Central California**

Day	7/11/1999									7/12/1999							
	12	13	14	15	16	17	18	19	20	12	13	14	15	16	17	18	19
<b>SF Bay Area</b>																	
Concord	113	115	126	120	126	99	102	81		134	156	149	129	104	93	99	
Livermore	88	94	96	138	145	146	128	93		117	144	133	128	111	94	86	
Fremont	79	111	133	117	101	66	43	14		93	98	90	88	80	73	59	
San Martin	112	121	124	125	97	62	56	45		115	96	90	74	65	55	46	
<b>Sacramento</b>																	
Folsom	125	132	133	137	125	107	98	90		109	108	100	89	89	92	107	
Vacaville	96	97	99	122	118	101	82	62		108	127	140	115	95	74	65	
Auburn	85	90	91	93	111	133	118	112		89	93	90	89	99	95	82	
Sacto - Del Paso	112	121	115	106	101	95	89	71		97	94	96	90	92	111	89	
Sloughhouse	125	131	116	109	105	103	100	83		108	106	110	103	96	105	91	
Roseville	108	120	128	128	119	108	100	81		96	90	82	78	78	81	108	
Rocklin	99	115	128	123	119	111	105	92		99	96	85	79	80	82	104	
<b>San Joaquin</b>																	
Clovis	124	140	142	125	105	110	81	58		112	124	108	102	98	96	90	
Fresno - 1st St	128	130	132	135	124	114	99	63		114	115	108	95	88	87	75	
Tracy	84	94	91	97	97	97	95	94		102	106	117	118	132	121	113	
Stockton - Hazelton	107	122	130	122	108	113	91	62		100	96	95	90	86	102	95	
Merced	111	115	118	116	112	110	110	100		121	125	117	115	102	108	118	

**Figure 8: Central California Modeling Domain**  
Gray shading indicates the terrain and lines mark county boundaries.



### **Description of the Meteorology**

High ozone levels can occur on days with high temperatures and light winds. During the summer, when the sunlight is intense, ozone-conducive conditions result when the Pacific high-pressure system moves onshore and blocks the movement of weather systems into California and reduces the normal ventilating sea breeze. Two different kinds of high ozone days typically occur in the Bay Area: days with widespread ozone throughout the region and its surroundings, and days with high ozone only at isolated locations. The July 1999 days were found to fall into the first category (widespread ozone), whereas the summer 2000 period was found to belong in the second (isolated ozone). The Air District modeling study includes meteorological inputs for the July 1999 days and the July-August 2000 period, so both types of days will be represented.

### **Inventory of Pollutant Emissions**

ARB, with assistance from the air districts and consultants, developed emissions inventories for all of Central California during each of the high-ozone periods described above. Separate, day-specific, modeling inputs were created for stationary point sources, for on-road motor vehicles, and for off-road vehicles and area-distributed sources. There is also an emissions input for biogenic emissions, which include ROG



from plants and trees and NO<sub>x</sub> from soils, especially soils rich with nitrogen-containing fertilizers.

An important step in developing the modeling inventory is spatially distributing the emissions within the modeling grid. ROG emissions are found concentrated near urban centers and along roadways, but also in the foothills of the Sierra Nevada and Coast Ranges where some tree species are high emitters. NO<sub>x</sub> emissions (reported as NO<sub>2</sub>) are highest along roadways since on-road motor vehicles are the largest source.

### **Computer Models Applied**

The computer modeling required the application of a number of different models. The meteorological model applied for both the July 1999 and the July-August 2000 episodes was the MM5 model. The specific meteorological inputs applied for modeling the July 1999 episode were developed by ARB, while the inputs applied for modeling the July-August 2000 episode were developed by National Oceanic and Atmospheric Administration (NOAA), with assistance from the Air District.

The emissions processing of episode-specific emissions was conducted with the 1995 Emissions Modeling System (EMS-95), the same model used by ARB to generate emissions for past state implementation plans (SIPs)<sup>12</sup> in Central California. The EMFAC 2002 model was used to provide up-to-date emissions estimates of on-road motor vehicle emissions. The biogenic inventory estimates were generated by the ARB's BEGIS model, which includes the latest vegetation maps and updated algorithms for plant emissions. Area source emissions used the most recent available population and employment estimates.

The air quality model, the Comprehensive Air Quality Model with extensions (CAMx, version 4.03) was used to predict ozone, using inputs from the MM5 model and the EMS-95 model. All of the selected models have been, or are currently being, used nationally for various SIPs and/or regional regulatory analyses, and thus have been accepted by the EPA and many States for this purpose. CAMx uses the current best representation of photochemical reactions and it supports a suite of probing tools to conduct sensitivity studies and an analysis of processes within the model that can be used to help ensure the model is working correctly. The CAMx model was also used by ARB for modeling of the CCOS episodes.

### **Results to Date**

The meteorological fields generated with MM5 were evaluated against wind, temperature, and humidity observations. For both the July 1999 and the July-August 2000 simulations, MM5 tended to underpredict temperatures in the Central Valley and overpredict moisture levels. Statistical performance criteria were defined and these were compared to statistics generated for meteorological simulations used for past air quality modeling efforts. For the July-August 2000 episode, the meteorological performance statistics within Central California suggested that performance was typical, while the 1999 performance was less successful, but still acceptable. For the Bay Area subregion, both simulations successfully represented important local flow patterns.

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<sup>12</sup> A state implementation plan is a statewide plan to achieve national ambient air quality standards.

The modeling emissions inventory inputs are difficult to evaluate independently. However, an independent estimate of on-road motor vehicle emissions was available from a UC Berkeley study. That study used fuel sales, on-road measurements, and ambient pollutant ratios to derive emissions. In the Bay Area, the fuel-based method and EMFAC estimates agree to within about 25% for VOC and to within 10% for NO<sub>x</sub>. In the San Joaquin Valley, the fuel-based estimates of both VOC and NO<sub>x</sub> are higher by about 50%.

For assessing model performance for ozone predictions, EPA has developed a set of performance goals. The performance statistics for ozone predictions in the Bay Area from the CAMx model indicate that the model is meeting the performance goals on all Bay Area high ozone days. The model meets most performance goals for other regions as well. However, while the model captures the observed peaks in Sacramento, the model underpredicts on July 11, 1999, and on August 1, 2000. The model underpredicts peak ozone values in the San Joaquin Valley on July 12, 1999, and August 2, 2000.

### **Future Directions**

The computer modeling work has produced reliable simulations of ozone production in the Bay Area and surrounding regions for most of the days and regions modeled. In the near future, the Air District expects to use the modeling system to:

- analyze the effects of reductions in Bay Area emissions on Bay Area ozone, and
- assess the impacts of ozone and ozone precursors transported between air basins on air quality in Central California.

These future modeling efforts will be focused on the national eight-hour ozone standard.

ARB has similar modeling efforts underway and has also modeled the July 1999 and the July-August 2000 episodes with results that are similar to the Air District's. ARB will also focus on modeling for the national eight-hour ozone standard. The Air District will coordinate with ARB and northern California air districts in this effort.

For the current modeling effort, we used multiple episodes and recent base years 1999 and 2000. Many improvements have been made in the emissions inventory modeling inputs. We expect that these updates and improvements will result in an improved modeling system compared to previous modeling efforts.

A technical report describing how the base-case modeling was conducted is available on the Air District's website at the following address: [http://www.baaqmd.gov/pln/plans/ozone/2003\\_modeling/baaqmdmodelingreport\\_jan05.pdf](http://www.baaqmd.gov/pln/plans/ozone/2003_modeling/baaqmdmodelingreport_jan05.pdf)

## **ENVIRONMENTAL REVIEW**

The 2005 Ozone Strategy is intended to and expected to benefit public health and the environment by reducing emissions of the air pollutants that form ozone. However, implementation of the proposed control measures could result in secondary environmental effects if, for example, any means used to reduce these emissions causes impacts to water, air quality, energy, hazards and hazardous materials, noise, public services and transportation. Therefore, the Air District will be the lead agency and will prepare an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA).

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## **APPENDICES**

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**Appendix A – Public Involvement Process**

**Appendix B - Control Measure Review and Evaluation Process**

**Bay Area 2005 Ozone Strategy – Volume 2**

**Appendix C - Stationary Source and Mobile Source Control Measure Descriptions**

**Appendix D - Transportation Control Measure Descriptions**

**Appendix E - Further Study Measure Descriptions**

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## APPENDIX A - PUBLIC INVOLVEMENT PROCESS

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## INTRODUCTION

The Air District's public involvement program for the 2005 Ozone Strategy has been very extensive. It has included a variety of outreach techniques, including public presentations, technical work group meetings, community meetings, email notices, and an ozone planning website. These strategies comprise the Air District's broad community outreach program to achieve the following goals:

- Include all the diverse stakeholders in the planning process (industry, community groups, environmental groups, local governments, neighboring air districts, and concerned citizens)
- Address stakeholder needs, issues and concerns
- Provide timely and accurate information
- Enhance communication between the Air District and all of the stakeholders
- Build understanding and support for ozone planning and related air quality programs and projects

## OZONE WORKING GROUP

During 2003-2004, the Air District, in cooperation with MTC and ABAG, convened a technical group called the Ozone Working Group (OWG) to help develop the Bay Area 2005 Ozone Strategy. The group was established as a way for members of the public and interested parties to be involved in all stages of the ozone planning process. All OWG meetings have been open to the public.

At OWG meetings, staff has presented updates on various aspects of the planning process, answered questions, and solicited discussion and public comment. Topics have included public involvement efforts, modeling, development and evaluation of control measures, regulatory and rule-making updates, MTC's Transportation 2030 process, and other items. OWG meetings are held approximately bi-monthly, during business hours, at MetroCenter in Oakland. OWG meetings are conducted by professional facilitators, with presentations primarily by Air District and MTC staff.

All meeting notices, agenda and handouts for the Ozone Working Group can be downloaded at [http://www.baaqmd.gov/pln/plans/ozone/2003\\_workgroup/index.asp](http://www.baaqmd.gov/pln/plans/ozone/2003_workgroup/index.asp)

The following list provides details on each OWG meeting held, to date:

### **Meeting #1:**

March 23, 2003, 10 a.m. – 12 p.m.

MetroCenter Auditorium, 101 8th Street, Oakland, CA

Agenda topics:

- Background
  - Ozone sources, health effects and trends
  - State and federal planning requirements
  - Components of an ozone plan/strategy
  - Current control measures & further study measures
  - Other outreach underway

- Public Involvement Process
  - Role of Ozone Working Group
  - Schedule and topics for future OWG meetings
  - OWG format, future meeting topics, location & time
  - Suggestions for additional outreach

Meeting materials:

- Ozone Fact Sheet
- Ozone Trends
- State & Natl. A.Q. Planning Requirements
- 2001 Plan Measure Status
- Community Outreach
- Potential Meeting Topics
- Ozone Strategy Draft Schedule

**Meeting #2:**

May 4, 2003, 2 p.m. – 4 p.m.

MetroCenter Auditorium, 101 8th Street, Oakland, CA

Agenda topics:

- Control Measures
  - Criteria for evaluating potential control measures
  - Summary of existing control measures, previous control measure suggestions, and current control measure suggestions
  - Suggestions for new/revised control measures

Meeting materials:

- Ozone Working Group March 27, 2003 meeting notes
- Control measure evaluation criteria
- Existing control measures and current status
- Prior stationary source control measure suggestions
- Transportation Control Measure Review Process
  - Attachment A – Federal TCMs (from 2001 Ozone Attainment Plan)
  - Attachment B – TCM Further Study Measures
  - Attachment C – Reasonably Available Control Measure evaluation for TCMs in 2001 Ozone Attainment Plan
  - Attachment D – TCMs in 2000 (State) Clean Air Plan
- Summary of control measure suggestions received to date
- Bay Area baseline emission inventory projections: 1995 – 2006

**Meeting #3:**

August 5, 2003, 9:30 a.m. – 11:30 a.m.

MetroCenter Auditorium, 101 8th Street, Oakland, CA

Agenda topics:

- Overview of Ozone Modeling
  - Summary of current ozone modeling
  - Q&A on ozone modeling presentation

- Control Measure Screening
  - Sources of suggested measures
  - Evaluation criteria
  - Suggested measures still under evaluation
  - Suggested measures already implemented
  - Suggested measures not passing screen
  - Suggested measures passing evaluation

Meeting materials:

- May 14 OWG meeting notes
- May 14 OWG responses to comments
- Modeling Overview
- Control Measure Evaluation Criteria
  - Stationary & Mobile Source measures
  - Transportation Control Measures
- Suggested Measures Still Under Evaluation
- Suggested Measures Already Implemented
- Suggested Measures not Passing Screen
- Suggested Measures Passing Evaluation
- Screening of TCMs

**Meeting #4:**

October 28, 2003, 9:30 a.m. – 11:30 a.m.

MetroCenter Auditorium, 101 8th Street, Oakland, CA

Agenda topics:

- Status Reports
  - Community meetings
  - Modeling
  - Existing refinery measures
  - TCM workshop
- Transportation, Land Use and Air Quality
  - Transportation 2030 Plan – smart growth and air quality goals
  - MTC's transportation and land use initiatives
- Control measure evaluation
  - Status report
  - Discussion / feedback on suggested measures

Meeting materials:

- August 5 OWG responses to comments
- Status report on community meetings
- Status report on existing refinery measures
- Status report on TCM workshop
  - Status report and agenda
  - Powerpoint presentation
- Transportation 2030 and the transportation and land use connection
  - T-2030: Key issues and preliminary strategies
  - T-2030: Revised goals
  - Transportation and land use initiatives
- Status report on control measure evaluation



**Meeting #5:**

January 6, 2004, 9 a.m. – 11 a.m.

MetroCenter Auditorium, 101 8th Street, Oakland, CA

## Agenda topics:

- Status Reports
  - National 8-hour designations
  - Refinery measures
  - Transportation 2030
- Attainment of National one-hour Ozone Standard
  - Finding of attainment
  - Redesignation Request
  - Continuing ozone control efforts
- Control Measure Evaluation
  - Preliminary stationary, mobile and other source evaluations
  - Preliminary transportation control measures evaluations

## Meeting materials:

- October 28 OWG responses to comments
- Attainment of national one-hour standard and redesignation requirements
- Control measures evaluations
  - Preliminary stationary, mobile and other source evaluations
  - Preliminary transportation control measure evaluations

**Meeting #6:**

January 20, 2004, 9 a.m. – 11 a.m.

MetroCenter Auditorium, 101 8th Street, Oakland, CA

## Agenda topics:

- Control Measure Evaluation - Continued Discussion
  - Preliminary stationary, mobile and other source evaluations
  - Preliminary transportation control measure evaluations

## Meeting materials:

- January 6 OWG meeting notes
- Control measures evaluations
  - Preliminary stationary, mobile and other source evaluations
  - Preliminary transportation control measure evaluations

**Meeting #7:**

March 23, 2004, 9:30 a.m. – 11:30 a.m.

MetroCenter Auditorium, 101 8th Street, Oakland, CA

## Agenda topics:

- Status Reports
- Control Measure Evaluation
  - Revised stationary, mobile and other source evaluations
  - Revised transportation control measures evaluations
- Control Measure Descriptions

- Preliminary draft stationary, mobile and other source measures
- Preliminary draft transportation control measures

Meeting materials:

- January 20 OWG meeting notes
- Control measures evaluations
  - Revised stationary, mobile and other source evaluations
  - Revised transportation control measure evaluations
- Control Measure Descriptions
  - Preliminary draft stationary, mobile and other source measures
  - Preliminary draft transportation control measures

**Meeting #8:**

May 20, 2004, 9 a.m. – 11 a.m.

MetroCenter Auditorium, 101 8th Street, Oakland, CA

Agenda topics:

- Status Reports
  - National one-hour ozone standard – finding of attainment
  - National 8-hour ozone designation & classification
  - Ozone Strategy / CEQA process and schedule
  - Health & Safety Code Section 40233 – TCM emission reductions
  - Modeling
  - Rule development schedule
- Control Measure Descriptions
  - Preliminary draft stationary source measures
  - Preliminary draft mobile source measures
  - Preliminary draft transportation control measures
  - Preliminary draft further study measures

Meeting materials:

- March 23 OWG meeting notes
- Control measure descriptions
  - Cover memo
  - Preliminary draft stationary source measures
  - Preliminary draft mobile source measures
  - Preliminary draft transportation control measures
  - Preliminary draft further study measures

**Meeting #9:**

September 28, 2004, 9:30 a.m. – 11:30 a.m.

MetroCenter Auditorium, 101 8th Street, Oakland, CA

Agenda topics:

- Status Reports
  - Ozone Strategy and CEQA review - process and schedule
  - Rule development update
  - T2030 process and schedule
- Draft Ozone Control Measures
  - Draft stationary source measures

- Draft mobile source measures
- Draft transportation control measures
- Draft further study measures

Meeting materials:

- May 20 OWG meeting notes
- Draft Control Measure Descriptions
  - Cover memo
  - Summary of Draft Ozone Control Measures and Further Study Measures

## **OUTREACH METHODS FOR OZONE WORKING GROUP**

### **Mailing to interested parties list**

Ozone Working Group meeting notices are typically sent three weeks prior to the meeting date to the Air District's mailing list of over 900 recipients. The mailing list includes individuals from environmental and community groups, business and industry groups, elected officials, local staff, state and federal agencies, neighboring air districts, and other interested parties. MTC also mails OWG meeting notices to their mailing list of interested parties.

### **Web Postings**

The Air District has a 2003-2004 Ozone Planning webpage that provides extensive technical information, status reports, announcements and meeting notices. Information on the website regarding the 2005 Ozone Strategy is regularly updated. The website can be reached at [http://www.baaqmd.gov/pln/plans/ozone/2003\\_04.asp](http://www.baaqmd.gov/pln/plans/ozone/2003_04.asp)

The Air District also maintains a website specifically for the Ozone Working Group where all meeting notices, agenda and handouts can be downloaded. The website can be reached at [http://www.baaqmd.gov/pln/plans/ozone/2003\\_workgroup/index.asp](http://www.baaqmd.gov/pln/plans/ozone/2003_workgroup/index.asp)

MTC has also included web postings for OWG meetings and links to the Air District webpage from their webpage, <http://www.mtc.ca.gov>.

### **Email notices**

The Air District maintains an Ozone Working Group email distribution list of over 100 individuals. The email distribution list includes prior meeting attendees and other interested parties. OWG meeting notices and other pertinent information about the ozone planning process has been disseminated through this email list. ABAG also maintains an email list for distributing OWG notices. ABAG's list primarily consists of city and county planning directors, city managers, county administrators and public health officials from their own database.

## Log of OWG Notifications

Date	Notice/Document	How Distributed
3/5/03 mail and website	Ozone Working Group 1 <sup>st</sup> meeting announcement distributed	BAAQMD, MTC, ABAG mailing lists; BAAQMD website
4/14/03	Email to Save the date for May 14 <sup>th</sup> OWG meeting	Ozone Working Group email list
4/22/03	Ozone Working Group 2 <sup>nd</sup> meeting notice	BAAQMD mailing list, MTC mailing list
5/2/03	Email announcing that agenda and handouts are available on OWG website for May 14 <sup>th</sup> OWG meeting	Ozone Working Group email list
7/11/03	Ozone Working Group 3 <sup>rd</sup> meeting notice	BAAQMD, MTC, ABAG mailing lists
7/14/03	Email reminder and meeting notice attachment for Aug 5 <sup>th</sup> OWG meeting	Ozone Working Group email list
9/24/03	Email announcing TCM workshop	Ozone Working Group email list
10/3/03	Ozone Working Group 4 <sup>th</sup> meeting notice	BAAQMD, MTC, ABAG mailing lists
10/7/03	Email reminder and meeting notice attachment for Oct 28 <sup>th</sup> OWG meeting	Ozone Working Group email list
10/17/03	Email announcing that agenda and handouts are available on OWG website for Oct 28 <sup>th</sup> OWG meeting	Ozone Working Group email list
12/12/03	Ozone Working Group 5 <sup>th</sup> meeting notice	BAAQMD, MTC, ABAG mailing lists
12/16/03	Email reminder and meeting notice attachment for Jan 6 <sup>th</sup> OWG meeting	Ozone Working Group email list
12/29/03	Email announcing that agenda and handouts are available on OWG website for Jan 6 <sup>th</sup> OWG meeting	Ozone Working Group email list
1/8/04	Notice for control measure evaluation continued discussion at Jan 20 <sup>th</sup> Ozone Working Group meeting	BAAQMD mailing lists and OWG, ABAG email list
1/15/04	Email announcing that agenda and handouts are available on OWG website for Jan 20 <sup>th</sup> OWG meeting	Ozone Working Group email list
3/2/04	Ozone Working Group March 23 <sup>rd</sup> Meeting notice	BAAQMD mailing lists and OWG, ABAG email list
3/16/04	Email announcing that agenda and handouts are available on OWG website for March 23rd OWG meeting	Ozone Working Group email list
5/5/04	Ozone Working Group May 20th Meeting notice	BAAQMD mailing lists and OWG, ABAG email list
5/14/04	Email announcing that agenda and handouts are available on OWG website for May 20 <sup>th</sup> OWG meeting	Ozone Working Group email list

Date	Notice/Document	How Distributed
9/3/04	Email notification to OWG list about community meetings and posted Draft Control Measures	OWG email list
9/15/04	Ozone Working Group Sept 28th Meeting notice	BAAQMD mailing lists and OWG, ABAG email list
9/21/04	Email announcing that agenda and handouts are available on OWG website for Sept 28 <sup>th</sup> OWG meeting	Ozone Working Group email list

## COMMUNITY MEETINGS

The Air District has also conducted two rounds of community meetings to discuss the 2005 Ozone Strategy. The first round of community meetings occurred in September 2003. Community meetings were held in the evening at community centers in Rodeo, East Palo Alto, Richmond, East San Jose, West Oakland, and southeast San Francisco. The community meetings were intended to provide background information on ozone health effects and regulatory programs, and to solicit suggestions on potential control measures. The Rodeo and East Palo Alto meetings also included Supplemental Environmental Projects (SEP) on the agendas.

The second round of community meetings occurred in September and October 2004. These community meetings were held in the evening at public facilities in Petaluma, Richmond, San Jose, Oakland, San Francisco, Livermore and Martinez. The second round of community meetings also provided background information on ozone health effects and regulatory programs, updates on the ozone planning process, and solicited input of draft ozone control measures and further study measures. The 2004 meetings also included discussion of the Air Districts new Community Air Risk Evaluation (CARE) program.

In addition to the community meetings, Air District staff worked with community groups to conduct "pre-meetings." Pre-meetings served as training sessions in which staff met with community members to provide background information on ozone planning, answered questions, and otherwise helped participants prepare for the community meetings. Two such pre-meetings were held in Richmond and San Jose prior to the 2003 community meetings, and one pre-meeting was held in Richmond prior to the 2004 community meetings.

### 2003 Richmond Pre-meeting

Co-sponsored by the Community Health Initiative, Communities for a Better Environment, the West County Toxics Coalition, Contra Costa Health Services, and the Bay Area Air Quality Management District.

Wednesday, September 3, 2003, 6:00 p.m. – 8:00 p.m.

Nevin Community Center Auditorium, 598 Nevin Avenue, Richmond, CA

Agenda topics:

- Controlling Air Pollution
  - Why does the BAAQMD develop these plans?

- What is an ozone attainment plan?
- What is ozone; how is it formed; good ozone vs. bad ozone
- Where does air pollution come from?
- What Types of Control Measures Are Included in an Ozone Plan and Who Has Authority Over What Sources
- The Rule making Process: Flare Case Study
- How residents can get involved (next steps)

Meeting materials:

- Ozone Sources, Plans and Controls Fact Sheet
- Existing Control Measures and Current Status
- How the Rulemaking Process Works at the Air District
- Ozone Planning – Technical Terms

**2003 San Jose Pre-meeting**

Informational pre- meeting conducted with community members and Silicon Valley Toxics Coalition.

Tuesday, September 16, 2003, 6:00 p.m. – 8:00 p.m.  
Mayfair Community Center, 2039 Kammerer Avenue, San Jose, CA

Agenda topics:

- Health Effects of Ozone
- Background on Ozone Planning
- What Types of Control Measures Are Included in an Ozone Plan and Who Has Authority Over What Sources

Meeting materials:

- Ozone Sources, Plans and Controls Fact Sheet
- Existing Control Measures and Current Status
- How the Rulemaking Process Works at the Air District
- Ozone Planning – Technical Terms

**2003 Community Meetings**

All 2003 Community Meeting agendas and handouts can be downloaded at [http://www.baaqmd.gov/pln/plans/ozone/2003\\_meetings/2003CommunityMeetings.asp](http://www.baaqmd.gov/pln/plans/ozone/2003_meetings/2003CommunityMeetings.asp)

Each 2003 Community Meeting included the following agenda topics and meeting materials:

Agenda topics:

- Health Effects of Ozone
- Background on Ozone Planning
- Discussion of Potential New Ozone Control Measures
- Supplemental Environmental Projects (Rodeo and East Palo Alto only)
- Discussion on Potential Supplemental Environmental Projects (Rodeo and East Palo Alto only)

Meeting materials:

- Ozone Sources, Plans and Controls Fact Sheet
- Existing Control Measures and Current Status
- How the Rulemaking Process Works at the Air District
- Ozone Planning – Technical Terms
- Supplemental Environmental Projects (Rodeo and East Palo Alto only)

The following is a list of the 2003 Community Meeting dates and locations:

Rodeo Community Meeting

September 4, 2003, 6:30 p.m. – 8:30 p.m.

Rodeo Senior Center, 189 Parker Avenue, Rodeo, CA

East Palo Alto Community Meeting

Wednesday, September 10, 2003, 6:30 p.m. – 8:30 p.m.

East Palo Alto Senior Center, 560 Bell Street, East Palo Alto, CA

Richmond Community Meeting

Thursday, September 11, 2003, 6:30 p.m. – 8:30 p.m.

Nevin Community Center Auditorium, 598 Nevin Avenue, Richmond, CA

Oakland Community Meeting

Tuesday, September 16, 2003, 6:30 p.m. – 8:30 p.m.

Jubilee West Community Center, 1485 Chester, Oakland, CA

San Jose Community Meeting

Wednesday, September 24, 2003, 6:30 p.m. – 8:30 p.m.

Mayfair Community Center, 2039 Kammerer Avenue, San Jose, CA

San Francisco Community Meeting

Tuesday, September 30, 2003, 6:30 p.m. – 8:30 p.m.

Southeast Community College Facility, 1800 Oakdale Avenue, San Francisco, CA

**2004 Richmond Pre-meeting**

Co-sponsored by the Community Health Initiative, Pacific Institute, the West County Toxics Coalition, Contra Costa Health Services, and the Bay Area Air Quality Management District.

Monday, September 13, 2004, 5:00 - 7:00pm

Community Heritage Senior Apartments, 1555 Third Street, Richmond, CA

Agenda topics:

- Background
  - Why does the BAAQMD develop these plans?
  - What is an ozone strategy?
  - What is ozone; how is it formed; good ozone vs. bad ozone
  - Where does air pollution come from?
- What Types of Control Measures Are Included in an Ozone Plan and Who Has Authority Over What Sources

- The Rule making Process: Case Studies
- What Residents Can Expect from BAAQMD Community Meetings
- How residents can get involved

Meeting materials:

- Ozone Sources, Plans and Controls Fact Sheet
- Ozone Control Strategy – Technical Terms
- How the Rulemaking Process Works at the Air District
- CARE Program Fact Sheet

### **2004 Community Meetings**

All 2004 Community Meeting agendas and handouts can be downloaded at [http://www.baaqmd.gov/pln/plans/ozone/2003\\_meetings/2004CommunityMeetings.asp](http://www.baaqmd.gov/pln/plans/ozone/2003_meetings/2004CommunityMeetings.asp)

Each 2004 Community Meeting included the following agenda topics and meeting materials:

Agenda topics:

- Ozone Background – Health Effects, Sources, and Planning Process
- Draft Ozone Control Measures
  - Overview of the Control Measure Evaluation and Review Processes
  - Draft Stationary Source Control Measures
  - Draft Mobile Source Control Measures
  - Draft Transportation Control Measures
- Draft Further Study Measures
- CARE Program
- Other Air Quality Issues or Concerns from the Community

Meeting materials:

- Ozone Sources, Plans and Controls Fact Sheet
- Summary of Draft Ozone Control Measures and Further Study Measures
- Glossary of Technical Terms
- CARE Program Fact Sheet

The following is a list of the 2004 Community Meeting dates and locations:

#### **Petaluma Community Meeting**

Wednesday, September 22, 2004, 6:30 p.m. – 8:30 p.m.

Petaluma City Council Chambers, 11 English Street, Petaluma, CA

#### **Richmond Community Meeting**

Thursday, September 23, 2004, 6:30 p.m. – 8:30 p.m.

Richmond City Council Chambers, 1401 Marina Way South, Richmond, CA

#### **San Jose Community Meeting**

Wednesday, September 29, 2004, 6:30 p.m. – 8:30 p.m.

San Jose City Council Chambers

801 N. First Street, San Jose, CA



**Oakland Community Meeting**

Thursday, September 30, 2004, 6:30 p.m. – 8:30 p.m.

Elihu Harris Building, 1st Floor Auditorium, 1515 Clay Street, Oakland, CA

**San Francisco Community Meeting**

Wednesday, October 13, 2004, 6:30 p.m. – 8:30 p.m.

California State Building, Milton Marks Conference Center, 455 Golden Gate Avenue  
San Francisco, CA

**Livermore Community Meeting**

Thursday, October 14, 2004, 6:30 p.m. – 8:30 p.m.

Livermore City Council Chambers, 3575 Pacific Avenue, Livermore, CA

**Martinez Community Meeting**

Thursday, October 21, 2004, 6:30 p.m. – 8:30 p.m.

Contra Costa County Board of Supervisors Chambers, 651 Pine Street, Room 107,  
Martinez, CA

**OUTREACH METHODS FOR COMMUNITY MEETINGS**

Both the 2003 and 2004 Community Meetings included a variety of outreach methods including:

**Meeting Notice Mailed to Interested Parties:**

The Air District keeps a mailing list of individuals and organizations that have expressed interest in air quality planning. That mailing list includes over 900 different interested individuals including representatives from environmental organizations, industry, community groups, local government, elected officials, other agencies, and concerned citizens.

For the 2003 Ozone Planning community meetings, meeting notices were mailed out to this mailing list on July 30, 2003.

For the 2004 Ozone Planning community meetings, meeting notices were mailed out to this mailing list on September 3, 2004.

Meeting notices for both rounds of community meetings were also sent through ABAG and MTC's mailing lists of interested parties.

**Meeting Notice Emails:**

Email notices for the 2003 Ozone Planning community meetings were sent to the Air District's email distribution list of elected officials, industry representatives, community and environmental groups, and other interested parties on the following dates:

- July 20, 2003
- August 6, 2003
- August 13, 2003
- August 14, 2003

Email notices for the 2004 Ozone Planning community meetings were sent in September 2004 to the following email distribution lists:

- Ozone Working Group email distribution list
- ABAG's list of city, county and municipal government officials and employees
- County Health Officials

**Web Postings:**

Both Air District and MTC created weblinks to the community meeting notice from their homepages, <http://www.baaqmd.gov> and <http://www.mtc.ca.gov>, respectively.

All Community Meeting agendas and handouts can be downloaded at [http://www.baaqmd.gov/pln/plans/ozone/2003\\_meetings/index.asp](http://www.baaqmd.gov/pln/plans/ozone/2003_meetings/index.asp)

**Meeting Notice Flyer Distribution:**

For the 2003 Community Meetings, community representatives posted meeting notice fliers and distributed them among the neighborhoods. Almost 10,000 fliers, in English and Spanish, were distributed to announce the 2003 Community Meetings at the following community centers:

- Mayfair Community Center, 2039 Kammerer, San Jose, CA
- City of East Palo Alto, 2415 University Avenue, East Palo Alto, CA
- Ravenswood Family Health Center, 1798 Bay Road, East Palo Alto, CA
- Community Development Institute, 321 Bell St, East Palo Alto, CA
- East Palo Alto Senior Center, 560 Bell St, East Palo Alto, CA
- Olinder Community Center, 848 William, San Jose, CA
- Roosevelt Community Center, 901 E. Santa Clara St., San Jose, CA
- Contra Costa Health Services, 597 Center Avenue, Martinez, CA
- Contra Costa Health Services, 597 Center Avenue, Martinez, CA
- Neighborhood House of North Richmond, 305 Chesley Avenue, Richmond, CA
- Nevin Community Center, 598 Nevin, Richmond, CA
- West County Toxics Coalition, 1019 Macdonald, Richmond, CA
- Bayview-Hunters Point Community Advocates, 5021 Third Street, San Francisco, CA
- Literacy for Environmental Justice, 6220 Third Street, San Francisco, CA
- Bayview-Hunters Point Project Area Committee (PAC), 1800 Oakdale, Rm. 8, San Francisco, CA
- Bayview-Hunters Point Southeast Health Center, 2401 Keith St., San Francisco, CA
- Coalition for West Oakland Revitalization (CWOR), 2485 W. 14th Street, Oakland Army Base, Oakland, CA
- Chester St. Block Club Association, 343 Chester St, Oakland, CA
- Jubilee West, 1485 Chester St., West Oakland, CA

For the 2004 Community Meetings, fliers were distributed primarily through local public school districts and city offices. Fliers, in English and Spanish, were distributed to announce the 2004 Community Meetings at the following locations:

- Petaluma Public Schools
- Santa Rosa Junior College



Oakland Tribune  
 Alameda Publishing Corp.: Berkeley Tri-City Post, El Mundo, Oakland Post, Richmond Post, San Francisco Post  
 Berkeley Voice  
 Montclarion  
 Oakland Metro Reporter  
 SF: SFG-TV/Access SF/Cable Channel 26 Public Access  
 Bay City News  
 San Francisco Bay View  
 San Francisco Independent  
 San Francisco Metro Reporter/The Sun Reporter  
 Potrero View, Sunset Beacon, Visitation Valley Grapevine, West of Twin Peaks Observer, West Portal Monthly, Richmond Review, The New Fillmore, North Beach Beat/North Beach Journal, Marina Times  
 San Francisco Bay Times  
 El Mensajero  
 Livermore: Tri-Valley Community Television (CTV30) Public Access TV  
 Las Positas Express  
 The Valley Times  
 Tri-Valley Herald  
 The Independent  
 Martinez: Contra-Costa TV (CCTV) Public Access TV  
 Martinez News Gazette

#### Press release

Thursday, October 7, 2004 – A press release entitled, “Air District Seeks Input on Measures to Reduce Summertime Smog” was sent to Livermore media as well as Bay City News to announce the October 14, 2004 Livermore Community Meeting.

#### Publications

“Air Currents” is a newsletter published by the Air District’s Public Information and Outreach office. It covers Air District activities as well as other air quality issues of interest to industry, government agencies, and the general public. “Air Currents” has a subscription of about 3,750 and is also posted to the BAAQMD website. Articles on the ozone planning process have periodically appeared in “Air Currents,” including the following:

- Spring 2003 – article on the ozone planning process kick-off
- Summer 2003 - article about the 2003 Community Meetings
- Spring/Summer 2004 – articles on the ozone planning update, national one-hour ozone standard finding of attainment, and national 8-hour ozone standard designation.

Published by MTC, “Transactions” is a monthly newsletter detailing transportation news for the nine-county San Francisco Bay Area. The Calendar section of “Transactions” provides a list of upcoming transportation-related meetings, and Ozone Working Group meetings are often listed. In the September 2004 issue, “Transactions” included reference to the 2004 Community Meetings and a link to the Air District’s website.

**Outreach to County Health Departments:**

For the 2003 and 2004 Community Meetings, the Air District conducted outreach specifically to local County Health Departments to encourage their participation. In the both rounds of community meetings, the Air District sent an invitation letter to each County's Public Health Director, emails to health department staff, and followed up with phone calls requesting their attendance. At the community meetings, Public Health Department staff participation was particularly helpful during discussions of the health impacts of ozone and other air pollutants.

**Staff from County Health Departments attended the following Community Meetings:**

September 3, 2003 – Richmond Pre-Meeting  
September 4, 2003 – Rodeo Community Meeting  
September 10, 2003 – East Palo Alto Community Meeting  
September 11, 2003 – Richmond Community Meeting  
September 16, 2003 – Oakland Community Meeting  
September 30, 2003 – San Francisco Community Meeting  
September 23, 2004 – Richmond Community Meeting  
October 13, 2004 – San Francisco Community Meeting  
October 21, 2004 – Martinez Community Meeting

**Public Presentations:**

Staff from the District's Public Information & Outreach Division gave presentations about the 2003 Community Meetings at the following meetings:

February 6, 2003 - East Palo Alto Environmental Justice Resource Team  
February 19, 2003 - Contra Costa County EJ Air Quality Working Group  
April 24, 2003 - East Palo Alto Environmental Justice Resource Team

**POLICY BOARDS AND COMMITTEES****Board of Directors**

The Air District is governed by a 22-member Board of Directors. State law provides that the number of representatives from each county is determined by that county's population. Currently, the counties of Marin, Napa, and Solano have one representative; Sonoma, and San Mateo have two representatives; San Francisco has three representatives; and Alameda, Contra Costa, and Santa Clara each have four representatives. Occasionally through this planning process, Air District staff has made presentations to the Board and Board Committees to update them on the planning process and to receive comments and guidance from them about the Bay Area 2005 Ozone Strategy. All meetings of the Board and Board Committees are open to the public.

**Dates of Board of Directors meetings and discussion topic(s):**

October 20, 2004 – Ozone Strategy outreach update

**Executive Committee**

The Air District Board of Directors Executive Committee meets quarterly. Throughout this planning process, Air District staff has briefed the Executive Committee and received comments and guidance from them about the Bay Area 2005 Ozone Strategy. Meetings are open to the public.

**Dates of Executive Committee meetings and discussion topic(s):**

January 29, 2003 – Ozone planning schedule

April 30, 2003 – Modeling and public involvement process

July 30, 2003 – Status report on ozone planning; 2001 Ozone Attainment Plan and EPA 8-hr designations

October 29, 2003 – Status report on monitoring record for national ozone standards; photochemical modeling; public involvement; control measure evaluations

December 18, 2003 - Status reports on EPA proposed finding of attainment; EPA action on 2001 Ozone Attainment Plan; redesignation request requirements; control measure evaluations

June 30, 2004 – Control measure development; public outreach; and CEQA

September 29, 2004 – Ozone Strategy status update

November 29, 2004 – Ozone Strategy status update

February 4, 2005 – Ozone Strategy status update

March 30, 2005 – Ozone Strategy status update

**Stationary Source Committee**

The Air District Board of Directors Stationary Source Committee meets bi-monthly. Air District staff has briefed the Air District Board of Directors Stationary Source Committee and received comments from them on proposed stationary source control measures and rule development activities. Meetings are open to the public.

**Dates of Stationary Source Committee meeting and discussion topic(s):**

January 26, 2004 - Status report on 2001 Ozone Attainment Plan ozone control measures and further study measures; status report on identifying new ozone control measures

**Public Outreach Committee**

The Air District Board of Directors Public Outreach Committee meets bi-monthly. Air District staff has briefed the Air District Board of Directors Stationary Source Committee and received comments from them on proposed stationary source control measures and rule development activities. Meetings are open to the public.

**Dates of Public Outreach Committee meeting and discussion topic(s):**

April 26, 2004 - Status report on the public outreach to date for the Ozone Strategy and plans for community involvement and future input.

**Metropolitan Transportation Commission Planning and Operations Committee**

MTC's Planning and Operations committee (POC) meets monthly to consider matters relating to MTC plans, and oversees MTC's activities to make the existing transportation network operate more efficiently. Meetings are open to the public.

**Dates of MTC POC meeting and discussion topic(s):**

March 4, 2005 – Status report on the Ozone Strategy

**Regional Agency Coordinating Committee**

The Regional Agency Coordinating Committee (RACC) consists of elected officials representing the three regional agencies (MTC, ABAG and the Air District), and provides direction to staff on regional planning and smart growth strategies. Representatives of other agencies and interests may attend RACC meetings. RACC meets on a bi-monthly basis and meetings are open to the public. Throughout this planning process, the Bay

Area 2005 Ozone Strategy has been a discussion item at RACC meetings, and Air District staff have briefed and received comments from the group.

**Dates of RACC meetings and discussion topic(s):**

February 21, 2003 - Ozone planning schedule

April 18, 2003 - Modeling and public involvement process

June 20, 2003 – Status report on control measure evaluation, public involvement process, and modeling

September 19, 2003 – Status report on modeling, control measure evaluation, public involvement

November 21, 2003 - Status report on EPA proposed finding of attainment; OWG meeting; control measure evaluations; photochemical modeling

January 23, 2004 - Status report on redesignation requirements and continuing ozone planning and control efforts

March 19, 2004 – Status report on Ozone Strategy

**Joint Policy Committee**

The Joint Policy Committee (JPC) coordinates the regional planning efforts of the Association of Bay Area Governments (ABAG), the Bay Area Air Quality Management District (BAAQMD), and the Metropolitan Transportation Commission (MTC) and pursues implementation of the Bay Area's Smart Growth Vision as expressed in the Smart Growth Preamble and Policies and the Smart Growth Strategy / Regional Livability Footprint Project. The JPC meets monthly and all meetings are open to the public.

**Dates of JPC meeting and discussion topic(s):**

March 25, 2005 – Status report on the Ozone Strategy

**ADVISORY COMMITTEES**

**Advisory Council**

The Air District Advisory Council and its various committees advise and consult with the Board of Directors and the Air Pollution Control Officer (APCO). Throughout the planning process, Air District staff has briefed the Advisory Council as a whole as well as the Air Quality Planning, Technical, Stationary Source and Public Outreach Committees to receive comments from them about the 2005 Ozone Strategy. All Advisory Council meetings are open to the public.

**Dates of Advisory Council meetings and discussion topic(s):**

March 12, 2003 – Ozone planning schedule and modeling presentation

November 12, 2003 - Status report on EPA proposed finding of attainment; photochemical modeling; public involvement; control measure evaluations

April 6, 2004 - Preliminary draft control measure descriptions

June 15, 2004 - Draft control measure descriptions

August 3, 2004 - Draft control measure descriptions

August 4, 2004 - Draft control measure descriptions

September 8, 2004 - Draft control measure descriptions

### **Modeling Advisory Committee**

The Air District has hired consultants to conduct photochemical modeling and to analyze meteorology and emissions on high ozone days in the Bay Area in order to better understand ozone formation within the region and transport of emissions between the Bay Area and downwind neighbors. To oversee the work that consultants are doing and to give feedback on modeling issues and protocol, the Air District has convened a technical working group called the Modeling Advisory Committee (MAC). The MAC meets bi-monthly and its membership includes staff from the Air District, ARB, other air districts, MTC, members of the scientific community, business and environmental representatives, and other interested parties with technical expertise in ozone modeling.

### **Dates of MAC meetings:**

May 23, 2002  
July 11, 2002  
September 11, 2002  
October 30, 2002  
December 18, 2002  
January 21, 2003  
February 25, 2003  
March 25, 2003  
April 29, 2003  
June 10, 2003  
August 14, 2003  
September 16, 2003  
October 21, 2003  
October 27, 2003  
December 4, 2003  
February 10, 2004  
March 16, 2004  
June 3, 2004  
July 20, 2004  
September 15, 2004  
November 17, 2004  
January 11, 2005  
March 22, 2005  
May 24, 2005  
August 9, 2005

### **CAPCOA ENGINEERING MANAGERS RULE DEVELOPMENT SUBCOMMITTEE MEETINGS**

In 2003, the Rule Development Managers subcommittee of the California Air Pollution Control Officers Association (CAPCOA) Engineering Managers identified a list of all feasible measures to assist local Air Districts in ozone strategy development. In August 2003, the subcommittee identified 27 source categories and identified the most stringent existing rule applicable to the source category. Bay Area Air District staff participated in the discussions and analyzed each measure for applicability and feasibility for the Bay Area Ozone Strategy. Of the 27, the Bay Area Air District has committed to control measure development in eight of the source categories, and six additional source categories were identified for further study. Bay Area rules were defined as the most stringent available for five source categories and equivalent to the most stringent



available for the remaining categories. This process is described in more detail in Appendix A, Control Measure Review and Evaluation Process.

**Dates of meetings:**

January 14, 2003  
March 4, 2003  
August 20, 2003  
September 2, 2003

**ARB RULE COMPARISON WORKING GROUP**

In 2003 and early 2004, ARB convened a workgroup of staff from the Bay Area Air Quality Management District, Sacramento Metro Air Quality Management District, San Joaquin Valley Unified Air Pollution Control District, the Yolo-Solano Air Quality Management District and ARB to participate in a rule comparison project. The project compared the relative stringency of district rules regulating 11 source categories and compared each district rules to the most stringent in California. This workgroup first met in August 2003, and most work was coordinated through conference calls and email correspondence. The project concluded in February 2004 with the development of a report including a rule comparison summary table. For the Bay Area Air District, emission reduction opportunities were identified for five source categories, and further study is proposed for five additional source categories. This process is described in more detail in Appendix A, Control Measure Review and Evaluation Process.

**Dates of meetings:**

August 27, 2003  
October 24, 2003  
November 5, 2003  
February 3, 2004  
February 17, 2004

**INTERAGENCY CONSULTATIONS**

In February 2004, the Sacramento Metropolitan AQMD provided the Bay Area Air District with a list of control measures suggestions from TIAX Consultants, developed at the request of the Sacramento District. TIAX developed a list of 30 stationary, mobile and transportation control measure suggestions based on the inventory for the Central California Ozone Study, in addition to 19 measures under state or federal authority. Some suggestions were incorporated into existing measures or helped to make proposed control measures more stringent. In July 2004, the Bay Area Air District submitted a summary of the control measure evaluations to the Sacramento District and conducted a follow-up meeting to discuss the analysis.

The Bay Area Air District has continued to communicate with neighboring air districts about the Bay Area's ozone planning process. In October 2004, the Bay Area Air District held a consultation meeting inviting comments from the following neighboring air districts on the draft control measures proposed for the Ozone Strategy, as required by Transport Mitigation regulations:

- Northern Sonoma County Air Pollution Control District
- Monterey Bay Unified Air Pollution Control District
- Yolo-Solano Air Quality Management District
- Sacramento Metropolitan Air Quality Management District
- San Joaquin Valley Unified Air Pollution Control District
- Placer County Air Pollution Control District
- El Dorado County Air Quality Management District
- Feather River Air Quality Management District
- Amador County Air Pollution Control District
- Calaveras County Air Pollution Control District
- Northern Sierra Air Quality Management District
- Tuolumne County Air Pollution Control District
- Mariposa County Air Pollution Control District

Comments on the draft control measures proposed for the Ozone Strategy were received from the Sacramento Metropolitan Air Quality Management District, San Joaquin Valley Unified Air Pollution Control District, Monterey Bay Unified Air Pollution Control District, and Northern Sierra Air Quality Management District.

**Dates of meetings:**

February 18, 2004

July 29, 2004

October 7, 2004

**PUBLIC WORKSHOPS**

**CEQA Scoping Meeting**

Pursuant to the California Environmental Quality Act (CEQA), the Air District is preparing a Draft Environmental Impact Report (DEIR) to evaluate potential environmental impacts of the Bay Area 2005 Ozone Strategy. The Air District held a public scoping meeting in April 2004 to discuss the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in the DEIR. The CEQA scoping meeting was open to the public.

Tuesday, April 20, 2004, 9:00 a.m. – 11:00 a.m.

Joseph P. Bort MetroCenter Auditorium, 101 8th Street, Oakland, CA

Agenda topics:

- CEQA and the Purpose of Scoping Meeting
- Ozone Strategy Overview
- Proposed Control Measure Descriptions
  - Preliminary draft stationary, mobile and other source measures
  - Preliminary draft transportation control measures
- Scope of Environmental Impact Report
  - Potential Environmental Impacts and Mitigation Measures

Meeting materials:

- Control Measure Descriptions
  - Preliminary draft stationary, mobile and other source measures
  - Preliminary draft transportation control measures

## **MTC TCM Workshop**

In September 2003, MTC held a Transportation Control Measure (TCM) Workshop to provide Ozone Working Group participants and other interested parties with an opportunity to review MTC's progress on TCM evaluation and to suggest new transportation strategies for consideration. The TCM Workshop was open to the public.

Tuesday, September 30, 2003, 9:00 a.m. – 11:00 a.m.

Joseph P. Bort MetroCenter Auditorium, 101 8th Street, Oakland, CA

Agenda topics:

- Types of TCMs in current federal and state ozone plans
  - Further Study Measures in the 2001 Ozone Attainment Plan
- Suggestions for new TCMs from the public to date
- Background on calculating emission reductions from TCMs
- Preliminary evaluation results for selected measures
  - Emission reductions
  - Cost effectiveness
- Other TCM suggestions

## **FUTURE OUTREACH**

The Air District will be conducting outreach to present, obtain input and receive public comment on the Draft 2005 Ozone Strategy and Draft EIR. Notices of meeting times and locations will be circulated to interested parties and posted on the Air District website.

After the close of the public comment period, staff will respond to comments, prepare the Proposed Final Bay Area 2005 Ozone Strategy and Proposed Final EIR, and release the documents for public review. The Air District Board of Directors will hold a public hearing to consider adoption of the Final 2005 Ozone Strategy and Final EIR. Members of the public will be notified of these meetings and encouraged to attend and provide comment.

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## **APPENDIX B - CONTROL MEASURE REVIEW AND EVALUATION PROCESS**

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### **INTRODUCTION**

To satisfy all feasible measures requirements in developing the control strategy for the 2005 Ozone Strategy, the Air District investigated a wide range of potential control measure ideas from many sources. Air District staff sought ideas for new sources to control, as well as ways to strengthen existing rules and programs. To identify potential control measures, the Air District:

- Participated with staff from ARB, Yolo-Solano APCD, Sacramento Metropolitan AQMD, and San Joaquin Valley Unified APCD on a rule comparison project.
- Participated in discussions as part of the Rule Development Managers subcommittee to the CAPCOA Engineering Managers Committee to develop a statewide all feasible measures list.
- Reviewed suggestions developed by consultants for Sacramento Metropolitan AQMD.
- Investigated rules in other districts throughout California.
- Investigated control measures and programs from plans in other districts and agencies, both within and outside the state.
- Considered comments and suggestions from the Ozone Working Group.
- Considered comments and suggestions from community meetings.
- Considered comments and suggestions Air District Board members, Advisory Council members and staff.

### **RULE COMPARISON PROCESSES**

In 2003 and early 2004, Air District staff participated in a rule comparison project with Robert Fletcher, Chief of the Planning and Technical Support Division at ARB, Lawrence Green, APCO of Yolo-Solano APCD, and staff from ARB, Sacramento Metropolitan AQMD and San Joaquin Valley Unified APCD. The project compared the relative stringency of district rules regulating 11 source categories, and compared each district's rules to the most stringent in California. The report on the results noted, "Rule comparisons can be very difficult to accomplish. While there are basic elements to regulating any industry, specific industrial facilities and inventories differ between districts, rules are developed and updated on different timelines, and guidance from ARB and EPA differ over time. Moreover, individual district SIP needs and commitments have dictated different schedules for rule development." In spite of the difficulties, the project did identify opportunities for realizing additional emissions reductions for each of the air districts. For the Bay Area Air District, emission reduction opportunities were identified for the following source categories:

- Boilers
- Turbines
- Auto Refinishing
- Organic Liquid Storage
- Graphic Arts Operations

The control strategy in Section 2 of the 2005 Ozone Strategy includes a control measure for each of these source categories.

In addition, further study measures are included for the following source categories:

- Stationary Internal Combustion Engines
- Adhesives
- Solvent Cleaning
- Degreasing
- Valves and Flanges

An investigation of the Can and Coil Coatings source category did not reveal the opportunity for emissions reductions in any district.

Also during 2003, the Rule Development Managers subcommittee of the CAPCOA Engineering Managers Committee identified a list of all feasible measures to assist districts in ozone strategy development. Air District staff participated in the discussions and analyzed each measure for applicability and feasibility for the 2005 Ozone Strategy. The CAPCOA subcommittee identified 27 source categories and identified the most stringent existing rule applicable to the source category. Of the 27, the Bay Area has committed to control measure development in the following source categories:

- Wood Products Coating
- Polyester Resin Operations
- High Emitting Spray Booths
- Large Water Heaters and Small Boilers
- Automotive Refinish Coatings
- Graphic Arts Operations
- Boilers, Steam Generators and Process Heaters
- Organic Liquid Storage Tanks

In addition, the following source categories were identified for further study:

- Fugitive Leaks and Releases from Petroleum Refineries and Chemical Plants
- Food Product Manufacturing and Processing
- Commercial Charbroilers
- Architectural Coatings
- Solvent Cleaning and Degreasing
- Adhesives and Sealants

The remaining source categories – hydrogen plant processing vents, organic liquid transfer operations, soil decontamination, solid waste disposal sites, aerospace coating, residential water heaters, wood flat stock coating, general solvent usage, glass coating, lime kilns, metal parts coating, and gasoline dispensing – are not recommended for control measures, either because existing Bay Area rules are already the most stringent available or because the existing inventory in the Bay Area or potential reductions are nonexistent or very small (de minimis).

Staff also analyzed measures suggested for the Bay Area by TIAX Consultants, developed at the request of the Sacramento Metropolitan AQMD. TIAX developed a list of 30 stationary, mobile and transportation control measure suggestions based on the inventory for the Central California Ozone Study, in addition to 19 measures under state

or federal authority. Some of the 30 suggested measures analyzed contained more than one suggestion. Some suggestions were duplicative of others, some were already being considered as control measures and some were rejected due to a de minimis emission reduction potential. However, some suggestions were incorporated into measures proposed in the 2005 Ozone Strategy or helped to make proposed control measures more stringent. The following measures suggested by TIAX have been incorporated into proposed control measures in the 2005 Ozone Strategy:

- Refinery Wastewater Systems
- Flares
- Organic Liquid Storage
- Graphic Arts Operations
- Gas Turbines
- Boilers, Steam Generators and Process Heaters
- Indirect Source Control Incentive Measure for Construction Equipment
- Gasoline Lawnmower Replacement
- Energy Conservation
- Airport Ground Support Equipment
- Grant Programs for Vehicle Fleets
- Heavy Diesel Engine Retrofits
- Large Water Heaters and Small Boilers
- Spare the Air Program Enhancements
- Community Design Program
- Construction Equipment Idling Ordinance
- Work Trip Reduction Program

In addition, the following measures suggested by TIAX are incorporated into Further Study Measures in the 2005 Ozone Strategy:

- NO<sub>x</sub> from Petroleum Refinery Boilers, Steam Generators and Process Heaters
- Adhesives and Sealants (as part of the CARB rule comparison)
- Solvent Cleaning and Degreasing (as part of the CARB rule comparison)
- Architectural Coating Clean-up and Surface Preparation
- Indirect Source Control for Operational Impacts
- Agricultural Pump Engines
- Free Gas Caps
- Catalytic Converter Replacement Programs

The remaining suggestions from TIAX regarding semiconductor manufacturing, NO<sub>x</sub> from electric utility boilers, incentives to speed up replacement of portable gasoline cans with CARB certified containers, clean air labeling, private fleet requirements, oil and gas production fugitives, and asphalt concrete plants, produced de minimis emissions reductions, were not found to be cost effective or are not within the Bay Area's legal jurisdiction.

## **OTHER SOURCES OF CONTROL MEASURE IDEAS**

In addition to the rule comparison processes, the Air District examined potential control measures from other sources. Efforts included:

- A January 23, 2003 request for control measure suggestions posted on the Air District website and mailed to over 1000 individuals, organizations, agencies and businesses who had previously expressed interest in air quality planning.
- Formation of the Ozone Working Group to facilitate public participation in the ozone planning process. The OWG has met roughly bimonthly since March 2003. Staff presents updates, answers questions, and solicits input. Control measure evaluations and descriptions have been topics at most OWG meetings.
- Staff review of other California air district plans and plan support documentation, including the draft and final 2003 South Coast Air Quality Management Plan, the San Joaquin Valley Unified APCD Amended 2002 and 2005 Ozone Rate of Progress Plan, and draft control measure suggestions prepared by consultants for the Sacramento Metropolitan AQMD.
- Staff review of rules and regulations from other California districts, particularly the South Coast AQMD.
- Review of air quality plans from Houston, TX and Atlanta, GA.
- Review of control measure suggestions made for the 1999 and 2001 San Francisco Bay Area Ozone Attainment Plans (for the national one-hour ozone standard) and for the 2000 Clean Air Plan.
- Review of suggestions submitted by:
  - Cities, counties and other public agencies
  - Environmental and community groups
  - Business and industry groups
- Consideration of comments and suggestions from six community meetings held in September 2003.
- Review of suggestions from Air District Board members, Advisory Council members, and staff.

## **CONTROL MEASURE EVALUATIONS**

Staff developed a database for control measure suggestions, and evaluated each suggestion made. In evaluating control measure suggestions, staff consider a variety of factors, including:

- Technological feasibility of proposed controls;
- Emission inventory of the source category and total likely emission reductions from proposed controls;
- Cost-effectiveness in dollars per ton of emissions reduced;
- Public acceptability, including interests and concerns of community members;
- Whether the emission reductions are real, quantifiable, permanent, enforceable, and surplus;
- Whether reduction is of volatile organic compounds or nitrogen oxides or both;
- Rate of emission reduction;
- Any potential adverse environmental impacts;
- Socioeconomic impacts

In some cases, not all of these elements could be ascertained from readily available information. For example, emissions data for some source categories or the emissions reduction potential of some control measure may be uncertain. In these cases, further study may be warranted if the other aspects of a suggested control, such as public acceptability and adverse environmental impacts appear positive. These measures are discussed under Further Study Measures.

Of the 390 control measure suggestions considered, not including the transportation control measure suggestions evaluated by MTC, Air District staff made preliminary determinations and presented them for discussion at three Ozone Working Group meetings on January 6, 2004, January 20, 2004, and March 23, 2004. The following table represents the findings of the evaluations:

<b>Summary of Air District Evaluations of Potential Control Measures for the 2005 Ozone Strategy</b>		
<b>Category</b>	<b>Category Definition</b>	<b>Number</b>
Potentially Viable Measures	Measures that meet the evaluation criteria and are recommended for the control strategy.	45
Potentially Viable Measures (Transport)	Measures that primarily control NO <sub>x</sub> and may have limited benefit for the Bay Area, but are included to reduce transport to other regions.	12
Measures Already Implemented	Measures that already have been adopted as District regulations or have been implemented through regional or State programs.	52
Measures Needing Further Study	Measures that meet some evaluation criteria, but that require further analysis to determine whether they are potentially viable.	36
Measures Needing Funding	Measures that meet some evaluation criteria, but that require funding in order to be implemented. These are mostly incentive measures, primarily for mobile sources	18
Measures Needing Legislation	Measures that meet some evaluation criteria, but that require State or federal legislation in order to be implemented.	9
Measures That Are Not Technically Feasible	Measures for which the necessary technology is not currently available or foreseen in the reasonable future.	7
Measure That Are Not Enforceable	Measures for which there is no clear enforcement mechanism.	5
Measures That Are Not Cost Effective	Measures that meet some evaluation criteria, but for which the emission reductions are so small and/or the implementation costs are so high that the measure would not likely be cost effective.	14
Measures With Negligible Emission Reductions or No Bay Area Sources	Measures with extremely low or no emissions reductions or for which no applicable facilities exist in the Bay Area.	86
Measures Under Jurisdiction of Other Agencies	Measures for which other federal, State or local agencies have regulatory authority. These are mostly measures related to mobile sources and consumer products.	93

Note: Measures do not total 390 because they do not include all of the measures submitted by TIAX Consultants on behalf of the Sacramento AQMD, as discussed above. Those measures were received on Feb. 18, 2004, and were evaluated during Spring 2004.



Finally, based on input from the Ozone Working Group and members of the public, and further evaluation by Air District staff, the potential control measures were distilled down to the measures identified in the control strategy. Duplicate and similar suggestions were combined into control measures for applicable source categories. Control measure ideas requiring additional analysis are proposed as further study measures.