SECTION 4.5

CLIMATE CHANGE AND GREENHOUSE GASES

4.5 CLIMATE CHANGE AND GREENHOUSE GASES

This section provides an analysis of potential global climate change (GCC) and greenhouse gas (GHG) emissions impacts related to construction, operation, and decommissioning of the proposed Project. Information in this section is derived from the California Air Resources Board (CARB), California Environmental Protection Agency (CalEPA), California Natural Resources Agency (CNRA), and U.S. Environmental Protection Agency (EPA, as well information provided in the *Air Quality Impact Analysis, Wistaria Ranch Solar Energy Center Project* (AQIA), prepared by AECOM (AECOM 2014d). This document is provided on the attached CD of Technical Appendices as **Appendix C** of this EIR.

This section focuses primarily on the Full Build-out Scenario. Previously-approved components of the Mount Signal Solar Farm Gen-Tie line are located within a corridor located on portions of APNs 052-190-011 & -012, -022 and -037, and 052-210-015 & -016. The Gen-Tie corridor improvements will occur independent of proposed CUP components. The construction and operation of the Mount Signal Solar Farm Gen-Tie line has been separately analyzed for potential GHG/GCC impacts under California Environmental Quality Act (CEQA) (for portions on privately-owned land) and National Environmental Policy Act (NEPA) (for portions on BLM land). The air quality/GHG emissions modeling in the AQIA included analysis of the portions of the Gen-Tie lines to be constructed as part of the proposed Project. As such, the GHG analysis for the proposed Project is inclusive of the new Project Gen-Tie line and no separate discussion is required (AECOM 2014d). The Full Build-out Scenario plus the portions of the Gen-Tie proposed as part of the Project are therefore hereinafter referred to in this section as the "GHG Study Area."

Similar to the approach used in the Draft Traffic Analysis, the analysis of GHGs assumed a Full Build-out Near-Term (Year 2016) development scenario. This represents a worst-case analysis as the modeled construction-related GHG emissions are not representative of required future clean air technologies.

A brief introduction to GHG and GCC is provided to lay the foundation for understanding the discussion and analysis that follows.

Greenhouse Gases and Climate Change

Atmospheric gases that absorb and emit infrared radiation are called GHG. GHGs act as effective global insulators allowing solar radiation (sunlight) into the Earth's atmosphere and preventing radiative heat from escaping thereby warming the Earth's atmosphere. Another way of understanding GHGs is as a collection of atmospheric gases that act like a "blanket" around the earth by "trapping" heat like the glass wall of a greenhouse.

Common GHGs include carbon dioxide (CO_2), water vapor (H_2O), methane (CH_4), nitrous oxide (N_2O), fluorinated gases, and ozone (O_3). Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely byproducts of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices and landfills.

Man-made GHGs include fluorinated gases such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These gases have greater heat-absorption potential than CO_2. As a result, these compounds increase the natural concentration of GHGs in the atmosphere and are commonly believed to result in a phenomenon referred to as "global warming" or GCC. A warmer Earth may lead to changes in rainfall patterns, much smaller polar ice caps, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans.

Terminology unique to this chapter includes: carbon dioxide equivalents (CO_2e), a term used to describe the concentration of CO_2 that would cause the same level of radiative forcing (i.e., the change in net irradiance between different layers of the atmosphere) as a given type and concentration of GHG, and two units of measures, metric tons (MT) and million metric tons (MMT).

4.5 CLIMATE CHANGE AND GREENHOUSE GASES

4.5.1 REGULATORY FRAMEWORK

BACKGROUND

In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change (IPCC) 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." The most recent reports of the IPCC have emphasized the scientific consensus that real and measurable changes to the climate are occurring, that they are caused by human activity (i.e., anthropogenic), and that significant adverse impacts on the environment, the economy, and human health and welfare are unavoidable.

The United States joined other countries around the world in signing the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC was entered on March 21, 1994. Under the UNFCCC, governments gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG 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.

The Kyoto Protocol is a treaty made under the UNFCCC. Countries can sign the treaty to demonstrate their commitment to reduce their emissions of GHGs or engage in emissions trading. More than 160 countries, 55 percent of global emissions, are under the protocol. Former U.S. Vice President Al Gore symbolically signed the Protocol in 1998. However, in order for the Kyoto Protocol to be formally adopted, or ratified, it must be adopted by the United States Senate. To date, the United States has not ratified the Kyoto Protocol.

A. FEDERAL

U.S. Environmental Protection Agency

The EPA is the federal agency responsible for implementing the Clean Air Act (CAA). In response to the mounting issue of climate change, the EPA has taken actions to regulate, monitor, and potentially reduce GHG emissions.

Greenhouse Gas Endangerment

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 GHGs, including carbon dioxide, under Section 202(a)(1) of the CCA. A decision was made on April 2, 2007, in which the Supreme Court found that GHGs are air pollutants covered by the CCA. The Court held that the EPA Administrator must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the CCA:

- Endangerment Finding: The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

Mandatory Reporting of Greenhouse Gases

The Consolidated Appropriations Act of 2008, passed in December 2007, requires the establishment of mandatory GHG reporting requirements. On September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule. The rule requires reporting of GHG emissions from large sources and suppliers in the U.S., and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 MT or more per year of GHG emissions are required to submit annual reports to the EPA.

EPA Greenhouse Gas Tailor Rule - New Source Review

On May 13, 2010, the EPA issued a final rule establishing thresholds for GHGs defining when permits are required for new and existing industrial facilities under the New Source Review (NSR) Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs. This final rule "tailors" the requirements of these CAA permitting programs to limit which facilities will be required to obtain PSD and Title V permits. In the preamble to the revisions to the Code of Federal Regulations (CFR), EPA states:

> *This rulemaking is necessary because without it the PSD and Title V requirements would apply, as of January 2, 2011, at the 100 or 250 tons per year levels provided under the CCA, greatly increasing the number of required permits, imposing undue costs on small sources, overwhelming the resources of permitting authorities, and severely impairing the functioning of the programs. EPA is relieving these resource burdens by phasing in the applicability of these programs to GHG sources, starting with the largest GHG emitters. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources, but excludes certain smaller sources from PSD and Title V permitting for GHG emissions until at least April 30, 2016.*

EPA estimates that facilities responsible for nearly 70 percent of the national GHG emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters: power plants, refineries, and cement production facilities.

Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 (EPCA) sought to ensure that all vehicles sold in the U.S. would meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the United States. Pursuant to the EPCA, the National Highway Traffic and Safety Administration (NHTSA), which is part of the U.S. Department of Transportation (DOT), is responsible for establishing additional vehicle standards and for revising existing standards.

Since 1990, the fuel economy standard for new passenger cars has been 27.5 miles per gallon (mpg). Likewise, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 mpg since 1996. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not currently subject to fuel economy standards. Compliance with federal fuel economy standards is determined on the basis of each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the U.S. The Corporate Average Fuel Economy (CAFE) program, which is administered by the EPA, was created to determine vehicle manufacturers' compliance with the fuel economy standards. The EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the DOT is authorized to assess penalties for noncompliance. In

August 2012, the EPA and the NHTSA announced the final standard governing new-vehicle fuel economy for model years 2017 through 2025. The new standard continued the previous system of incremental increases in CAFE requirements, and introduced the strategy of simultaneously regulating fuel economy and GHG emissions of new vehicles (model years 2012 through 2016). Together, implementation of these standards is anticipated to cut GHG emissions by an estimated 960 MMT and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program, and simultaneously reduce GHG emissions, improve energy security, increase fuel savings, and provide clarity and predictability for manufacturers.

Energy Policy Acts of 1992 and 2005

The Energy Policy Act (EPAct) of 1992 was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct of 1992 includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct of 1992 requires certain federal, state, and local government and private fleets to purchase a percentage of light duty AFVs capable of operating on alternative fuels each year. In addition, financial incentives are included in EPAct of 1992. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the EPAct to consider a variety of incentive programs to help promote AFVs. It was amended several times in the Energy Conservation and Reauthorization Act of 1998 and in 2005. The EPAct of 2005 was signed into law on August 8, 2005. Generally, the EPAct of 2005 provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for a clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Climate Change Action Plan of 1993

In October 1993, President Clinton announced his Climate Change Action Plan, which had a goal to return GHG 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 GHG emissions.

B. STATE

Concern about the disproportionately negative impacts that global warming are expected to have on the California environment and economy has led the California State Legislature to pass several climate change related bills. These bills are aimed at controlling and reducing the emission of GHGs to slow the effects of global warming. The bills that have the potential to substantially impact or be impacted by the proposed Project are discussed in this section. In addition to the bills discussed below, the California Legislature has introduced numerous other bills that range in scope from establishing market-based compliance mechanisms to energy standards for light bulbs. Some have been enacted into law and others are pending. In addition to the legislature bills, California governors have issued several climate change-related executive orders. A brief discussion of the State Senate Bills (SB), Assembly Bills (AB) and Executive Orders (EO) are provided below.

Senate Bills

Senate Bill 1771 – Climate Action Registry

In September 2000, Senate Bill 1771 established the creation of the non-profit organization, the California Climate Action Registry (CCAR) and specified functions and responsibilities to develop a process to identify and qualify third-party organizations approved to provide technical assistance and advice in monitoring GHG emissions, and setting GHG emissions baselines in coordination with the California Energy Commission (CEC). The bill directs the CCAR to enable participating entities to

voluntarily record annual GHG emissions inventories. SB 1771 also directed CEC to update the state's greenhouse gas inventory from an existing 1998 report and continuing to update it every five years.

Senate Bills 1078 and 107 - Renewable Portfolio Standards Program

On September 12, 2002, then Governor Gray Davis signed SB 1078, establishing the California Renewables Portfolio Standard (RPS) Program, and requiring California to generate 20 percent of its electricity from renewable energy by December 31, 2017 for the purposes of increasing the diversity, reliability, public health and environmental benefits of the energy mix.

On September 26, 2006, SB 107 moved the RPS due date forward to 2010 instead of 2017. SB 107 directs California Public Utilities Commission's (CPUC's) Renewable Energy Resources Program to increase the amount of renewable electricity generated per year, from 17 percent to an amount that equals at least 20 percent of the total electricity sold to retail customers in California per year by December 31, 2010. In 2008, the RPS target increased under EO S-21-09 (discussed further below), which required the state's load serving entities to meet a 33 percent renewable energy target by 2020.

Senate Bill 1368 – Emissions Performance Standards

SB 1368 was approved by then Governor Schwarzenegger on September 29, 2006. SB 1368 requires the CEC and California Public Utilities Commission (CPUC) to set a global warming emissions standard for electricity used in California regardless of whether it's generated in-state or purchased from plants in other states. The new standard applies to any new long-term financial contracts for base load electricity, and applies both to investor-owned utilities and municipal utilities. The standard for baseload generation owned by, or under long-term contract to publicly owned utilities, is an emissions performance standard (EPS) jointly established by the CEC and the CPUC of 1,100 pounds of CO2 per megawatt-hour (MWh).

Senate Bill 97 – CEQA: Greenhouse Gas Emissions

In August 2007, then Governor Schwarzenegger signed into law SB 97 – CEQA: Greenhouse Gas Emissions, stating: "This bill advances a coordinated policy for reducing GHG emissions by directing the Office of Planning and Research (OPR) and the Resources Agency to develop California Environmental Quality Act (CEQA) guidelines on how state and local agencies should analyze and, when necessary, mitigate GHG emissions." Specifically, SB 97 requires the OPR to prepare, develop, and transmit to the CNRA guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, including but not limited to, effects associated with transportation or energy consumption. The CNRA certified and adopted the guidelines amendments on December 30, 2009, and transmitted the Adopted Amendments and the entire rulemaking file to the OAL on December 31, 2009. The amendments were approved by the OAL on February 16, 2010, and became effective on March 18, 2010. The new CEQA guidelines provide the lead agency with broad discretion in determining what methodology is used in assessing the impacts of GHG emissions in the context of a particular project.

The CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines to reference climate change.

A new section, CEQA Guidelines Section 15064.4, was added to assist agencies in determining the significance of GHG emissions. The new section allows agencies the discretion to determine whether a quantitative or qualitative analysis is best for a particular project. However, little guidance is offered on the crucial next step in this assessment process: how to determine whether a project's estimated GHG emissions are significant or cumulatively considerable.

Also amended were CEQA Guidelines Sections 15126.4(c) and 15130(b)(1)(B) which address mitigation measures and cumulative impacts respectively. GHG mitigation measures are referenced in general terms, but no specific measures are championed. The revision to the cumulative impact discussion requirement simply directs agencies to analyze GHG emissions in an EIR when a project's incremental contribution of emissions may be cumulatively considerable. However, it does not answer the question of when emissions are cumulatively considerable. CEQA Guidelines Section 15183.5 permits programmatic GHG analysis and later project-specific tiering, as well as the preparation of Greenhouse Gas Reduction Plans. Compliance with such plans can support a determination that a project's cumulative effect is not cumulatively considerable according to CEQA Guidelines 15183.5(b).

In addition, the amendments revised Appendix F of the CEQA Guidelines, which focuses on Energy Conservation, and also required analysis of projects' energy use and demand be included in CEQA analysis. The sample environmental checklist in Appendix G of the CEQA Guidelines was amended to include GHG questions.

Senate Bill 375 - Sustainable Communities and Climate Protection Act of 2008

SB 375 requires regions within the State, which have a metropolitan planning organization, to adopt a sustainable communities strategy as part of their regional transportation plans. The strategy must be designed to achieve certain goals for the reduction of GHG emissions. The bill finds that GHG from autos and light trucks can be substantially reduced by new vehicle technology, but even so, "it will be necessary to achieve significant additional greenhouse gas reductions from changed land use patterns and improved transportation. Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 provides that new CEQA provisions be enacted to encourage developers to submit applications and local governments to make land use decisions that will help the State achieve its goals under AB 32," and that "current planning models and analytical techniques used for making transportation infrastructure decisions and for air quality planning should be able to assess the effects of policy choices, such as residential development patterns, expanded transit service and accessibility, the walkability of communities, and the use of economic incentives and disincentives."

Assembly Bills

Assembly Bill 2514 – Energy Storage Systems

AB 2514 was approved by then Governor Arnold Schwarzenegger on September 29, 2010. Assembly Bill 2514 - California Strategy to Reduce Petroleum Dependence This bill requires the CPUC to determine appropriate targets, if any, for load serving entities to procure energy storage systems. This bill requires load serving entities to meet any targets adopted by the Commission by 2015 and 2020. This bill requires publicly owned utilities to set their own targets for the procurement of energy storage and then meet those targets by 2016 and 2021.

Assembly Bill 2067 - California Strategy to Reduce Petroleum Dependence

AB 2076 (Chapter 936, Statutes of 2000) requires the CEC and the CARB to develop and submit to the Legislature a strategy to reduce petroleum dependence in California. The statute requires the strategy to include goals for reducing the rate of growth in the demand for petroleum fuels. In addition, the strategy is required to include recommendations to increase transportation energy efficiency as well as the use of non-petroleum fuels and advanced transportation technologies including alternative fuel vehicles, hybrid vehicles, and high-fuel efficiency vehicles.

The strategy, Reducing California's Petroleum Dependence, was adopted by the CEC and CARB in 2003. The three-fold strategy recommends that: 1) California reduce inroad gasoline and diesel fuel demand to

15 percent below 2003 demand levels by 2020 and maintain that level for the foreseeable future; 2) the Governor and Legislature work to establish national fuel economy standards that double the fuel efficiency of new cars, light trucks, and sport utility vehicles (SUVs); and, 3) the use of non-petroleum fuels increase to 20 percent of on-road fuel consumption by 2020 and 30 percent by 2030.

Assembly Bill 1493 – Vehicle Emissions

AB 1493 (Pavley) enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Regulations adopted by CARB apply to 2009 and later model year vehicles. CARB estimates that the regulation will reduce climate change emissions from light duty passenger vehicle fleet by an estimated 22 percent in 2012 and 30 percent in 2016. The federal CAFE standard determines the fuel efficiency of certain vehicle classes in the United States. In 2007, as part of the Energy and Security Act of 2007, CAFE standards were increased for new light-duty vehicles to 35 miles per gallon by 2020.

Assembly Bill 32 – Global Warming Solution Act

The California Global Warming Solutions Act of 2006, widely known as AB 32, requires the CARB to develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is directed to set a GHG emission limit, based on 1990 levels, to be achieved by 2020. California needs to reduce GHG emissions by approximately 28.3 percent below the business-as-usual (BAU) predictions to achieve this goal.

Climate Change Scoping Plan

In 2008, CARB adopted its *Climate Change Scoping Plan* (Scoping Plan) which functions as a roadmap of CARB's plans to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations. The Scoping Plan identifies GHG emissions reductions CARB recommends for each emissions sector of the state's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards (CARB 2008):

- improved emissions standards for light-duty vehicles (estimated reductions of 31.7 $MMTCO_2e$),
- the Low-Carbon Fuel Standard (15.0 $MMTCO_2e$),
- energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 $MMTCO_2e$), and
- a renewable portfolio standard for electricity production (21.3 $MMTCO_2e$).

CARB approved the 1990 GHG emissions level of 427 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) on December 6, 2007. Therefore, emissions generated in California in 2020 are required to be equal to or less than 427 $MMTCO_2e$. The Scoping plan is required to be updated every five years. Currently, CARB's first update is available for public review as a discussion draft, and undergoing CEQA review. According to the *Climate Change Scoping Plan First Update - Discussion Draft for Public Review and Comment*, updated emissions in 2020 in a "business as usual" scenario are estimated to be 507 $MMTCO_2e$ (CARB 2013c). This projection incorporates two reduction measures [Pavley I and the RPS (12 percent – 20 percent)] that have been implemented since the original Business as Usual (BAU) estimate was prepared as part of the 2008 Scoping Plan. The discussion draft also provides updated estimates that an additional reduction of 80 $MMTCO_2e$ are necessary to reduce statewide emissions to the AB 32 Target of 427 $MMTCO_2e$ by 2020 (CARB 2013c).

The California Environmental Protection Agency's *2013 Greenhouse Gas Reduction Report Card* (CalEPA 2013) reported that in 2011, the date for which the most current data are available, California had

achieved a reduction of 12.2 $MMTCO_2e$ from implementation of various measures carried out by State agencies and that a reduction of 146.4 $MMTCO_2e$ is expected by 2020.

Executive Orders

Executive Order S-3-05 – GHG Reductions by Year 2020

EO S-3-05, signed by then Governor Schwarzenegger on June 1, 2005, established the state's first greenhouse gas emission reduction targets in 2005. Specifically, EO S-3-05 calls for a reduction in GHG emissions to year 1990 levels by the year 2020, and for an 80 percent reduction in GHG emissions by the year 2050. EO S-3-05 also created the CalEPA Climate Action Team (CAT), and calls for the CAT to prepare biennial science reports on the potential impact of continued global warming on certain sectors of the California economy. The most recent of these reports, "Climate Action Team Report to Governor Schwarzenegger and the California Legislature," was published in December 2010. According to the report, substantial temperature increases would result in a variety of impacts to the people, economy, and environment of California associated with a projected increase in extreme conditions. The severity of the impacts would depend upon actual future emissions of GHGs and associated warming. Under the report's emissions scenarios, the impacts of global warming in California are anticipated to include, but are not limited to, public health, biology, rising sea levels, hydrology and water quality, and water supply.

Executive Order S-01-07 – Low Carbon Fuel Standard

EO S-01-07 was enacted by then Governor Schwarzenegger on January 18, 2007. The order mandates the following: 1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and 2) that a Low Carbon Fuel Standard ("LCFS") for transportation fuels be established for California. It is assumed that the effects of the LCFS would be a 10 percent reduction in GHG emissions from fuel use by 2020.

Executive Order S-13-08 – Climate Adaptation Strategy

EO S-13-08 was enacted by then Governor Schwarzenegger on November 14, 2008. EO S-13-08 indicates that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the order, the 2009 California Climate Adaptation Strategy was adopted, which is the"…first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States" (CNRA 2009). Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Executive Order S-14-08 - Renewable Portfolio Standard (RPS) Target

On November 17, 2008, Governor Arnold Schwarzenegger signed EO S-14-08, which established a Renewable Portfolio Standard (RPS) target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020 (see also SB 1078 and SB 107, above).

Executive Order S-21-09 – Renewable Energy Target

EO S-21-09 was enacted by then Governor Schwarzenegger on September 15, 2009. EO S-21-09 requires that the CARB, under its AB 32 authority, adopt a regulation by July 31, 2010 that sets a 33 percent renewable energy target as established in EO S-14-08 by 2020. Under EO S-21-09, the CARB was required to work with the CPUC and CEC to encourage the creation and use of renewable energy sources, and to regulate all California utilities. The CARB was also required to consult with the

Independent System Operator (ISO) and other load balancing authorities on the impacts on reliability, renewable integration requirements, and interactions with wholesale power markets in carrying out the provisions of the EO. The order requires the CARB to establish highest priority for those resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health. CARB approved the RPS on September 23, 2010 by Resolution 10-23 (see also SB 1078 and SB 107, above).

California Code of Regulations Title 24

Although not originally intended to reduce GHG emissions, California Code of Regulations (CCR) Title 24 Part 6: California's Energy Efficiency Standards for Residential and Non-residential Buildings were first established 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. Energy efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for water heating) results in GHG emissions. Therefore, increased energy efficiency results in decreased GHG emissions. CARB's greenhouse gas inventory is based on 2006 Title 24 standards.

California Air Resources Board: Interim Significance Thresholds

In October 2008, the CARB released interim guidance on significance thresholds for industrial, commercial, and residential projects. The draft proposal for residential and commercial projects states that a project would not be significant if it complies with a previously approved plan that addresses GHG emissions, or meets an energy use performance standard defined as CEC's Tier II Energy Efficiency goal (specified as 35 percent above Title 24 requirements) along with "as yet to be defined" performance standards for water, waste, and transportation or is below an "as yet to be developed" threshold for GHG emissions in tons per year. As such, the CARB did not establish a threshold of significance. As of January 22, 2009, the CARB has halted all work efforts on the draft *GHG Threshold of Significance Under CEQA*. As such, local jurisdictions and air districts currently establish guidance on thresholds for their district, pending statewide direction.

C. LOCAL

Imperial County Air Pollution Control District (ICAPCD)

The CARB's Scoping Plan states that local governments are "essential partners" in the effort to reduce GHG emissions (CARB 2008). The Scoping Plan also acknowledges that local governments have broad influence and, in some cases, exclusive jurisdiction over activities that contribute to significant direct and indirect GHG emissions through: planning and permitting processes; local ordinances; outreach and education efforts; and municipal operations. Many of the proposed measures to reduce GHG emissions rely on local government actions. Imperial County has not established formal quantitative or qualitative thresholds through a public rulemaking process, but CEQA permits the lead agency to establish a project-specific threshold of significance if backed by substantial evidence, until such time as a formal threshold is approved.

ICAPCD Rule 903

ICAPCD Rule 903 applies to any stationary source that would have the potential to emit air contaminants equal to or in excess of the threshold for a major source of regulated air pollutants. In 2011, THE ICAPCD amended Rule 903 to add GHGs to the list of regulated pollutants. As part of the revised rule, stationary sources that do not exceed the *de minimis* (meaning no further study is required) emissions level of 20,000 tons CO2e per year in a 12-month period would not need to meet recordkeeping and reporting

requirements. The ICAPCD has no regulations or additional guidelines relative to GHG emissions for residential, commercial, or industrial projects (AECOM 2104b, p. 16).

Imperial County General Plan

The Imperial County General Plan does not contain any goals, objectives, policies or programs directly pertaining to GCC or GHG.

4.5.2 ENVIRONMENTAL SETTING

A. CLIMATE CHANGE - GLOBAL

GCC is a change in the average weather of the Earth that is measured by temperature, wind patterns, precipitation, and storms over a long period of time. The baseline, against which these changes are measured, originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. The global climate is continuously changing, as evidenced by repeated episodes of substantial warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. However, scientists have observed an unprecedented acceleration in the rate of warming during the past 150 years. GCC is a documented effect. Although the degree to which the change is caused by anthropogenic (human activity) sources is still under study, the increase in warming has coincided with the global industrial revolution which has seen the widespread reduction of forests to accommodate urban centers, agriculture, and the use of fossil fuels (primarily the burning of coal, oil, and natural gas for energy). The majority of scientists agree that anthropogenic sources are a main, if not primary, contributor to the GCC warming.

The effects of increasing global temperature are far-reaching and extremely difficult to quantify. The scientific community continues to study the effects of GCC. In general, increases in the ambient global temperature as a result of increased GHGs is anticipated to result in rising sea levels which could threaten coastal areas through accelerated coastal erosion; threats to levees and inland water systems; and disruption to coastal wetlands and habitat.

B. CLIMATE CHANGE IN CALIFORNIA

The CARB prepared the *Inventory of California Greenhouse Gas Emissions and Sinks: 2000 to 2011* (CARB 2013d). **Table 4.5-1** provides a summary of CARB's *Inventory of California Greenhouse Gas Emissions and Sinks: 2000 to 2011* by sector years 2000, 2005, 2010 and 2011. The inventory is divided into nine broad sectors of economic activity: agriculture, commercial, electricity generation, forestry, high global warming potential (GWP) emitters, industrial, recycling and waste, residential, and transportation. Emissions are quantified in $MMTCO_2E$.

TABLE 4.5-1
CALIFORNIA GHG EMISSIONS BY SECTOR IN 2000, 2005, 2010, AND 2012
(BY CATEGORIES AS DEFINED IN THE 2008 SCOPING PLAN)

Sector	2000 Emissions in $MMTCO_2E$ (% total)[1]	2005 Emissions in $MMTCO_2E$ (% total)[1]	2010 Emissions in $MMTCO_2E$ (% total)[1]	2012 Emissions in $MMTCO_2E$ (% total)[1]
Agriculture	32.52 (7.0%)	36.54 (7.5%)	35.73 (7.9%)	37.86 (8.3%)
Commercial	12.63 (2.7%)	13.01 (2.7%)	14.44 (3.2%)	14.22 (3.1%)
Electric Power	104.86 (22.5%)	107.86 (22.2%)	90.30 (19.9%)	95.09 (20.7%)

TABLE 4.5-1
CALIFORNIA GHG EMISSIONS BY SECTOR IN 2000, 2005, 2010, AND 2012
(BY CATEGORIES AS DEFINED IN THE 2008 SCOPING PLAN)

Sector	2000 Emissions in $MMTCO_2E$ (% total)[1]	2005 Emissions in $MMTCO_2E$ (% total)[1]	2010 Emissions in $MMTCO_2E$ (% total)[1]	2012 Emissions in $MMTCO_2E$ (% total)[1]
High GWP[1,2]	8.03 (1.7%)	10.36 (2.1%)	15.89 (3.5%)	18.41 (4.0%)
Industrial[2]	95.01 (20.4%)	92.29 (19.0%)	88.51 (19.5%)	89.16 (19.4%)
Recycling and Waste[3]	7.35 (1.6%)	7.75 (1.6%)	8.34 (1.8%)	8.49 (1.9%)
Residential	29.07 (6.2%)	28.22 (5.8%)	29.42 (6.5%)	28.09 (6.1%)
Transportation[4]	176.21 (37.8%)	189.08 (39.0%)	170.46 (37.6%)	167.38 (36.5%)
Total	**465.68**	**485.11**	**453.09**	**458.68**

Source: CARB 2014a.

[1] Semiconductor Manufacturing is listed in the Industrial sector of ARB's GHG Emission Inventory sectors.

[2] Electricity Grid SF6 losses are listed in the Electric Power sector of ARB's GHG Emission Inventory sectors.

[3] Oil and Gas Extraction reflects emissions from combustion of natural gas, diesel, and lease fuel plus fugitive emissions.

[4] On-road includes equipment used in construction, mining, oil drilling, industrial and airport ground operations.

The inventory indicates that California's gross emissions of GHG decreased by 1.5 percent from 465.68 $MMTCO_2e$ in 2000 to 458.68 $MMTCO_2e$ in 2012, with a maximum 492.6 $MMTCO_2e$ in 2004 (2004 not shown in **Table 4.5-1**). During the same period, California's population grew by 12.2 percent from 33,871,648 in 2000 (Census 2000) to 37,999,878 in 2012 (DOC 2014). As a result, California's per capita GHG emissions have decreased over the last 12 years from 13.7 (465,680,000 ÷ 33,871,648) to 12.1 (458,680,000 ÷ 37,999,878) tons of CO_2e per person. In 2012, emissions continued to decrease for the transportation. Emissions from all other sectors remained relatively flat or increased slightly from 2010 (CARB 2013d).

Comparatively, total U.S. GHG emissions as of 2011, the latest information available, were 6,702.3 $MMTCO_2e$ (EPA 2013). Total United States GHG emissions increased by 8.4 percent from 1990 to 2011, and emissions decreased from 2010 to 2011 by 1.6 percent (108.0 $MMTCO_2e$). The decrease from 2010 to 2011 was due to a decrease in the carbon intensity of fuels consumed to generate electricity based on a decrease in coal consumption with increased natural gas consumption, and a significant increase in hydropower. Additionally, relatively mild winter conditions, especially in the South Atlantic Region of the United States, where electricity is an important heating fuel, resulted in an overall decrease in electricity demand in most sectors. Since 1990, U.S. emissions have increased at an average annual rate of 0.4 percent (EPA 2013).

A summary and overview of the impacts of GCC on various sectors of California's economy and natural resources, based on the CAT's white paper "Scenarios of Climate Change in California: An Overview" (CAT 2006) is provided below.

Public Health

Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to ozone formation are projected to increase from 25 percent to 35 percent under the lower warming range, to 75 percent to 85 percent under the medium warming range. In addition, if global background ozone levels increase as predicted in some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can

travel long distances depending on wind conditions. Large wildfires could become up to 55 percent more frequent if GHG emissions are not significantly reduced (CAT 2006).

In addition, under the higher warming scenario, there could be up to 100 more days per year with temperatures above 90°F in Los Angeles and 95°F in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures remain within or below the lower warming range. Rising temperatures will increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

Water Resources

A vast network of man-made reservoirs and aqueducts capture and transport water throughout the state from northern California and the Colorado River. The current distribution system relies on Sierra Nevada snow pack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snow pack, increasing the risk of summer water shortages (CAT 2006).

The state's water supplies are also at risk from rising sea levels. An influx of saltwater would degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern edge of the Sacramento/San Joaquin River Delta, a major state fresh water supply. GCC is also projected to seriously affect agricultural areas, with California farmers projected to lose as much as 25 percent of the water supply they need; decrease the potential for hydropower production within the state (although the effects on hydropower are uncertain); and seriously harm winter tourism. Under the lower warming range, the snow dependent winter recreational season at lower elevations could be reduced by as much as one month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing and snowboarding and other snow dependent recreational activities (CAT 2006).

If GHG emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snow pack by as much as 70 to 90 percent. Under the lower warming scenario, snow pack losses are expected to be only half as large as those expected if temperatures were to rise to the higher warming range. How much snow pack will be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snow pack would pose challenges to water managers, hamper hydropower generation, and nearly eliminate all skiing and other snow-related recreational activities (CAT 2006).

Agriculture

Increased GHG emissions are expected to cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. Although higher carbon dioxide levels can stimulate plant production and increase plant water-use efficiency, California's farmers will face greater water demand for crops and a less reliable water supply as temperatures rise (CAT 2006).

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than optimal development for many crops, so rising temperatures are likely to worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts, and milk (CAT 2006).

Crop growth and development will be affected, as will the intensity and frequency of pest and disease outbreaks. Rising temperatures will likely aggravate ozone pollution, which makes plants more susceptible to disease and pests and interferes with plant growth (CAT 2006).

In addition, continued GCC will likely shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion is expected in many species while range contractions are less likely in rapidly evolving species with significant populations already established. Should range contractions occur, it is likely that new or different weed species will fill the emerging gaps. Continued GCC is also likely to alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates (CAT 2006).

Forests and Landscapes

GCC is expected to alter the distribution and character of natural vegetation thereby resulting in a possible increased risk of large of wildfires. If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55 percent, which is almost twice the increase expected if temperatures stay in the lower warming range. However, because wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. For example, if precipitation increases as temperatures rise, wildfires in southern California are expected to increase by approximately 30 percent toward the end of the century. In contrast, precipitation decreases could increase wildfires in northern California by up to 90 percent (CAT 2006).

Moreover, continued GCC will alter natural ecosystems and biological diversity within the state. For example, alpine and sub-alpine ecosystems are expected to decline by as much as 60 percent to 80 percent by the end of the century as a result of increasing temperatures. The productivity of the state's forests is also expected to decrease as a result of global warming (CAT 2006).

Rising Sea Levels

Rising sea levels, more intense coastal storms, and warmer water temperatures will increasingly threaten the state's coastal regions. Under the higher warming scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate coastal areas with saltwater, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats (CAT 2006).

Energy Resources

California produces almost 70 percent of its electricity consumption from power plants located within the state and imports the remaining 30 percent. Energy production effects the GHG intensity of electricity generation (i.e., the quantity of CO_2e emitted per MWh produced). The GHG intensity of California electricity peaked in 2001, a year marked by drought and electricity market manipulation, and reached a low point in 2011, a particularly wet year. The GHG intensity of electricity imports declined to the lowest point in a decade in 2010 and increased slightly in 2011 (CARB 2013d).

CARB's GHG emission inventory divides the electric power sector into two broad categories: 1) emissions from in-state power generation; and, 2) emissions from imported electricity. Total GHG emissions from electric power generation varied over the eleven years between 2001 and 2011 from a high 122.0 MT of CO_2e in 2001 to a low of 86.6 MT of CO_2e in 2011, an overall decrease of about 29 percent. During that same period, electricity consumption grew from 250.4 terawatt hours (TWh) in 2001 to 287.8 TWh in 2008, followed by a steady decline to 272.6 TWh in 2011 (CARB 2013d).

The Imperial Irrigation District (IID) is the electric utility provider to Imperial County. IID uses a comprehensive energy strategy that relies on expansion of customer energy efficiency and demand-side

management programs to meet its customers' future power needs in ways that are consistent with the California's Energy Action Plan. The strategy also includes securing additional renewable power resources before seeking to meet customer energy needs through efficient traditional generation sources.

A discussion of energy impacts are analyzed as part of Chapter 7.0, Other CEQA Required Considerations, of this EIR.

C. SOLAR ENERGY CENTER

The discussion provided below summarizes the primary components of the Solar Energy Center; provides an overview of GHGs currently generated on the solar field site parcels; and the carbon sequestration potential of the solar field site parcels.

The proposed Project includes the construction, operation and decommissioning of up to 17 individual CUPs developed with PV and/or CPV solar technology. The Full Build-out Scenario totals approximately 2,793 acres and is anticipated to generate 250 MW of renewable energy for California's electrical grid. Project components that could contribute to the generation of GHG emissions include power conversion station(s) (PCSs) located at the center of each array, on-site substation(s) and switchyard(s) associated with each CUP, and collector lines to convey electricity from the solar arrays to Project substation(s). Each CUP may also have its own O&M Building(s) facilities that would provide for on-site septic, parking, administration, energy storage, water storage, and maintenance activities. Each CUP would connect to adjacent IID canals to provide for non-potable water.

The majority of the solar field site parcels are currently in agricultural production. As such, there are limited "point source" quantities of GHGs currently being produced on the solar field site parcels and the existing use of the land is not a major or significant generator of GHGs. Existing mobile sources of GHG emissions include agricultural worker vehicles and equipment used to prepare, plant, and harvest.

The Full Build-out Scenario may be constructed at one time over an 18 month period. Alternatively, the Project may be built out under the Phased CUP Scenario which consists of constructing 17 individual CUPs or multiple CUPs over a ten year period. As the CUPs are constructed over time, each CUP could take approximately 7 months. Construction of some CUPs could overlap one another. The construction equipment, materials, and labor would remain similar whether the Project is constructed as individual CUPs over ten years or built-out over an 18 month period.

The 18 month build-out of the Full Build-out Scenario would result in greater intensity of labor and equipment during the construction period. Each CUP of the Project may have its own off-taker and operate independently from the other CUPs. The CUPs may be aggregated during construction and operation so that multiple CUPs could be built at one time. All CUPs are anticipated to utilize the Gen-Tie line that extends from the solar field site parcels to the Imperial Solar Energy Center South (ISECS) switchyard. The CUPs are also anticipated to use the main Project switchyard; however, each CUP may independently construct its own up to 230-kV step-up transformer and switchyard.

Following construction, the Project would operate 365 days per year and generate power during daylight hours. The operational life of the solar energy complex would be approximately 30 years from completion of construction (i.e. the end of each CUP or 30 years, whichever is later). At the end of the useful life of the Project, the Solar Energy Center would be removed and each CUP would be reclaimed to pre-Project soil conditions. The proposed Project is described in detail in Chapter 2.0, Project Description.

D. GEN-TIE

A portion of Project's proposed Gen-Tie transmission line would be co-located with the previously approved Mount Signal Solar Farm Project and interconnect to the previously-approved ISECS switchyard in order to connect to the IV Substation. Previously approved Gen-Tie lines not located within the proposed CUPs are located on portions of APNs 052-190-011 & -012, -022 and -037, and 052-210-015 & -016. Development of the Mount Signal Solar Farm Gen-Tie corridor would separately, and outside of each CUP. The construction and operation of Mount Signal Solar Farm Gen-Tie lines have been separately analyzed for potential GHG/GCC impacts under CEQA and NEPA (for portions of BLM land). The decommissioning process for the Gen-Tie line is estimated to disturb approximately 6 acres of land. The disturbance area will be the within the same area that was temporarily disturbed during the construction of the Gen-Tie line.

The AQIA (AECOM 2014d) prepared for the proposed Project included analysis of the portions of the Gen-Tie line to be constructed as part of the proposed Project (i.e. eight new Gen-Tie poles) within the air quality emissions modeling for a typical CUP and the Full Build-out Scenario. As such, the analysis for the Solar Energy Center is inclusive of the Gen-Tie line, and no separate discussion is required. The Solar Energy Center plus the proposed segments of the Gen-Tie specifically associated with the Wistaria Ranch Solar Energy Center Project are therefore referred to hereinafter in this section as the "GHG Study Area." Further, the regulatory framework and regional and local GHG/GCC setting described for the Solar Energy Center would also apply to the Gen-Tie.

4.5.3 IMPACTS AND MITIGATION MEASURES

A. STANDARDS OF SIGNIFICANCE

Unlike criteria pollutants (discussed in Section 4.4, Air Quality) GHGs do not have human health effects. Rather, it is the increased accumulation of GHGs in the atmosphere that may result in GCC. Due to the complexity of conditions and interactions affecting GCC, it is not possible to predict the specific impact, if any, attributable to GHG emissions associated with a single project. Furthermore, the proposed Project's GHG emissions would be small relative to total global or even statewide GHG emissions. Thus, the significance of potential impacts from GHG emissions related to the proposed Project has been analyzed for long-term operations on a cumulative basis, as discussed further in the following subsections.

Pursuant to SB 97, the CEQA Guidelines were amended to address GHG emissions and these changes became effective March 18, 2010. For this analysis and pursuant to CEQA, the Project's GHG emissions and its incremental contribution to GCC would be considered significant if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHG.

The ICAPCD has not established quantitative significance thresholds for the evaluation of GHG emissions for CEQA analysis. Instead, each project is evaluated on a case-by-case basis using the most up-to-date calculation and analysis methods. Therefore, to establish additional context in which to consider the order of magnitude of the Project's construction-related and operational GHG emissions, this analysis considers the following guidelines on the levels of GHG emissions that would constitute a cumulatively considerable incremental contribution to GCC (AECOM 2014d, pp. 23-24).

- The South Coast Air Quality Management District (SCAQMD) has adopted a significance threshold for GHG emissions of 10,000 MT CO_2e per year where SCAQMD is the lead agency for an industrial project.

The significance thresholds presented above are for informational purposes only in order to serve as examples of the types of thresholds being established and utilized in nearby jurisdictions/AQMDs. In the absence of ICAPCD thresholds, the intention is to put Project-generated GHG emissions into the appropriate State-wide context in order to evaluate whether the GHG emissions contribution from the Project to GCC would reach the level of a considerable incremental contribution to a significant cumulative impact (AECOM 2014d, p. 24).

Many California air districts, including the SCAQMD, also recommend that construction emissions associated with a project be amortized over the life of the project (typically 30 years) and added to the operational emissions. Therefore, modeled construction-related GHG emissions associated with the Project are discussed first, then operational GHG emissions are totaled and the amortized construction emissions are added to the operational emissions (AECOM 2014d, p. 24).

B. METHODOLOGY

The *Air Quality Impact Analysis, Wistaria Ranch Solar Energy Center Project* (AQIA) (AECOM 2014d) for the proposed Project identified GHG emissions that would occur during construction, operation and decommissioning of the proposed Project. The analysis in the AQIA was based on the Project Description provided by the Applicant, which is also reflected in Chapter 2.0, Project Description, of this EIR. The AQIA is provided on the attached CD of Technical Appendices as **Appendix C** of this EIR.

Total GHG emissions were estimated using the California Emission Estimator Model (CalEEMod) (version 2011.1.1) with the same inputs and assumptions that were used to estimate criteria pollutant construction emissions (see Section 4.4, Air Quality). CalEEMod allows the user to enter project-specific construction information, such as types, number and horsepower of construction equipment, and number and length of off-site motor vehicle trips (AECOM 2014d). Where available from the Applicant, modeling was based on Project-specific data. Where Project-specific information (e.g., amount of land to be disturbed/graded per day, types of equipment to be used, number of construction employees) was not available, reasonable assumptions were used to estimate emissions (AECOM 2014d).

GHG emissions would be associated with vehicle engine exhaust from construction equipment, haul trips, and construction worker trips. GHG emissions generated by the Project would predominantly consist of CO_2. While emissions of other GHGs, such as CH_4, are important with respect to global climate change, emission levels of other GHGs are less dependent on the emissions-generating activities associated with the Project than are levels of CO_2. However, where appropriate emission factors were available, emissions of CH_4 and N_2O were included in the analysis of the Project (AECOM 2014d).

For purposes of developing a conservative (i.e. worst-case) analysis, the AQIA analysis assumed the Full Build-out Scenario would be built over an 18-month period. Utilizing the shortest construction timeframe in modeling construction-phase GHG emissions results in a greater intensity of labor and equipment (and therefore potential simultaneous emissions) during the construction period (AECOM 2014d).

Total estimated construction and decommissioning related GHG emissions associated with the Full Build-out Scenario were divided by 30 years to estimate the amortized construction emissions over the lifetime of the Project (AECOM 2014d).

C. PROJECT/CUMULATIVE IMPACTS AND MITIGATION MEASURES

Due to the global nature of climate change and GHG emissions and their potential effects, GHG emissions generated by an individual project are evaluated on a cumulative basis. The Project's contribution to cumulative GHG emissions were analyzed based on the AQIA prepared by AECOM (AECOM 2014d). The AQIA is provided on the attached CD of Technical Appendices as **Appendix C** of this EIR.

Generation of GHG Emissions

Impact 4.5.1 Construction, operation and decommissioning of the proposed Project would generate GHG emissions. Neither the County nor any other agency with jurisdiction over the proposed Project has adopted GHG emissions thresholds. The Project would also not exceed GHG emissions thresholds adopted by the nearby SCAQMD where related thresholds have been adopted. Thus, Project GHG emissions are considered **less than significant**.

INDIVIDUAL CUPs 13-0036 thru 13-0050

Construction

Construction of each CUP 13-0036 thru 13-0050 would generate GHG emissions. Construction emissions would be associated with vehicle engine exhaust from equipment, haul trips, and worker trips. Construction of a single CUP was estimated to generate approximately 671 MT CO_2 over the duration of the 7-month construction period.[1] Therefore, the total estimated construction related GHG emissions are divided by 30 years to estimate the amortized construction emissions (16 MT CO_2 per year) (AECOM 2014d, p. 44). Construction activities are temporary in nature, and GHG emissions are addressed at the cumulative level over the lifespan of the Project.

Operation

Operational GHG emissions for each CUP would be generated by mobile sources, electricity use, water consumption, wastewater treatment, and the use of gas-insulated switches. Mobile source emissions would be associated with off-road equipment use, diesel generator testing and maintenance, and vehicle travel required for maintenance of each CUP. On-site operations activity would include in-place panel washing, which would require approximately five acre feet of water per year. The total SF_6 capacity for each CUP is estimated at 84 pounds (lbs) with annual SF_6 emissions for each CUP at 0.42 lbs. Based on the high GWP of SF_6, the estimated CO_2e emissions at each CUP would be approximately 5 MT per year (AECOM 2014d, p. 45).

Table 4.5-2 shows the summary of operational GHG emissions estimated for a typical CUP. The annual operational emissions levels were estimated using the best available methodologies and emission factors available at the time the AQIA was prepared. Additional details are available in **Appendix C** of this EIR.

TABLE 4.5-2
TYPICAL CUP AREA GHG EMISSIONS

Emission Source	MT CO_2e Emissions per Year
Off-Road Equipment/On-Road Vehicles	51
Energy	151

[1] *Total construction-related emissions include CalEEMod estimates (671 MT CO_2) and water use (222 MT CO_2).*

TABLE 4.5-2
TYPICAL CUP AREA GHG EMISSIONS

Emission Source	MT CO_2e Emissions per Year
Water	11
Wastewater	3
Gas-Insulated Switches	5
Total (Operational)[1]	221
Total Amortized Construction[1]	22
Total Amortized Decommissioning[1]	16
Total (Operational + Amortized Construction)[1]	**259**

Source: AECOM 2014d, p. 45.
[1]Totals may not add correctly due to rounding.

The total construction-related and operational CO_2e emissions associated with a typical CUP would be less than the SCAQMD threshold of 10,000 MT CO_2e per year. Therefore, a typical CUP would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. This impact would be **less than cumulatively considerable**.

Decommissioning

Decommissioning of the CUP area was estimated to generate approximately 474 MT CO_2 over the duration of the decommissioning period.[2] Therefore, the total estimated GHG emissions are divided by 30 years to estimate the amortized decommissioning emissions (approximately 16 MT CO_2 per year).

Decommissioning activities are temporary in nature, and it is anticipated that regulatory compliance similar to or greater than what is currently required would be in effect at the time of Project decommissioning. It is also anticipated that the BACTs required to be implemented would be more stringent at the time of Project decommissioning. GHG emissions are addressed at the cumulative level over the lifespan of the Project (i.e. the end of each CUP or 30 years, whichever is later).

FULL BUILD-OUT SCENARIO

Construction

Construction of the Full Build-out Scenario would generate GHG emissions. Construction emissions would be associated with vehicle engine exhaust from equipment, haul trips, and worker trips and water consumption. Construction activities would require approximately 1,200 acre-feet (AF) of water for dust control and other construction activities. GHG emissions generated by the Project would predominantly consist of CO_2. While emissions of other GHGs, such as CH_4, are important with respect to GCC, emission levels of other GHGs are less dependent on the emissions generating activities associated with the Project than are levels of CO_2. However, where appropriate emission factors were available, emissions of CH_4 and N_2O were included in the analysis of the Project (AECOM 2014d, p. 42).

Construction of the Full Build-out Scenario was estimated to generate approximately 7,463 MT CO_2 over the duration of the 18-month construction period[3]. In order to estimate the construction emissions over the lifetime of the Project, the total estimated construction related GHG emissions associated with the Project were amortized over 30 years (7,463 MT CO_2 divided by 30 years). Therefore, the total estimated

[2] Total decommissioning-related emissions include CalEEMod estimates (252 MT CO_2) and water use (222 MT CO_2). Water use for decommissioning was conservatively estimated to be the same as the initial construction period.
[3] Total construction-related emissions include CalEEMod estimates (4,943 MT CO_2) and water use (2,520 MT CO_2)

construction-related GHG emissions of 7,463 MT CO_2 associated with the Full Build-out Scenario was divided by 30 years (approximately 249 MT CO_2 per year) to estimate the amortized construction emissions over the lifetime of the Project (AECOM 2014d, p. 43). Construction activities are temporary in nature, and GHG emissions are addressed at the cumulative level over the lifespan of the Project.

Operation

GHG emissions generated during Project operation would originate from direct and indirect emissions sources generated by mobile sources, electricity use, water consumption, and treatment of wastewater generated at each CUP. Mobile source emissions would be associated with activities such as off-road equipment use, diesel generator testing and maintenance, and vehicle travel required for maintenance of each CUP. On-site operation activity would include panel washing, which would require approximately 60 AF of water per year (AECOM 2014d, p. 43).

As stated in Chapter 2.0, Project Description, the PV (or CPV) modules would be mounted on fixed-tilt, single, or dual-axis tracking structures. The estimate of GHG emissions in the AQIA assumes that all PV (or CPV) modules would be on trackers, and that there would be use of grid-provided electricity to power the trackers. Consumption of water may result in indirect GHG emissions from electricity used to power off-site conveyance, distribution, and treatment of water and associated wastewater. The analysis also assumed that wastewater would be conveyed to a water reclamation facility. This likely overestimates wastewater-related emissions, because (1) most water would be used and disposed of on site, and (2) no organic material (which affects GHG emissions in wastewater treatment) would be added to the wastewater coming from the Project (AECOM 2014d, p. 43).

The Project would include gas-insulated switchgear (e.g., circuit breakers) that uses SF_6, which is a GHG often associated with high-voltage switching devices as an electrical insulating medium. The circuit breakers have the potential to leak small amounts of SF_6 to the atmosphere. New circuit breakers are reported to have a potential upper-bound leakage rate of 0.5 percent. The total SF_6 capacity for the Full Build-out Scenario was estimated at 960 pounds. Using the leakage rate of 0.5 percent per year, the annual SF_6 emissions for the Full Build-out Scenario would be 4.8 pounds. Based on the high GWP of SF_6, the estimated CO_2e emissions would be approximately 52 MT per year (AECOM 2014d, p. 43).

Table 4.5-3 shows the summary of operational GHG emissions estimated for the Full Build-out Scenario. The annual operational emissions levels were estimated using the best methodologies and emission factors available at the time of preparing the AQIA. Additional details are available in **Appendix C** of this EIR.

TABLE 4.5-3
TOTAL GHG EMISSIONS – FULL BUILD-OUT SCENARIO

Emission Source	Unmitigated Project Emissions of CO_2e per Year (MT)
Off-Road Equipment/On-Road Vehicles	294
Energy	1,721
Water	126
Wastewater	30
Gas-Insulated Switches	52
Total (Operational)[1]	2,223
Total Amortized Construction[1]	243
Total Amortized Decommissioning[1]	153
Total (Operational + Amortized Construction)[1]	**2,619**

Source: AECOM 2014d, p. 44.
[1]Totals may not add correctly due to rounding.

As shown in **Table 4.5-3**, operation of the Full Build-out Scenario would result in GHG emissions of 2,223 MT per year of CO_2e over the anticipated 30-year lifespan (AECOM 2014d, p. 44).

Amortizing the construction-phase emissions over the Project's 30 year operational lifespan would result in the addition of 243 MT CO_2e to the Project's total GHG emissions. Amortizing decommissioning emissions over the Project's 30 year operational lifespan would result in the addition of 153 MT CO_2e to the Project's total GHG emissions. Therefore, construction plus operational GHGs for the Full Build-out Scenario would result in a total of 2,619 MT per year CO_2e GHG emissions (AECOM 2014d, p. 44).

The total construction, operation and decommissioning CO_2e emissions associated with the Full Build-out Scenario would be less than the SCAQMD's significance threshold for GHG emissions of 10,000 MT CO_2e per year. As a result, the Full Build-out Scenario would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. Therefore, a **less than significant impact** would occur in regard to GHG emissions and GCC (AECOM 2014d, p. 44) and the Full Build-out Scenario's contribution to GHG emissions would be **less than cumulatively considerable**.[4]

Decommissioning

Decommissioning activities would increase air pollutant emissions as a result of earth-moving and exhaust from diesel equipment. Both dust and exhaust would be typical of most construction sites and temporary in nature. Decommissioning of the Full Build-out Scenario was estimated to generate approximately 4,580 MT CO_2 over the duration of the decommissioning period.[5] Therefore, the total estimated GHG emissions are divided by 30 years to estimate the amortized decommissioning emissions (approximately 153 MT CO_2 per year). (AECOM 2014d, p. 43). Decommissioning activities are temporary in nature. Further, it is anticipated that regulatory compliance similar to or greater than what is currently in place would be required at the time of Project decommissioning. It is also anticipated that the BACTs required to be implemented would be more stringent at the time of Project decommissioning. Therefore, a **less than significant impact** would occur in regard to GHG emissions and GCC (AECOM 2014d, p. 44) and the Full Build-out Scenario's contribution to GHG emissions would be **less than cumulatively considerable**.

Mitigation Measures

None required.

Significance After Mitigation

Not applicable.

Conflict with an Applicable Plan, Policy, or Regulation Adopted to Reduce GHG Emissions

Impact 4.5.2 The Full Build-out Scenario or Phased CUP Scenario would not conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions. Neither the County nor any other agency with jurisdiction over the proposed Project has adopted GCC or GHG reduction measures. As such, the proposed Project would not conflict with any applicable plan, policy, or regulation for the purpose of reducing GHG emissions. Therefore, **no impact** would occur.

[4] Note that if a single CUP development has 259 MT CO2e annually and the worst-case Near-Term scenario has 2,619 MT CO2e, then development of individual CUPs in the Phased CUP Scenario would range within these results and also not exceed the 10,000 MT CO2e significance threshold.

[5] Total construction-related emissions include CalEEMod estimates (2,060 MT CO_2) and water use (2,520 MT CO_2). Water use for decommissioning was conservatively estimated to be the same as the initial construction period

PHASED CUP SCENARIO (INDIVIDUAL CUPs13-0036 THRU 13-0052)

Construction, Operation and Decommissioning

Construction and operation of each CUP is aligned with the goals of AB 32 and would provide non-fossil-fuel-based electricity. Therefore, development of each of the 17 CUPs would support the State's goal to obtain 33 percent of all electricity from renewable sources and help to achieve 1990 statewide GHG emissions levels by 2020 (AECOM 2014d, p. 47).

The total amount of carbon savings from implementation of a typical CUP area is estimated at 30,026 MT CO_2e per year. After accounting for annual emissions of 259 MT CO_2e per year, a typical CUP area would result in a net carbon savings of 29,767 MT CO_2e per year. As these emissions reductions are accounted for by a utility that would be using these reductions to meet its RPS goal, the reductions are not factored into the significance findings in the AQIA; however, quantifying reductions does demonstrate that development of CUP areas would assist the State in meeting its RPS goal (AECOM 2014d, p. 47).

As discussed earlier, a typical CUP would not generate GHG emissions that would have a significant impact on the environment. As a result, construction, operation and decommissioning of a typical CUP would not conflict with any applicable plan, policy, or regulation for the purpose of reducing GHG emissions. Therefore, **no impact** associated with conflicts with an applicable plan, policy, or regulation for the purpose of reducing GHG emissions would occur in association with construction, operation and decommissioning of a typical CUP (AECOM 2014d, p. 47).

FULL BUILD-OUT SCENARIO

Construction, Operation and Decommissioning

CARB's Scoping Plan includes measures to meet California's goal of reducing emissions to 1990 levels by 2020 and also reiterates the State's role in the long-term goal established in EO S-3-05, which is to reduce GHG emissions to 80 percent below 1990 levels by 2050. According to the CARB, the 2020 goal was established as an achievable, mid-term target, and the 2050 GHG emissions reduction goal represents the level scientists believe is necessary to stabilize the climate (AECOM 2014d, pp. 45-46).

None of the measures listed in the CARB Scoping Plan (which contains the main strategies that California will use to achieve emission reductions necessary to meet the goals of AB 32) directly relate to construction activity. The Scoping Plan includes some measures that would indirectly address GHG emissions levels associated with construction activity, such as the phasing in of cleaner technology for diesel engine fleets (including construction equipment) and the development of a Low Carbon Fuel Standard (LCFS). However, successful implementation of these measures will predominantly depend on the development of laws and policies at the State level. Those policies formulated under the mandate of AB 32 that are applicable to construction-related activity, either directly or indirectly, would be implemented during construction of the Full Build-out Scenario if those policies and laws are developed and adopted before the commencement of construction. Therefore, construction of the Full Build-out Scenario would not conflict with the Scoping Plan (AECOM 2014d, p. 46).

The measures in the Scoping Plan also put California on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels. Implementing light-duty vehicle GHG emission standards, LCFS, regional transportation-related GHG targets, and the RPS as set forth in the Scoping Plan would continue to achieve reductions through at least 2030. However, the Scoping Plan does not recommend additional measures for meeting specific GHG emissions limits beyond 2020. The Scoping Plan is currently being updated, and additional information on the revised measures was not

available at the time the AQIA was prepared. In addition, operation and decommissioning of the Full Build-out Scenario is anticipated to be completed prior to 2050 (AECOM 2014d, p. 46).

Although construction and operation of the Full Build-Out Scenario would result in a direct increase of GHG emissions, it is aligned with the goals of AB 32. The proposed Project would provide non-fossil fuel based electricity and would support the State's goal to obtain 33 percent of all electricity from renewable sources and, therefore, help to achieve 1990 statewide emissions levels by 2020 (AECOM 2014d, p. 46).

In order to demonstrate that the proposed Project is aligned with and supporting the goals of AB 32, the Scoping Plan, and the RPS, it is important to understand the indirect (secondary) impacts of its approval. To facilitate this understanding, the AQIA estimated the amount of carbon savings that would be derived from implementing the Project, as opposed to implementing a carbon-based power plant (AECOM 2014d, p. 46). The total amount of carbon savings from implementation of the Project is estimated at 341,200 MT CO_2e per year. After accounting for annual operational emissions and amortized construction and decommissioning emissions of 2,619 MT CO_2e per year, the Project would result in a net carbon savings of 338,581 MT CO_2e per year. As these emissions reductions are accounted for by a utility in order to meet its RPS goal, the reductions are not factored into the significance findings for the AQIA. However, quantifying the emissions reductions does demonstrate that the Project would assist the State in meeting its RPS goal and informs the public and the decision-makers about the indirect benefits of the Project (AECOM 2014d, p. 46).

As discussed earlier under impact 4.5.1, the Project would not generate GHG emissions that would have a significant impact on the environment. Neither the County nor any other agency with jurisdiction over the proposed Project has adopted GCC or GHG reduction measures. Therefore, the proposed Project would not conflict with any applicable plan, policy, or regulation for the purpose of reducing GHG emissions (AECOM 2014d, p. 46). Therefore, **no impact** would occur.

Mitigation Measures

None required.

Significance After Mitigation

Not applicable.