Climate Change Analysis
Public Safety Enterprise Communication Project
County of Riverside, California

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ARB	California Air Resources Control Board
C_2F_6	Hexafluoroethane
CAPCOA	California Air Pollution Control Officers Association
CAT	Climate Action Team (Report)
CC	Climate Change
CCX	Chicago Climate Exchange
CEQA	California Environmental Quality Act
CF_4	Tetrafluoromethane
CFC	Chlorofluorocarbons
CFI	CCX Contract Specifications
CH_4	Methane
CO_2	Carbon Dioxide
DEIR	Draft Environmental Impact Report
ECX	European Energy Exchange
EIR	Environmental Impact Report
EMWD	Eastern Municipal Water District
EPA	Environmental Protection Agency
EU ETS	European Union Greenhouse Gas Emission Trading Scheme
gpd	Gallons Per Day
HCFC	Hydrochlorofluorocarbons
HFC	Hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
ITS	Intelligent Transportation Systems
kWh	Kilowatt-hours
LEED	Leadership in Energy and Environmental Design
LPG	Liquefied Petroleum Gas
MBA	Michael Brandman Associates
MDAQMD	Mojave Desert Air Quality Management District
$MTCO_2E$	Metric Tons of Carbon Dioxide Equivalent
$MMTCO_2e$	Million Metric Tons of Carbon Dioxide Equivalent
MWh	Megawatt-hour
NO_x	Nitrogen Oxides
N_2O	Nitrous Oxide
O_3	Ozone
OPR	Office of Planning and Research
PFC	Perfluorocarbons

ppm	Parts per Million
ppt	Parts per Trillion
PSEC	Public Safety Enterprise Communication
RCP	Regional Comprehensive Plan
RGGI	Regional Greenhouse Gas Initiative
RTA	Riverside Transit Agency
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
sq ft	Square Feet
TMA	Transportation Management Association
TRU	Transportation Refrigeration Units
UNFCCC	United Nations Framework Convention on Climate Change
U.S.	United States
VOC	Volatile Organic Compound
WCI	Western Climate Initiative

SECTION 1: INTRODUCTION

This document assesses the impact of the Public Safety Enterprise Communication Project (Project) on climate change. The conclusions and findings that may be reached based on the technical information and analyses contained in this report represent the independent judgment of the County of Riverside as the CEQA Lead Agency. This analysis is specific to this Project and may not apply to other projects.

In 2006, Governor Arnold Schwarzenegger signed Assembly Bill (AB) 32, which charged the California Air Resources Board (ARB) with developing regulations on how the State would address climate change (also known as "global warming"). The ARB, the California Environmental Protection Agency, the U.S. Environmental Protection Agency (EPA), or other appropriate governmental organizations have not yet developed guidelines on how to prepare a California Environmental Quality Act (CEQA) assessment for climate change. In absence of published CEQA thresholds, this analysis includes CEQA-level discussions that suggests thresholds of significance and evaluates the potential impact of the Project with regard to its contribution to greenhouse gases based on the intent of AB 32.

1.1 - Executive Summary

The County of Riverside's fire and law enforcement agencies currently utilize approximately 20 communication sites to provide voice and data transmission capabilities to assigned personnel in the field. As currently configured, the system provides coverage to only about 60 percent of the County. The communication system now in use is at the end of its useful life, and is no longer adequate to meet the County's coverage and capacity needs. Population growth within the County necessitates the expansion of the coverage footprint. Additionally, due to increases in the County's radio usage, additional traffic-carrying capacity is required to meet the needs of emergency services personnel as they serve the public. The proposed Public Safety Enterprise Communication (PSEC) Project is the expansion of the system's capabilities and its associated infrastructure.

Construction of the entire Project (50 sites) would generate approximately 2,750 metric tons of carbon dioxide equivalents ($MTCO_2e$). Construction of the Project would be complete prior to the year 2020, which is the year that California's emissions need to be at or below 1990 emissions pursuant to AB 32. Additionally, mitigation measures as proposed within the air quality analysis for this Project would reduce greenhouse gas emissions associated with unnecessary idling and construction employee trips. Therefore, construction of the Project would not hinder or delay implementation of AB 32 and emissions are less than significant.

During operation of the Project, 1,820 $MTCO_2e$ of greenhouse gases would be emitted per year. However, the Project is also implementing many design features that reduce its emissions of greenhouse gases.

The Project will connect all but two sites to the electrical power grid, which results in approximately 2 $MTCO_2e$ per year per site for indirect emissions associated with electricity generation. Emissions from the full time generators are approximately 200 $MTCO_2e$ per year per site (approximately 400 $MTCO_2e$ total). By utilizing the electrical grid for most of its sites, the Project is offsetting approximately 9,600 $MTCO_2e$ per year (200 $MTCO_2e$ * 48 sites).

Project design features also increase the energy efficiency of the buildings. For example, cool roofs reflect sunlight thereby reducing the cooling load inside of the building. Energy efficient lighting also reduces electricity demand. EPA-certified air conditioning units use less energy to operate (EPA 2008). According to a simplified life cycle estimate of the air conditioning units, the County could save approximately $11,000 by installing Energy Star air conditioning units and could reduce 274,000 pounds of carbon dioxide emissions (124 $MTCO_2e$) during the life cycle of all the units.

Implementation of the Project will assist fire fighters in communication during fire events. One of the anticipated effects of climate change is an increase in the frequency of wildland fire events. In essence, the Project is providing adaptation to climate change impacts. Therefore, the Project's project-level impact to climate change is less than significant and it is not anticipated that the Project would hinder or delay the implementation of AB 32.

The cumulative-level significance finding is speculative at this time for the following reasons: the list of cumulative projects is unknown, there is no approved greenhouse gas or climate change plan for the region in which the Project sites are located, and there is no cumulative significance threshold.

Potential impacts from climate change to the Project, such as the potential for wildfires and the rise of sea levels, are less than significant.

The environmentally superior alternative is the Taller Tower Alternative, which would allow fewer sites to be constructed and therefore fewer construction and operational greenhouse gas emissions.

1.2 - Project Description

The PSEC Project proposes to construct numerous new communications facilities throughout the entirety of Riverside County, and along the Riverside County borders in Orange, San Bernardino, and San Diego Counties (Exhibit 1).

The Project will expand the Riverside County emergency services radio tower network from the current 25 sites to approximately 70 sites throughout the County. This expansion will increase the operational coverage of the emergency services telecommunication system to approximately 95 percent of the County's land area, and will also provide greatly expanded voice and data transmission capability. The specific design, approval, and installation of the entire network is projected to take 2 to 3 years.

At this time, approximately 50 of the proposed towers consist of three-legged, self-supporting tower structures. These towers would range in height from approximately 40 feet to 240 feet. The remaining two towers, Line and Spring Hill, are currently proposed as guyed towers with an approximate height of 330 feet. Exhibit 2 displays a typical site location.

Certain sites will require construction of additional infrastructure, such as access roads and utility lines; however, analysis of the potential impacts resulting from the installation of infrastructure is not included in this report, as those plans have yet to be developed.

Project Design Features to Reduce Emissions

The following project design features reduce emissions of greenhouse gases:

- All sites except for two would be connected to the electricity power grid, which would reduce direct emissions associated with generator power (diesel or propane).
- By its design, the Project will provide a more efficient and reliable communication system, which may reduce unnecessary vehicle miles traveled from vehicles that are in communication black outs.
- The Project is required to comply with current Title 24 energy efficiency requirements; doing so will reduce indirect emissions from electricity generation.
- Implementation of the Project will assist fire fighters in communication during fire events. One of the anticipated effects of climate change is an increase in the frequency of wildland fire events. Therefore, the Project would provide adaptation to climate change impacts.
- The Project will install energy efficient lighting and lighting control systems.
- The Project will ensure that roofs meet EPA cool roof requirements. There is a variety of cool roof products available, including coatings (typically of a white color), cool single-ply membranes, reflective tiles, or EPA Energy Star metal roofs. The Project could use coatings (a paint of white color) or EPA Energy Star certified metal roofs.
- The Project will install EPA Energy Star air conditioning units or similar unit with equal or better energy savings. These units use less energy to operate.
- The EPA is phasing out use of refrigerants HCFC-22 or HCFC-142b in the year 2010. The Project will not be using those refrigerants in the air conditioning units.

The County investigated the use of solar power to provide power to the two sites that require full time generators, but has determined that the provision of solar power is not feasible. The size of the solar panel arrays that would be required to generate sufficient power would be enormous, and would add significantly to the site footprint and the aesthetic impacts at the sites. The arrays would be vulnerable to vandalism and other damage, and would not be able to guarantee the reliability that is

required for an emergency services communication system. For these reasons, the County is not proposing the use of solar power at these locations.

1.3 - Mitigation Measures in Other Impact Areas

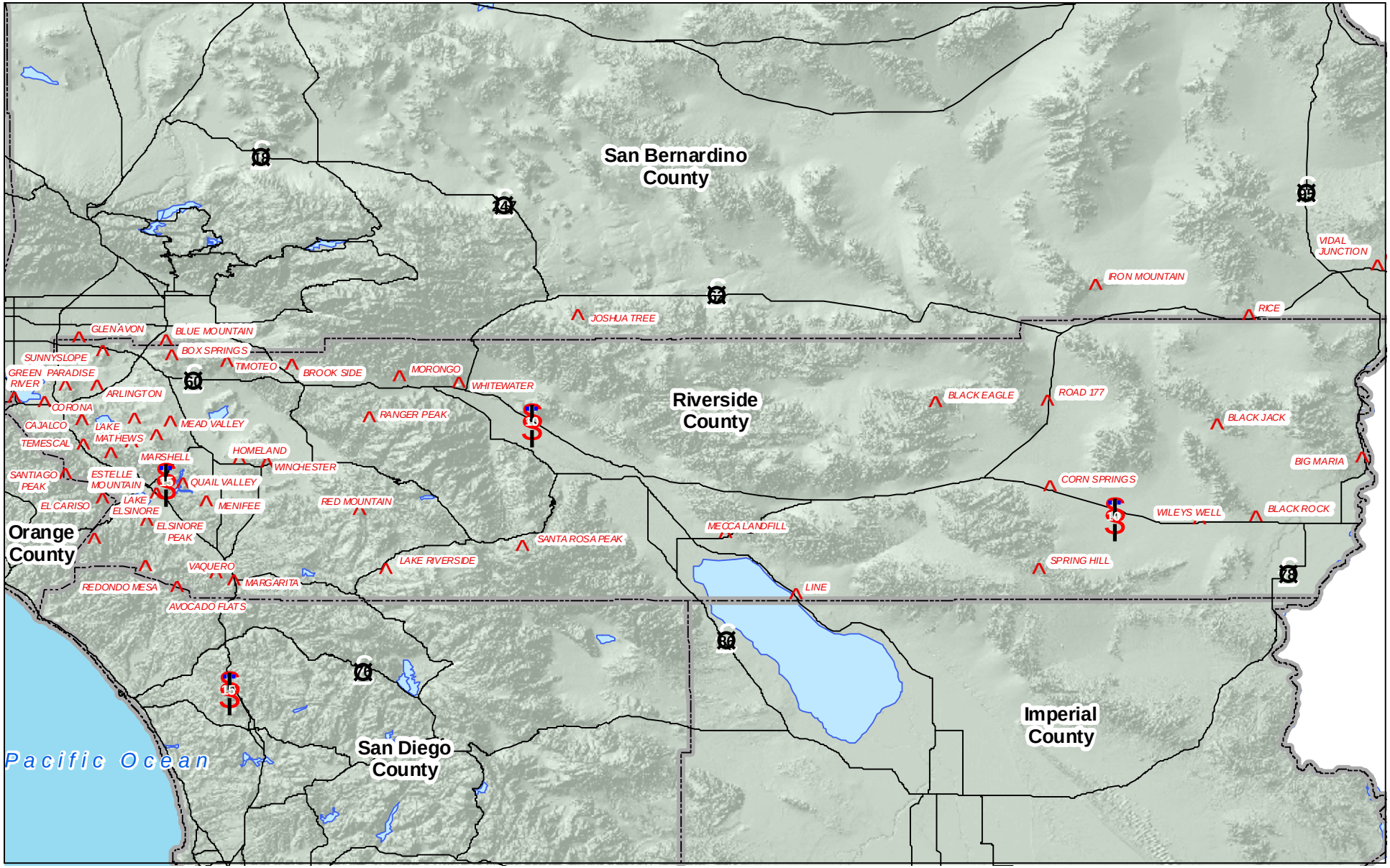
The following are mitigation measures that would reduce greenhouse gases contained in the Air Quality Analysis for the Project prepared by Michael Brandman Associates (MBA 2008). Only the mitigation measures that pertain to greenhouse gas emissions are shown. An analysis of the mitigation measures in respect to greenhouse gases is shown below each measure.

AQ-2 During Project construction, the developer shall require all contractors not to idle construction equipment onsite for more than five minutes.

Analysis: Mitigation Measure AQ-2 would reduce greenhouse gases because idling construction equipment produces emissions of greenhouse gas emissions from the exhaust. Shutting off the equipment when not in use would reduce the emissions of greenhouse gases.

AQ-3 During Project construction, the workers should carpool to the greatest extent practical. Workers shall be informed in writing of this requirement. At a minimum, the workers shall leave their vehicles at a central location near the site so that fugitive dust generated by travel on dirt roads is limited.

Analysis: Mitigation Measure AQ-3 encourages the construction crew to carpool thereby reducing the greenhouse gas emissions associated with those vehicle trips.



Source:US Census Data and Riverside County

50 25 0 Miles

NORTH

Michael Brandman Associates

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Exhibit 1
Regional Vicinity Map

COUNTY OF RIVERSIDE • PSEC PROJECT

Source: MBA, 2008

Michael Brandman Associates

NORTH

Exhibit 2
Typical PSEC Comunication Site

SECTION 2: CLIMATE CHANGE

Briefly stated, climate change is a change in the average weather of the earth that may be measured by changes in wind patterns, storms, precipitation, and temperature. These changes are measured using historical records of temperature changes that have occurred in the past, such as during previous ice ages. Many of the recent concerns regarding climate change use this data to extrapolate a level of statistical significance specifically focusing on temperature records from the last 150 years (the Industrial Age) that differ from previous climate changes in rate and magnitude.

The United Nations Intergovernmental Panel on Climate Change (IPCC) constructed several emission trajectories of greenhouse gases needed to stabilize global temperatures and climate change impacts. The IPCC predicted that global mean temperature change from 1990 to 2100, given six scenarios, could range from 1.1 degrees Centigrade (°C) to 6.4°C (IPCC 2007). Regardless of analytical methodology, global average temperature and sea level are expected to rise under all scenarios (IPCC 2007).

2.1 - Greenhouse Gases

Gases that trap heat in the atmosphere are called greenhouse gases. The effect is analogous to the way a greenhouse retains heat. Common greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxides, chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, ozone, and aerosols. Natural processes and human activities emit greenhouse gas. The presence of greenhouse gases in the atmosphere affects the earth's temperature. Without the natural heat-trapping effect of greenhouse gas, the earth's surface would be about 34°C (93°F) cooler (CAT 2006). However, it is believed that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations.

Climate change is driven by forcings and feedbacks. Radiative forcing is the difference between the incoming energy and outgoing energy in the climate system. A feedback is "an internal climate process that amplifies or dampens the climate response to a specific forcing" (NRC 2005). The global warming potential is the potential of a gas or aerosol to trap heat in the atmosphere; it is the "cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas" (EPA 2006a).

Individual greenhouse gas compounds have varying warming potentials and atmospheric lifetimes. The reference gas for the global warming potential is carbon dioxide; as shown in Table 1, carbon dioxide has a global warming potential of one. The calculation of the carbon dioxide equivalent is a consistent methodology for comparing greenhouse gas emissions since it normalizes various greenhouse gas emissions to a consistent metric. Methane's warming potential of 23 indicates that methane has a 23 times greater global warming effect than carbon dioxide on a molecule per

molecule basis. A carbon dioxide equivalent is the mass emissions of an individual greenhouse gas multiplied by its global warming potential.

The atmospheric lifetime and global warming potentials of selected greenhouse gases are summarized in Table 1. As shown in the table, global warming potentials range from 1 (carbon dioxide) to 23,900 (sulfur hexafluoride).

Table 1: Global Warming Potentials and Atmospheric Lifetimes of Select Greenhouse Gases

Greenhouse Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)
Carbon Dioxide (CO_2)	50 to 200	1
Methane (CH_4)	12	23
Nitrous Oxide (N_2O)	114	296
HFC-23	260	12,000
HFC-134a	13.8	1,300
HFC-152a	1.4	120
Sulfur Hexafluoride	3,200	22,200
Source: IPCC 2001.		

Water Vapor

Description: Of all greenhouse gases in the atmosphere, water vapor is the most abundant, important, and variable. It is not considered a pollutant; in the atmosphere, it maintains a climate necessary for life.

Health Effects: There are no health effects from water vapor. When some pollutants are exposed to water vapor, they can dissolve and then the water vapor can be a transport mechanism to enter the human body.

Sources: The main source of water vapor is evaporation from the oceans (JAC 2002). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.

Ozone

Description: Ozone (O_3) is known as a photochemical pollutant. Ozone is a greenhouse gas; however, unlike other greenhouse gases, ozone in the troposphere is relatively short-lived and therefore is not global in nature. It is difficult to make an accurate determination of the contribution of ozone precursors (nitrogen oxides [NO_x] and volatile organic compounds [VOC]) to climate change. Tropospheric ozone changes contribute to radiative forcing on a global scale (IPCC 2007).

Health Effects: Health effects of ozone can include the following: respiratory system irritation, reduction of lung capacity, asthma aggravation, inflammation of and damage to lung cells, aggravated cardiovascular disease, and permanent lung damage. The greatest health risk is to those who are more active outdoors during smoggy periods, such as children, athletes, and outdoor workers. Ozone also damages natural ecosystems such as forests and foothill communities, and damages agricultural crops (EPA 2003).

Sources: Ozone is not emitted directly into the atmosphere, but is formed by a complex series of chemical reactions between VOC, NO_x, and sunlight. VOC and NO_x are emitted from automobiles, solvents and fuel combustion, the sources of which are widespread throughout the South Coast Air Basin. In order to reduce ozone, it is necessary to control emissions of these ozone precursors such as NO_x. Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight. A reduction of ozone precursors reduces ozone. The conditions conducive to the formation of ozone include extended periods of daylight (solar radiation) and hot temperatures. These conditions are prevalent during the summer when thermal inversions are most likely to occur. As a result, summertime conditions of long periods of daylight and hot temperatures form ozone in the greatest quantities. During the summer, thermal inversions trap ozone from dispersing vertically, and high concentrations of this pollutant are prevalent.

Aerosols

Description: Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols.

Health Effects: Particulate matter can be inhaled directly into the lungs where it can be absorbed into the bloodstream. It is a respiratory irritant and can cause direct pulmonary effects such as coughing, bronchitis, lung disease, respiratory illnesses, increased airway reactivity, and exacerbation of asthma (EPA 2003b). Particulate matter is also thought to have direct effects on the health, capacity, and productivity of the heart (EPA 2003b). Relatively recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air (EPA 2003b). Non-health effects include reduced visibility and soiling of property.

Sources: Sulfate aerosols are emitted when fuel containing sulfur is burned. Black carbon (or soot) is emitted during biomass burning and incomplete combustion of fossil fuels. The regulation of particulate matter has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

Carbon Dioxide

Description: Carbon dioxide (CO_2) is an odorless, colorless natural greenhouse gas.

Health Effects: Outdoor levels of carbon dioxide are not high enough to result in negative health effects. The National Institute for Occupational Safety and Health reference exposure level is 5,000 ppm, averaged over 10 hours in a 40-hour workweek. The short-term reference exposure level is 30,000 ppm, averaged over 15 minutes. At those levels, potential health problems are as follows: headache, dizziness, restlessness, paresthesia (skin tingling, prickling, or numbness); dyspnea (breathing difficulty); sweating, malaise (vague feeling of discomfort); increased heart rate, cardiac output, blood pressure; coma; asphyxia; and/or convulsions (NIOSH 2005).

Sources: Carbon dioxide is emitted from natural and anthropogenic sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources are from burning coal, oil, natural gas, and wood. Concentrations of carbon dioxide were 379 ppm in 2005, which is an increase of 1.4 ppm per year since 1960 (IPCC 2007). The concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources (IPCC 2001).

Sinks: Sinks are mechanisms by which a gas or aerosol is taken out of the atmosphere. Carbon dioxide is removed from the air by photosynthesis, dissolution into ocean water, transfer to soils and ice caps, and mineral sequestration into solid carbonate salts (surface limestone or calcium carbonate).

Methane

Description: Methane (CH_4) is a flammable gas and is the main component of natural gas. When one molecule of methane is burned in the presence of oxygen, one molecule of carbon dioxide and two molecules of water are released.

Health Effects: There are no ill health effects from methane. The immediate health hazard is that it may cause burns if it ignites. It is highly flammable and may form explosive mixtures with air. Methane is violently reactive with oxidizers, halogens, and some halogen-containing compounds. Methane is also an asphyxiant and may displace oxygen in an enclosed space (OSHA 2003).

Sources: A natural source of methane is from the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain methane, which is extracted for fuel. Other sources are from landfills, fermentation of manure, and ruminants such as cattle.

Nitrous Oxide

Description: Nitrous oxide (N_2O), also known as laughing gas, is a colorless greenhouse gas.

Health Effects: Higher concentrations can cause dizziness, euphoria, and sometimes-mild hallucinations.

Sources: Nitrous oxide is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used in rocket engines, racecars, and as an aerosol spray propellant.

Chlorofluorocarbons

Description: Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface).

Health Effects: CFCs are no longer being used; therefore, it is not likely that health effects would be experienced. Nonetheless, in confined indoor locations, working with CFC-113 or other CFCs are thought to result in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation (NIOSH 1989).

Sources: CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone; therefore, their production was stopped as required by the Montreal Protocol in 1987.

Hydrofluorocarbons

Description: Hydrofluorocarbons (HFCs) are synthetic man-made chemicals that are used as a substitute for CFCs. Of all the greenhouse gases, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 (CHF_3), HFC-134a (CF_3CH_2F), and HFC-152a (CH_3CHF_2) (EPA 2006b). Prior to 1990, the only significant emissions were HFC-23. HFC-134a use is increasing due to its use as a refrigerant. Concentrations of HFC-23 and HFC-134a are now about 10 parts per trillion (ppt) each (EPA 2006b). Concentrations of HFC-152a are about 1 ppt.

Health Effects: Most HFCs do not have health effects associated with them. For example, 1, 1-difluoroethane (HCFC-152A) does not have any adverse health effects (EPA 1995). However, HFC-134a has a chronic inhalation exposure of 80 mg/m3; the critical effect is Leydig cell hyperplasia (EPA 1995).

Sources: HFCs are man made for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons

Description: Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane

(CF_4) and hexafluoroethane (C_2F_6). Concentrations of CF_4 in the atmosphere are over 70 ppt (EPA 2006b).

Health Effects: High concentrations of CF_4 can cause confusion, dizziness, or headache and may cause effects on the cardiovascular system, resulting in cardiac disorders (NIOSH 1997).

Sources: The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur Hexafluoride

Description: Sulfur hexafluoride is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest global warming potential of any gas evaluated, 23,900. Concentrations in the 1990s were about 4 ppt (EPA 2006b).

Health Effects: In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.

Sources: Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

2.1.1 - Federal Inventory

In 2004, total worldwide greenhouse gas emissions were estimated to be 20,135 $MMTCO_2e$, excluding emissions/removals from land use, land use change, and forestry (UNFCCC 2006). (Note that sinks, or greenhouse gas removal processes, play an important role in the greenhouse gas inventory as forest and other land uses absorb carbon.) In 2004, greenhouse gas emissions in the U.S. were 7,074.4 $MMTCO_2e$ (EPA 2006a). In 2005, total U.S. greenhouse gas emissions were 7,260.4 $MMTCO_2e$, a 16.3 percent increase from 1990 emissions, while U.S. gross domestic product has increased by 55 percent over the same period (EPA 2007a). Emissions rose from 2004 to 2005, increasing by 0.8 percent. The main causes of the increase are believed to be: (1) strong economic growth in 2005, leading to increased demand for electricity, and (2) an increase in the demand for electricity due to warmer summer conditions (EPA 2007a). However, a decrease in demand for fuels due to warmer winter conditions and higher fuel prices moderated the increase in emissions (EPA 2007a).

2.1.2 - State Inventory

California is a substantial contributor of greenhouse gases as it is the second largest contributor in the U.S. and the sixteenth largest in the world (CEC 2006). In 2004, California produced 500 $MMTCO_2e$ (CEC 2007), including imported electricity and excluding combustion of international fuels and carbon sinks or storage, which is approximately 7 percent of U.S. emissions. The major source of greenhouse gases in California is transportation, contributing 41 percent of the State's total

greenhouse gas emissions (CEC 2006). Electricity generation is the second largest source, contributing 22 percent of the State's greenhouse gas emissions (CEC 2006).

2.1.3 - Local Inventory

The Project sites are located within Riverside, San Bernardino, Orange, and San Diego Counties. The Project sites are within the jurisdiction of the South Coast Air Quality Management District (SCAQMD) and the Mojave Desert Air Quality Management District (MDAQMD). Neither the counties nor the districts have prepared a local inventory of greenhouse gas emissions for the sources within their jurisdictions.

2.2 - Regulatory Environment

2.2.1 - International and Federal

International and Federal agreements have been enacted to deal with global climate change issues. In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change to assess "the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation" (IPCC 2004).

On March 21, 1994, the United States joined a number of countries around the world in signing the United Nations Framework Convention on Climate Change. Under the Convention, governments do the following: gather and share information on greenhouse gas emissions, national policies, and best practices; launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change (UNFCCC 2007).

A particularly notable result of the United Nations Framework Convention on Climate Change efforts was a treaty known as the Kyoto Protocol, which went into effect on February 16, 2005. When countries sign the treaty, they demonstrate their commitment to reduce their emissions of greenhouse gases or engage in emissions trading. More than 170 countries are currently participating in the Protocol. Industrialized countries have to reduce their greenhouse gas emissions by on average 5 percent below their 1990 levels by 2012.

The reduction targets established in the Kyoto Protocol can be met by reducing domestic greenhouse gas emissions, or by utilizing three mechanisms allowed under the Kyoto Protocol: Emissions Trading, Joint Implementation, and the Clean Development Mechanism. Joint Implementation is a mechanism for transfer of emissions permits from one Annex B country to another. The Clean Development Mechanism allows project-based emission reduction activities in developing countries. Certificates are generated through this mechanism from projects that lead to certifiable emissions reductions that would otherwise not occur.

In 1998, United States Vice President Al Gore symbolically signed the Protocol; however, in order for the Protocol to be formally ratified, it must be ratified by the United States Congress. Congress did not do this during the Clinton Administration, and the current US President, George W. Bush, has indicated that he does not intend to submit the treaty for ratification.

In October 1993, President Clinton announced his Climate Change Action Plan, which had a goal to return greenhouse gas emissions to 1990 levels by the year 2000. This was to be accomplished through 50 initiatives that relied on innovative voluntary partnerships between the private sector and government aimed at producing cost-effective reductions in greenhouse gas emissions.

The EPA currently does not regulate greenhouse gas emissions from motor vehicles. *Massachusetts v. EPA* (Supreme Court Case 05-1120) was argued before the United States Supreme Court on November 29, 2006, in which it was petitioned that the EPA regulate four greenhouse gases, including carbon dioxide, under Section 202(a)(1) of the Clean Air Act. A decision was made on April 2, 2007, in which the Court held that petitioners have a standing to challenge the EPA and that the EPA has statutory authority to regulate emissions of greenhouse gases from new motor vehicles.

2.2.2 - California

There has been significant legislative and regulatory activity regarding climate change and greenhouse gases in California. Although it was not originally intended to reduce greenhouse gases, California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The latest amendments were made in October 2005 and currently require new homes to use half the energy they used only a decade ago. Energy efficient buildings require less electricity, and electricity production by fossil fuels results in greenhouse gas emissions. Therefore, increased energy efficiency results in decreased greenhouse gas emissions.

California Assembly Bill 1493 (Pavley), enacted on July 22, 2002, required the ARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. Regulations adopted by the ARB would apply to 2009 and later model year vehicles. The ARB estimates that the regulation would reduce climate change emissions from the light-duty passenger vehicle fleet by an estimated 18 percent in 2020 and by 27 percent in 2030 (ARB, 2004).

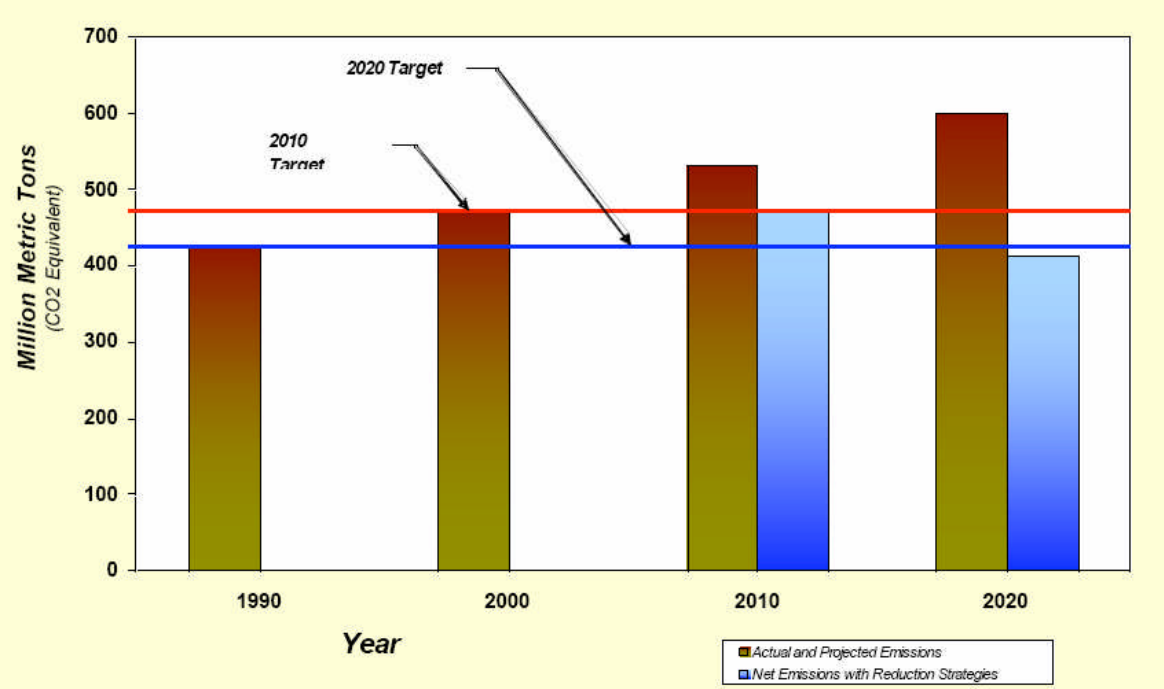
California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following greenhouse gas emission reduction targets:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels (CA 2005).

To meet these targets, the Governor directed the Secretary of the California EPA to lead a Climate Action Team (CAT) made up of representatives from the Business, Transportation and Housing Agency; the Department of Food and Agriculture; the Resources Agency; the Air Resources Board; the Energy Commission; and the Public Utilities Commission. The CAT's Report to the Governor in 2006 contains recommendations and strategies to help ensure the targets in Executive Order S-3-05 are met (CAT 2006).

The CAT Report (2006) contains baseline emissions as estimated by the ARB and the California Energy Commission, as shown in Exhibit 3 below.

Exhibit 3: California Greenhouse Gas Emissions



Source: State of California, Environmental Protection Agency, Climate Action Team. March 2006. Climate Action Team Report to Governor Schwarzenegger and the California Legislature. (CAT 2006).

Executive Order S-01-07 was signed by the Governor on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. It also requires that a Low Carbon Fuel Standard for transportation fuels be established for California.

In 2006, the State Legislature adopted Senate Bill 1368 ("SB 1368"), which was subsequently signed into law by the Governor. SB 1368 directs the California Public Utilities Commission to adopt a greenhouse gas emission performance standard for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by

forbidding procurement arrangements for energy longer than five years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Due to the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as natural gas, combined cycle plants. Accordingly, the new law will effectively prevent California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. Thus, SB 1368 will lead to dramatically lower greenhouse gas emissions associated with California energy demand, as SB 1368 will effectively prohibit California utilities from purchasing power from out of state producers that cannot satisfy the greenhouse gas emission performance standard required by SB 1368.

SB 97 was passed in August 2007 and added Section 21083.05 to the Public Resources Code, "(a) On or before July 1, 2009, the Office of Planning and Research shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the Office of Planning and Research pursuant to subdivision (a)." Section 21097 was also added to the Public Resources Code and indicates that the failure to analyze adequately the effects of greenhouse gases in a document related to the environmental review of a transportation project funded under the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 does not create a cause of action for a violation. However, SB 97 does not safeguard non-transportation funded projects from being challenged in court for omitting a climate change analysis.

AB 32

In 2006, the California State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 focuses on reducing greenhouse gas emissions in California. Greenhouse gases, as defined under AB 32, include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. AB 32 requires that greenhouse gases emitted in California be reduced to 1990 levels by the year 2020. ARB is the state agency charged with monitoring and regulating sources of emissions of greenhouse gases that cause global warming in order to reduce emissions of greenhouse gases. AB 32 requires that by January 1, 2008, ARB must determine what the statewide greenhouse gas emissions level was in 1990, and it must approve a statewide greenhouse gas emissions limit so it may be applied to the 2020 benchmark.

The ARB Board approved the 1990 greenhouse gas emissions level of 427 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) on December 6, 2007. Therefore, in 2020, emissions in California are required to be at or below 427 $MMTCO_2e$.

Under AB 32, the ARB published its Final Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California (ARB 2007). Discrete early action measures are currently underway or are enforceable by January 1, 2010. Early action measures are regulatory or non-

regulatory and are currently underway or to be initiated by the ARB in the 2007 to 2012 timeframe. The ARB has 44 early action measures that apply to the transportation, commercial, forestry, agriculture, cement, oil and gas, fire suppression, fuels, education, energy efficiency, electricity, and waste sectors. Of those early action measures, nine are considered discrete early action measures, as they are regulatory and enforceable by January 1, 2010. The ARB estimates that the 44 recommendations are expected to result in reductions of at least 42 $MMTCO_2e$ by 2020, representing approximately 25 percent of the 2020 target. CEQA is only mentioned once in the Early Action Measures report. The California Air Pollution Control Officer's Association suggested that ARB work with local air districts on approaches to the review of greenhouse gas impacts under the CEQA process, including greenhouse gas significance thresholds for projects, and to develop a process for the capturing of reductions that result from CEQA mitigations. ARB's response to this recommendation in the report is as follows: "the Governor's Office of Planning and Research is charged with providing statewide guidance on CEQA implementation. With respect to quantifying any reductions that result from project-level mitigation of greenhouse gas emissions, we would like to see air districts take a lead role in tracking such reductions in their regions" (ARB 2007).

Under AB 32, the ARB has the primary responsibility for reducing greenhouse gas emissions. However, the CAT Report contains strategies that many other California agencies can take. The CAT published a public review draft of Proposed Early Actions to Mitigate Climate Change in California (CAT 2007). Most of the strategies were in the 2006 CAT Report or are similar to the 2006 CAT strategies.

2.2.3 - Local Public Agencies

The Project sites are located within Riverside, San Bernardino, Orange, and San Diego Counties. The Project sites are within the jurisdiction of the SCAQMD and the MDAQMD. Neither the counties nor the districts have prepared greenhouse gas reduction plans.

2.3 - Emissions Trading and Carbon Offset Programs

Current and future emissions trading programs as well as carbon offset programs are discussed below.

2.3.1 - Emissions Trading Programs

An emissions trading (or cap and trade) program is an approach for controlling emissions by providing economic incentives for reducing emissions. Typically, a limit (or cap) is placed on the quantity of greenhouse gas emissions that can be emitted per year. The source emitters are then issued permits by the governing authority for a certain allowance of emissions. Source emitters can reduce their own emissions and sell the excess or they can continue to emit high levels and purchase credits from another facility (a trade). There are several uncertainties regarding trading programs. Allowances need to be set at proper levels when a cap and trade program is initialized. Another uncertainty is deciding who is regulated (i.e., power plants, transportation sector, etc.).

Existing Carbon Trading Program

The European Union Greenhouse Gas Emission Trading Scheme (EU ETS) is one of three mechanisms under the Kyoto Protocol to reduce emissions in the European Union. The other two mechanisms are called Joint Implementation and the Clean Development Mechanism. The EU ETS is examined herein to provide background information on how a trading system in California or the United States may work or end up over time. Note that the EU ETS does not apply to or reduce emissions generated in the United States.

The EU ETS commenced operation in 2005 as the largest multi-country, multi-sector greenhouse gas emission trading program worldwide. The mandatory trading system covers over 11,500 facilities in Europe (EUETS 2007). The EU ETS covers half of the European Union's emissions of carbon dioxide and 40 percent of its total greenhouse gas emissions.

The National Allocation Plans determine the total quantity of carbon dioxide emissions that Member States grant to their companies, which can then be sold or bought by the companies themselves. This means each Member State must decide how many allowances to allocate in total for a trading period and how to distribute those allowances. The first trading period runs from 2005-2007, the second one from 2008-2012, and the third one will start in 2013 (EUETS 2007). The first trading period covered only carbon dioxide emissions from large emitters in the power and heat generation industry and in selected energy-intensive industrial sectors: combustion plants, oil refineries, coke ovens, iron and steel plants and factories making cement, glass, lime, bricks, ceramics, pulp, and paper. The second period will also include nitrous oxide emissions.

The transportation sector and direct emissions from the commercial and residential sector are not included in the cap (MAC 2007). The EU relies on policies and measures apart from the emissions trading system to reduce emissions from uncovered sectors. For example, taxes on gasoline are considerably higher than those in California, leading to prices over $6 per gallon (MAC 2007).

The number of second period allowances is less than the first phase period. In the United Kingdom, the reduction in allowances for Phase II is to be borne by Large Electricity Producers, as in Phase I, because the public can carry the cost by increased energy rates (DEFRA 2007).

The allowances allotted through the EU ETS can be traded at Carbon Trading Exchanges, including but not limited to the following: European Climate Exchange; European Energy Exchange (ECX); Energy Exchange Austria; Nord Pool; and Bluenext. The price per metric ton in the European markets is currently around 20 Euros (± $29).

Future Carbon Trading Programs

Future trading programs currently being developed include the Western Climate Initiative, the Regional Greenhouse Gas Initiative, and a cap and trade system for California.

Western Climate Initiative

The Western Climate Initiative (WCI) was signed on February 26, 2007 by five states: Washington, Oregon, Arizona, New Mexico, and California. British Columbia, Canada joined on April 20, 2007. Members of the Initiative plan on collaborating to identify, evaluate, and implement ways to reduce greenhouse gas emissions in the states collectively and to achieve related co-benefits. Members also plan to design a regional market-based multi-sector mechanism, such as a load-based cap and trade program, by August 2008. In addition, a multi-state registry will track, manage, and credit entities that reduce greenhouse gas emissions. The Initiative published its regional greenhouse gas reduction goals on August 22, 2007, which include a reduction of 15 percent below 2005 levels by 2020 (WCI 2007).

The WCI has prepared documents on the variety of approaches that can be used within the trading program. They explored the feasibility of utilizing carbon offsets by listing the advantages and disadvantages of an offset program (WCI 2008).

Regional Greenhouse Gas Initiative

The Regional Greenhouse Gas Initiative (RGGI) is an agreement between nine northeastern states to institute a mandatory carbon dioxide reduction program. The goal of the RGGI is to reduce the member states carbon dioxide production from the power sector by 10 percent between 2009 and 2018. The program will cover fossil fuel electricity generation stations larger than 25 megawatts (RGGI 2008).

Cap and Trade Program in California

California is exploring the possibility of a cap and trade system for greenhouse gases. The Market Advisory Committee to the ARB published recommendations for designing a mandatory greenhouse gas cap and trade system for California (MAC 2007), as follows:

- The program should eventually include all major greenhouse gas-emitting sectors of the economy in the cap-and-trade program.
- To address emissions associated with imported electricity within a state-based cap-and-trade program, the Committee recommends a “first-seller approach.” Under this approach, the entity that first sells electricity in the state is responsible to meet the compliance obligation established under the greenhouse gas cap-and-trade program.
- The Committee recommends a combined approach in which some share of allowances is allocated free of charge initially, while the remaining allowances are auctioned. The percentage of allowances auctioned should then increase over time.
- The Committee recommends that California’s cap-and-trade program recognize offsets generated both within and outside the state’s borders.
- California should encourage linkages with other mandatory greenhouse gas cap-and-trade systems.

- The Committee recommends the use of very stringent criteria for determining whether activities qualify as offsets. (MAC 2007)

The program could include the upstream transportation sector, which would regulate petroleum refiners and importers of refined products. It could also cover the distribution of natural gas.

2.3.2 - Carbon Offset Programs

Carbon offset programs allow entities to purchase carbon offsets. Carbon offsets are designed to fund programs that reduce greenhouse gas emissions, such as digesters on dairy farms that capture and reuse methane gas. There are different sources for purchasing carbon offsets, as discussed below.

Chicago Climate Exchange

The Chicago Climate Exchange (CCX) is currently North America's only marketplace for integrating voluntary legally binding emissions reductions with emissions trading and offsets (CCX 2008). The commodity traded at CCX is the CFI contract, each of which represents one $MTCO_2e$. Trading volumes have increased since the CCX was established in 2003. The price of a CFI has ranged from \$1 to \$4.50 per $MTCO_2e$. The price on February 13, 2008 was \$4.45.

Entities can also become members of the CCX. Members agree to reduce their direct emissions by 2010 by 6 percent. Direct emissions result from the on-site combustion of fossil fuels, such as natural gas to power industrial operations and gasoline to operate vehicle fleets. Indirect emissions result from energy purchases, such as electricity, and their corresponding emissions.

The offsets available through the CCX are verified by a third party annually. The types of offsets available through the CCX include the following:

- Agricultural methane;
- Coal mine methane;
- Landfill methane;
- Agricultural soil carbon;
- Rangeland soil carbon management;
- Forestry;
- Renewable energy; and
- Ozone depleting substance destruction.

Carbon Finance at the World Bank

The World Bank is facilitating the development of a carbon market thorough managing carbon funds to finance sustainable development in developing countries (WB 2006). One of the funds is called the Prototype Carbon Fund, which promotes sustainable development and has 29.8 million metric tons of carbon dioxide equivalents under contract.

Other Offset Providers

There are a variety of carbon offset providers, including but not limited to the following.

- TerraPass funds clean energy produced by wind power, farm power, and landfill gas capture. An independent third party verifies the projects. The cost to offset is approximately $10 to $11 per ton.
- Carbonfund.org has a current price per ton of $5.50. It funds renewable energy, energy efficiency, and reforestation projects. Carbonfund.org indicates that it has third party verification of the offsets.
- Climate Care is based in the United Kingdom. It focuses on small-scale renewable energy and efficiency projects in developing countries. It addresses additionality in its project selection criteria and implementation procedures.
- Climate Trust is based out of Portland, Oregon. Its projects include energy efficiency, renewable energy, sequestration (reforestation), fuel replacement, cogeneration, material substitution, and transportation efficiency (i.e., truck stop electrification, internet-based carpool matching, traffic signals optimization). The cost per ton is currently $11 per metric ton.
- AgCert International funds anaerobic digestion projects in Brazil, Mexico, Argentina, and Chile.

Independent Offset Acquisition

A company can choose to obtain its own offsets independently, either by developing its own emission reduction projects or by securing long-term rights from another emitter. The benefits of acquiring offsets independently could mean that any economic benefits that arise from the projects could potentially be shared with the purchaser. However, there could be long lead times for the offset projects, which could mean that the benefits may not be available until after 2011 or later. Also, offset developers may not be interested in selling or may request an unreasonably large price for such offsets. The administrative costs of independent offset acquisition may also be higher than obtaining them directly from an offset provider. There is also risk in that the offset project may reduce less emissions than anticipated.

The types of projects that the developer can obtain are similar to those offered by the offset providers, and include renewable energy projects (solar or wind), agricultural projects (installation of biodigesters, which trap methane released and convert it to electricity), or landfill gas recovery.

SECTION 3: THRESHOLDS OF SIGNIFICANCE

The thresholds and the analyses contained in this report may not be relevant to other projects. Therefore, this analysis does not establish thresholds or set precedents for the type of assessment in a climate change analysis.

CEQA requires that Lead Agencies inform decision makers and the public regarding potential significant environmental effects of Projects and feasible ways that environmental damage can be avoided or reduced, through the use of feasible mitigation measures and/or project alternatives, and disclose the reasons why the Lead Agency approved a project if significant environmental effects are involved (CEQA Guidelines Section 15002). CEQA also requires Lead Agencies to evaluate potential environmental effects based on, to the fullest extent possible, scientific and factual data (CEQA Guidelines Section 15064[b]). Significance conclusions must be based on substantial evidence, which includes facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts (CEQA Guidelines Section 15064f [5]).

There are currently no published thresholds of significance established by any state or regional regulatory agency for measuring the impact of climate change on or from a project. SB 97 requires the Office of Planning and Research to develop CEQA guidelines for greenhouse gas emissions by January 1, 2010. However, CEQA Guidelines Section 15064.7 indicates, "each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects."

On January 8, 2008, the California Air Pollution Control Officers Association (CAPCOA) released a paper to provide a common platform of information and tools for public agencies. It is not a guidance document but a resource to enable local decision makers to make the best decisions they can in the face of incomplete information during a period of change. The paper is an interim resource and CAPCOA does not endorse any particular approach. It discusses three groups of potential thresholds, including a no significance threshold, a threshold of zero, and a non-zero threshold (CAPCOA 2008).

The following threshold is used for this analysis:

> Does the project comply with the provisions of an adopted Greenhouse Gas Reduction Plan or Strategy? If no such Plan or Strategy is applicable, would the project significantly hinder or delay California's ability to meet the reduction targets contained in AB 32?

In addition, this report also discusses the two following issues:

1. Would the impacts of climate change significantly impact the Project?
2. What is the environmentally superior alternative to the Project?

SECTION 4: IMPACT ANALYSIS

The following impact analysis addresses climate change on a project-level and cumulative-level. Impacts to the Project from climate change are also addressed.

4.1 - Project-Level Analysis

The following approach is used to address the impact of the Project on climate change:

1. *Inventory*: Generate an inventory of greenhouse gas emissions emitted during construction and operation.
2. *Onsite mitigation measures*: Mitigation measures and strategies from various sources are reviewed to determine the applicability and feasibility of such measures to reduce Project related greenhouse gas emissions.
3. *Offsite carbon offsets*: The feasibility of carbon offsets is explored.
4. *Determination of significance*: The level of significance before and after mitigation is determined.

4.1.1 - Project Inventory of Greenhouse Gases

An inventory of construction and operation-related greenhouse gas emissions generated by the Project is presented below.

Construction

The Project would emit greenhouse gases from upstream emission sources (the manufacture of building materials such as cement) and direct sources (combustion of fuels from worker vehicles and construction equipment).

An upstream emission source refers to emissions that were generated during the manufacture of products to be used for construction of the Project. Upstream emission sources for the Project include but are not limited to the following: emissions from the manufacture of cement; emissions from the manufacture of steel; and/or emissions from the transportation of building materials in other countries. The upstream emissions were not estimated because of the uncertainty associated with them.

Emissions from the combustion of fuel from construction equipment and associated worker vehicles were estimated using URBEMIS2007 as discussed in the Air Quality Analysis Report prepared by MBA for the Project (MBA 2008). The emissions of carbon dioxide from Project construction equipment and worker vehicles are shown in Table 2 below. Emissions of nitrous oxide and methane are negligible. As shown in Table 2, emissions to construct all sites total 2,750 $MTCO_2e$.

Table 2: Construction Exhaust Greenhouse Gas Emissions (Unmitigated)

Source	Carbon Dioxide Emissions (tons)	Emissions ($MTCO_2e$)
One site		
Grading/Excavation	16	15
Building	44	40
All sites (50 sites)		
Grading/Excavation	800	750
Building	2,200	2,000
Total - all sites	3,000	2,750
$MTCO_2e$ = (tons/year) * 0.9072 = metric tons of carbon dioxide equivalent		

Operation

Operational, or long-term, emissions occur over the life of the Project. The only sources of operational emission from the Project are from generators and worker trips to the sites for site maintenance.

Fifty sites would have propane generators installed. The generators would be for standby emergency use only in the event of power failure. These generators automatically run for 30 minutes each week for maintenance and system checks. All generators in the current system run at the same time on Tuesdays. The remainder of the sites will connect to commercial power. Two sites would operate generators full time for power, Santa Rosa Peak and Spring Hill. They are both located in the SCAQMD jurisdiction in the Salton Sea Air Basin. Santa Rosa Peak is the only location that would use diesel fuel to run its generator. Propane tanks automatically send a signal for refill once they are below 55 percent capacity. For standby generators, this may occur only every six months. For the generators that run full time, refills could occur as frequently as once per month.

Propane is normally a gas but can be compressed to a liquid to be transportable. It is made from petroleum products during oil or natural gas processing. It is commonly known as liquefied petroleum gas (LPG or LP-gas), which is a mixture of propane and small amounts of propylene, butane, and butylene. There is also an odorant added so that people can smell it if there is a leak. The propane tanks can hold typically 2,000 gallons of LPG.

Emission factors for the generator exhaust emissions are from the EPA model, NONROAD (EPA 2005). The emission factors are for diesel and propane gas generator sets for a horsepower between 50 and 75 horsepower. The emission factors demonstrate that LPG emits more carbon dioxide emissions compared with diesel generators. However, it has been shown that use of LPG in applications such as distributed generation, irrigation pumps, and forklifts results in fewer carbon dioxide emissions (PC 2007).

Typically, a maintenance technician will visit a site once per month for standard maintenance of the radio equipment and refills of propane. If there is an outage or a problem, they will be dispatched as needed. The emissions from the maintenance worker vehicles were estimated using URBEMIS2007, as operational emissions.

The primary electrical draw at communication sites is usually not the electronic equipment, but rather the HVAC units required to maintain the electronics at a suitable temperature. The electrical current draw for air conditioning units in particular can be significant, and a constant supply of electricity is required. The amount of electricity to be generated by each site was estimated using emission factors from the California Energy Commission for a large office. The emissions from the offsite electricity generation were then estimated using emission factors from the California Climate Action Registry.

Air conditioning units can leak small amounts of the air refrigerant, which is a greenhouse gas. These emissions were estimated based on 100 units total (two per site). Under the Montreal Protocol, the U.S. is planning to phase out HCFC-22 and HCFC-142b by the year 2010 (EPA 2008b). Mitigation measure CC-2 would ensure compliance with this phase out.

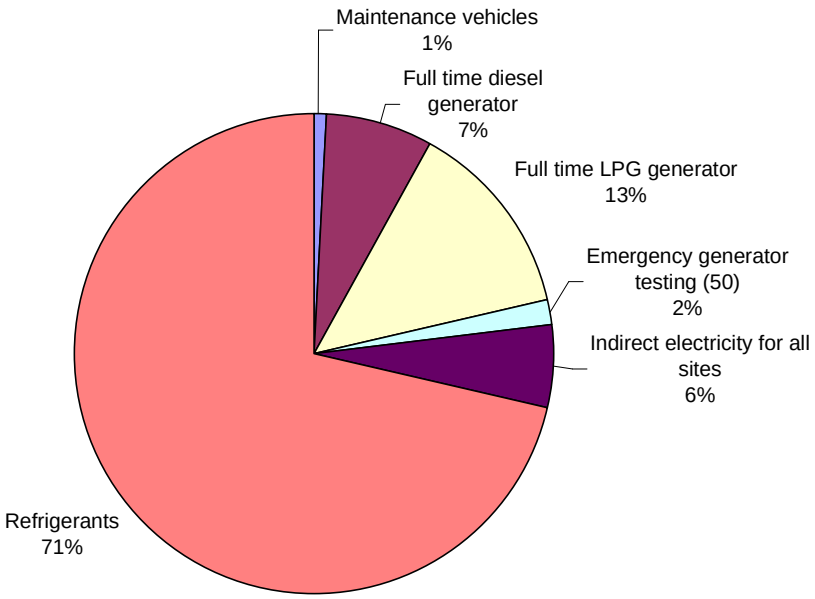
A summary of the anticipated greenhouse gas emissions from operation of the Project is presented in Table 3. As shown in Table 3, emissions are approximately 1,820 $MTCO_2e$ per year. As shown in Exhibit 4, the main source of greenhouse gas emissions is from the full time generators.

Table 3: Project Operational Greenhouse Gas Emissions (Unmitigated)

Source	Carbon Dioxide Emissions (tons per year)	Emissions ($MTCO_2e$ per year)
Maintenance vehicles	19	17
Full time diesel generator	146	132
Full time LPG generator	262	238
Emergency generator testing (50)	39	35
Indirect electricity for all sites	111	101
Refrigerants	**	1,297
Total	**577**	**1,820**

$MTCO_2e$ = (tons/year) * (0.9072) * global warming potential = metric tons of carbon dioxide equivalent
** Note that fugitive refrigerant emissions are not carbon dioxide emissions, but HCFCs, which have a greater global warming potential.
Source: URBEMIS2007 and spreadsheets contained in Appendix A.

Exhibit 4: Project Operational Greenhouse Gas Emissions



Negligible Greenhouse Gas Emissions

The Project does not contribute substantially to water vapor because water vapor concentrations in the upper atmosphere are primarily due to climate feedbacks rather than emissions from Project-related activities.

Ozone is a greenhouse gas; however, unlike the other greenhouse gases, ozone in the troposphere is relatively short-lived and can be reduced in the troposphere on a daily basis. Therefore, it is assumed that Project emissions of ozone precursors would not significantly contribute to climate change.

As mentioned previously, there is a ban on chlorofluorocarbons; therefore, the Project would not generate emissions of these greenhouse gases and they are not considered any further in this analysis.

Perfluorocarbons and sulfur hexafluoride are typically used in industrial applications, none of which would be used by the Project. Therefore, it is not anticipated that the Project would emit any of these greenhouse gases.

4.1.2 - Onsite Greenhouse Gas Reduction Options

As shown in the inventory above, the main source of greenhouse gas emissions are from the refrigerants and from the full-time generators.

Although not required by statute or regulation, there are voluntary greenhouse gas reduction strategies available for projects to reduce greenhouse gas emissions. The California Climate Action Team has

suggested strategies to reduce greenhouse gas emissions. These policies and measures are assessed below to determine the applicability and feasibility of such reduction measures to the Project.

California Climate Action Team Strategies

In 2005, the Governor's Executive Order S-3-05 set greenhouse gas emission reduction targets as follows:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels (CA 2005).

AB 32 has the same reduction target as the second item in Executive Order S-3-05, to reduce the State's emissions to 1990 levels by 2020.

The 2006 CAT Report is not in response to AB 32; however, the 2006 CAT Report introduces strategies that can be implemented by the ARB and other California agencies to reduce California's emissions to 1990 levels by 2020, which is the same target for AB 32. In addition, the 2006 CAT Report is consistent with the intent of AB 32. AB 32 contains a timeline for development and approval of strategies to reduce state emissions. The bulk of the strategies are not yet developed. Therefore, in the absence of climate change thresholds and standards, the strategies published in the 2006 CAT Report in response to Executive Order S-3-05 are used for this analysis because it contains the most complete list of strategies as of the date of this analysis.

Some of the State strategies in the 2006 CAT Report could be used to reduce greenhouse gas emissions from the Project, as shown in Table 4. Most of the strategies do not apply to the Project because they deal with statewide issues and are not directly intended to guide specific individual projects. Some of the strategies, however, have components that could be used with respect to specific individual projects. Table 4, therefore, sets forth those strategies that are not applicable as well as those that could be applied and analyzes the Project's consistency or applicability to each of the strategies.

Other Reduction Options

Other reduction options and potential mitigation measures were assessed, including the California Office of the Attorney General (AG 2008). Many of the measures are not applicable and/or not feasible for the Project. The feasible measures are contained as mitigation measures (see Section 1.2).

Table 4: California Greenhouse Gas Emission Reduction Strategies

Strategy	Project Consistency/Applicability
Vehicle Climate Change Standards: AB 1493 (Pavley) required the state to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of climate change emissions emitted by passenger vehicles and light duty trucks. Regulations were adopted by the ARB in September 2004.	**Not applicable.**
Other Light-Duty Vehicle Technology: New standards would be adopted to phase in beginning in the 2017 model.	**Not applicable.**
Heavy-Duty Vehicle Emission Reduction Measures: Increased efficiency in the design of heavy-duty vehicles and an education program for the heavy-duty vehicle sector.	**Not applicable.**
Diesel Anti-Idling: In July 2004, the ARB adopted a measure to limit diesel-fueled commercial motor vehicle idling.	**Not applicable.** The project would not be associated with commercial diesel-fueled vehicles.
Hydrofluorocarbon Reduction: 1) Ban retail sale of HFC in small cans; 2) Require that only low global warming potential refrigerants be used in new vehicular systems; 3) Adopt specifications for new commercial refrigeration; 4) Add refrigerant leak-tightness to the pass criteria for vehicular Inspection and Maintenance programs; 5) Enforce federal ban on releasing HFCs.	**Not applicable.**
Transportation Refrigeration Units (TRU), Off-Road Electrification, Port Electrification: Strategies to reduce emissions from TRUs, increase off-road electrification, and increase use of shore-side/port electrification.	**Not applicable.**
Manure Management: The proposed San Joaquin Valley Rule 4570 will reduce volatile organic compounds from confined animal facilities through implementation of control options.	**Not applicable.**
Alternative Fuels - Biodiesel Blends: ARB would develop regulations to require the use of 1 to 4 percent biodiesel displacement of California diesel fuel.	**Not applicable.**
Alternative Fuels - Ethanol: Increased use of ethanol fuel.	**Not applicable.**
Achieve 50 percent Statewide Recycling Goal: Achieving the State's 50 percent waste diversion mandate as established by the Integrated Waste Management Act of 1989, (AB 939, Sher, Chapter 1095, Statutes of 1989), will reduce climate change emissions associated with energy intensive material extraction and production as well as methane emission from landfills. A diversion rate of 48 percent has been achieved on a statewide basis. Therefore, a 2 percent additional reduction is needed.	**Not applicable.** The Project would not generate a substantial amount of waste.
Zero Waste - High Recycling: Additional recycling beyond the State's 50 percent recycling goal.	**Not applicable.** The Project would not generate a substantial amount of waste.
Landfill Methane Capture: Install direct gas use or electricity projects at landfills to capture and use emitted methane.	**Not applicable.**

Table 4 (Cont.): California Greenhouse Gas Emission Reduction Strategies

Strategy	Project Consistency/Applicability
Urban Forestry: A new statewide goal of planting 5 million trees in urban areas by 2020 would be achieved through the expansion of local urban forestry programs.	**Not applicable.**
Afforestation/Reforestation Projects: Reforestation projects focus on restoring native tree cover on lands that were previously forested and are now covered with other vegetative types.	**Not applicable.**
Water Use Efficiency: Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce greenhouse gas emissions.	**Not applicable.** The Project would not use a substantial amount of water.
Building Energy Efficiency Standards in Place and in Progress: Public Resources Code 25402 authorizes the CEC to adopt and periodically update its building energy efficiency standards (that apply to newly constructed buildings and additions to and alterations to existing buildings).	**Not applicable.** However, the Project is required to comply with current Title 24 Energy Requirements.
Appliance Energy Efficiency Standards in Place and in Progress: Public Resources Code 25402 authorizes the Energy Commission to adopt and periodically update its appliance energy efficiency standards (that apply to devices and equipment using energy that are sold or offered for sale in California).	**Not applicable.**
Cement Manufacturing: Cost-effective reductions to reduce energy consumption and to lower carbon dioxide emissions in the cement industry.	**Not applicable.** The Project is not involved in the manufacturing of cement.
Smart Land Use and Intelligent Transportation Systems (ITS): Smart land use, demand management, ITS, and value pricing are critical elements for improving mobility and transportation efficiency. Specific strategies include: promoting jobs/housing proximity and transit-oriented development; encouraging high density residential/commercial development along transit/rail corridor; valuing and congestion pricing; implementing intelligent transportation systems, traveler information/traffic control, incident management; accelerating the development of broadband infrastructure; and comprehensive, integrated, multimodal/intermodal transportation planning.	**Not applicable.** The Project does not involve the construction of residential or commercial uses.
Enteric Fermentation: Cattle emit methane from digestion processes. Changes in diet could result in a reduction in emissions.	**Not applicable.** The Project would not involve cattle.
Green Buildings Initiative: Green Building Executive Order, S-20-04 (CA 2004), sets a goal of reducing energy use in public and private buildings by 20 percent by the year 2015, as compared with 2003 levels.	**Not applicable.** However, the Project is required to comply with current Title 24 Energy Requirements.

Table 4 (Cont.): California Greenhouse Gas Emission Reduction Strategies

Strategy	Project Consistency/Applicability
California Solar Initiative: Installation of 1 million solar roofs or an equivalent 3,000 MW by 2017 on homes and businesses; increased use of solar thermal systems to offset the increasing demand for natural gas; use of advanced metering in solar applications; and creation of a funding source that can provide rebates over 10 years through a declining incentive schedule.	**Not applicable.** The County has investigated the use of solar power to provide power to the two sites that require full time generators, but has determined that the provision of solar power is not feasible. The size of the solar panel arrays that would be required to generate sufficient power would be enormous, and would add significantly to the site footprint and the aesthetic impacts at the sites. The arrays would be vulnerable to vandalism and other damage, and would not be able to guarantee the reliability that is required for an emergency services communication system. For these reasons, the County is not proposing the use of solar power at these locations.
Source: State of California, Environmental Protection Agency, Climate Action Team, 2006.	

4.1.3 - Offsite Greenhouse Gas Reduction Options

Section 2.3 discusses an existing cap and trade program in the European Union as well as potential future cap and trade programs through the Western Climate Initiative, the Regional Greenhouse Gas Initiative, and a future program in California through ARB. There is currently no mandatory cap and trade program within the project area.

The emissions generated by the Project would not likely be covered under a cap and trade program, even if both the ARB cap and trade system and the Western Climate Initiative cap and trade system were initiated. At this time, entities can offset their greenhouse gas emissions by voluntarily purchasing offsets, which consist of programs that reduce greenhouse gas emissions offsite. Examples of programs that reduce greenhouse gas emissions include installation of digesters on dairy farms to capture the methane released or installation of a wind farm to generate "clean" electricity.

Current offset programs within the United States are described in Section 2.3. The offset providers described are not based within California. Additionally, it is not known whether or not the offset programs would reduce emissions within California.

Offset Uncertainties and Criticisms

There are a number of uncertainties associated with purchasing offsets, including the permanence, price fluctuations, ownership, verification, and additionality.

The permanence of the offsets refers to how long the offset is valid. Are the offsets only good for a year, or are they good as long as the offset project is running? What if the offset is used to purchase land and plant trees? Would the trees be cut or burned down?

Another uncertainty is regarding price fluctuations. The current carbon offset market in the U.S. varies in price from $4.50 to $11 per metric ton. As discussed in Section 2.3, the price in the European market is currently as high as $30 per metric ton. One of the reasons for the variation in pricing could be due to the fact that there is a mandatory cap and trade system in the European Union. Some indicate, "considerable uncertainty exists regarding the long-term outlook for carbon and energy markets, driven by the dynamic and the complex relationships between these markets" (PC 2008). Additionally, it is unknown if the CCX is going to allow for trading beyond the year 2010.

Ownership of the offsets is important, so that the offsets are not re-sold. Registration of the offsets is a method to ensure that the offsets are not sold more than once.

Verification is an important step to make sure the offsets are real. However, there is no universally accepted standard for verification, which has led to various verification methodologies. Many third party verification companies use their own internal methods (that are often proprietary) to verify offsets. This can lead to uncertainty regarding the validity of the offsets.

Additionality refers to additional steps taken to reducing greenhouse gas emissions beyond business as usual. For example, was a solar powered farm going to be constructed anyway, or is the carbon market providing the funding necessary to build it? Determining additionality can be highly speculative and uncertain. There are "additionality tests," which attempt to determine if an offset project is additional:

- Regulatory Test: does the project go beyond legal requirements?
- Financial Test: is the project economically viable without offset revenues?
- Barriers Test: are there significant non-financial barriers that a project needs to overcome?
- Common Practice Test: does the project go beyond common business practice?
- Timing Test: was the project started after a certain date? (CC 2006)

There is also some uncertainty associated with the benefits realized by carbon offsets, or the quantification of the offsets. Similarly, there is uncertainty associated with the quantification of the emissions that are to be offset.

A recent investigation into the carbon offset market yielded the following results:

- Widespread instances of people and organizations buying worthless credits that do not yield any reductions in carbon emissions.
- Industrial companies profiting from doing very little – or from gaining carbon credits based on efficiency gains from which they have already benefited substantially.
- Brokers providing services of questionable or no value.

- Questionable verification, making it difficult for buyers to assess the true value of carbon credits.
- Companies and individuals being charged over the odds for the private purchase of European Union carbon permits that have plummeted in value because they do not result in emissions cuts. (FT 2007)

Another source that documents the concerns about the offset market is AB 1851, a bill introduced on January 29, 2008, by Assembly Member Nava. AB 1851 has not passed and still has to go through the legislative process. As it is currently written, AB 1851 would, "…express legislative intent to create a process for ensuring that voluntary greenhouse gas emissions offsets sold in California meet clear and consistent standards, and assist local governments and others in the state in generating and marking qualifying projects for the voluntary offsets market." AB 1851 also states that, "…concerns have been raised about instances of potential fraud or misrepresentation in the voluntary offset market, which is difficult to address in the absence of clear standards for retail offsets." It is unknown if this bill will pass the legislature.

The Washington Post reported that offsets purchased by the U.S. House through CCX might not have met the additionality test (WP 2008). For example, some of the funds went to the North Dakota Farmers Union, to pay farmers for "no-till" farming. This practice increases the amount of carbon dioxide trapped in the soil compared with farming that uses conventional plows. Reportedly, some farmers were already utilizing no-till farming because the practice saves fuel.

It also should be noted that AB 32 requires the State of California to reduce its greenhouse gas emissions. It is unclear if offsets purchased through the CCX or another exchange would reduce emissions in California.

Feasibility of Offsetting Project Emissions

There are a number of opportunities to offset greenhouse gas emissions. However, there are also uncertainties and criticisms associated with the current offset market. Therefore, offsets are not feasible for the Project at this time.

4.1.4 - Level of Significance

Level of Significance before Mitigation

There is no adopted Greenhouse Gas Reduction Plan or applicable strategy in the jurisdiction of the Project. Therefore, this assessment looks at whether or not the Project would hinder or delay California's ability to meet the reduction targets contained in AB 32.

Construction: Less than significant.

Construction of the Project would occur prior to the year 2020 and therefore would not hinder or delay implementation of AB 32, as AB 32 assesses the emissions (not the concentration) in the year

2020. Additionally, mitigation measures as proposed within the air quality analysis for this Project would reduce greenhouse gas emissions associated with unnecessary idling and construction employee trips.

Operation: Less than significant.

The Project will connect all but two sites to the electrical power grid, which results in approximately 2 $MTCO_2e$ per year per site for indirect emissions associated with electricity generation. Emissions from the full time generators are approximately 200 $MTCO_2e$ per year per site (approximately 400 $MTCO_2e$ total). By utilizing the electrical grid for most of its sites, the Project is offsetting approximately 9,600 $MTCO_2e$ per year (200 $MTCO_2e$ * 48 sites).

Project design features also increase the energy efficiency of the buildings. For example, cool roofs reflect sunlight thereby reducing the cooling load inside of the building. Energy efficient lighting also reduces electricity demand. EPA certified air conditioning units use less energy to operate (EPA 2008). According to a simplified life cycle estimate of the air conditioning units, the County could save approximately $11,000 by installing Energy Star air conditioning units and could reduce 274,000 pounds of carbon dioxide emissions (124 $MTCO_2e$) during the life cycle of all the units.

Implementation of the Project will assist fire fighters in communication during fire events. One of the anticipated effects of climate change is an increase in the frequency of wildland fire events. In essence, the Project is providing adaptation to climate change impacts. Therefore, the Project's project-level impact to climate change is less than significant and it is not anticipated that the Project would hinder or delay the implementation of AB 32.

Mitigation Measures

No mitigation measures are required.

Level of Significance after Mitigation

Construction: Less than significant.

Operation: Less than significant.

4.2 - Cumulative-Level Analysis

Section 15130(b) of the CEQA Guidelines states the following:

> The following elements are necessary to an adequate discussion of significant cumulative impacts: Either: (A) A list of past, present, and probable future Projects producing related or cumulative impacts, including, if necessary, those Projects outside the control of the agency, or (B) A summary of Projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which

described or evaluated regional or area-wide conditions contributing to the cumulative impact.

Even a very large individual project cannot generate enough greenhouse gas emissions to measurably influence climate change. It is a project's incremental contribution combined with the cumulative increase of all other sources of greenhouse gases that together form anthropogenic climate change impacts. However, the theory that an increase of one molecule of an air pollutant constitutes significant increase (one-molecule theory) should not be the basis of a de-facto significance threshold, as discussed in the decision for *Community for a Better Environment v. California Resources Agency* (103 Cal. App. 4th 98 (2002), "this does not mean, however, that any additional effect in a nonattainment area for that effect necessarily creates a significant cumulative impact; the 'one [additional] molecule rule' is not the law."

An individual project contributes to cumulative greenhouse gas emissions through construction, increased vehicular travel, and increased energy consumption. Each project can reduce its own greenhouse gas emissions through project-level review and mitigation. However, the cumulative impact of greenhouse gas emissions, and therefore climate change, cannot be mitigated on a piecemeal, case-by-case basis. It is the regional development pattern, land use, and transportation policies that determine the cumulative impact in which a project participates.

Large-scale assessments and emission reduction strategies must be formulated to evenly address greenhouse gas emissions on a regional level that includes land use patterns, energy generation and consumption, transportation, water transport, waste disposal, and the other major sources of greenhouse gas emissions. A region-specific plan would be a platform for a cumulative analysis.

According to CEQA Guidelines 15145, if a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate the discussion of the impact. The assessment of cumulative climate change impacts, which are Project impacts plus all the other "cumulative" projects, is speculative at this time for the following reasons:

- The list of cumulative projects for climate change is unknown, in that it could conceivably include all projects around the globe. Guidelines for establishing the radius for climate change have not yet been adopted. Without such guidelines, it is impossible to know how big the impact study area is supposed to be. For example, does the list of projects include those only within a one-mile radius of the Project, or does it include projects within the entire air basin, or the state of California? For this reason, the "Project List" approach for conducting a CEQA cumulative impacts analysis is not feasible.
- There is no approved plan that covers the jurisdiction of the Project that discusses climate change or greenhouse gases; therefore, the plan approach is not viable at this time. State and local agencies are currently trying to develop strategies to reduce greenhouse gases in their jurisdictions; however, these strategies are not complete at this time. Without a region-specific

plan that addresses the cumulative nature of greenhouse gases and creates a framework for comprehensive greenhouse gas emission reductions, a project's cumulative impacts to climate change through greenhouse gas emissions "when added to closely related past, present, and reasonably foreseeable probable future projects" (CEQA Guidelines §15355) is speculative at this time.

- There are no adopted legal, regulatory, or advisory thresholds for measuring project or cumulative impacts of greenhouse gases.

In summary, potential cumulative impacts are speculative at this time and no significance determination can be made.

4.3 - Climate Change Impacts on the Project

Climate Change Impacts

AB 32 indicates that "the potential effects of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snow pack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidence of infections, disease, asthma, and other health-related problems" (AB 32, section 38501[a]).

The California Climate Change Center (CCCC 2006) published a report that assesses the risks of climate change to California. The following is a summary of the potential risks to California from that report:

- A reduction in the Sierra snow pack could result a reduction in hydropower, which comprises about 15 percent of California's in-state electricity production.
- A reduction in the Sierra snow pack could result in a loss of winter recreation from insufficient snow for skiing and snowboarding.
- A decrease in water supply could also negatively impact the food supply that depends on that water for use.
- Climate change could also increase temperatures, leading to decreased supply of certain agricultural products such as wine, fruit, nuts, and milk. California farmers may also have to face increasing threats from pests and pathogens.
- Climate change could also result in increasing wildfires. If temperatures rise into the medium range in the modeled predictions, the risk of fires in California could increase as much as 55 percent.
- Climate change could result in plant and animal species relocating to cooler more habitable "up slope" locations.

- Climate change could negatively affect the health and productivity of California's forests. The productivity of mixed conifer forests is expected to diminish as much as 18 percent by the end of the century.
- A rise in sea levels could result in increased coastal floods and shrinking beaches.

The California Energy Commission also indicates that there could be an earlier start of spring snowmelt, an increase in winter runoff as a fraction of total runoff, and an increase in winter flood frequency (CEC 2005b).

Rise in Sea Level

The Project sites are typically in elevated locations and therefore would not be threatened from rising sea waters.

Wildfires

The Project EIR determined that the Project would result in less than significant wildland fire impacts, as is summarized from the EIR below.

A number of the tower sites are proposed in areas that are potentially subject to occasional impacts by wildland fire. These conditions require that these facilities be given special consideration in their design and maintenance. Continued operation of these facilities during a wildfire event is critical to the provision of emergency communications during these situations.

Existing regulations require the maintenance of fuel modification zones and defensible space around any structure that is located in a fire-prone area. Typically, this requires the trimming or removal of fuels (i.e., combustible vegetation) from a specified area around a structure. These fuel modification zones are designed to provide for defensible space around structures and to allow for their protection in the event that an advancing wildfire should attempt to encroach upon them. Adequate defensible space denies fuel to the fire in the area surrounding a structure, and also provides fire protection personnel with a buffer in which to work and defend the structure. All County communication sites will be required to abide by these regulations.

The regulations also specify that buildings and other structures be constructed of materials that are, to the extent feasible, fire resistant. Equipment shelters at the sites will be of either concrete block construction built onsite or of prefabricated concrete. Roofing materials will be made from non-combustible materials such as steel or tin.

In the event of a wildland fire, the protection of critical facilities that are vital to public safety are given first priority. Emergency communication structures are in this category of critical facilities. If such a site is determined to be in danger, firefighting resources are immediately dispatched and every effort is made to save the structure. Roadways to these sites are maintained with the need for rapid

access by on-ground firefighting personnel. Fire retardant-dropping aircraft are also deployed to add to the defensive perimeter around a site.

Development of the tower sites and associated infrastructure will aid in the provision of fire services. Enhanced communication capabilities made possible by the new sites will be used to dispatch fire protection personnel and to provide for their support in the field. County fire personnel and their cooperators will be able to utilize the improved and expanded network. The project will, in fact, provide a substantial benefit in the provision of these services. Accordingly, it can be concluded that the project will have a less than significant impact in this regard.

Water Supply

The Project would not require water. Therefore, secondary effects of climate change that include water shortages would not directly influence the Project.

In summary, climate change impacts to the Project are less than significant.

4.4 - Alternatives

Typically, air quality emissions are assessed on a localized basis. Districts have criteria pollutant thresholds that determine the significance of the air emissions based on the air pollution budget in the basin(s). Due to a number of factors including topography, wind patterns, etc., pollutants in the South Coast Air Basin, the Salton Sea Air Basin, and the Mojave Desert Air Basin tend to congregate and influence the local area potentially resulting in ill health effects. Emissions of greenhouse gases are important on a global scale. While it is unknown if they congregate in basins similar to criteria pollutants, the effect of greenhouse gases occurs on a global basis, potentially influencing the global climate. The following compares the potential impacts of the Project alternatives against those resulting from the Project and determines an environmentally superior alternative. Note that a summary of this analysis is contained in the EIR for the Project but is expanded herein.

No Project Alternative

Under this alternative, the project would not be built and the County would continue to utilize its existing emergency services radio network into the foreseeable future. No new facilities would be built, and all of the environmental impacts identified in this DEIR would be avoided.

The No Project Alternative would not meet the Project objectives of providing appropriate and adequate telecommunication coverage to County emergency services personnel. The absence of this communication could result in longer response times for emergency personnel and increased vehicle miles traveled. Implementation of the Project will assist fire fighters in communication during fire events. One of the anticipated effects of climate change is an increase in the frequency of wildland fire events. Therefore, the Project would provide adaptation to climate change impacts. The No Project Alternative is not the preferred alternative in respect to climate change.

Alternative Locations Alternative

This alternative would build a comparable number of towers as the proposed project, but those towers would be in different locations than what has been proposed. The locations could be within a couple of miles from the currently proposed location for any of the multiple sites proposed.

The Alternative Location Alternative would result in the same air emissions and the same impact as the Project.

Alternative Technologies Alternative

This alternative would abandon the project as currently designed and instead provide emergency communication services through alternative technology. These technologies could include the use of satellites or other services that would not require the use of land-based networks and thus avoid the significant environmental effects of the proposed project.

This alternative would eliminate the need for the construction and operation of the towers. It would also eliminate the air emissions associated with construction and operation. It is assumed that the needs of the Project could be covered using existing satellites and an additional launch would not be required. During operation, satellites generate power from solar panels. As discussed in the EIR, this alternative is not feasible at this time.

Taller Towers Alternative

This alternative would provide taller towers, but fewer of them. The reason for considering this alternative would be that taller towers can provide coverage to a larger area, and therefore fewer towers would be needed. This would have the effect of reducing the number of towers and thus the impacts associated with them.

A reduction in the number of sites would result in fewer air emissions. The Taller Towers Alternative is the environmentally superior alternative in respect to climate change.

Shorter Towers

This alternative would provide greater numbers of shorter towers to cover the same area. Under this alternative, the number of towers would increase by a substantial amount from what is proposed. The purpose of this alternative would be to lessen the aesthetic impacts of the project by using smaller towers exclusively. While the number of towers would actually increase, the idea would be that smaller towers would be less obtrusive and easier to conceal than taller towers.

The Shorter Towers Alternative would require more towers to be constructed, which is associated with greater construction and operational air emissions. Therefore, the Shorter Towers Alternative would be associated with a greater impact than the Project. This is not the preferred alternative.

Summary

The Taller Towers Alternative is the environmentally superior alternative in respect to climate change.

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Appendix A: Greenhouse Gas Emission Spreadsheets and URBEMIS 2007 Model Output for Proposed Project

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: S:\Client\2749 RivCo Facil. Mngmt\0003\Air Quality\PSEC.urb924

Project Name: PSEC

Project Location: Riverside County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009	0.06	0.58	0.26	0.00	0.13	0.02	0.15	0.03	0.02	0.05	60.69
Mass Grading 01/05/2009-01/23/2009	0.02	0.14	0.08	0.00	0.13	0.01	0.13	0.03	0.01	0.03	16.45
Mass Grading Dust	0.00	0.00	0.00	0.00	0.13	0.00	0.13	0.03	0.00	0.03	0.00
Mass Grading Off Road Diesel	0.01	0.14	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	14.81
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.64
Building 01/26/2009-05/30/2009	0.05	0.45	0.19	0.00	0.00	0.02	0.02	0.00	0.02	0.02	44.24
Building Off Road Diesel	0.05	0.44	0.18	0.00	0.00	0.02	0.02	0.00	0.02	0.02	43.33
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
Building Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67

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Phase Assumptions

Phase: Mass Grading 1/5/2009 - 1/23/2009 - Grading and excavation

Total Acres Disturbed: 1

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Default

15 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Bore/Drill Rigs (291 hp) operating at a 0.75 load factor for 4 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 4 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 4 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 2 hours per day

Phase: Building Construction 1/26/2009 - 5/30/2009 - Construction of tower

Off-Road Equipment:

2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Operational Maintenance	0.02	0.03	0.21	0.00	0.03	0.01	18.64
TOTALS (tons/year, unmitigated)	0.02	0.03	0.21	0.00	0.03	0.01	18.64

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Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2009 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Operational Maintenance		5.00	1000 sq ft	1.00	5.00	100.00
					5.00	100.00

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	45.7	1.5	98.3	0.2
Light Truck < 3750 lbs	9.6	3.1	90.7	6.2
Light Truck 3751-5750 lbs	21.8	0.9	99.1	0.0
Med Truck 5751-8500 lbs	12.0	0.8	98.4	0.8
Lite-Heavy Truck 8501-10,000 lbs	1.9	0.0	73.7	26.3
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	0.8	0.0	12.5	87.5
Heavy-Heavy Truck 33,001-60,000 lbs	1.5	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.4	70.5	29.5	0.0
School Bus	0.1	0.0	0.0	100.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Motor Home	1.5	6.7	80.0	13.3

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	20.0	20.0	20.0	20.0	20.0	20.0
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Operational Maintenance				2.0	1.0	97.0

Operational Changes to Defaults

The urban/rural selection has been changed from Urban to Rural

Home-based work rural trip length changed from 17.6 miles to 20 miles

Home-based shop rural trip length changed from 12.1 miles to 20 miles

Home-based other rural trip length changed from 14.9 miles to 20 miles

Commercial-based commute rural trip length changed from 15.4 miles to 20 miles

Commercial-based non-work rural trip length changed from 9.6 miles to 20 miles

Commercial-based customer rural trip length changed from 12.6 miles to 20 miles

Generator Exhaust Emissions

Project: Riverside County PSEC
Prepared by: Michael Brandman Associates
Date: 5/5/2008

	Number	Hours per day or year	CO2
NONROAD Emission Factors* (grams per operating hour)			
Diesel Generator Set			15163
LPG Generator Set			27222
Total Emissions (pounds/day)			
Diesel Generator (full time)	1	24	801
LPG Generator (full time)	1	24	1437
LPG Emergency Generators	50	0.5	1497
Total (pounds per day)			*3735*
Total Emissions (tons per year)			
Diesel Generator (full time)	1	8760	146
LPG Generator (full time)	1	8760	262
LPG Emergency Generators	50	26	39
Total (tons per year)			*447*
Salton Sea Emissions (pounds /day)			
Diesel Generator (full time)	1	24	801
LPG Generator (full time)	1	24	1437
LPG Emergency Generators	6	0.5	180
Total			*2418*
South Coast Emissions (pounds /day)			
LPG Emergency Generators	50	0.5	*1497*
MDAQMD Emissions (pounds /day)			
LPG Emergency Generators	8	0.5	*240*
MDAQMD Emissions (tons/year)			
LPG Emergency Generators	8	26	*6*

* NONROAD report output is contained in Appendix.
** Note that PM2.5 was not reported by NONROAD. Therefore, it was assumed to be 92 percent of PM10 emissions pursuant to SCAQMD guidance (2006).
To estimate the annual emissions for the emergency generators, it was assumed that each

Emission Factors by Horsepower, SCC, and Pollutant

All Fuels **Grams/Operating Hour** **#Name?**

#Name?

#Error

#Error Today's Date: 5/1/2008

Fuel Type	SCC	Equipment Description	Engine Type / Horsepower	Exhaust THC	Exhaust NOx	Exhaust CO	Exhaust PM10	Exhaust SO2	Exhaust CO2	Crankcase THC	Diurnal THC
Diesel											
	Commercial Equipment										
	2270006005	Generator Sets	Diesel								
			3 < HP <= 6	2.39	16.28	11.24	1.98	1.89	1,350.53	0.04	0.00
			6 < HP <= 11	3.76	25.62	17.69	3.12	2.97	2,125.00	0.07	0.00
			11 < HP <= 16	5.91	36.58	21.83	4.09	4.79	3,423.48	0.11	0.00
			16 < HP <= 25	9.27	57.43	34.27	6.42	7.52	5,375.07	0.17	0.00
			25 < HP <= 40	12.76	80.89	45.68	9.18	11.82	8,448.34	0.24	0.00
			40 < HP <= 50	17.24	109.31	61.73	12.41	15.98	11,416.88	0.33	0.00
			50 < HP <= 75	18.31	153.83	84.78	17.10	21.22	15,162.96	0.36	0.00
			75 < HP <= 100	26.39	221.71	122.19	25.00	30.59	21,854.29	0.53	0.00
			100 < HP <= 175	31.03	351.99	121.73	26.73	43.23	30,887.89	0.62	0.00
			175 < HP <= 300	51.03	596.20	198.14	43.30	75.84	54,184.15	1.02	0.00
			300 < HP <= 600	78.94	1,048.75	369.24	67.19	133.67	95,494.73	1.58	0.00
			600 < HP <= 750	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			750 < HP <= 1000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			1000 < HP <= 1200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			1200 < HP <= 2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Emission Factors by Horsepower, SCC, and Pollutant

All Fuels **Grams/Operating Hour** **#Name?**

#Name?

#Error

#Error Today's Date: 5/1/2008

Fuel Type	SCC	Equipment Description	Engine Type / Horsepower	Vapor Displacement THC	Spillage THC	Hot Soak THC	Running Loss THC	Tank Permeation THC	Hose Permeation THC	Total THC
Diesel										
	Commercial Equipment									
	2270006005	Generator Sets	Diesel							
			3 < HP <= 6	0.00	0.00	0.00	0.00	0.00	0.00	2.43
			6 < HP <= 11	0.00	0.00	0.00	0.00	0.00	0.00	3.83
			11 < HP <= 16	0.00	0.00	0.00	0.00	0.00	0.00	6.02
			16 < HP <= 25	0.00	0.00	0.00	0.00	0.00	0.00	9.45
			25 < HP <= 40	0.00	0.00	0.00	0.00	0.00	0.00	13.00
			40 < HP <= 50	0.00	0.00	0.00	0.00	0.00	0.00	17.57
			50 < HP <= 75	0.00	0.00	0.00	0.00	0.00	0.00	18.67
			75 < HP <= 100	0.00	0.00	0.00	0.00	0.00	0.00	26.92
			100 < HP <= 175	0.00	0.00	0.00	0.00	0.00	0.00	31.65
			175 < HP <= 300	0.00	0.00	0.00	0.00	0.00	0.00	52.05
			300 < HP <= 600	0.00	0.00	0.00	0.00	0.00	0.00	80.52
			600 < HP <= 750	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			750 < HP <= 1000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			1000 < HP <= 1200	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			1200 < HP <= 2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Fuel Type	SCC	Equipment Description	Engine Type	Exhaust THC	Exhaust NOx	Exhaust CO	Exhaust PM10	Exhaust SO2	Exhaust CO2	Crankcase THC	Diurnal THC
			Horsepower								
			2000 < HP <= 3000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LPG											
	Commercial Equipment										
	2267006005*	Generator Sets	LPG								
			25 < HP <= 40	25.79	162.30	550.76	1.16	0.25	12,978.85	7.97	0.00
			40 < HP <= 50	39.12	246.18	835.41	1.75	0.38	19,686.58	12.10	0.00
			50 < HP <= 75	56.48	359.56	1,164.62	2.38	0.53	27,221.87	17.69	0.00
			75 < HP <= 100	72.97	464.55	1,504.69	3.08	0.68	35,170.78	22.86	0.00
			100 < HP <= 175	124.61	793.31	2,569.53	5.25	1.17	60,060.35	39.03	0.00
			175 < HP <= 300	215.11	1,369.43	4,435.58	9.07	2.01	103,677.67	67.38	0.00
			300 < HP <= 600	333.97	2,126.16	6,886.63	14.08	3.13	160,968.63	104.61	0.00

* Under 25 horsepower spark-ignition engines are lumped into either 2- or 4-stroke.

Fuel Type	SCC	Equipment Description	Engine Type Horsepower	Vapor Displacement THC	Spillage THC	Hot Soak THC	Running Loss THC	Tank Permeation THC	Hose Permeation THC	Total THC
			2000 < HP <= 3000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LPG										
	Commercial Equipment									
	2267006005*	Generator Sets	LPG							
			25 < HP <= 40	0.00	0.00	0.00	0.00	0.00	0.00	33.76
			40 < HP <= 50	0.00	0.00	0.00	0.00	0.00	0.00	51.21
			50 < HP <= 75	0.00	0.00	0.00	0.00	0.00	0.00	74.17
			75 < HP <= 100	0.00	0.00	0.00	0.00	0.00	0.00	95.83
			100 < HP <= 175	0.00	0.00	0.00	0.00	0.00	0.00	163.64
			175 < HP <= 300	0.00	0.00	0.00	0.00	0.00	0.00	282.48
			300 < HP <= 600	0.00	0.00	0.00	0.00	0.00	0.00	438.58

* Under 25 horsepower spark-ignition engines are lumped into either 2- or 4-stroke.

Air Conditioning and Refrigeration Fugitive Emissions

Project: PSEC Project
Prepared by: Michael Brandman Associates
Prepared on: 5/5/2008

Type of Unit	Units	Capacity of Unit (kg)	Operating Emissions (% capacity/year)	Emissions (kg/year)	Emissions (tons/year)	Global Warming Potential	Metric Tons CO2 Equiv./year
Residential/Commercial A/C	100	100	10%	1000	1.1	1300	1,297
Total							**1,297**

Source:
Screening Protocol from: U.S. Environmental Protection Agency, Climate Leaders. November 2007. Direct HFC and PFC Emissions from Use of Refrigeration and Air Conditioning Equipment. www.epa.gov/stateply/documents/resources/mfgrfg.pdf

Electricity - Indirect Emissions

Project: PSEC Project
Prepared by: Michael Brandman Associates
Prepared on: 5/5/2008

Average square feet per building	312	square feet
Buildings	50	buildings
Total square feet	15600	square feet
Annual Energy Intensity	17.7	kWh/square feet-year (from large office)
Electricity Use	276120	KWh/year
Electricity Use	276	MWh/year

Greenhouse Gas	Emission Factor (pounds per MWh/year)	Emissions (pounds/year)	Emissions (tons/year)	Emissions (metric tons CO2e/year)
Carbon dioxide	804.54	222,150	111	100.8
Methane	0.0067	2	0.001	0.0
Nitrous oxide	0.0037	1	0.001	0.1

Emission factor source:
California Climate Action Registry. General Reporting Protocol. Reporting Entity-Wide Greenhouse Gas Emissions. Version 2.2, March 2007. www.climateregistry.org

Table E-1 from California Energy Commission. California Commercial End-Use Survey. Consultant Report. March 2006. CEC-400-2006-005

Table E-1: Overview of Energy Usage in the Statewide Service Area

Building Type	Floor Stock (kft^2)	Annual Energy Intensities			Total Annual Usage	
		Electricity (kWh/ft^2)	Natural Gas (therms/ft^2)	Natural Gas (kBtu/ft^2)	Electricity (GWh)	Natural Gas (Mtherms)
All Commercial	4,920,114	13.63	0.26	25.99	67077	1278.60
Small Office (<30k ft^2)	361,584	13.10	0.11	10.54	4738	38.10
Large Office (>=30k ft^2)	660,429	17.70	0.22	21.93	11691	144.80
Restaurant	148,892	40.20	2.10	209.98	5986	312.60
Retail	702,053	14.06	0.05	4.62	9871	32.50
Food Store	144,209	40.99	0.28	27.60	5911	39.80
Refrigerated Warehouse	95,540	20.02	0.06	5.60	1913	5.30
Unrefrigerated Warehouse	554,166	4.45	0.03	3.07	2467	17.00
School	445,106	7.46	0.16	15.97	3322	71.10
College	205,942	12.26	0.34	34.24	2524	70.50
Health	232,606	19.61	0.76	75.53	4561	175.70
Lodging	270,044	12.13	0.42	42.40	3275	114.50
Miscellaneous	1,099,544	9.84	0.23	23.34	10817	256.60
All Offices	1,022,012	16.06	0.18	17.90	16430	182.90
All Warehouses	649,706	6.74	0.03	3.44	4380	22.40

Products that earn the ENERGY STAR prevent greenhouse gas emissions by meeting strict energy efficiency guidelines set by the U.S. Environmental Protection Agency and the U.S. Department of Energy.
www.energystar.gov

CHANGE FOR THE BETTER WITH ENERGY STAR

Life Cycle Cost Estimate for 100 ENERGY STAR Qualified Room Air Conditioner(s)

This energy savings calculator was developed by the U.S. EPA and U.S. DOE and is provided for estimating purposes only. Actual energy savings may vary based on use and other factors.

Enter your own values in the gray boxes or use our default values.

Number of units	100
Electricity Rate ($/kWh)	$0.097
Choose your city from the menu at right	CA-Palm Springs

	ENERGY STAR Qualified Unit	Conventional Unit
Initial Cost per Unit (estimated retail price)	$300	$270
Energy Efficiency Ratio (EER)	10.8	9.8
Cooling Capacity of Air Conditioner (Btu/hr)	10,000	10,000

Annual and Life Cycle Costs and Savings for 100 Room Air Conditioner(s)

	100 ENERGY STAR Qualified Unit(s)	100 Conventional Unit(s)	Savings with ENERGY STAR
Annual Operating Costs*			
Energy cost	$18,801	$20,719	$1,918
Energy consumption (kWh)	*193,704*	*213,469*	*19,766*
Maintenance cost	$0	$0	$0
Total	**$18,801**	**$20,719**	**$1,918**
Life Cycle Costs*			
Operating costs (energy and maintenance)	$139,791	$154,055	$14,264
Energy costs	$139,791	$154,055	$14,264
Energy consumption (kWh)	*1,743,333*	*1,921,224*	*177,891*
Maintenance costs	$0	$0	$0
Purchase price for 100 unit(s)	$30,000	$27,000	-$3,000
Total	**$169,791**	**$181,055**	**$11,264**
		Simple payback of initial additional cost (years)†	**1.6**

** Annual costs exclude the initial purchase price. All costs, except initial cost, are discounted over the products' lifetime using a real discount rate of 4%. See "Assumptions" to change factors including the discount rate.*

† *A simple payback period of zero years means that the payback is immediate.*

Summary of Benefits for 100 Room Air Conditioner(s)

Initial cost difference	**$3,000**
Life cycle savings	**$14,264**
Net life cycle savings (life cycle savings - additional cost)	**$11,264**
Simple payback of additional cost (years)	**1.6**
Life cycle energy saved (kWh)	**177,891**
Life cycle air pollution reduction (lbs of CO_2)	**273,063**
Air pollution reduction equivalence (number of cars removed from the road for a year)	**24**
Air pollution reduction equivalence (acres of forest)	**34**
Savings as a percent of retail price	**38%**