3.3 Air Quality and Global Climate Change

This section describes the potential effects on state and regional air quality under the No Project Alternative and proposed HST Alignment Alternatives, using the existing and No Project conditions for comparison. Included in this section is an overview of the air basins studied and a description of the air pollutants and conditions of these air basins.

Air pollution is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. Eight air pollutants have been identified by the EPA as being of concern nationwide: carbon monoxide (CO), sulfur oxides (SO_X), hydrocarbons (HC), oxides of nitrogen (NO_X), ozone (O_3), particulate matter 10 microns in diameter or less (PM10), particulate matter 2.5 microns in diameter or less (PM2.5), and lead. Except for HC (also referred to as total organic gases [TOG]), all of these pollutants (NO_X in the form of nitrogen dioxide [NO_2] and SO_X in the form of sulfur dioxide [SO_2]) are collectively referred to as criteria pollutants. Criteria pollutants are pollutants that have standards.

Along with criteria pollutants, pollutants that are considered greenhouse gases (GHGs) are also of concern. GHGs are gases that trap heat in the atmosphere. GHGs include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), halogenated fluorocarbons (HCFCs), O_3, perfluorinated carbons (PFCs), and hydrofluorocarbons (HFCsCO_2 and N_2O are the two GHGs released in greatest quantities from mobile sources burning gasoline and diesel fuel). Based on a recent FHWA memo from their headquarters to their division offices, the transportation sector directly accounted for approximately 33% of U.S. CO_2 emissions and about 28% of total U.S. greenhouse emissions (American Association of State Highway and Transportation Officials 2008) in 2005. Transportation is the fastest-growing source of U.S. GHGs and the largest end-use source of CO_2, which is the most prevalent GHG.

GHGs are necessary to life as we know it because they keep the planet's surface warmer than it otherwise would be. This is referred to as the greenhouse effect. As concentrations of GHGs are increasing, however, the Earth's temperature is increasing. Many scientists believe that recently recorded increases in the earth's average temperature are the result of increases in concentrations of GHGs. According to the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA) data, the Earth's average surface temperature has increased by about 1.2 to 1.4ºF in the last 100 years. Eleven of the last twelve years rank among the twelve warmest years on record (since 1850), with the warmest two years being 1998 and 2005. Most of the warming in recent decades is very likely the result of human activities. Other aspects of the climate are also changing, such as rainfall patterns, snow and ice cover, and sea level. These changes are referred to as global climate change.

3.3.1 Regulatory Requirements and Methods of Evaluation

A. REGULATORY REQUIREMENTS

Federal Regulations

Air quality is regulated at the federal level under the CAA of 1970 and the Final Conformity Rule (40 CFR Parts 51 and 93). The Clean Air Act Amendments of 1990 (Public Law [PL] 101–549, November 15, 1990) direct the EPA to implement strong environmental policies and regulations that will ensure better air quality. According to Title I, Section 101, Paragraph F of the Clean Air Act Amendments (42 USC § 7401 *et seq.*): "No federal agency may approve, accept, or fund any transportation plan, program, or project unless such plan, program or project has been found to conform to any applicable SIP in effect under this act." Title 1, Section 101, Paragraph F of the amendments, amends Section 176(c) of the CAA to define *conformity* as follows: conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the National

Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of such standards; such activities will not cause any of the following occurrences.

- Cause or contribute to any new violation of any NAAQS in any area.
- Increase the frequency or severity of any existing violation of any NAAQS in any area.
- Delay timely attainment of any NAAQS or any required interim emissions reductions or other milestones in any area. (42 USC § 7506[c][1].)

Federal Climate Change Policy

According to the EPA, "the United States government has established a comprehensive policy to address climate change" that includes slowing the growth of emissions; strengthening science, technology, and institutions; and enhancing international cooperation. To implement this policy, "the Federal government is using voluntary and incentive-based programs to reduce emissions and has established programs to promote climate technology and science." The federal government's goal is to reduce the GHG intensity (a measurement of GHG emissions per unit of economic activity) of the American economy by 18% over the 10-year period from 2002 to 2012. In addition, the EPA administers multiple programs that encourage voluntary GHG reductions, including "ENERGY STAR," "Climate Leaders," and methane voluntary programs. However, at this time there are no adopted federal plans, policies, regulations, or laws directly regulating GHG emissions.

State Regulations

Air quality is regulated at the state level by the California Air Resources Board (CARB), the agency designated to prepare the SIP required by the CAA under the California Clean Air Act of 1988 (Assembly Bill [AB] 2595) and other provisions of the California Health and Safety Code (Health and Safety Code § 39000 *et seq.*). California's Clean Air Act (CCAA) requires all districts designated as nonattainment for any pollutant to "adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under their jurisdiction."

The responsibility for controlling air pollution in California is shared by 35 local or regional air pollution control and air quality management districts, CARB, and EPA. The districts issue permits for industrial pollutant sources and adopt air quality management plans and rules. CARB establishes the state ambient air quality standards, adopts and enforces emission standards for mobile sources, adopts standards and suggested control measures for toxic air contaminants, provides technical support to the districts, oversees district compliance, approves local air quality plans, and prepares and submits the SIP to EPA. EPA establishes NAAQS, sets emission standards for certain mobile sources (airplanes and locomotives), oversees the state air programs, and reviews and approves the SIP. CARB inventories sources of air pollution in California's air basins and is required to update the inventory triennially, starting in 1998 (Health and Safety Code §§ 39607 and 30607.3). CARB also identifies air basins that are affected by transported air pollution (Health and Safety Code § 39610; 17 C.C.R. Part 70500).

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this executive order is to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by the 2020 and 3) 80% below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

Climate change and GHG reduction is also a concern at the federal level; however, at this time, no legislation or regulations have been enacted specifically addressing GHG emissions reductions and climate change.

Assembly Bill 32, the California Climate Solutions Act of 2006 (Health and Safety Code § 38500 et seq.)

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006, into law. AB 32 was intended to effectively end the scientific debate in California over the existence and consequences of global warming. In order to be effective, measures to reduce GHG will have to occur in connection with similar reductions by other states and countries. Through AB 32, California is attempting to take on a leadership role in the abatement of climate change and offer a model for other states and countries to reduce GHG emissions. In general, AB 32 directs CARB to do the following:

- On or before June 30, 2007, publicly make available a list of discrete early action GHG emission reduction measures that can be implemented prior to the adoption of the statewide GHG limit and the measures required to achieve compliance with the statewide limit;
- By January 1, 2008, determine the statewide levels of GHG emissions in 1990, and adopt a statewide GHG emissions limit that is equivalent to the 1990 level (an approximately 25% reduction in existing statewide GHG emissions);
- On or before January 1, 2010, adopt regulations to implement the early action GHG emission reduction measures;
- On or before January 1, 2011, adopt quantifiable, verifiable, and enforceable emission reduction measures by regulation that will achieve the statewide GHG emissions limit by 2020, to become operative on January 1, 2012, at the latest. The emission reduction measures may include direct emission reduction measures, alternative compliance mechanisms, and potential monetary and non-monetary incentives that reduce GHG emissions from any sources or categories of sources as CARB finds necessary to achieve the statewide GHG emissions limit; and
- Monitor compliance with and enforce any emission reduction measure adopted pursuant to AB 32.

AB 32 also takes into account the relative contribution of each source or source category to protect adverse impacts on small businesses and others by requiring CARB to recommend a minimum threshold of GHG emissions below which emissions reduction requirements would not apply. AB 32 also allows the governor to adjust the deadlines mentioned above for individual regulations or the entire state to the earliest feasible date in the event of extraordinary circumstances, catastrophic events, or threat of significant economic harm.

Governor's Low Carbon Fuel Standard (Executive Order #S-01-07)

Executive Order #S-01-07 establishes a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10% by 2020 through establishment of a Low Carbon Fuel Standard. The Low Carbon Fuel Standard shall be incorporated into the State Alternative Fuels Plan required by AB 1007 and is one of the proposed discrete early action GHG reduction measures identified by CARB pursuant to AB 32.

Senate Bill 97 (SB 97)

Senate Bill 97 was signed by the governor on August 24, 2007. This bill provides that in an environmental impact report, negative declaration, mitigated negative declaration, or other document required by CEQA for either transportation projects funded under the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006, or for projects funded under the Disaster Preparedness and Flood Prevention Bond Act of 2006, the failure to analyze adequately the effects of

GHG emissions otherwise required to be reduced pursuant to regulations adopted under the Global Warming Solutions Act of 2006 does not create a cause of action for a violation of CEQA. The bill provides that this provision shall apply retroactively for any of the above documents that are not final and shall be repealed on January 1, 2010.

The bill requires the Office of Planning and Research (OPR), by July 1, 2009, to prepare, develop, and transmit to the resources agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, including, but not limited to, effects associated with transportation or energy consumption. The resources agency would be required to certify and adopt those guidelines by January 1, 2010. The OPR is required to periodically update the guidelines to incorporate new information or criteria established by the CARB pursuant to the California Global Warming Solutions Act of 2006.

Climate Action Program at Caltrans

In December 2006, the California Department of Transportation, Business, Transportation, and Housing Agency, issued a Climate Action Program. The goal of the Climate Action Program is to promote clean and energy efficient transportation, and provide guidance for mainstreaming energy and climate change issues into business operations. The overall approach to lower fuel consumption and CO_2 from transportation is twofold: (1) reduce congestion and improve efficiency of transportation systems through smart land use, operational improvements, and Intelligent Transportation Systems; and (2) institutionalize energy efficiency and GHG emission reduction measures and technology into planning, project development, operations, and maintenance of transportation facilities, fleets, buildings, and equipment.

The reasoning underlying the Climate Action Program is the conclusion that "the most effective approach to addressing GHG reduction, in the short-to-medium term, is strong technology policy and market mechanisms to encourage innovations. Rapid development and availability of alternative fuels and vehicles, increased efficiency in new cars and trucks (light and heavy duty), and super clean fuels are the most direct approach to reducing GHG emissions from motor vehicles (emission performance standards and fuel or carbon performance standards)." Caltrans asserts that the state must maintain a consistent GHG reduction policy across all agencies to create a coordinated climate change program.

Executive Order #S-3-05

Executive Order #S-3-05, signed by Governor Arnold Schwarzenegger on June 1, 2005, calls for a reduction in GHG emissions to 1990 levels by 2020 and for an 80% reduction in GHG emissions to below 1990 levels by 2050. Executive Order #S-3-05 also calls for the California Environmental Protection Agency (CalEPA) to prepare biennial science reports on the potential impact of continued global warming on certain sectors of the California economy. The first of these reports, *Scenarios of Climate Change in California: An Overview* (Climate Scenarios report), was published in February 2006 (California Climate Change Center 2006).

National and State Ambient Air Quality Standards

As required by the CAA Amendments of 1970 (PL 91-064, December 31, 1970) and the CAA Amendment of 1977 (PL 95-95, August 7, 1977), EPA has established NAAQS for the following air pollutants: CO, O_3, NO_2, PM10, SO_X, and lead. CARB has also established standards for these pollutants. Recent legislation requires CARB to develop and adopt regulations to reduce GHGs (AB 1493, 2002). The federal and state governments have both adopted health-based standards for pollutants. For some pollutants, the national and state standards are very similar; for other pollutants, the state standards are more stringent. The differences in the standards are generally the result of the different health effect studies considered during the standard-setting process and how these studies were interpreted.

Table 3.3-1 lists the federal and state standards. The federal primary standards are intended to protect the public health with an adequate margin of safety. The federal secondary standards are intended to protect the nation's welfare and account for air-pollutant impacts on soil, water, visibility, vegetation, and other aspects of the general welfare. Areas that violate these standards are designated nonattainment areas. Areas that once violated the standards but now meet the standards are classified as maintenance areas. Classification of each area under the federal standards is done by EPA based on state recommendations and after an extensive review of monitored data. Classification under the state standards is done by CARB.

Table 3.3-1
State and National Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]		Federal Standards[b]		
		Concentration[c]	**Method[d]**	**Primary[c,e]**	**Secondary[c,f,g]**	**Method[g]**
O_3	1 hour	0.09 ppm (180 µg/m^3)	Ultraviolet photometry	N/A	Same as primary standard	Ultraviolet photometry
	8 hours	0.070 ppm (137 µg/m^3)		0.08 ppm (157 µg/m^3)[h]		
PM10	24 hours	50 µg/m^3	Gravimetric or beta attenuation	150 µg/m^3	Same as primary standard	Inertial separation and gravimetric analysis
	Annual arithmetic mean	20 µg/m^3		N/A		
PM2.5	24 hours	No separate state standard	Gravimetric or beta attenuation	35 µg/m^3	Same as primary standard	Inertial separation and gravimetric analysis
	Annual arithmetic mean	12 µg/m^3		15 µg/m^3		
CO	8 hours	9.0 ppm (10 mg/m^3)	NDIR	9 ppm (10 mg/m^3)	None	NDIR
	1 hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 hour (Lake Tahoe)	6 ppm (7 mg/m^3)		N/A		
NO_2	Annual arithmetic mean	N/A	Gas phase chemilum-incescence	0.053 ppm (100 µg/m^3)	Same as primary standard	Gas phase chemilum-incescence
	1 hour	0.25 ppm (470 µg/m^3)		N/A		
Lead[i]	30 day average	1.5 µg/m^3	Atomic absorption	N/A	N/A	High volume sampler and atomic absorption
	Calendar quarter	N/A		1.5 µg/m^3	Same as primary standard	
SO_2	Annual arithmetic mean	N/A	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	N/A	Spectro-photometry (Pararosoani-line method)
	24 hours	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	N/A	
	3 hours	N/A		N/A	0.5 ppm (1300 µg/m^3)	
	1 hour	0.25 ppm (655 µg/m^3)		N/A	N/A	
Visibility reducing particles	8 hours (10 a.m. to 6 p.m., Pacific Standard Time)	In sufficient amount to produce an extinction coefficient of 0.23 per km-visibility of 10 mi (16 km) or more (0.07–30 mi [.011–48 km] or more for Lake Tahoe) due to particles when the relative humidity is less than 70%. Method: Beta attenuation and transmittance through filter tape.		No federal standards		

Pollutant	Averaging Time	California Standards[a]		Federal Standards[b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f,g]	Method[g]
Sulfates	24 hour	25 µg/m³				
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m³)	Ultraviolet fluorescence			
Vinyl Chloride[h]	24 hour	0.01 ppm (26 µg/m³)	Gas chroma-tography			

µg/m³ = micrograms per cubic meter.
mg/m³ = milligrams per cubic meter.
N/A = not available.
NDIR = non-dispersive infrared photometry.
ppm = parts per million.

[a] California standards for O_3, CO (except Lake Tahoe), SO_2 (1 and 24 hour), NO_2, suspended particulate matter-PM10, PM2.5, and visibility reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 CCR.

[b] National standards (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For PM2.5, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standards.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C (77°F) and a reference pressure of 760 mm (30 in) of mercury. Most measurements of air quality are to be corrected to a reference temperature of 25°C (77°F) and reference pressure measurements of 760 mm (30 in) of mercury (1,013.2 millibar [1 atmosphere]); ppm in this table refers to ppm volume, or micromoles of pollutant per mole of gas.

[d] Any equivalent procedure that can be shown to the satisfaction of CARB to give equivalent results at or near the level of the air quality standard may be used.

[e] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[f] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[g] Reference method as described by EPA. An *equivalent method* of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by EPA.

[h] CARB has identified lead and vinyl chloride as *toxic air contaminants* with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: California Air Resources Board 2006.

B. METHOD OF EVALUATION OF IMPACTS

Pollutants

Pollutants that can be traced principally to transportation sources and are thus relevant to the evaluation of the project alternatives are CO, O_3 precursors (NO_X and TOG), PM10, PM2.5, and CO_2. Because high CO levels are mostly the result of congested traffic conditions combined with adverse meteorological conditions, high CO concentrations generally occur within 300 ft (91 m) to 600 ft (183 m) of heavily traveled roadways. Concentrations of CO on a regional and localized or microscale basis can consequently be predicted appropriately.

As discussed below in the affected environment section, TOG and NO_X emissions from mobile sources are of concern primarily because of their role as precursors in the formation of O_3 and particulate matter. O_3 is formed through a series of reactions that occur in the atmosphere in the presence of sunlight over a period of hours. Because the reactions are slow and occur as the pollutants are diffusing downwind, elevated O_3 levels are often found many miles from sources of the precursor pollutants. The impacts of TOG and NO_X emissions are, therefore, generally examined on a regional level. CO_2 emission burdens, because of their global impact, are currently expressed only on the statewide level by CARB and EPA. In this analysis, therefore, CO_2 impacts are discussed on the statewide level. It is appropriate to predict concentrations of PM10 and PM2.5 on a regional and localized basis.

Pollutant Burdens

The air quality analysis for this Program EIR/EIS focuses on the potential statewide, regional, and localized impacts on air quality. The regional pollutant burdens were estimated based on changes that would occur, including the following, under each of the alternatives.

- Highway VMT.
- Number of plane operations.
- Number of train movements (proposed HST and existing LOSSAN system).
- Power requirements for the proposed HST system.

Localized air quality impacts were estimated based on level of service information and volume to capacity ratios for intercity freeway segments.

A comparison of the 2005 conditions to the 2030 No Project conditions illustrates the expected trends in air quality. Currently, CARB has not released 2030 emission inventory information. For the purposes of this analysis, emission burdens were projected to 2030, based on CARB emission burden data from 2005–2020. The potential impacts from proposed alternatives were then added to the 2030 conditions. Changes in VMT for on-road mobile sources (vehicles) and for off-road mobile sources (number of plane operations and train movements) were estimated for each of the alternatives. Changes in emissions of stationary sources (electrical power generators) were also assessed.

Highway VMT: On-road pollutant burdens were calculated as a ratio of baseline VMT to estimated VMT changes under each alternative. Although vehicular speeds affect emission rates, the potential basinwide speed changes were considered too small to affect overall emission estimates; thus, changes in future on-road mobile source emission burdens for the project were based solely on VMT changes and did not consider speed.

Number of Plane Operations: The FAA's Emission and Dispersion Modeling System (EDMS) Version 6 is used to estimate airplane emissions. The EDMS estimates the emissions generated from a specified number of landing and take-off (LTO) cycles. Along with the emissions from the planes themselves, emissions generated from associated ground maintenance requirements are also included. Average plane emissions are calculated based on a typical 737 aircraft. The pollutant burdens generated by the LTOs under each alternative were added to CARB's off-road mobile sources (planes) emission budgets for each air basin to determine the potential impacts of the alternatives.

To determine the number of plane trips potentially replaced from the No Project Alternative daily by the HST Alignment Alternatives, the following calculations were performed using a representative HST Alignment Alternatives[1]. The number of daily air trips that could be removed by the proposed HST system (77,682) was divided by an average number of passengers per flight (101.25). The resulting number (38.50) represents the number of flights per day that could potentially be removed by the proposed HST system. (See Chapter 2, "Alternatives," for definition of system alternatives.)

[1] Based on revised low-end ridership forecast developed by Cambridge Systematics June 11, 2007. Also refer to Chapter 2, "Alternatives," and Section 2.3.3.C, Travel Demand and Ridership Forecasts.

77,682 trips = 77,682 flying passengers (1 trip = 1 takeoff and 1 landing)

1 flight = 101.25 passengers (135 seats X 75% load factor, as per Table 3.2-3 in the *System Definition Report,* [Parsons Brinckerhoff 2002])

Therefore,

(77,682 passengers/day) / (101.25 passengers/flight) = 38.5 flights/day

Number of Train Movements: It has been determined that there will be no increase in feeder train service to the proposed HST service; therefore, there are expected to be no changes in train movements due to the HST Alignment Alternatives.

Power Requirements: In addition to the on-road and off-road emission burdens, emissions resulting from the power generated to run the HST system as a whole were estimated and included in the emission burden of the HST Alignment Alternatives. Emission estimates are based on British thermal unit (BTU) requirements calculated in the energy analysis for the project (Section 3.5). BTU emission factors are based on energy usage information from the *California Energy Demand 2006–2016, Staff Energy Demand Forecast* (California Energy Commission, Revised September 2005); California Air Resources Board , Emission Inventory Data, *Conserving Energy and Preserving the Environment: The Role of Public Transportation* (Shapiro et al. 2002); and the *Transportation Energy Data Book* (U.S. Department of Energy 2006).

Pollutant burdens generated by on-road (vehicles), off-road (planes, trains), and stationary (electric power generation) sources were combined and compared to the No Project Alternative and to the HST Alignment Alternatives. The HST system will be powered by the state's electricity grid. Because the grid will supply the power, and no dedicated generating facilities are proposed, no source facilities can be identified. Emission changes from power generation can therefore be predicted on a statewide level only. In addition, because of the state requirement that an increasing fraction of electricity generated for the state's power portfolio come from renewable energy sources, the emissions generated for the HST system are expected to be lower in the future as compared to emissions generated based on the state's current power portfolio.

C. CEQA SIGNIFICANCE CRITERIA / PROJECT RATING SCHEME

Under CEQA, impacts on air quality would be considered significant if the project would:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

To determine if the project has significant air quality impacts as defined by CEQA, the relevance of the potential emission changes was assessed from a total pollutant burden and percentage change compared to the No Project Alternative in the affected air basins and statewide. Depending on each air basin's attainment status, the predicted differences were ranked as a high (+ or -), medium (+ or -), or low (+ or -) impact. The ranking of high, medium, or low was based on the potential magnitude of the emission changes compared to EPA's General Conformity threshold levels for nonattainment and maintenance areas and the No Project Alternative emission inventory (for on-road sources, planes, and trains) for each air basin.

This assessment is based on the total pollutant burden of an area under the No Project Alternative and the change in emissions estimated under a proposed alternative. Both positive and negative impacts were considered. A positive (+) impact indicates a potential benefit (i.e., a decrease in emissions) to an air basin for a specific pollutant; a negative (-) impact indicates a potential detriment (i.e., an increase in emissions) to an air basin.

The following factors were used to rate the potential effects of each proposed project alternative:

- The threshold values provided in EPA's Conformity Rule (Table 3.3-2) that determine when a detailed conformity analysis is required for a proposed federal project located in a nonattainment or maintenance area along with CEQA significance thresholds.
- The Conformity Rule's definition (40 CFR Part 55.852) of a regionally significant project, which is one that would increase emissions of an applicable pollutant in a nonattainment or maintenance area by 10% or more.
- CARB's emission inventories, which are the estimated amounts of pollutants emitted into the atmosphere in 2030 (from the growth projections based on 2005-2020 CARB data) in each air basin from major stationary, areawide, and natural source categories.

For the purpose of this analysis, a project alternative is considered to cause a low impact for a pollutant when it is estimated to increase or decrease the emissions of that pollutant in an air basin by an amount less than the CEQA significance threshold or the appropriate conformity threshold value. A project alternative is considered to cause a medium impact when it is estimated to increase or decrease emissions by an amount greater than the CEQA significance threshold or the appropriate conformity threshold value but less than 10% of the total emissions generated in the basin. A project alternative is considered to cause a high impact when it is estimated to increase or decrease emissions by an amount greater than 10% of the total emissions generated in the basin.

Changes in the amounts of CO_2 emitted as a result of the project alternatives were estimated on a statewide basis. These estimates were based on the estimated changes in fuel use and electrical energy production associated with the HST Alignment Alternatives. In light of the substantial GHG emission reductions goal established by the State Legislature to mitigate the significant adverse environmental effects of global climate change, the following global climate change significance threshold is used for this analysis. This threshold has been identified for the purposes of this EIS/EIR only.

- The project's incremental contribution to global climate change would be considered cumulatively significant if the GHG emissions generated by the proposed project are not consistent with California's achievement of the reductions required by AB 32.

Table 3.3-2
Threshold Values Used to Determine Impact Significance

Pollutant	Area's Attainment Status	Conformity Rule's Significant Impact Thresholds in Tons (Metric Tons)/Year	CEQA Impact Thresholds in Tons (Metric tons)/Year
O_3 (VOCs or NO_X)	Nonattainment—serious	50 (45)	10 (9)
	Nonattainment—severe	25 (23)	10 (9)
	Nonattainment—extreme	10 (9)	10 (9)
	Nonattainment—outside an O_3 transport region	100 (91)	10 (9)
	Nonattainment—moderate/marginal inside an O_3 transport region	50/100 (45/91) (VOC/NO_X)	10 (9)
	NO_X maintenance	100 (91)	10 (9)
	VOC maintenance—outside O_3 transport region	100 (91)	10 (9)
	VOC maintenance—inside O_3 transport region	50 (45)	10 (9)
CO	Nonattainment—all	100 (91)	100 (91)
	Maintenance	100 (91)	100 (91)
PM10/PM2.5	Nonattainment—moderate	100 (91) / 100 (91)	27 (25) / 10 (9)
	Nonattainment—serious	70 (64) / 100 (91)	27 (25) / 10 (9)
	Maintenance	100 (91) / 100 (91)	27 (25) / 10 (9)

To quantify a project's impact on local pollutant levels, a screening analysis was conducted based on overall traffic volumes and projected changes in V/C ratios and level of service estimates. Per state and national guidelines (California Department of Transportation 1997), baseline intersection level of service estimates of D or below that would degrade because of a project have the potential to affect local air quality. Similarly, volume increases of greater than 5% could potentially impact local air quality levels. The traffic analyses determined which roadways would experience an impact (positive or negative) under the project alternatives.

For this level of analysis, however, detailed intersection information has not been generated. Rather, traffic screenlines have been developed. *Screenlines* describe defined segments of a roadway that were selected to reasonably represent the routes affected by the proposed alternatives, as discussed in detail in Section 3.1, "Traffic, Transit, Circulation, and Parking." The estimated traffic volume generated or reduced by the HST Alignment Alternatives was added to No Project traffic volumes and expressed as overall screenline volumes (typical values based on averages over time), level of service, and V/C ratios. These factors were compared to No Project values, and locations with potentially high impacts were identified. The screenlines do not include an analysis of intersections and are therefore not detailed enough to be used for an air quality intersection screening analysis. However, the screenline numbers provide a general idea of the project's impact on the roadway network. Based on these numbers, general potential impacts on the local roadway network for each of the alternatives are discussed below.

3.3.2 Affected Environment

A. STUDY AREA DEFINED

California is divided into 15 air basins (17 CCR § 60100 *et seq.*). Each has unique terrain, meteorology, and emission sources. This analysis has been structured to estimate the potential impacts on the two air basins directly affected by the proposed alternatives, as illustrated in Figure 3.3-1 and statewide impacts. The following basins are considered in this study:

- San Francisco Bay Area.
- San Joaquin Valley.

The previous statewide program EIR/EIS studied the air basins that would be directly affected by the project. Air quality in nearby air basins could also be affected by changes in travel patterns, miles traveled, and regional pollutant transport resulting from the proposed alternatives. These effects are expected to be less than those experienced by the basins that physically contain the project. For this program-level analysis, potential impacts on air quality are described only on a statewide level and for the air basins specified.

B. GENERAL DISCUSSION OF AIR QUALITY RESOURCES

Each pollutant is briefly described below.

- CO is a colorless, odorless gas that is generated in the urban environment primarily by the incomplete combustion of fossil fuels in motor vehicles. Relatively high concentrations of CO can be found near crowded intersections and along heavily used roadways carrying slow-moving traffic. CO chemically combines with the hemoglobin in red blood cells to decrease the oxygen-carrying capacity of the blood. Prolonged exposure can cause headaches, drowsiness, or loss of equilibrium.
- SO_X constitute a class of compounds, of which SO_2 and SO_3 are of great importance in air quality. SO_X is also generated by the incomplete combustion of fossil fuels in motor vehicles. However, relatively little SO_X is emitted from motor vehicles. The health effects of SO_X include respiratory illness, damage to the respiratory tract, and bronchio-constriction.
- HC are composed of a wide variety of organic compounds, including methane (CH_4), emitted principally from the storage, handling, and combustion of fossil fuels. HC are classified according to their level of photochemical reactivity: reactive or nonreactive. Nonreactive hydrocarbons consist mostly of methane. Emissions of TOG and ROG are two classes of hydrocarbons measured for California's emission inventory. TOG include all hydrocarbons, both reactive and nonreactive. In contrast, ROG include only reactive HC. TOG is measured because nonreactive HC have enough reactivity to play an important role in photochemistry. Though TOG can cause eye irritation and breathing difficulty, their principal health effects are related to their role in the formation of O_3. TOG are also considered a GHG.
- NO_X constitute a class of compounds that include NO_2 and nitric oxide (NO), both of which are emitted by motor vehicles. Although NO_2 and NO can irritate the eyes and nose and impair the respiratory system, NO_X, like TOG, is of concern primarily because of its role in the formation of O_3. NO_X is also considered a GHG.
- O_3 is a photochemical oxidant that is a major cause of lung and eye irritation in urban environments. It is formed through a series of reactions involving HC and NO_X that take place in the atmosphere in the presence of sunlight. Relatively high concentrations of O_3 are normally found only in the summer because low wind speeds or stagnant air coupled with warm temperatures and cloudless skies provide the optimum conditions for O_3 formation. Because of

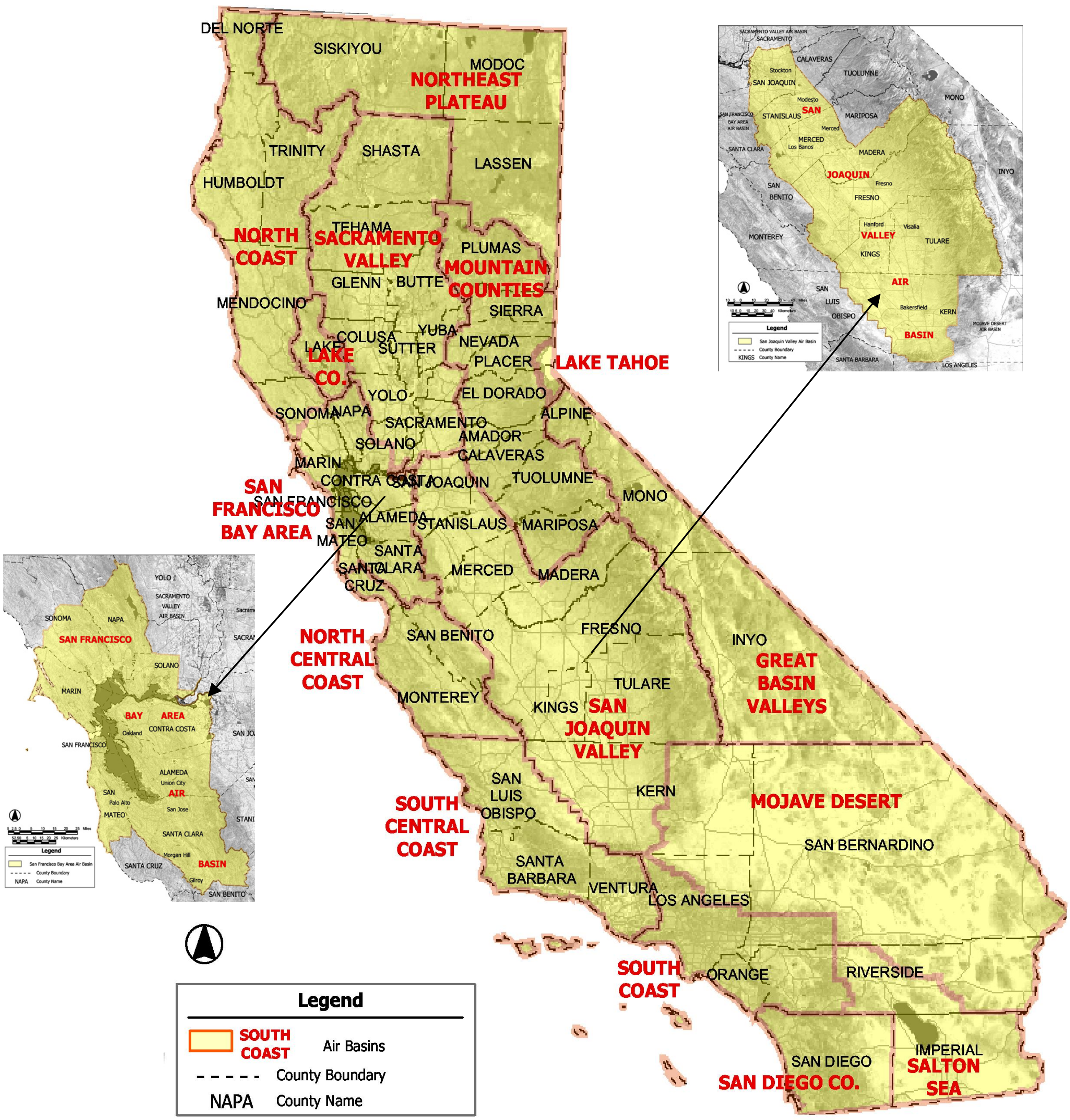

Figure 3.3-1
Air Basins in the Study Region

the long reaction time involved, peak O_3 concentrations often occur far downwind of the precursor emissions. Thus, O_3 is considered a regional pollutant rather than a localized pollutant.

- Particulate matter includes both airborne and deposited particles of a wide range of size and composition. Of particular concern for air quality are particles smaller than or equal to 10 microns and 2.5 microns in size, PM10 and PM2.5, respectively. The data collected through many nationwide studies indicate that most PM10 is the product of fugitive dust, wind erosion, and agricultural and forestry sources, while a small portion is produced by fuel combustion processes. However, combustion of fossil fuels account for a significant portion of PM2.5. Airborne particulate matter mainly affects the respiratory system.
- Lead is a stable chemical element that persists and accumulates both in the environment and in humans and animals. There are many sources of lead pollution, including mobile sources such as motor vehicles and other gasoline-powered engines and nonmobile sources such as petroleum refineries. Lead levels in the urban environment from mobile sources have significantly decreased because of the federally mandated switch to lead-free gasoline. The principal effects of lead on humans are on the blood-forming, nervous, and renal systems.
- CO_2 is a colorless, odorless gas that occurs naturally in the earth's atmosphere. Significant quantities are also emitted into the air by fossil fuel combustion. CO_2 is considered a GHG. The natural greenhouse effect allows the earth to remain warm and sustain life. GHGs trap the sun's heat in the atmosphere and help determine our climate. As atmospheric concentrations of GHGs rise, so may temperatures. Higher temperatures may result in more emissions, increased smog, and respiratory disease.

The existing (2005) baseline pollutant burden for each of the two air basins is described in the following section. The existing baseline represents the current air quality conditions in each of the air basins in the study area. The future No Project conditions are considered the estimated 2020 future baseline pollutant burden for each of the affected air basins. The existing and future baseline information was developed using the CARB pollutant burden projections for the years 2005 and 2020, available at the CARB web site. 2030 emission projections were projected based on the 2005–2020 data. CARB projections are based on future growth levels in stationary, areawide, and mobile sources. CARB projections account for emission reductions resulting from clean vehicles and clean fuel programs. There are two categories of mobile sources: on road and off road. Vehicles licensed for highway use are considered on-road mobile sources; airplanes, marine vessels, locomotives, construction and garden equipment, and recreational off-road vehicles are considered off-road mobile sources.

C. AIR RESOURCES BY AIR BASIN

The air quality attainment status based on state and federal standards for CO, PM10, PM2.5 and O_3 for each of the air basins in the study area is shown in Table 3.3-3. All air basins are assigned an attainment status for air pollutants based on meeting state and federal pollutant standards. There are some differences between state and federal standards, so a pollutant might not have the same status under each standard. A basin is considered in *attainment* for a particular pollutant if it meets the standards set for that pollutant; a basin is considered in *maintenance* for a pollutant if the standards were once violated but are now met; and a basin is considered *nonattainment* for a particular pollutant if its air quality exceeds standards for that pollutant. A basin is considered *unclassified* if the area cannot be classified based on available information as meeting or not meeting the applicable standard. The standards and status designations are discussed in more detail above in Section 3.3.1, Regulatory Requirements and Methods of Evaluation.

Table 3.3-3
Attainment Status of Affected Air Basins

Air Basin	CO		PM2.5		PM10		O_3	
	National Standard	State Standard	National Standard	State Standard	National Standard	State Standard	National Standard	State Standard
San Francisco Bay Area	Maintenance	Attainment	Attainment	Nonattain-ment	Unclassified – 24 hour/ Attainment – Annual	Nonattain-ment	Marginal nonattain-ment	Nonattain-ment – 1 hour / Unclassified – 8 hour
San Joaquin Valley	Maintenance	Attainment except for Fresno Urbanized Area, which is nonattainment	Nonattain-ment	Nonattain-ment	Maintenance (as of 10/17/06)	Nonattain-ment	Serious nonattain-ment	Nonattain-ment

San Francisco Bay Area Air Basin

The San Francisco Bay Area Air Basin covers California's second largest metropolitan area. The counties in the air basin are Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara, as well as the southern half of Sonoma County and the southwestern portion of Solano County. The unifying feature of the basin is the San Francisco Bay, which is oriented north-south and covers about 400 square miles (sq mi) (1,036 square kilometers [sq km]) of the area's total 5,545 sq mi (14,361 sq km). Approximately 20% of California's population resides in this air basin. The area is surrounded by hills, but low passes and the Sacramento–San Joaquin River Delta, which extends to the San Francisco Bay, allow some air pollutant transport to the Central Valley.

Pollution sources in the basin account for about 16% of the total statewide criteria pollutant emissions. The basin is federally classified as follows: maintenance for CO, attainment for PM2.5, unclassified/attainment for PM10, and marginal nonattainment for O_3.

Emissions of O_3 precursors (NO_X and TOG) have decreased since 1975 and are projected to continue declining through 2010. This is the result of strict motor vehicle controls. Stationary source emissions of TOG have declined over the last 20 years because of new controls on oil refinery fugitive emissions and new rules for control of TOG from various industrial coatings and solvent operations.

PM10 emissions are predicted to increase through 2010. This increase is caused by growth in emissions from areawide sources, primarily fugitive dust sources. Mobile source emissions from diesel motor vehicles have been decreasing since 1990, even though population and VMT have been growing. This is the result of stringent emission standards.

CO emissions have been declining in the basin over the last 25 years, and this trend is expected to continue. Motor vehicles and other mobile sources are the largest sources of CO emissions in the air basin. Because of stringent control measures, CO emissions from motor vehicles have been declining.

San Joaquin Valley Air Basin

The San Joaquin Valley Air Basin encompasses the southern two-thirds of California's Central Valley. The counties in this basin are Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare, and the western portion of Kern. The basin spreads across 25,000 sq mi (64,750 sq km). The basin is mostly flat and unbroken, with most of the area below 400 ft (122 m) in elevation. The San Joaquin River runs along the western side of the basin from south to north. The San Joaquin Valley has cool, wet winters and hot, dry summers. Generally, the temperature increases and rainfall decreases from north to south.

Air quality is not dominated by emissions from one large urban area in this basin. Instead, a number of moderately sized urban areas are spread along the main axis of the valley. Approximately 9% of the state's population lives in the San Joaquin Valley. Pollution sources in the region account for about 14% of the total statewide criteria pollutant emissions.

The basin is federally classified as follows: maintenance for CO, nonattainment for PM2.5 and PM10, and serious nonattainment for O_3.

The population in the San Joaquin Valley Air Basin increased by 56% from 1981 to 2000. This is a much higher rate than the statewide average of 39%. During the same time period, the daily VMT increased by 136%, again much higher than the overall statewide average of 91%. Overall, except for PM10, the emission levels in the San Joaquin Valley Air Basin have been decreasing since 1990. The rate of improvement, however, has not been the same as for other air basins. This is due mainly to the large growth rates and increased VMT this area has experienced.

Emissions of the O_3 precursors NO_X and TOG are decreasing in the air basin. NO_X emissions have decreased by approximately 24% since 1985 and are predicted to decrease another 26% by 2010. ROG emissions have decreased by approximately 48% since 1985. They are predicted to decrease another 11% by 2010. These reductions have resulted from more stringent mobile and stationary source emission controls and standards.

Direct emissions of PM10 have been increasing in the air basin and are expected to continue increasing. This increase is due to growth in emissions from areawide sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, waste burning, and residential fuel combustion. These increases are a direct result of the large growth in population and VMT. Mobile sources (emissions directly emitted from motor vehicles) are predicted to decrease through 2010 because of new diesel standards.

CO emissions have been trending downward since 1985 and are expected to continue downward through 2010. Motor vehicles are the largest source of CO emissions in the air basin. Emissions from motor vehicles have been declining since 1985, despite increased VMT. This is the result of stringent emission control measures and standards.

3.3.3 Environmental Consequences

A. EXISTING CONDITIONS COMPARED TO NO PROJECT ALTERNATIVE

Pollutant burden levels of CO, NO_X, and TOG are predicted to decrease statewide through 2030 compared to existing levels. This decrease is due to the implementation of stringent standards, control measures, and state-of-the-art emission control technologies. Emissions per vehicle are dropping significantly in California because of CARB's clean vehicle and clean fuel programs. Consequently, motor vehicle emissions are declining overall, despite an increase in VMT. The low emission vehicle (LEV) and LEVII regulations adopted in 1990 and 1998, respectively, require a declining average fleet emission rate for new cars, pickup trucks, and medium-duty vehicles (including sport utility vehicles). These regulations, which are being implemented between 1994 and 2010, are expected to result in about a 90% decline in new vehicle emissions. Similar emission reductions are occurring in the heavy-duty diesel truck fleet as progressively lower emission standards for new trucks are introduced. The next phase of tighter diesel truck standards, scheduled to be implemented between 2007 and 2010, is expected to produce an overall reduction of 98% from uncontrolled engine emissions. Newer regulations, including California's low fuel standards, which will require a 10% reduction of carbon intensity by 2020, and AB1493, which is predicted to result in a 27% reduction in grams of CO_2 per vehicle mile by 2030, are not yet reflected in the current emission burden estimates developed by CARB and are thus not reflected in this analysis.

According to CARB pollutant burden projections, emissions of PM10 are expected to increase statewide for the No Project Alternative compared to existing conditions. The upward trend in PM10 emissions is primarily the result of increased emissions from areawide sources, including dust from increased VMT on unpaved and paved roads. PM10 emissions from stationary sources are also expected to increase slightly in the future because of industrial growth.

CO_2 levels for 2005 were projected from data in the December 2006 report *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004*, by the California Energy Commission. Year 2005 CO_2 emissions were estimated at 1.280 million tons/day.

The percentage of each pollutant source that may be affected by the HST Alignment Alternatives is shown in Figure 3.3-2. Of the four sources of concern (on-road mobile, trains, planes, electric) shown in the figure, on-road mobile is the largest single contributor for all the pollutants. For CO, on-road mobile sources would contribute 74%; for NO_X, on-road mobile sources would contribute 50%. These percentages are only based on the four sources affected by the project and do not reflect total statewide percentages. By detailing the potential overall contribution to statewide pollution levels of each of these sources, the relationship between changes in sources and overall pollution concentrations becomes clearer.

The following analysis of the Pacheco and Altamont Alternatives is based on the "low" ridership projections found in Chapter 2, Table 2.3-3. As discussed in Chapter 2, only the low ridership forecasts are used for air quality analysis for both the Pacheco and Altamont alternatives.

B. PACHECO ALTERNATIVE

No Project Base Alternative Compared to Pacheco Alignment Alternative

The highway component is based on potential daily VMT reductions of 73.365 million miles. The air travel component is based on potential reductions of 43,865 daily trips.

Roadways: The proposed Pacheco Alignment Alternative could potentially result in a daily reduction of 73.365 million VMT as compared to the No Project Alternative. Changes in VMT and estimated on-road mobile source emission reductions resulting from the use of the proposed HST have been calculated statewide and for each of the air basins (Table 3.3-4). The highest reductions in on-road mobile source emissions are predicted for the San Francisco Bay Air Basin. The Pacheco Alignment Alternative is predicted to reduce the 2030 predicted CO mobile source emission budget for San Francisco Bay Air Basin by 94.3 tons per day (85.6 metric tons per day).

Air Travel: The air-travel component is based on 52,876 daily trips (1 trip = 1 takeoff and 1 landing), or 433 flights statewide, being shifted from the airplane component of No Project future conditions to the proposed Pacheco Alignment Alternative. The emission burden reductions projected from the reduced number of flights, shown in Table 3.3-5, were calculated by determining the number of flights that could be accommodated by the proposed HST and multiplying that number by the emission estimates of an average flight, as described above in the discussion of methods of evaluating impacts. The emission changes by air basin resulting from the reduced number of flights range from an estimated 3.4% reduction in PM2.5 in the San Francisco Bay Air Basin to a 0.1% reduction in CO in the San Joaquin Air Basin. Statewide emission reductions range from 0.7% for PM10 and PM2.5 to 3.4% for NO_X. CO_2 plane emissions, generated based on BTUs, are predicted to decrease by approximately 44% on a statewide level under the Pacheco Alignment Alternative.

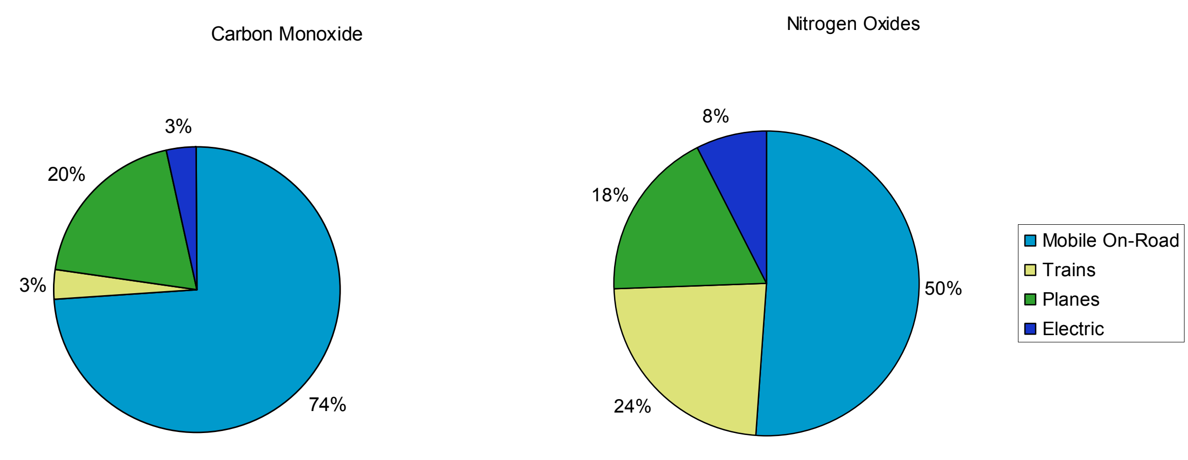

**Figure 3.3-2
Pollutants That May Be Affected**

Train Travel: Conventional rail service is not predicted to increase under the proposed Pacheco Alignment Alternative; therefore, no change in pollutant burdens is predicted as a result of conventional train travel.

Electrical Power: Additional electrical power would be required to operate the HST system. Because of the nature of electrical power generation and the use of a grid system to distribute electrical power, it is not yet clear which facilities would be supplying power to the HST system. Emission changes from power generation can therefore be predicted only on a statewide level for the full HST system. As shown in Table 3.3-6, CO, PM10, PM2.5, NO_X, and TOG burden levels would be predicted to increase because of the power requirements of the Pacheco Alignment Alternative. A 1.2% increase in CO, PM10, PM2.5, TOG, and NO_X is predicted in the electric utilities portion of these CARB pollutant emission burden projections. A 1.8% increase in CO_2 electrical power emission burden projections is predicted due to increased electrical requirements of the project. If it is decided that the project would be run on 100% clean, zero-carbon emissions electricity, there would be no predicted increase in CO_2 levels due to the project's increased electrical requirements.

Summary of Pollutants: Table 3.3-7 summarizes the combined source categories for existing conditions and the No Project Alternative and the Pacheco Alignment Alternative. Compared to the No Project Alternative, the proposed Pacheco Alignment Alternative is projected to result in a decrease in the amount of pollutants statewide and in all air basins analyzed. Potential air quality benefits would range from a medium to a high rating. CO_2 levels are also detailed in Table 3.3-7. CO_2 project impacts were estimated based on energy projections developed for each alignment alternative. CO_2 calculations for the alignment alternatives reflect only emissions from electrical power stations, planes, and on-road VMT. More detailed tables illustrating the analysis of the pollutant burdens predicted, can be found in the appendix to this report.

Table 3.3-4
On-Road Mobile Source Regional Emissions Analysis—No Project Alternative and Pacheco Alignment Alternative

Air Basin	2030 No Project VMT	2030 Pacheco Base VMT	2030 No Project Emission Burden (Tons/Day)						2030 Pacheco Base Emission Burden (Tons/Day)						Incremental Change from No Project					
			CO	PM 10	PM 2.5	NO_X	TOG	CO_2	CO	PM 10	PM 2.5	NO_X	TOG	CO_2	CO	PM 10	PM 2.5	NO_X	TOG	CO_2
Miles and Tons per Day*																				
San Francisco Bay	112,280,333	71,514,786	259.8	11.6	7.5	51.0	36.0	NA	165.5	7.4	4.8	32.5	22.9	NA	-94.3	-4.2	-2.7	-18.5	-13.1	NA
San Joaquin Valley	126,463,316	116,352,966	142.8	7.1	4.2	33.8	19.3	NA	131.4	6.5	3.9	31.1	17.8	NA	-11.4	-0.6	-0.3	-2.7	-1.5	NA
State Total	1,141,592,762	1,068,227,705	1,310.5	56.9	35.1	263.5	186.2	486,613	1,226.2	53.2	32.5	246.5	174.2	455,341	-84.2	-3.7	-2.6	-16.9	-12.0	-31,272
Kilometers and Metric Tons per Day*																				
San Francisco Bay	180,697,680	115,091,892	235.7	10.5	6.8	46.2	32.6	NA	150.1	6.7	4.3	29.5	20.8	NA	-85.6	-3.8	-2.5	-16.8	-11.8	NA
San Joaquin Valley	203,522,979	187,251,948	129.6	6.4	3.8	30.6	17.5	NA	119.2	5.9	3.5	28.2	16.1	NA	-10.4	-0.5	-0.3	-2.4	-1.4	NA
State Total	1,837,215,462	1,719,145,847	1,188.8	51.6	31.8	239.0	168.9	441,457	1,112.4	48.3	29.5	223.7	158.1	413,086	-76.4	-3.3	-2.3	-15.4	-10.9	-28,370

* Area emission increments are based on area specific emission factors derived from area specific VMT and emission burdens. Statewide emission increments are based on statewide average emissions rather than area specific emissions, thus the statewide totals do not represent a simple sum of all air basins but rather an average of emission increments statewide. CO_2 emissions are only calculated on a statewide level.

Air Basin	% Change from No Project					
	CO	PM10	PM2.5	NO_X	TOG	CO_2
San Francisco Bay	-36.3	-36.3	-36.3	-36.3	-36.3	NA
San Joaquin Valley	-8.0	-8.0	-8.0	-8.0	-8.0	NA
State Total	-6.4	-6.4	-7.3	-6.4	-6.4	-6.4

Table 3.3-5
Airplane Emission Burdens—No Project Alternative and Pacheco Alignment Alternative

Air Basin	2030 Projected No Project Airplane Emission Inventory (Tons/Day)						Flights removed due to project	2030 Emission Reductions due to Flights removed under Build Alternative (Tons/Day)						2030 Total Plane Emission Burden under Build Alternative (Tons/Day)					
	CO	PM 10	PM 2.5	NO_X	TOG	CO_2		CO	PM 10	PM 2.5	NO_X	TOG	CO_2	CO	PM 10	PM 2.5	NO_X	TOG	CO_2
Tons per Day*																			
San Francisco Bay	74.75	0.67	0.64	41.45	12.72	NA	167	-1.74	-0.02	-0.02	-1.20	-0.41	NA	73.00	0.65	0.62	40.24	12.31	NA
San Joaquin Valley	81.50	0.46	0.45	4.75	10.03	NA	10	-0.10	0.00	0.00	-0.07	-0.02	NA	81.40	0.46	0.45	4.68	10.00	NA
State Total	346.74	7.76	7.67	92.44	51.05	114	433	-4.53	-0.06	-0.06	-3.13	-1.08	-50.45	342.21	7.70	7.62	89.32	49.97	63.41
Metric Tons per Day*																			
San Francisco Bay	67.81	0.61	0.58	37.60	11.54	NA	167	-1.58	-0.02	-0.02	-1.09	-0.38	NA	66.23	0.59	0.56	36.51	11.17	NA
San Joaquin Valley	73.93	0.42	0.41	4.31	9.10	NA	10	-0.09	0.00	0.00	-0.06	-0.02	NA	73.84	0.42	0.41	4.24	9.07	NA
State Total	314.56	7.04	6.96	83.87	46.31	103.30	433	-4.11	-0.05	-0.05	-2.84	-0.98	-45.77	310.45	6.99	6.91	81.03	45.33	57.52

*CO_2 emissions are only calculated on a statewide level.

Air Basin	% Change from No Project					
	CO	PM10	PM2.5	NO_X	TOG	CO_2
San Francisco Bay	-2.3	-3.2	-3.4	-2.9	-3.3	NA
San Joaquin Valley	-0.1	-0.3	-0.3	-1.4	-0.2	NA
State Total	-1.3	-0.7	-0.7	-3.4	-2.1	-44.3

Table 3.3-6
Electrical Power Station Emissions—No Project Alternative and Pacheco Alignment Alternative

Air Basin	2030 Projected No Project Energy Emission Inventory (Tons/Day)						2030 Emission changes due to HST power demands under the Build Alternative (Tons/Day)						2030 Total Energy Emission Burden under Build Alternative (Tons/Day)					
	CO	PM10	PM2.5	NO_X	TOG	CO_2*	CO	PM10	PM2.5	NO_X	TOG	CO_2	CO	PM10	PM2.5	NO_X	TOG	CO_2
Tons per Day																		
Statewide	60.08	9.34	9.00	39.16	44.48	391,412	0.71	0.11	0.11	0.46	0.52	7,234	60.78	9.45	9.11	39.62	45.01	398,647
Metric Tons per Day																		
Statewide	54.50	8.47	8.17	35.53	40.36	355,090	0.64	0.10	0.10	0.42	0.47	6,563	55.14	8.57	8.27	35.94	40.83	361,653

* Assumes 22.2% of CO_2 inventory is a result of electrical production, as per Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004,

Air Basin	% Change from No Project					
	CO	PM10	PM2.5	NO_X	TOG	CO_2
Statewide	1.2	1.2	1.2	1.2	1.2	1.8

Table 3.3-7
Potential Impacts on Air Quality Statewide—Existing, No Project, and Pacheco Alignment Alternative

Air Basin	2005 Existing Emission Inventory (Planes, Trains, On-Road Mobile, and Energy, CO_2 all sources) (Tons/Day)						2030 Projected No Project Emission Inventory (Planes, Trains, On-Road Mobile, and Energy, CO_2 all sources) (Tons/Day)						2030 Projected Build Emission Inventory (Planes, Trains, On-Road Mobile, and Energy, CO_2 all sources) (Tons/Day)					
	CO	PM10	PM2.5	NO_X	TOG	CO_2	CO	PM10	PM2.5	NO_X	TOG	CO_2	CO	PM10	PM2.5	NO_X	TOG	CO_2
Tons per Day																		
San Francisco Bay	1536	10	7	318	174	NA	398	22	17	144	94	NA	303	18	15	125	81	NA
San Joaquin Valley	948	7	6	224	102	NA	231	8	5	58	31	NA	220	7	5	55	30	NA
State Total	7,979	69	52	1759	932	1,280,217	1,715	69	47	478	253	1,763,118	1,627	65	44	457	239	1,739,034
Metric Tons per Day																		
San Francisco Bay	1,393	9	7	288	157	NA	361	20	16	131	86	NA	275	16	13	114	74	NA
San Joaquin Valley	860	7	5	203	93	NA	210	7	5	53	28	NA	199	7	4	50	27	NA
State Total	7,239	63	48	1,596	846	1,161,416	1,556	62	42	433	229	1,599,505	1,476	59	40	415	217	1,577,657

Air Basin	% Change from No Project					
	CO	PM10	PM2.5	NO_X	TOG	CO_2
San Francisco Bay	-23.9	-18.9	-15.2	-13.3	-13.7	NA
San Joaquin Valley	-5.0	-7.0	-6.6	-4.8	-5.0	NA
State Total	-5.2	-5.4	-5.6	-4.2	-5.2	-1.4
	Benefit Rating					
Air Basin	**CO**	**PM10**	**PM2.5**	**NO_X**	**TOG**	**CO_2**
San Francisco Bay	High	High	High	High	High	NA
San Joaquin Valley	Medium	Medium	Medium	Medium	Medium	NA
State Total	Medium	Medium	Medium	Medium	Medium	NA

Local Impacts: A total of 18 intercity freeway segments were analyzed. The general trend in screenline data shows that the LOS on these freeway segments would largely remain the same under the Pacheco Alignment Alternative compared to the No Project Alternative. Most of the freeway segments would experience less than a 5% change in V/C ratio and no change in LOS. This is with the exception of I-5 (between I-580 and SR 140), which would experience a better level of service under the Pacheco Alignment Alternative, with an approximately 20% reduction in V/C ratio. V/C ratio is the comparison of the roadway volume to roadway capacity, and a reduction in the V/C ratio signifies a better level of service and, therefore, less congestion and lower potential for air quality impacts.

As the alignment alternatives are refined, segments where V/C ratios increase (degrade) should be screened to determine whether more detailed local analyses need to be conducted. Roadways and intersections around proposed station location options should also be screened and undergo detailed modeling if necessary to ensure that the project would not cause or exacerbate a violation of applicable air quality standards.

GHGs: The air quality analysis identified a reduction of about 1.4% of CO_2 emissions statewide attributed to the Pacheco Alignment Alternative. This would be a beneficial impact due to the reduction in automobile vehicle miles traveled (mobile sources) and reduction in the number of airplane trips.

C. ALTAMONT ALTERNATIVE

No Project Base Alternative Compared to Altamont Alignment Alternative

The highway component is based on potential daily VMT reductions of 87.952 million miles. The air travel component is based on potential reductions of 41,573 daily trips.

Roadways: The proposed Altamont Alignment Alternative could potentially result in a daily reduction of 87.952 million VMT as compared to the No Project Alternative. Changes in VMT and estimated on-road mobile source emission reductions resulting from the use of the proposed HST have been calculated statewide and for each of the air basins (Table 3.3-8). The highest reductions in on-road mobile source emissions are predicted for the San Francisco Bay Air Basin. The Altamont Alignment Alternative is predicted to reduce the 2030 predicted CO mobile source emission budget for San Francisco Bay Air Basin by 101.5 tons per day (91.7 metric tons per day).

Air Travel: The air-travel component is based on 55,168 daily trips (1 trip = 1 takeoff and 1 landing), or 411 flights statewide, being shifted from the airplane component of No Project future conditions to the proposed Altamont Alignment Alternative. The emission burden reductions projected from the reduced number of flights, shown in Table 3.3-9, were calculated by determining the number of flights that could be accommodated by the proposed HST and multiplying that number by the emission estimates of an average flight, as described above in the discussion of methods of evaluating impacts. The emission changes by air basin resulting from the reduced number of flights range from an estimated 3.2% reduction in PM2.5 in the San Francisco Bay Air Basin to a 0.1% reduction in CO in the San Joaquin Air Basin. Statewide emission reductions range from 0.7% for PM10 and PM2.5 to 3.2% for NO_X. CO_2 plane emissions, generated based on BTUs, are predicted to decrease by approximately 42% on a statewide level under the Altamont Alignment Alternative.

Train Travel: Conventional rail service is not predicted to increase under the proposed Pacheco Alignment Alternative; therefore, no change in pollutant burdens is predicted as a result of conventional train travel.

Table 3.3-8
On-Road Mobile Source Regional Emissions Analysis—No Project Alternative and Altamont Alignment Alternative

Air Basin	2030 No Project VMT	2030 Altamont Base VMT	2030 No Project Emission Burden (Tons/Day)						2030 Altamont Base Emission Burden (Tons/Day)						Incremental Change from No Project					
			CO	PM 10	PM 2.5	NO_X	TOG	CO_2	CO	PM 10	PM 2.5	NO_X	TOG	CO_2	CO	PM 10	PM 2.5	NO_X	TOG	CO_2
Miles and Tons per Day*																				
San Francisco Bay	112,280,333	65,382,106	259.8	11.6	7.5	51.0	36.0	NA	158.7	7.1	4.6	31.1	22.0	NA	-101.5	-4.5	-2.9	-19.8	-14.0	NA
San Joaquin Valley	126,463,316	112,879,903	142.8	7.1	4.2	33.8	19.3	NA	131.7	6.5	3.9	31.1	17.8	NA	-11.2	-0.6	-0.3	-2.6	-1.5	NA
State Total	1,141,592,762	1,053,640,241	1,310.5	56.9	35.1	263.5	186.2	486,613	1,224.3	53.1	32.8	246.2	174.0	463,187	-86.2	-3.7	-2.3	-17.3	-12.2	-23,426
Kilometers and Metric Tons per Day*																				
San Francisco Bay	180,697,681	105,222,299	235.7	10.5	6.8	46.2	32.6	NA	144.0	6.4	4.1	28.3	19.9	NA	-91.7	-4.1	-2.6	-18.0	-12.7	NA
San Joaquin Valley	203,522,980	181,662,594	129.6	6.4	3.8	30.6	17.5	NA	119.5	5.9	3.5	28.2	16.2	NA	-10.1	-0.5	-0.3	-2.4	-1.4	NA
State Total	1,837,215,462	1,695,669,599	1,188.8	51.6	31.8	239.0	168.9	441,457	1,110.7	48.2	29.7	223.3	157.8	420,204	-78.2	-3.4	-2.1	-15.7	-11.1	-21,252

* Area emission increments are based on area specific emission factors derived from area specific VMT and emission burdens. Statewide emission increments are based on statewide average emissions rather than area specific emissions, thus the statewide totals do not represent a simple sum of all air basins but rather an average of emission increments statewide. CO_2 emissions are only calculated on a statewide level.

Air Basin	% Change from No Project					
	CO	PM10	PM2.5	NO_X	TOG	CO_2
San Francisco Bay	-38.9	-38.9	-38.9	-38.9	-38.9	NA
San Joaquin Valley	-7.8	-7.8	-7.8	-7.8	-7.8	NA
State Total	-6.6	-6.6	-6.6	-6.6	-6.6	-4.8

Table 3.3-9
Airplane Emission Burdens—No Project Alternative and Altamont Alignment Alternative

Air Basin	2030 Projected No Project Airplane Emission Inventory (Tons/Day)						Flights removed due to project	2030 Emission Reductions due to Flights removed under Build Alternative (Tons/Day)						2030 Total Plane Emission Burden under Build Alternative (Tons/Day)					
	CO	PM 10	PM 2.5	NO_X	TOG	CO_2		CO	PM 10	PM 2.5	NO_X	TOG	CO_2	CO	PM 10	PM 2.5	NO_X	TOG	CO_2
Tons per Day*																			
San Francisco Bay	74.75	0.67	0.64	41.45	12.72	NA	-158	-1.65	-0.02	-0.02	-1.14	-0.39	NA	73.10	0.65	0.62	40.31	12.33	NA
San Joaquin Valley	81.50	0.46	0.45	4.75	10.03	NA	-9	-0.09	0.00	0.00	-0.07	-0.02	NA	81.40	0.46	0.45	4.68	10.00	NA
State Total	346.74	7.76	7.67	92.44	51.05	114	-411	-4.29	-0.05	-0.05	-2.96	-1.02	-47.83	342.44	7.70	7.62	89.48	50.03	66.03
Metric Tons per Day*																			
San Francisco Bay	67.81	0.61	0.58	37.60	11.54	NA	-158	-1.50	-0.02	-0.02	-1.03	-0.36	NA	66.31	0.59	0.56	36.57	11.19	NA
San Joaquin Valley	73.93	0.42	0.41	4.31	9.10	NA	-9	-0.09	0.00	0.00	-0.06	-0.02	NA	73.85	0.42	0.41	4.25	9.07	NA
State Total	314.56	7.04	6.96	83.87	46.31	103.30	-411	-3.90	-0.05	-0.05	-2.69	-0.93	-43.39	310.67	6.99	6.91	81.18	45.38	59.90

*CO_2 emissions are only calculated on a statewide level.

Air Basin	% Change from No Project					
	CO	PM10	PM2.5	NO_X	TOG	CO_2
San Francisco Bay	-2.2	-3.1	-3.2	-2.8	-3.1	NA
San Joaquin Valley	-0.1	-0.3	-0.3	-1.4	-0.2	NA
State Total	-1.2	-0.7	-0.7	-3.2	-2.0	-42.0

Table 3.3-10
Electrical Power Station Emissions—No Project Alternative and Altamont Alignment Alternative

Air Basin	2030 Projected No Project Energy Emission Inventory (Tons/Day)						2030 Emission changes due to HST power demands under the Build Alternative (Tons/Day)						2030 Total Energy Emission Burden under Build Alternative (Tons/Day)					
	CO	PM10	PM2.5	NO_X	TOG	CO_2*	CO	PM10	PM2.5	NO_X	TOG	CO_2	CO	PM10	PM2.5	NO_X	TOG	CO_2
Tons per Day																		
Statewide	60.08	9.34	9.00	39.16	44.48	391,412	0.71	0.11	0.11	0.46	0.52	7,234	60.78	9.45	9.11	39.62	45.01	398,647
Metric Tons per Day																		
Statewide	54.50	8.47	8.17	35.53	40.36	355,090	0.64	0.10	0.10	0.42	0.47	6,563	55.14	8.57	8.27	35.94	40.83	361,653

* Assumes 22.2% of CO_2 inventory is a result of electrical production, as per Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004,

Air Basin	% Change from No Project					
	CO	PM 10	PM2.5	NO_X	TOG	CO_2
Statewide	1.2	1.2	1.2	1.2	1.2	1.8

Table 3.3-11
Potential Impacts on Air Quality Statewide—Existing, No Project, and Altamont Alignment Alternative

Air Basin	2005 Existing Emission Inventory (Planes, Trains, On-Road Mobile, and Energy, CO_2 all sources) (Tons/Day)						2030 Projected No Project Emission Inventory (Planes, Trains, On-Road Mobile, and Energy, CO_2 all sources) (Tons/Day)						2030 Projected Build Emission Inventory (Planes, Trains, On-Road Mobile, and Energy, CO_2 all sources) (Tons/Day)					
	CO	PM10	PM2.5	NO_X	TOG	CO_2	CO	PM 10	PM 2.5	NO_X	TOG	CO_2	CO	PM 10	PM 2.5	NO_X	TOG	CO_2
Tons per Day																		
San Francisco Bay	1,536	10	7	318	174	NA	398	22	17	144	94	NA	296	17	15	124	80	NA
San Joaquin Valley	948	7	6	224	102	NA	231	8	5	58	31	NA	220	8	5	55	30	NA
State Total	7,979	69	52	1,759	932	1,280,217	1,715	69	47	478	253	1,763,118	1,625	65	44	457	239	1,746,883
Metric Tons per Day																		
San Francisco Bay	1,393	9	7	288	157	NA	361	20	16	131	86	NA	269	16	13	112	73	NA
San Joaquin Valley	860	7	5	203	93	NA	210	7	5	53	28	NA	200	7	4	50	27	NA
State Total	7,239	63	48	1,596	846	1,161,416	1,556	62	42	433	229	1,599,505	1,474	59	40	415	217	1,584,777

Air Basin	% Change from No Project					
	CO	PM10	PM2.5	NO_X	TOG	CO_2
San Francisco Bay	-25.6	-20.2	-16.3	-14.2	-14.7	NA
San Joaquin Valley	-4.9	-6.9	-6.4	-4.7	-4.9	NA
State Total	-5.3	-5.5	-5.1	-4.2	-5.3	-0.9
	Benefit Rating					
Air Basin	**CO**	**PM10**	**PM2.5**	**NO_X**	**TOG**	**CO_2**
San Francisco Bay	High	High	High	High	High	NA
San Joaquin Valley	Medium	Medium	Medium	Medium	Medium	NA
State Total	Medium	Medium	Medium	Medium	Medium	NA

Electrical Power: Additional electrical power would be required to operate the HST system. Because of the nature of electrical power generation and the use of a grid system to distribute electrical power, it is not yet clear which facilities would be supplying power to the HST system. Emission changes from power generation can therefore be predicted only on a statewide level for the full HST system. As shown in Table 3.3-10, CO, PM10, PM2.5, NO_X, and TOG burden levels would be predicted to increase because of the power requirements of the Altamont Alignment Alternative. A 1.2% increase in CO, PM10, PM2.5, TOG, and NO_X is predicted in the electric utilities portion of these CARB pollutant emission burden projections. A 1.8% increase in CO_2 electrical power emission burden projections is predicted due to increased electrical requirements of the project. If it is decided that the project would be run on 100% clean, zero-carbon emissions electricity, there would be no predicted increase in CO_2 levels due to the project's increased electrical requirements.

Summary of Pollutants: Table 3.3-11 summarizes the combined source categories for existing conditions and the No Project Alternative and the Altamont Alignment Alternative. Compared to the No Project Alternative, the proposed Altamont Alignment Alternative is projected to result in a decrease in the amount of pollutants statewide and in all air basins analyzed. Potential air quality benefits would range from a medium to a high rating. CO_2 levels are also detailed in Table 3.3-11. CO_2 project impacts were estimated based on energy projections developed for each alignment alternative. CO_2 calculations for the alignment alternatives reflect only emissions from electrical power stations, planes, and on-road VMT. More detailed tables illustrating the analysis of the pollutant burdens predicted can be found in the appendix to this section.

Local Impacts: A total of 18 intercity freeway segments were analyzed. The general trend in screenline data shows that the LOS on these freeway segments would largely remain the same under the Altamont Alignment Alternative compared to the No Project Alternative. Most of the freeway segments would experience less than a 5% change in V/C ratio and no change in LOS. This is with the exception of I-5 (between I-580 and SR 140), which would experience a better level of service under the Altamont Alignment Alternative, with an approximately 20% reduction in V/C ratio. V/C ratio is the comparison of the roadway volume to roadway capacity, and a reduction in the V/C ratio signifies a better level of service and, therefore, less congestion and lower potential for air quality impacts.

As the alignment alternatives are refined, segments where V/C ratios increase (degrade) should be screened to determine whether more detailed local analyses need to be conducted. Roadways and intersections around proposed station location options should also be screened and undergo detailed modeling if necessary to ensure that the project would not cause or exacerbate a violation of applicable air quality standards.

GHGs: The air quality analysis identified a reduction of about 0.9% of CO_2 emissions statewide attributed to the Altamont Alignment Alternative. This would be a beneficial impact due to the reduction in automobile vehicle miles traveled (mobile sources) and reduction in the number of airplane trips.

3.3.4 Design Practices

The HST system would use electrical propulsion to serve the forecast ridership, which is primarily diverted from highway or air travel. The HST Alignment Alternatives are estimated to have a beneficial effect on the emissions levels throughout the air basins involved. In addition, the Authority will pursue the identification and utilization of energy produced from clean/efficient sources to the extent possible, as per the California Renewables Portfolio Standard Program, which was enacted in SB 1078, ch. 516, Statutes of 2002, which added California Public Utility codes sections 387, 399.11 et seq., and 399.25.

As described in Section 3.1, "Traffic, Transit, Circulation, and Parking," using existing/planned multimodal hubs for station location options would also minimize air emission increases in and around station areas.

3.3.5 Mitigation Strategies and CEQA Significance Conclusions

Based on the analysis above, the proposed HST Alignment Alternatives would have a less than significant effect on air quality because they are predicted to result in reduced emissions of CO, PM10, PM2.5, NO_X, TOG, and CO_2 compared to the No Project Alternative. [2] Continued improvements in air pollution controls on vehicles, as new vehicles replace older vehicles, will result in an overall reduction of the average air pollutant emissions per vehicle mile of operation in the future. Use of the proposed HST system, however, would reduce vehicle miles otherwise traveled and result in an air quality benefit when viewed on a systemwide and a regional basis. Temporary, short-term (defined by EPA as less than 5 years) increases in emissions associated with construction activities will be reduced with the application of mitigation strategies. The potential for localized air pollutant increases associated with traffic near proposed HST stations will be addressed by mitigation strategies and design practices (discussed in Section 3.1.6) applied to reduce these impacts. When more detailed, area-specific analyses are conducted on the project, it is recommended that a hot spot screening analysis and if necessary a detailed microscale analysis be conducted to determine if the project causes or exacerbates a violation of the applicable standards. Construction sites lasting more than 5 years should undergo a detailed construction analysis in the area specific analyses.

The proposed HST system would result in beneficial impacts related to GHGs and global climate change. Any additional carbon entering the atmosphere, whether by emissions from the project itself or by removal of carbon sequestering plants (included agricultural crops), would be more than offset by the beneficial reduction of carbon resulting from the project due to a reduction in automobile vehicle miles traveled (mobile sources) and reduction in the number of airplane trips.

The program-level analysis in this document reviews the potential statewide air quality impacts of a proposed HST system, and the analysis would support determination of conformity for the proposed HST system. At the project level, potential mitigation strategies should be explored to address potential localized impacts. The proposed HST system could be designed to use state-of-the-art, energy-efficient equipment to minimize potential air pollution impacts associated with power used by the proposed HST system. Potential localized impacts could be addressed at the project level by promoting the following measures:

- Increase use of public transit.
- Increase use of alternative-fueled vehicles.
- Increase parking for carpools, bicycles, and other alternative transportation methods.
- Potential construction impacts, which should be analyzed once more detailed project plans are available, can be mitigated by following local and state guidelines.

Potential mitigation strategies for air quality impacts associated with the project would focus on the alleviation of traffic congestion around passenger station areas, as described in Section 3.1, "Traffic, Transit, Circulation, and Parking," and on the reduction of air emissions during the construction process. The potential strategies listed below are related to the reduction of air emissions during construction.

- Water all active construction areas at least twice daily.

[2] Both the Altamont and Pacheco Alignment Alternatives would have virtually the same air quality benefits. See Tables 3.3-7 and 3.3-11.

- Cover all trucks hauling soil, sand, and other loose materials or require that all trucks maintain at least 2 ft of freeboard.
- Pave, apply water three times daily, or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- Hydroseed or apply (nontoxic) soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, water twice daily, or apply (nontoxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 mi per hour.
- Install sandbags or other erosion-control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Use alternative fuels for construction equipment when feasible.
- Minimize equipment idling time.
- Maintain properly tuned equipment.

The proposed HST system is expected to result in an air quality improvement when viewed on a systemwide basis. Temporary, short-term emissions increases associated with construction activities and potential localized air pollution increases associated with traffic near proposed HST stations would be substantially reduced by the application of mitigation strategies and design practices. See Section 3.1.6 for further discussion of mitigation strategies for increased traffic near stations. At the second-tier, project-level review, applications of these mitigation strategies are expected to reduce localized air quality impacts to a less-than-significant level in most locations. Additional environmental assessment will allow more precise evaluation in the second-tier, project-level environmental analyses.

3.3.6 Subsequent Analysis

At the project level, local traffic counts would be conducted at access roads serving major station locations. These counts would provide more accurate information for determining potential local air quality hotspot locations. Hotspots are areas where the potential for elevated pollutant levels exist. Once potential hotspot locations (if any) are determined, a detailed analysis following the guidelines at the time of analysis would be conducted.

Potential construction impacts and potential mitigation measures would also be addressed in subsequent analyses. Once alignments are established, a full construction analysis should be conducted. This analysis should quantify emissions from construction vehicles, excavation, worker trips, and other related construction activities. Specific mitigation measures, if required, would be identified and a construction monitoring program, if required, would be established.