## 3.1.3 Greenhouse Gas Emissions

This section discusses potential impacts to greenhouse gases (GHG) resulting from implementation of the Proposed Project. The analysis is based on the review of existing resources, technical data, and applicable laws, regulations, and guidelines, as well as the following technical reports prepared for the Proposed Project consistent with the County's draft requirements for GHG Reports (2012):

- *Greenhouse Gas Analysis, Tierra del Sol Solar Farm Project* (Appendix 3.1.3-1)
- *Rugged Solar LLC Project Climate Change and Greenhouse Gas Emissions Analysis* (Appendix 3.1.3-2)
- *AB 900 Application for the Soitec Solar Energy Project* (Appendix 3.1.3-3).

### *3.1.3.1 Existing Conditions*

This section describes the existing setting and also identifies the resources that could be affected by the Proposed Project.

#### *3.1.3.1.1 The Greenhouse Effect and Greenhouse Gases*

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind, lasting for an extended period (decades or longer).

Gases that trap heat in the atmosphere are often called "greenhouse gases" (GHGs). The greenhouse effect traps heat in the troposphere through a threefold process as follows: Short-wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and toward the Earth. This "trapping" of the long-wave (thermal) radiation emitted back toward the Earth is the underlying process of the greenhouse effect. Principal GHGs include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), ozone ($O_3$), and water vapor ($H_2O$). Some GHGs, such as $CO_2$, $CH_4$, and $N_2O$, occur naturally and are emitted to the atmosphere through natural processes and human activities. 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 mostly from off-gassing associated with agricultural practices and landfills. Man-made GHGs, which have a much greater heat-absorption potential than $CO_2$, include fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride ($SF_6$), and nitrogen trifluoride ($NF_3$), which are associated with certain industrial products and processes (CAT 2006).

The greenhouse effect is a natural process that contributes to regulating the Earth's temperature. Without it, the temperature of the Earth would be about 0°F (−18°C) instead of its present 57°F (14°C). Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect (National Climatic Data Center 2009).

The effect each GHG has on climate change is measured as a combination of the mass of its emissions and the potential of a gas or aerosol to trap heat in the atmosphere, known as its "global warming potential" (GWP). GWP varies between GHGs; for example, the GWP of $CO_2$ is 1, the GWP of $CH_4$ is 21, and the GWP of $N_2O$ is 310. Total GHG emissions are expressed as a function of how much warming would be caused by the same mass of $CO_2$. Thus, GHG emissions are typically measured in terms of pounds or tons of "$CO_2$ equivalent" ($CO_2E$).[1]

#### *3.1.3.1.2 Contributions to Greenhouse Gas Emissions*

In 2010, the United States produced 6,822 million metric tons of $CO_2E$ ($MMTCO_2E$) (EPA 2012). The primary GHG emitted by human activities in the United States was $CO_2$, representing approximately 84% of total GHG emissions. The largest source of $CO_2$, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 94% of the $CO_2$ emissions and 78% of overall GHG emissions.

According to the 2009 GHG inventory data compiled by the California Air Resources Board (CARB) for the California Greenhouse Gas Inventory for 2000–2009, California emitted 457 $MTCO_2E$ of GHGs, including emissions resulting from out-of-state electrical generation (CARB 2011a). The primary contributors to GHG emissions in California are transportation, electric power production from both in-state and out-of-state sources, industry, agriculture and forestry, and other sources, which include commercial and residential activities. These primary contributors to California's GHG emissions and their relative contributions in 2009 are presented in Table 3.1.3-1, GHG Sources in California.

#### *3.1.3.1.3 Potential Effects of Human Activity on Climate Change*

According to CARB, some of the potential impacts in California of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high $O_3$ days, more large forest fires, and more drought years (CARB 2006). Several recent studies have attempted to explore the possible negative consequences that climate change, left unchecked, could have in California. These reports acknowledge that climate scientists' understanding of the complex global climate system, and the interplay of the various internal and external factors that affect

[1] The $CO_2$ equivalent for a gas is derived by multiplying the mass of the gas by the associated GWP, such that $MTCO_2E$ = (MT of a GHG) x (GWP of the GHG). For example, the GWP for $CH_4$ is 21. This means that emissions of 1 MT of methane are equivalent to emissions of 21 MT of $CO_2$.

climate change, remains too limited to yield scientifically valid conclusions on such a localized scale. Substantial work has been done at the international and national level to evaluate climatic impacts, but far less information is available on regional and local impacts.

The primary effect of global climate change has been a rise in average global tropospheric temperature of 0.2°C per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling using 2000 emission rates shows that further warming would occur, which would induce further changes in the global climate system during the current century. Changes to the global climate system and ecosystems and to California would include, but would not be limited to:

- The loss of sea ice and mountain snowpack resulting in higher sea levels and higher sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures (IPCC 2007)
- A rise in global average sea level primarily due to thermal expansion and melting of glaciers and ice caps and the Greenland and Antarctic ice sheets (IPCC 2007)
- Changes in weather that include widespread changes in precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (IPCC 2007)
- A decline of Sierra snowpack, which accounts for approximately half of the surface water storage in California, by 70% to as much as 90% over the next 100 years (CAT 2006)
- An increase in the number of days conducive to $O_3$ formation by 25% to 85% (depending on the future temperature scenario) in high $O_3$ areas of Los Angeles and the San Joaquin Valley by the end of the 21st century (CAT 2006)
- High potential for erosion of California's coastlines and sea water intrusion into the Delta and levee systems due to the rise in sea level (CAT 2006).

### *3.1.3.2 Regulatory Setting*

#### Federal Regulations

The following federal regulations pertaining to GHG emissions would apply to the Proposed Project.

#### Massachusetts vs. EPA

On April 2, 2007, in *Massachusetts v. EPA*, the Supreme Court directed the Environmental Protection Agency (EPA) Administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In

making these decisions, the EPA Administrator is required to follow the language of Section 202(a) of the federal Clean Air Act (CAA). On December 7, 2009, the Administrator signed a final rule with two distinct findings regarding GHGs under Section 202(a) of the CAA:

- The Administrator found that elevated concentrations of GHGs—$CO_2$, $CH_4$, $N_2O$, HFCs, PFCs, and $SF_6$—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the "endangerment finding."
- The Administrator further found the combined emissions of GHGs—$CO_2$, $CH_4$, $N_2O$, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the CAA.

### Energy Independence and Security Act

On December 19, 2007, President Bush signed the Energy Independence and Security Act of 2007. Among other key measures, the act would do the following, which would aid in the reduction of national GHG emissions:

1. Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022
2. Set a target of 35 miles per gallon (mpg) for the combined fleet of cars and light trucks by model year 2020 and directs National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks
3. Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

### EPA and NHTSA Joint Final Rule for Vehicle Standards

On April 1, 2010, the EPA and NHTSA announced a joint final rule to establish a national program consisting of new standards for light-duty vehicles model years 2012 through 2016. The joint rule is intended to reduce GHG emissions and improve fuel economy. The EPA is finalizing the first-ever national GHG emissions standards under the CAA, and the NHTSA is finalizing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act (EPA 2010). This final rule follows the EPA and Department of Transportation's joint

proposal on September 15, 2009, and is the result of President Obama's May 2009 announcement of a national program to reduce GHGs and improve fuel economy (EPA 2011). The final rule became effective on July 6, 2010 (EPA and NHTSA 2010).

The EPA GHG standards require new passenger cars, light-duty trucks, and medium-duty passenger vehicles to meet an estimated combined average emissions level of 250 grams of $CO_2$ per mile in model year 2016, equivalent to 35.5 mpg if the automotive industry were to meet this $CO_2$ level through fuel economy improvements alone. The CAFE standards for passenger cars and light trucks will be phased in between 2012 and 2016, with the final standards equivalent to 37.8 mpg for passenger cars and 28.8 mpg for light trucks, resulting in an estimated combined average of 34.1 mpg. Together, these standards will cut GHG emissions by an estimated 960 MMTs and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program. The rules will simultaneously reduce GHG emissions, improve energy security, increase fuel savings, and provide clarity and predictability for manufacturers (EPA 2011).

In August 2012, the EPA and NHTSA approved a second round of GHG and CAFE standards for model years 2017 and beyond (EPA and NHTSA 2012). These standards will reduce motor vehicle GHG emissions to 163 grams of $CO_2$ per mile, which is equivalent to 54.5 mpg if this level were achieved solely through improvements in fuel efficiency, for cars and light-duty trucks by model year 2025. A portion of these improvements, however, will likely be made through improvements in air conditioning leakage and through use of alternative refrigerants, which would not contribute to fuel economy. The first phase of the CAFE standards, for model year 2017 to 2021, are projected to require, on an average industry fleet-wide basis, a range from 40.3 mpg to 41.0 mpg in model year 2021. The second phase of the CAFE program, for model years 2022 to 2025, are projected to require, on an average industry fleet-wide basis, a range from 48.7 mpg to 49.7 mpg in model year 2025. The second phase of standards have not been finalized due to the statutory requirement that NHTSA set average fuel economy standards not more than 5 model years at a time. The regulations also include targeted incentives to encourage early adoption and introduction into the marketplace of advanced technologies to dramatically improve vehicle performance, including:

- Incentives for electric vehicles, plug-in hybrid electric vehicles, and fuel cells vehicles
- Incentives for hybrid technologies for large pickups and for other technologies that achieve high fuel economy levels on large pickups
- Incentives for natural gas vehicles
- Credits for technologies with potential to achieve real-world GHG reductions and fuel economy improvements that are not captured by the standards test procedures.

## State Regulations

The following state regulations pertaining to GHG emissions would apply to the Proposed Project.

### Title 24

Although not originally intended to reduce GHG emissions, California's Energy Efficiency Standards for Residential and Nonresidential Buildings (24 California Code of Regulations (CCR) Part 6) 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. The premise for the standards is that energy-efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for space and water heating) results in GHG emissions. Therefore, increased energy efficiency in buildings results in relatively lower rates of GHG emissions on a building-by-building basis.

### Assembly Bill (AB) 1493

In a response to the transportation sector accounting for more than half of California's $CO_2$ emissions, AB 1493 (Pavley) was enacted on July 22, 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles whose primary use is noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22% in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards will result in a reduction of about 30%.

Before these regulations could go into effect, the EPA had to grant California a waiver under the federal CAA, which ordinarily preempts state regulation of motor vehicle emission standards. The waiver was granted by Lisa Jackson, the EPA Administrator, on June 30, 2009. On March 29, 2010, the CARB Executive Officer approved revisions to the motor vehicle GHG standards to harmonize the state program with the national program for 2012–2016 model years (see "EPA and NHTSA Joint Final Rule for Vehicle Standards" above). The revised regulations became effective on April 1, 2010.

### Executive Order S-3-05

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990

levels by 2020; and GHG emissions should be reduced to 80% below 1990 levels by 2050. The California Environmental Protection Agency (CalEPA) Secretary is required to coordinate efforts of various agencies to collectively and efficiently reduce GHGs. The Climate Action Team is responsible for implementing global warming emissions reduction programs. Representatives from several state agencies comprise the Climate Action Team. The Climate Action Team fulfilled its report requirements through the March 2006 Climate Action Team Report to the governor and the legislature (CAT 2006). A second draft biennial report was released in April 2009.

The 2009 Draft Climate Action Team Report (CAT 2009) expands on the policy outlined in the 2006 assessment. The 2009 report provides new information and scientific findings regarding the development of new climate and sea-level projections using new information and tools that have recently become available and evaluates climate change within the context of broader soil changes, such as land use changes and demographics. The 2009 report also identifies the need for additional research in several different aspects that affect climate change in order to support effective climate change strategies. The aspects of climate change determined to require future research include vehicle and fuel technologies, land use and smart growth, electricity and natural gas, energy efficiency, renewable energy and reduced carbon energy sources, low GHG technologies for other sectors, carbon sequestration, terrestrial sequestration, geologic sequestration, economic impacts and considerations, social science, and environmental justice.

### Assembly Bill 32

In furtherance of the goals established in Executive Order S-3-05, the legislature enacted AB 32 (Núñez and Pavley), the California Global Warming Solutions Act of 2006, which Governor Schwarzenegger signed on September 27, 2006. The GHG emissions limit is equivalent to the 1990 levels, which are to be achieved by 2020.

CARB has been assigned to carry out and develop the programs and requirements necessary to achieve the goals of AB 32. Under AB 32, CARB must adopt regulations requiring the reporting and verification of statewide GHG emissions. This program will be used to monitor and enforce compliance with the established standards. CARB is also required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 allows CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted.

The first action under AB 32 resulted in the adoption of a report listing early action GHG emission reduction measures on June 21, 2007. The early actions include three specific GHG

control rules. On October 25, 2007, CARB approved an additional six early action GHG reduction measures under AB 32. The three original early-action regulations meeting the narrow legal definition of "discrete early action GHG reduction measures" include:

1. A low-carbon fuel standard to reduce the "carbon intensity" of California fuels
2. Reduction of refrigerant losses from motor vehicle air conditioning system maintenance to restrict the sale of "do-it-yourself" automotive refrigerants
3. Increased methane capture from landfills to require broader use of state-of-the-art methane capture technologies.

The additional six early-action regulations, which were also considered "discrete early action GHG reduction measures," consist of:

1. Reduction of aerodynamic drag, and thereby fuel consumption, from existing trucks and trailers through retrofit technology
2. Reduction of auxiliary engine emissions of docked ships by requiring port electrification
3. Reduction of PFCs from the semiconductor industry
4. Reduction of propellants in consumer products (e.g., aerosols, tire inflators, and dust removal products)
5. Requirements that all tune-up, smog check, and oil change mechanics ensure proper tire inflation as part of overall service in order to maintain fuel efficiency
6. Restriction on the use of $SF_6$ from non-electricity sectors if viable alternatives are available.

As required under AB 32, on December 6, 2007, CARB approved the 1990 GHG emissions inventory, thereby establishing the emissions limit for 2020. The 2020 emissions limit was set at 427 $MMTCO_2E$. In addition to the 1990 emissions inventory, CARB also adopted regulations requiring mandatory reporting of GHGs for large facilities that account for 94% of GHG emissions from industrial and commercial stationary sources in California. About 800 separate sources fall under the new reporting rules and include electricity generating facilities, electricity retail providers and power marketers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and other industrial sources that emit $CO_2$ in excess of specified thresholds.

On December 11, 2008, CARB approved the *Climate Change Proposed Scoping Plan: A Framework for Change* (Scoping Plan; CARB 2008) to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction measures by both

entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program.

The key elements of the Scoping Plan include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards
- Achieving a statewide renewables energy mix of 33%
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85% of California's GHG emissions
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard (LCFS)
- Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation.

### Senate Bill 1368

In September 2006, Governor Schwarzenegger signed SB 1368, which requires the California Energy Commission (CEC) to develop and adopt regulations for GHG emissions performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by the California Public Utilities Commission (CPUC). This effort will help protect energy customers from financial risks associated with investments in carbon-intensive generation by allowing new capital investments in power plants whose GHG emissions are as low or lower than new combined-cycle natural gas plants, by requiring imported electricity to meet GHG performance standards in California, and by requiring that the standards be developed and adopted in a public process.

### Executive Order S-1-07

Issued on January 18, 2007, Executive Order S-1-07 sets a declining Low Carbon Fuel Standard (LCFS) for GHG emissions measured in $CO_2E$ gram per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered. CARB adopted the implementing regulation in

April 2009. The regulation is expected to increase the production of biofuels, including those from alternative sources such as algae, wood, and agricultural waste. In addition, the LCFS would drive the availability of plug-in hybrid, battery electric, and fuel-cell power motor vehicles. The LCFS is anticipated to lead to the replacement of 20% of the fuel used in motor vehicles with alternative fuels by 2020.

### Senate Bill 97

In August 2007, the legislature enacted SB 97 (Dutton), which directs the Governor's Office of Planning and Research (OPR) to develop guidelines under the California Environmental Quality Act (CEQA) for the mitigation of GHG emissions. OPR was to develop proposed guidelines by July 1, 2009, and the Natural Resources Agency was directed to adopt the guidelines by January 1, 2010. On April 13, 2009, OPR submitted to the Secretary for Natural Resources its proposed amendments to the CEQA Guidelines.

On June 19, 2008, OPR issued a technical advisory as interim guidance regarding the analysis of GHG emissions in CEQA documents (OPR 2008). The advisory indicated that a project's GHG emissions, including those associated with vehicular traffic, energy consumption, water usage, and construction activities, should be identified and estimated. The advisory further recommended that the lead agency determine significance of the impacts and impose all mitigation measures that are necessary to reduce GHG emissions to a level that is less than significant.

On April 13, 2009, OPR submitted to the Natural Resources Agency its proposed amendments to the CEQA Guidelines relating to GHG emissions. On July 3, 2009, the Natural Resources Agency commenced the Administrative Procedure Act rulemaking process for certifying and adopting the proposed amendments, starting the public comment period.

The Natural Resources Agency adopted the CEQA Guidelines Amendments on December 30, 2009, and transmitted them to the Office of Administrative Law on December 31, 2009. On February 16, 2010, the Office of Administrative law completed its review and filed the amendments with the secretary of state. The amendments became effective on March 18, 2010. The amended guidelines establish several new CEQA requirements concerning the analysis of GHGs, including the following:

- Requiring a lead agency to "make a good faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of GHG emissions resulting from a project" (Section 15064(a))
- Providing a lead agency with the discretion to determine whether to use quantitative or qualitative analysis or performance standards to determine the significance of GHG emissions resulting from a particular project (Section 15064.4(a))

- Requiring a lead agency to consider the following factors when assessing the significant impacts from GHG emissions on the environment:
  - The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting
  - Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project
  - The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. (Section 15064.4(b))
- Allowing lead agencies to consider feasible means of mitigating the significant effects of GHG emissions, including reductions in emissions through the implementation of project features or off-site measures, including offsets that are not otherwise required (Section 15126.4(c)).

The amended guidelines also establish two new guidance questions regarding GHG emissions in the Environmental Checklist set forth in CEQA Guidelines Appendix G:

- Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

The adopted amendments do not establish a GHG emission threshold, and instead allow a lead agency to develop, adopt, and apply its own thresholds of significance or those developed by other agencies or experts.[2] The Natural Resources Agency also acknowledges that a lead agency may consider compliance with regulations or requirements implementing AB 32 in determining the significance of a project's GHG emissions.[3]

### Senate Bill 375

In August 2008, the legislature passed and on September 30, 2008, Governor Schwarzenegger signed SB 375 (Steinberg), which addresses GHG emissions associated with the transportation

[2] "The CEQA Guidelines do not establish thresholds of significance for other potential environmental impacts, and SB 97 did not authorize the development of a statement threshold as part of this CEQA Guidelines update. Rather, the proposed amendments recognize a lead agency's existing authority to develop, adopt and apply their own thresholds of significance or those developed by other agencies or experts" (California Natural Resources Agency 2009, p. 84).

[3] "A project's compliance with regulations or requirements implementing AB 32 or other laws and policies is not irrelevant. Section 15064.4(b)(3) would allow a lead agency to consider compliance with requirements and regulations in the determination of significance of a project's greenhouse gas emissions" (California Natural Resources Agency 2009, p. 100).

sector through regional transportation and sustainability plans. Regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035, as determined by CARB, are required to consider the emission reductions associated with vehicle emission standards (see SB 1493), the composition of fuels (see Executive Order S-1-07), and other CARB-approved measures to reduce GHG emissions. Regional metropolitan planning organizations (MPOs) will be responsible for preparing a Sustainable Communities Strategy (SCS) within their Regional Transportation Plan (RTP). The goal of the SCS is to establish a development plan for the region, which, after considering transportation measures and policies, will achieve, if feasible, the GHG reduction targets. If an SCS is unable to achieve the GHG reduction target, an MPO must prepare an Alternative Planning Strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies. SB 375 provides incentives for streamlining CEQA requirements by substantially reducing the requirements for "transit priority projects," as specified in SB 375, and eliminating the analysis of the impacts of certain residential projects on global warming and the growth-inducing impacts of those projects when the projects are consistent with the SCS or Alternative Planning Strategy. On September 23, 2010, CARB adopted the SB 375 targets for the regional MPOs. The targets for the San Diego Association of Governments (SANDAG) are a 7% reduction in emissions per capita by 2020 and a 13% reduction by 2035. Achieving these goals through adoption of a SCS will be the responsibility of the MPOs.

### Executive Order S-13-08

Governor Schwarzenegger issued Executive Order S-13-08 on November 14, 2008. The Executive Order is intended to hasten California's response to the impacts of global climate change, particularly sea level rise. It directs state agencies to take specified actions to assess and plan for such impacts. It directs the Resources Agency, in cooperation with the California Department of Water Resources, CEC, California's coastal management agencies, and the Ocean Protection Council, that the National Academy of Sciences prepare a Sea Level Rise Assessment Report by December 1, 2010. The Ocean Protection Council, California Department of Water Resources, and CEC, in cooperation with other state agencies, are required to conduct a public workshop to gather information relevant to the Sea Level Rise Assessment Report. The Business, Transportation, and Housing Agency was ordered to assess within 90 days of the order the vulnerability of the state's transportation systems to sea level rise. OPR and the Resources Agency are required to provide land use planning guidance related to sea level rise and other climate change impacts. The order also requires the other state agencies to develop adaptation strategies by June 9, 2009, to respond to the impacts of global climate change that are predicted to occur over the next 50 to 100 years. A discussion draft adaptation strategies report was released in August 2009, and the final adaption strategies report was issued in December 2009. To assess the state's

vulnerability, the report summarizes key climate change impacts to the state for the following areas: public health, ocean and coastal resources, water supply and flood protection, agriculture, forestry, biodiversity and habitat, and transportation and energy infrastructure. The report then recommends strategies and specific responsibilities related to water supply, planning and land use, public health, fire protection, and energy conservation.

### Executive Order S-14-08

On November 17, 2008, Governor Schwarzenegger issued Executive Order S-14-08. This Executive Order focuses on the contribution of renewable energy sources to meet the electrical needs of California while reducing the GHG emissions from the electrical sector. The governor's order requires that all retail suppliers of electricity in California serve 33% of their load with renewable energy by 2020. Furthermore, the order directs state agencies to take appropriate actions to facilitate reaching this target. The Resources Agency, through collaboration with the CEC and California Department of Fish and Wildlife (CDFW; formerly California Department of Fish and Game), is directed to lead this effort. Pursuant to a Memorandum of Understanding between the CEC and CDFW creating the Renewable Energy Action Team, these agencies will create a "one-stop" process for permitting renewable energy power plants.

### Executive Order S-21-09

On September 15, 2009, Governor Schwarzenegger issued Executive Order S-21-09. This Executive Order directed CARB to adopt a regulation consistent with the goal of Executive Order S-14-08 by July 31, 2010. CARB is further directed to work with the CPUC and CEC to ensure that the regulation builds upon the Renewable Portfolio Standard (RPS) program and is applicable to investor-owned utilities, publicly owned utilities, direct access providers, and community choice providers. Under this order, CARB is to give the highest priority to those renewable resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health and can be developed the most quickly in support of reliable, efficient, cost-effective electricity system operations. On September 23, 2010, CARB adopted regulations to implement a "Renewable Electricity Standard," which would achieve the goal of the Executive Order with the following intermediate and final goals: 20% for 2012–2014, 24% for 2015–2017, 28% for 2018–2019, and 33% for 2020 and beyond. Under the regulation, wind; solar; geothermal; small hydroelectric; biomass; ocean wave, thermal, and tidal; landfill and digester gas; and biodiesel would be considered sources of renewable energy. The regulation would apply to investor-owned utilities and public (municipal) utilities.

### Senate Bill X1 2

On April 12, 2011, Governor Jerry Brown signed SB X1 2 in the First Extraordinary Session, which would expand the RPS by establishing a goal of 20% of the total electricity sold to retail

customers in California per year, by December 31, 2013, and 33% by December 31, 2020, and in subsequent years. Under the bill, a renewable electrical generation facility is one that uses biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts (MW) or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current, and that meets other specified requirements with respect to its location. In addition to the retail sellers covered by SB 107, SB X1 2 adds local publicly owned electric utilities to the RPS. By January 1, 2012, the CPUC is required to establish the quantity of electricity products from eligible renewable energy resources to be procured by retail sellers in order to achieve targets of 20% by December 31, 2013; 25% by December 31, 2016; and 33% by December 31, 2020. The statute also requires that the governing boards for local publicly owned electric utilities establish the same targets, and the governing boards would be responsible for ensuring compliance with these targets. The CPUC will be responsible for enforcement of the RPS for retail sellers, while the CEC and CARB will enforce the requirements for local publicly owned electric utilities.

### Assembly Bill 900

On September 27, 2011, Governor Jerry Brown signed AB 900, the "Jobs and Economic Improvement Through Environmental Leadership Act." Under AB 900, specific projects may be qualified for expedited and streamlined environmental review under CEQA. As stated in Section 21183, a project that is identified as an "environmental leadership project" under AB 900 may be certified for streamlining if the project applicant invests $100,000,000 in the State of California following construction, creates high-wage jobs, would not result in any net additional GHG emissions from employee transportation, and mitigation measures identified under environmental review become conditions of approval for the project, among others.

## Local Regulations

The following local/regional regulations pertaining to GHG would apply to the Proposed Project.

### County of San Diego Climate Action Plan

The County of San Diego Climate Action Plan (CAP), adopted June 2012, documents the County's long-term strategy for addressing the adverse effects of climate change (County of San Diego 2012a). The CAP outlines various mechanisms and measures for reducing GHG emissions at the County level, including those specific to water conservation, waste reduction, land use, and adaptation strategies to fulfill the obligations delineated in AB 32. The CAP includes County goals previously established under the County General Plan and County Strategic Energy Plan, and establishes GHG reduction targets at 15% below 2005 levels by 2020, and 49% below 2005 levels by 2035. The CAP builds on long-standing efforts, including state initiatives, County staff recommendations, and regional planning strategies to enhance environmental sustainability and

carbon neutrality, particularly unincorporated segments of the County. As shown in Table 3.1.3-2, GHG Sources in San Diego County, unincorporated San Diego County emitted approximately 4.51 $MMTCO_2E$ of GHGs in 2005. Similar to the statewide emissions inventory, the transportation sector was the largest contributor to GHG emissions in 2005 accounting for approximately 59% of total GHG emissions (more than 2.6 $MMTCO_2E$). Emission sources and emission estimates by sector are shown in Table 3.1.3-2.

### San Diego County Greenhouse Gas Inventory

The University of San Diego School of Law's Energy Policy Initiative Center (University of San Diego 2008) prepared a regional GHG inventory. This San Diego County Greenhouse Gas Inventory consisted of a detailed inventory that took into account the unique characteristics of the region in calculating emissions. The study found that emissions of GHGs must be reduced by 33% below business as usual in order for San Diego County to achieve 1990 emission levels by 2020.

### 2050 Regional Transportation Plan

On October 28, 2011, the SANDAG Board of Directors adopted the 2050 Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS), which articulates future plans for San Diego's regional transportation system over the next 40 years. The SCS, which is included as part of the RTP, details the regional strategy for reducing GHG emissions to state-mandated levels over time as required by SB 375, including measures encouraging infill development. The San Diego region is the first in California to produce an RTP with a SCS. As part of the 2050 RTP and SCS approval process, SANDAG Board of Directors also approved a strategy for evaluating alternative land use scenarios as part of the Regional Comprehensive Plan update, which would aid in addressing reduction of GHG emissions between the years 2035 and 2050. As part of the RTP effort, SANDAG has committed to additional actions that will assist in SANDAG's implementation of SB 375 and its 2050 RTP/SCS consistent with California's state planning priorities (AB 857 adopted in 2002), the California Global Warming Solutions Act of 2006, and regional GHG targets. These actions would include alternative land use/transportation scenarios, developing a regional bike plan early action program, transportation implementation strategy, and others. These actions will be part of the San Diego Forward: The Regional Plan, which will include the next update to the RTP/SCS and an update to the Regional Comprehensive Plan that was adopted in 2004.

## *3.1.3.3 Analysis of Project Effects and Determination as to Significance*

The Proposed Project consists of four renewable energy solar farms in southeastern San Diego County. The following impact analysis has been separated into discussions for each of the four solar farms: Tierra del Sol, Rugged, LanEast, and LanWest, as well as a combined discussion of the Proposed Project as a whole. For the purposes of this Program EIR, the

Tierra del Sol and Rugged solar farms are analyzed at a project level, whereas the LanEast and LanWest solar farms are analyzed at a programmatic level as sufficient project-level data has not been developed at this time.

### Methodology and Assumptions

The State of California has developed guidelines to address the significance of climate change impacts based on Appendix G of the CEQA Guidelines, Based on the CEQA Guidelines, a project would have a significant environmental impact if it would:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Neither the State of California nor the San Diego County Air Pollution Control District (SDAPCD) has adopted emission-based thresholds for GHG emissions under CEQA. The OPR Technical Advisory titled *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review* states that "public agencies are encouraged but not required to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the project contributes to a significant, cumulative climate change impact" (OPR 2008, p. 4). Furthermore, the advisory document indicates in the third bullet item on page 6 that "in the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a 'significant impact," individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice." Similarly, Section 15064.4(a) of the CEQA Guidelines states "The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based on the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project" (14 CCR 15064.4).

### County Climate Change Analysis Screening Criteria

As indicated in the County's *DPLU Interim Approach to Addressing Climate Change In CEQA Documents* (County of San Diego 2010a), any commercial or light industrial use that exceeds a

screening criteria threshold of 900 metric tons (MT) of carbon dioxide equivalent ($MTCO_2E$)[4] per year would be required to prepare a climate change analysis.[5] The 900 MT threshold for determining when a more detailed climate change analysis is required was chosen based on available guidance from the California Air Pollution Control Officers Association (CAPCOA) white paper on addressing GHG emissions under CEQA (CAPCOA 2008). The CAPCOA white paper references a 900 MT guideline as a conservative threshold for requiring further analysis and mitigation. Table 3.3.1-3, Project Size Thresholds, shows the general sizes of projects that would generally require a more detailed climate change analysis based on the 900 MT threshold.

If a project falls below the project size thresholds set forth in Table 3.1.3-3, or does not exceed 900 $MTCO_2E$ per year, then the climate change impacts would be considered less than significant.

For a project whose emissions exceed the screening threshold, however, the Interim Guidance indicates that the project needs to demonstrate that it would not impede the implementation of the Global Warming Solutions Act of 2006 (AB 32). The Interim Guidance states that to demonstrate that a project would not impede the implementation of AB 32, the project should demonstrate how its overall GHG emissions would be reduced to 33% below projected Business As Usual (BAU). The 33% reduction should be an overall reduction for operational emissions, construction-related emissions, and vehicular-related GHG emissions (County of San Diego 2010a). Construction emissions are to be annualized over the expected life of the project and added to the operational emissions. The Interim Guidance defines BAU as "the projected 2020 emissions that would have been generated without implementation of 2006 emissions restrictions and updated standards (e.g. 2005 Title 24 standards)" (County of San Diego 2010a).

This approach ensures that new development with the potential to make cumulatively considerable contributions to climate change will incorporate appropriate mitigation measures and not impede the implementation of AB 32.

In addition to the County of San Diego Interim Guidance, the proposed project was analyzed under *Draft County of San Diego Guidelines for Determining Significance – Climate Change,* which includes a 2,500 $MTCO_2E$ per year "bright line" screening threshold. The County developed screening criteria for a range of project types and sizes to identify smaller projects that

[4] The $CO_2$ equivalent for a gas is derived by multiplying the mass of the gas by the associated global warming potential (GWP), such that $MTCO_2E$ = (MT of a GHG) x (GWP of the GHG). For example, the GWP for $CH_4$ is 21. This means that emissions of 1 MT of methane are equivalent to emissions of 21 MT of $CO_2$.

[5] The County of San Diego has drafted an update to the *Interim Approach to Addressing Climate Change in CEQA Documents* for evaluating a project's GHG emissions, which include three general thresholds and one threshold for projects that include stationary sources. One of these thresholds, known as the "bright line" threshold, recommends a 2,500 metric-ton $CO_2$ equivalent threshold for determining significance of operational GHG emissions. These updated guidelines are still in draft form and have yet to be approved.

would have less-than-cumulatively considerable GHG emissions effects (Table 3.1.3-4). If a proposed project is the same type and equal to, or smaller than the project size listed, it is presumed that the operational GHG emissions for that project would not exceed 2,500 $MTCO_2E$ per year, and there would be a less-than-cumulatively considerable impact (County of San Diego 2012b). Use of the 2,500 MT "bright line" threshold only applies to a project's operational emissions and does not require construction emissions be annualized and added to the operational emissions.

It should be noted that these *Draft Guidelines for Determining Significance – Climate Change* guidelines were recently approved on November 7, 2013; however, the Interim Approach described above is regarded as the more stringent significance guideline for the purposes of analyzing the Proposed Project.

#### *3.1.3.3.1 Generation of Construction-Related and Operational Greenhouse Gas Emissions*

##### Guidelines for the Determination of Significance

For the purpose of this EIR, the County's *Interim Approach to Addressing Climate Change In CEQA Documents* (May 7, 2010) applies to both the direct impact analysis and the cumulative impact analysis. A significant impact would result if:

- The project would impede the implementation of AB 32. The project would not impede the implementation of AB 32 if it would generate less than 900 $MTCO_2E$ annually, or if project GHG emissions would be reduced to 33% below projected Business As Usual (BAU) levels in 2020.

##### Analysis

###### Tierra del Sol

The Tierra del Sol solar farm is anticipated to commence construction in September 2014 and would be completed within approximately 14 months for both Phase I and Phase II. Proposed construction phases and associated durations include the following:

- Mobilization (1 week)
- Clearing, grubbing, and grinding (9 weeks)
- Road construction (8 days)
- Underground electric/communications cable installation (17 weeks)
- Tracker installation Phase 1a – 30 MW (20 weeks)

- Tracker installation Phase 1b – 15 MW (7 weeks)
- Tracker installation Phase 2a – 15 MW (7 weeks)
- Substation construction (4 weeks)
- Operations and maintenance building construction (13 weeks)
- Gen-tie (10 weeks, commencing prior to clearing/grubbing/grinding).

Completion of construction of the Tierra del Sol solar farm is anticipated in November 2015, although construction of Phase II may be completed at a later date. Details of the construction schedule including heavy construction equipment hours of operation and duration, worker trips, and equipment mix are included in Appendix 3.1.3-1.

The equipment mix anticipated for construction activity was based on information provided by the applicant and best engineering judgment. The equipment mix is meant to represent a reasonably conservative estimate of construction activity.

Operation of the Tierra del Sol solar farm would involve in-place tracker washing that would occur every 6 to 8 weeks by mobile crews who would also be available for dispatch whenever on-site repairs or other maintenance are required. Tracker washing would be undertaken using the IPC Eagle Wash Station or equipment similar in nature and washing vehicles. On-site water storage tanks may be installed to facilitate washing. A 4-acre O&M annex site would be located adjacent to the substation site and would house O&M supplies, telecommunications equipment, and rest facilities all within a single-story building.

Maintenance and repair activities for transmission facilities would include both routine preventive maintenance and emergency procedures conducted to maintain system integrity, as well as vegetation clearing. Activities anticipated to occur would include pole or structure brushing, herbicide application, equipment repair and replacement, insulator washing, and helicopter operations. Operational activities are described in more detail Chapter 1.0, Project Description, Section 1.2.1.1.

**Construction Impacts**

GHG emissions would be associated with the construction phase of Tierra del Sol (solar farm and gen-tie line) through use of construction equipment and vehicle trips, including those for water delivery. Information regarding modeling assumptions and outputs, and detailed calculations of construction-related GHG emissions are provided Appendix 3.1.3-1.

As shown in Table 3.1.3-5, maximum construction emissions over the construction period for the Tierra del Sol solar farm would be approximately 2,888 $MTCO_2E$. When this total is annualized

over the 30-year life of the Tierra del Sol solar farm, the annual construction emissions would be approximately 96 $MTCO_2E$ per year.

**Operational Impacts**

Following construction, operation of the Tierra del Sol solar farm would produce GHG emissions associated with worker vehicles, personnel transport vehicles, washing vehicles and an IPC Eagle Wash Station or equipment similar in nature, service trucks, emergency generators, electricity consumption, water supply and wastewater during operations and maintenance for the project. Operation of the Tierra del Sol gen-tie would include pole/structure brushing, herbicide application, equipment repair using heavy-duty diesel trucks and light-duty diesel trucks, and biannual helicopter inspections. GHG emissions from natural gas use and creation of solid waste are not associated with the Tierra del Sol solar farm.

***Motor Vehicles***

The Tierra del Sol solar farm would impact GHG emissions through the vehicular traffic generated by O&M vehicles including worker vehicles, on-site personnel transport vehicles, washing vehicles, and a service truck. Worker trip distances for operations and maintenance of the Tierra del Sol solar farm were conservatively estimated for the model inputs as originating in Alpine, El Centro, and surrounding areas[6] (approximately 35 miles one way). All other O&M vehicles would be staged on site, and would conduct approximately 10 miles per day of maintenance activities per vehicle. Maintenance vehicles associated with the Tierra del Sol gen-tie line were assumed to originate in Alpine plus the length of the gen-tie line (6 miles) for a total of 41 miles one way. Maintenance activities for the Tierra del Sol gen-tie line were assumed to occur twice per month, and periodic repair activities were assumed to occur 1 week (5 days) per year.

Annual $CO_2$ emissions from motor vehicle trips associated with the Tierra del Sol solar farm were quantified using EMFAC2011. The $CO_2$ emissions from diesel-fueled washing vehicles that would accompany the IPC Eagle equipment were adjusted by a factor derived from the relative $CO_2$, $CH_4$, and $N_2O$ for diesel fuel as reported in the California Climate Action Registry's (CCAR's) General Reporting Protocol for transportation fuels and the global warming potential for each GHG (CCAR 2009). $CH_4$ and $N_2O$ emissions from all other motor vehicles during operation of the solar farm were accounted for by multiplying the estimated $CO_2$ emissions by a factor based on the assumption that $CO_2$ represents 95% of the $CO_2E$ emissions associated with passenger vehicles (EPA 2005). As summarized in Table

[6] The average of the distances from Alpine and El Centro is 46 miles. This distance was reduced by 25% to reflect worker commute trips from local housing (temporary or permanent) for an average worker commute distance of 35 miles.

3.1.3-6, Tierra del Sol – Estimated Operational GHG Emissions, total annual operational GHG emissions from motor vehicles would be 85.28 $MTCO_2E$ per year. Additional detail regarding these calculations can be found in Appendix 3.1.3-1.

***Helicopters***

Helicopters would be used for surveillance and inspection of the Tierra del Sol gen-tie. To best represent helicopter emissions during maintenance and inspection activities, a Bell 206 helicopter was used for the purposes of calculating annual $CO_2$ emissions. Annual $CO_2$ emissions from helicopter use were calculated based on fuel consumption of a Bell 206 model aircraft and the $CO_2$ emission factor for aviation gasoline as reported in the CCAR's General Reporting Protocol for transportation fuels (CCAR 2009). The GHG emissions estimate is based on two inspections of the gen-tie line per year, each lasting approximately 8 hours. The $CO_2$ emissions from use of helicopters were adjusted by a factor derived from the relative $CO_2$, $CH_4$, and $N_2O$ for aviation gasoline as reported in the CCAR's General Reporting Protocol for transportation fuels and the global warming potential for each GHG (CCAR 2009).

***Diesel Generators***

Operational emissions would result from intermittent use of two 680-kilowatt (kW) diesel-powered emergency generators for maintenance and testing purposes. Each generator would be run for testing and maintenance approximately 1 hour each week for a total of 50 hours per year. Generator engines would meet the EPA standards for Tier 2 engines as required by the CARB Airborne Toxic Control Measure for new and in-use stationary diesel engines. The $CO_2$ emission factor was obtained from Section 3.4 (Large Stationary Diesel and All Stationary Dual-fuel Engines) of the EPA's *Compilation of Air Pollutant Emission Factors* (EPA 1996). The $CO_2$ emissions from diesel combustion were adjusted by a factor derived from the relative $CO_2$, $CH_4$, and $N_2O$ for natural gas as reported in the CCAR's General Reporting Protocol (CCAR 2009) for stationary combustion fuels and their GWPs. The estimated emissions from the emergency generator engines are shown in Table 3.1.3-6. See Appendix 3.1.3-1 for additional information.

***Gas-Insulated Switchgear***

At the present time, specific substation devices, such as transformers and circuit breakers, have not been identified; however, the substation may include gas-insulated switchgear (e.g., circuit breakers) that use $SF_6$, which is a GHG often associated with high-voltage switching devices. If the substation circuit breakers contain $SF_6$, they would potentially 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% (Blackman n.d.). For the 138 kV substation, the estimated total capacity of the circuit breakers could be up to 75 pounds (lbs) (Mehl, pers. comm. 2013). $SF_6$ has a GWP of 23,900

using $CO_2$ at a reference value of 1 (UNFCCC 2012). Thus, the annual $SF_6$ emissions (expressed in units of $CO_2E$), would be calculated as follows:

$$75 \text{ lbs} \times 0.5\% = 0.375 \text{ lb } SF_6/\text{year}$$

$$0.375 \text{ lb } SF_6/\text{year} \times 23{,}900 \text{ (GWP)} \div 2204.623 \text{ lbs/MT} = 4.07 \text{ MT}CO_2E/\text{year}$$

***Electrical Generation***

Annual electricity use for the proposed Tierra del Sol O&M annex was based upon estimated generation rates for land uses in the San Diego Gas & Electric (SDG&E) service area (see Appendix 3.1.3-1). In addition, the trackers (e.g., control units, motors) and other devices (e.g., inverters, field communications) common to each building block of trackers would use electricity to be provided by SDG&E (see Appendix 3.1.3-1). The Tierra del Sol solar farm proponent provided the estimated ratings of the devices and their operating schedule. Annual usage was determined depending on the period that devices would operate (e.g., daylight hours only). The generation of electricity through combustion of fossil fuels typically results in emissions of $CO_2$ and to a smaller extent $CH_4$ and $N_2O$. Annual electricity emissions were estimated using the reported $CO_2$ emissions per megawatt-hour (MWh) for SDG&E in 2008 (SDG&E 2010), which would provide electricity for the solar farm, adjusted to reflect 33% renewable energy in 2020 as calculated in the following equations:

$$2008 \ CO_2 \text{ Factor (lb/MWh)} \div (1 - 2009 \text{ \% Renewables}[7]) \times (1 - 2020 \text{ \% Renewables}) = 2020 \ CO_2 \text{ Factor (lb/MWh)}$$

$$739.05 \text{ lb/MWh} \div (1 - 0.10) \times (1 - 0.33) = 550.18 \text{ lb/MWh}$$

The contributions of $CH_4$ and $N_2O$ for power plants in California were obtained from the CCAR's General Reporting Protocol (CCAR 2009), which were adjusted for their GWPs. The Tierra del Sol solar farm would consume an estimated 1,095,859 kilowatt-hours (kWh) per year, generating approximately 275.04 $MTCO_2E$ annually as shown in Table 3.1.3-6 (see Appendix 3.1.3-1 for complete results).

***Water Supply and Wastewater***

Water supplied to the Tierra del Sol site would be obtained from an on-site well, which would require the use of electricity. Annual water use for the Tierra del Sol solar farm for the O&M annex and washing the trackers was based upon information provided by the solar farm proponent and would result in a water consumption rate of approximately 5.5 acre-feet per year. The estimated electrical usage associated with water supply was obtained from a CEC report on electricity associated with water supply in California (CEC 2006). An electricity usage factor representing supply and conveyance of locally supplied water in Northern California was

[7] A Power Content Label showing the mix of power sources in 2008 for SDG&E was not available. Thus, the Power Content Label for 2009 was used (SDG&E n.d.). The 2009 Power Content Label indicated that 10% of SDG&E's electricity sales were generated by renewable energy sources, such as biomass, wind, and solar.

assumed to be applicable (the factor for Southern California water assumes that water would be provided from the State Water Project, which is not the case for this project). GHG emissions from electrical generation were calculated as described above. As shown in Table 3.1.3-6, annual water use would result in approximately 2.92 $MTCO_2E$ per year (see Appendix 3.1.3-1).

GHG emissions associated with wastewater treatment using a septic tank were estimated based on data provided in the *County of San Diego Design Manual for Onsite Wastewater Treatment Systems* (County of San Diego 2010b) and a $CH_4$ emission factor derived from *CalEEMod User's Guide* (Environ 2011). Estimated annual wastewater treatment would result in approximately 0.13 $MTCO_2E$ per year (see Appendix 3.1.3-1).

As shown in Table 3.1.3-6, total annual GHG emissions from construction and operation of the Tierra del Sol solar farm would be approximately 518 $MTCO_2E$ per year.

The total Tierra del Sol solar farm GHG emissions would not exceed the County's screening threshold of 900 $MTCO_2E$, impacts would be **less than significant**. Additionally, the project's operational emissions would not exceed the updated County screening threshold of 2,500 $MTCO_2E$ per year as delineated in the County's *Draft Guidelines for Determining Significance – Climate Change* (County of San Diego 2012b).

Additionally, the Tierra del Sol solar farm has been certified as an Environmental Leadership Project under the Jobs and Economic Improvement through Environmental Leadership Act (AB 900) (Public Resources Code (PRC) Section 21178 et seq.) which, as a prerequisite, requires that the project not result in any net additional GHG emissions pursuant to PRC Section 21183(c). To ensure the Tierra del Sol solar farm would result in a zero net-increase in GHG emissions, the project applicant has committed to obtain voluntary carbon offsets or GHG credits from a qualified GHG emission broker to offset total projected construction and operational GHG emissions as stated in the *AB 900 Application for the Soitec Solar Energy Project* (attached as Appendix 3.1.3-3). Therefore, the project would provide the voluntary carbon offsets or GHG credits for the program eligibility, and there would not be a net-increase in GHG emissions following implementation of the Tierra del Sol solar farm. Therefore, because there would not be a net increase in GHG emissions following implementation of the Tierra del Sol solar farm, impacts would be **less than significant**.

**Decommissioning Impacts**

The expected lifespan of the Tierra del Sol solar farm is estimated to be 30 to 40 years or longer (although for the purposes of amortizing construction GHG emissions a 30-year lifetime was assumed). At the end of the useful life of the solar farm, two alternative scenarios are possible: (1) re-tool the technology and contract to sell energy to a utility; (2) if no other buyer of the energy emerges, the solar plant can be decommissioned and dismantled.

Dismantling the Tierra del Sol solar farm would entail disassembly of the solar facilities and substantive restoration of the site. Impacts associated with closure and decommissioning of the solar farm site would be temporary and would be associated with disassembly and removal of all detachable aboveground elements of the installation; removal of tracker masts and any other structural elements, including those that penetrate the ground surface to a depth of 2 feet below grade; and reuse of the land consistent with the Zoning Ordinance, which could include ground surface restoration to surrounding grade and reseeding with appropriate native vegetation. Decommissioning activities would be expected to result in substantially lower GHG emissions compared to construction activities due to more stringent engine and motor vehicle standards at the time of decommissioning (e.g., in 30 years all off-road diesel engines will meet Tier 4 or better requirements at a minimum, and motor vehicles will meet future fuel efficiency and GHG emissions standards). As with the construction emissions, the emissions resulting from decommissioning are expected to be well below the County's 900-metric-ton $CO_2E$ per year threshold, and impacts would be **less than significant**.

**GHG Emissions Offset Benefits**

In keeping with the renewable energy target under the Scoping Plan and as required by SB X1 2, the proposed Tierra del Sol solar farm would provide a source of renewable energy to achieve the RPS of 33% by 2020. Renewable energy, in turn, potentially offsets GHG emissions generated by fossil-fuel power plants. Based on estimates by the project proponent, the solar farm would generate 2,083 kWh alternating current annually per installed kilowatt (based on the direct current capacity of the trackers). This factor reflects the available daylight hours, conversion of direct current to alternating current, and various system losses. Using the installed tracker capacity of 80 MW (80,000 kW) direct current, the solar farm is anticipated to generate 166,640,000 kWh per year. A GHG factor for fossil-fuel-generated electricity was developed based on reported $CO_2$ emissions per kilowatt-hour for SDG&E in 2008 (SDG&E 2010) and an adjustment to reflect electricity from renewable energy, large hydroelectric, and nuclear sources in 2009 (SDG&E n.d.), which do not generate GHG emissions. The $CO_2$ factor for fossil-fuel-generated electricity would be 1.071 pounds $CO_2$ per kilowatt-hour as calculated in the following equations:

$$\text{2008 } CO_2 \text{ Factor (lb/kWh)} \div (1 - \text{2009 \% Renewables, Large Hydroelectric, Nuclear}^{8}) = \text{Fossil Fuel } CO_2 \text{ Factor (lb/kWh)}$$

$$0.739 \text{ lb/kWh} \div (1 - (0.10 + 0.03 + 0.18)) = 1.071 \text{ lb/kWh}$$

[8] A Power Content Label showing the mix of power sources in 2008 for SDG&E was not available. Thus, the Power Content Label for 2009 was used (SDG&E n.d.). The 2009 Power Content Label indicated that 10%, 3%, and 18% of SDG&E's electricity sales were generated by renewable, large hydroelectric, and nuclear energy sources, respectively.

The contributions of $CH_4$ and $N_2O$ for power plants in California were obtained from the CCAR's General Reporting Protocol (CCAR 2009), which were adjusted for their GWPs. Thus, the Tierra del Sol solar farm would provide a potential reduction of 81,334 $MTCO_2E$ per year if the electricity generated by the Tierra del Sol solar farm were to be used instead of electricity generated by fossil-fuel sources. Additional detail regarding these calculations can be found in Appendix 3.1.3-1. After accounting for the annualized construction and annual operational emissions of 518 $MTCO_2E$ per year, and the project proponent's commitment to obtain voluntary carbon offsets or GHG credits from a qualified GHG emission broker to offset total projected construction and operational GHG emissions, the net reduction in GHG emissions would be 80,816 $MTCO_2E$ per year. This reduction is not considered in the significance determination of the Tierra del Sol solar farm's GHG emissions but is provided for disclosure purposes.

## Rugged

### Construction Impacts

Construction-related GHG emissions generated by the Rugged solar farm would be associated with typical construction activities, such as site grading, tracker installation, vehicle engine exhaust from construction equipment, vendor trips, water delivery trips, and construction employee commute trips. Generation of construction-related emissions would be temporary and would subside after completion of the Rugged solar farm. Construction at the Rugged solar farm would require up to about 12 months and is anticipated to begin in July 2014. Construction activities would generally occur for 8 hours per day, 6 days per week.

In order to provide construction materials for the proposed Rugged solar farm, a temporary batch plant and rock crushing facility would be constructed on site. The temporary facility would be used for preparing and mixing concrete used for solar tracker foundations, transformers at the substation, the O&M building, and other project facilities including those for the Tierra del Sol site. The batch plant would operate for approximately 121 days in 2014 and 182 days in 2015 to serve both the Tierra del Sol and Rugged site construction activities. Source materials (e.g., sand) for the concrete batch plant would be purchased from a commercial source approximately 55 miles from the Rugged site. Water would be provided by on-site wells, and aggregate materials would be obtained from within the development footprint. It is assumed that the temporary batch plant and rock crushing facility would each be powered by portable diesel generators.

Information regarding modeling assumptions and outputs, and detailed calculations of construction-related GHG emissions are provided Appendix 3.1.3-2.

Construction of the Rugged solar farm would involve localized clearing and grading, construction of primary and secondary access roads, installation of tracker foundations, trenching

within each building block for the collection system and communications system, and installation of small concrete footing at each pair of inverters and attendant transformer. Table 3.1.3-7, Rugged – Estimated Construction GHG Emissions, shows the estimated annual GHG construction emissions associated with the Rugged solar farm, as well as the 30-year annualized construction emissions.

As shown in Table 3.1.3-7, maximum construction emissions over the construction period for the Rugged solar farm would be approximately 4,072 $MTCO_2E$. When this total is annualized over the 30-year life of the Rugged solar farm, the annual construction emissions would be approximately 136 $MTCO_2E$ per year.

**Operational Impacts**

Following construction, day-to-day activities associated with operation of the Rugged solar farm would generate direct and indirect GHG emissions from a limited number of sources including motor vehicles such as worker vehicles, personnel transport vehicles, washing vehicles including an IPC Eagle Wash Station or equipment similar in nature, satellite washing vehicles (light-duty diesel trucks) and service trucks; emergency generators; electricity consumption; water supply and wastewater during operations and maintenance for the solar farm. Operation of the Rugged gen-tie would include pole/structure brushing, herbicide application, equipment repair using heavy-duty diesel trucks and light-duty diesel trucks, and biannual helicopter inspections. GHG emissions from natural gas use and creation of solid waste are not associated with the Rugged solar farm.

***Motor Vehicles***

Construction of the Rugged solar farm would impact air quality through the vehicular traffic generated by O&M vehicles including employee vehicles, on-site personnel transport vehicles, washing vehicles, and a service truck. Employee trip distances for operation and maintenance of the solar farm were conservatively estimated for the model inputs as originating in Alpine, El Centro, and surrounding areas (approximately 35 miles one way). All other operation and maintenance vehicles were assumed to be staged on site, and would conduct approximately 10 miles per day of maintenance activities per vehicle. Maintenance vehicles associated with the gen-tie line were assumed to originate in Alpine plus the length of the gen-tie line (6 miles) for a total of 41 miles one way. Maintenance activities for the gen-tie line were assumed to occur twice a month, and periodic repair activities were assumed to occur one week (5 days) per year.

As summarized in Table 3.1.3-8, Estimated Operational GHG Emissions, total annual operational GHG emissions from motor vehicles would be 162.92 $MTCO_2E$ per year. Additional detail regarding these calculations can be found in Appendix 3.1.3-2.

### *Diesel Generators*

Operational emissions would result from intermittent use of two 680 kW diesel-powered emergency generators for maintenance and testing purposes. Each generator would be run for testing and maintenance approximately 1 hour each week for a total of 50 hours per year. Generator engines would meet the EPA standards for Tier 2 engines as required by the CARB Airborne Toxic Control Measure for new and in-use stationary diesel engines. The $CO_2$ emission factor was obtained from Section 3.4 (Large Stationary Diesel and All Stationary Dual-fuel Engines) of the EPA's *Compilation of Air Pollutant Emission Factors* (EPA 1996). The $CO_2$ emissions from diesel combustion were adjusted by a factor derived from the relative $CO_2$, $CH_4$, and $N_2O$ for diesel fuel as reported in the CCAR's General Reporting Protocol (CCAR 2009) for stationary combustion fuels and their GWPs. The estimated emissions from the emergency generator engines are 50.97 $MTCO_2E$ per year (Table 3.1.3-8). Refer to Appendix 3.1.3-2 for additional information.

### *Gas-Insulated Switchgear*

At the present time, specific substation devices, such as transformers and circuit breakers, have not been identified; however, the substation may include gas-insulated switchgear (e.g., circuit breakers) that use $SF_6$, which is a GHG often associated with high-voltage switching devices. If the substation circuit breakers contain $SF_6$, they would potentially leak small amounts of $SF_6$ to the atmosphere. The estimated annual $SF_6$ emissions are 4.07 $MTCO_2E$ per year (Table 3.1.3-8). Refer to Appendix 3.1.3-2 for additional information.

### *Electrical Generation*

Annual electricity use for the proposed O&M annex was based upon estimated generation rates for land uses in the SDG&E service area (see Appendix 3.1.3-7). In addition, the trackers (e.g., control units, motors) and other devices (e.g., inverters, field communications) common to each building block of trackers would use electricity to be provided by SDG&E (see Appendix 3.1.3-7). The project proponent provided the estimated ratings of the devices and their operating schedule. Annual usage was determined depending on the period that devices would operate (e.g., daylight hours only). The generation of electricity through combustion of fossil fuels typically results in emissions of $CO_2$ and to a smaller extent $CH_4$ and $N_2O$. Annual electricity emissions were estimated using the reported $CO_2$ emissions per megawatt-hour for SDG&E in 2008 (SDG&E 2010), which would provide electricity for the project. The Proposed Project would consume an estimated 1,448,103 kWh per year, generating approximately 363.45 $MTCO_2E$ annually as shown in Table 3.1.3-8 (see Appendix 3.1.3-2 for complete results).

***Water Supply and Wastewater***

Water supplied to the Proposed Project would be obtained from an on-site well, which would require the use of electricity. Annual water use for the Proposed Project for the O&M annex and tracker washing was based upon information provided by the project proponent and would result in a water consumption rate of approximately 8.7 acre-feet per year. The estimated electrical usage associated with water supply was obtained from a CEC report on electricity associated with water supply in California (CEC 2006). An electricity usage factor representing supply and conveyance of locally supplied water in Northern California was assumed to be applicable (the factor for Southern California water assumes that water would be provided from the State Water Project, which is not the case for this project). As shown in Table 3.1.3-8, annual water use would result in approximately 4.62 $MTCO_2E$ per year (see Appendix 3.1.3-7).

GHG emissions associated with wastewater treatment using a septic tank were estimated based on data provided in the *County of San Diego Design Manual for Onsite Wastewater Treatment Systems* (County of San Diego 2010b) and a $CH_4$ emission factor derived from the *CalEEMod User's Guide* (Environ 2011). Estimated annual wastewater treatment would result in approximately 0.38 $MTCO_2E$ per year (see Appendix 3.1.3-7).

Table 3.1.3-8 shows the summary of operational GHG emissions estimated for the Rugged solar farm. Additional details are available in Appendix 3.1.3-2.

As shown in Table 3.1.3-8, the Rugged solar farm would result in approximately 722 $MTCO_2E$ per year. The total construction-related and operational $CO_2E$ emissions associated with the solar farm would be less than the screening criteria of 900 $MTCO_2E$ recommended by the County. Therefore, impacts resulting from implementation of the Rugged solar farm would be **less than significant**. Additionally, the project's operational emissions would not exceed the screening threshold of 2,500 $MTCO_2E$ per year as delineated in the County's *Draft Guidelines for Determining Significance – Climate Change* (County of San Diego 2012b).

Moreover, the Rugged solar farm has been certified as an Environmental Leadership Project under the Jobs and Economic Improvement through Environmental Leadership Act (Assembly Bill 900) (PRC Section 21178 et seq.) which, as a prerequisite, requires that the project not result in any net additional GHG emissions pursuant to PRC Section 21183(c). To ensure the Rugged solar farm would result in a zero net-increase in GHG emissions, the applicant has committed to obtain voluntary carbon offsets or GHG credits from a qualified GHG emissions broker to offset total projected construction and operational GHG emissions as stated in the *AB 900 Application for the Soitec Solar Energy Project* (attached as Appendix 3.1.3-3). Therefore, the project will be conditioned to provide the voluntary carbon offsets or GHG credits for the program eligibility.

There would not be a net-increase in GHG emissions following implementation of the Rugged solar farm, and impacts would be **less than significant**.

**Decommissioning Impacts**

The expected lifespan of the Rugged solar farm is estimated to be 30 to 40 years or longer (although for the purposes of amortizing construction GHG emissions a 30-year lifetime was assumed). At the end of the useful life of the solar farm, two alternative scenarios are possible: (1) re-tool the technology and contract to sell energy to a utility; (2) if no other buyer of the energy emerges, the solar plant can be decommissioned and dismantled.

Similar to the Tierra del Sol solar farm, dismantling the Rugged solar farm would entail disassembly of the solar facilities and substantive restoration of the site. Impacts associated with closure and decommissioning of the solar farm site would be temporary and would be associated with disassembly and removal of all detachable aboveground elements of the installation; removal of tracker masts and any other structural elements, including those that penetrate the ground surface to a depth of 2 feet below grade; and reuse of the land consistent with the Zoning Ordinance, which could include ground surface restoration to surrounding grade and reseeding with appropriate native vegetation. Decommissioning activities would be expected to result in substantially lower GHG emissions compared to construction activities due to more stringent engine and motor vehicle standards at the time of decommissioning (e.g., in 30 years all off-road diesel engines will meet Tier 4 or better requirements at a minimum, and motor vehicles will meet future fuel efficiency and GHG emissions standards). As with the construction emissions, the emissions resulting from decommissioning are expected to be well below the County's 900 $MTCO_2E$ per year threshold, and impacts would be **less than significant**.

**GHG Emissions Offset Benefits**

In keeping with the renewable energy target under the Scoping Plan and as required by SB X1 2, the proposed Rugged solar farm would provide a source of renewable energy to achieve the RPS of 33% by 2020. Renewable energy, in turn, potentially offsets GHG emissions generated by fossil-fuel power plants. Based on estimates by the project proponent, the solar farm would generate 2,083 kWh alternating current annually per installed kilowatt (based on the direct current capacity of the trackers). This factor reflects the available daylight hours, conversion of direct current to alternating current, and various system losses. Using the installed tracker capacity of 105 MW (105,000 kW) direct current, the solar farm is anticipated to generate 219,204,505 kWh per year. A GHG factor for fossil-fuel-generated electricity was developed based on reported $CO_2$ emissions per kilowatt-hour for SDG&E in 2008 (SDG&E 2010) and an adjustment to reflect electricity from renewable energy, large hydroelectric, and nuclear sources in 2009 (SDG&E n.d.), which do not generate GHG emissions. The $CO_2$ factor for

fossil-fuel-generated electricity would be 1.071 pounds $CO_2$ per kilowatt-hour as calculated in the following equations:

$$\text{2008 } CO_2 \text{ Factor (lb/kWh)} \div (1 - \text{2009 \% Renewables, Large Hydroelectric, Nuclear}[9]) = \text{Fossil Fuel } CO_2 \text{ Factor (lb/kWh)}$$

$$0.739 \text{ lb/kWh} \div (1 - (0.10 + 0.03 + 0.18)) = 1.071 \text{ lb/kWh}$$

The contributions of $CH_4$ and $N_2O$ for power plants in California were obtained from the CCAR's General Reporting Protocol (CCAR 2009), which were adjusted for their GWPs. Thus, the Rugged solar farm would provide a potential reduction of 106,990 $MTCO_2E$ per year if the electricity generated by the Rugged solar farm were to be used instead of electricity generated by fossil-fuel sources. Additional detail regarding these calculations can be found in Appendix 3.1.3-1. After accounting for the annualized construction and annual operational emissions of 722 $MTCO_2E$ per year, and the project proponent's commitment to obtain voluntary carbon offsets or GHG credits from a qualified GHG emission broker to offset total projected construction and operational GHG emissions, the net reduction in GHG emissions would be 106,268 $MTCO_2E$ per year. This reduction is not considered in the significance determination of the Rugged solar farm's GHG emissions but is provided for disclosure purposes.

## LanEast

### Construction Impacts

Construction-related GHG emissions from the LanEast solar farm would be generated by sources such as heavy-duty off-road equipment, trucks hauling materials to the site, and worker commutes during construction of the solar farm. Depending on the construction activities occurring on a given day, construction-related GHG emissions would vary substantially. During periods of moderate activity, GHG emissions could be generated from a combination of heavy-duty construction equipment, haul trucks, and construction worker vehicles. During a period of heavy construction activity, GHG emissions could be generated from all identified construction sources. During periods of lower levels of construction activity emissions would be generated primarily from construction worker trips.

Overall, construction of the LanEast solar farm would require similar equipment and construction activities as discussed above for the Tierra del Sol and Rugged solar farms (with the exception that the LanEast site would not include rock crushing activities). Construction

[9] A Power Content Label showing the mix of power sources in 2008 for SDG&E was not available. Thus, the Power Content Label for 2009 was used (SDG&E n.d.). The 2009 Power Content Label indicated that 10%, 3%, and 18% of SDG&E's electricity sales were generated by renewable, large hydroelectric, and nuclear energy sources, respectively.

activities would be temporary and short-term in nature and would vary day to day depending on the nature or phase of construction (e.g., demolition/land clearing, grading and excavation, tracker installation). Based on the size and scale of the project in comparison to the Tierra del Sol and Rugged solar farms as previously analyzed, and the activities that would be required for construction, construction-related GHG emissions are not expected to exceed the County's screening level thresholds. However, site design, construction schedule, and equipment fleet has not yet been determined; therefore, a quantitative analysis cannot be conducted at this time and there is no guarantee emissions would not exceed County thresholds. Therefore, the following project design feature (PDF), as listed in Table 1-10 of Section 1.0, Project Description, would be implemented in order to reduce potential impacts related to GHG emissions:

**PDF-GHG -1** **Prepare Site-Specific GHG Report.** Prior to issuance of Major Use Permits for the solar farm, a site-specific greenhouse gas technical report will be prepared and approved by the County. The site-specific technical report will be prepared in accordance with County report format and content requirements, and the report will be completed and approved by the County prior to certification of the project-level CEQA document.

The site-specific greenhouse gas technical report would evaluate the GHG emission impacts associated with the construction of the LanEast solar farm and would identify project-specific measures to reduce GHG emissions, thereby reducing potential impacts to **less than significant**.

**Operational Impacts**

Operational emissions would be generated from direct and indirect emissions sources including mobile sources, electricity and water usage, and emissions generated during the treatment of wastewater at the LanEast site. Mobile source emissions would be associated with activities such as vehicle travel required for maintenance of the trackers and the surrounding site. On-site operational activity would include in-place panel washing approximately every 6 to 8 weeks. No more than 24 gallons of water would be required to wash each tracker. Panel washing would occur on site for approximately 4 to 6 days per washing cycle.

Minimal grid-provided electricity would be used to power the trackers and communication/monitoring system on site. Consumption of water may result in indirect GHG emissions from electricity used to power any off-site conveyance, distribution, and treatment of water and associated wastewater.

The LanEast solar farm is anticipated to be smaller in size and scale, at approximately 22 MW, than both the proposed Tierra del Sol and Rugged solar farms (60 MW and 80 MW, respectively); therefore, it is expected that GHG emissions would be well below the County's 900 $MTCO_2E$

screening threshold. However, as previously discussed, quantification of the impact is based upon a theoretical site design, construction schedule or equipment fleet. The project has not yet been defined and, therefore, GHG emissions for the LanEast solar farm must be reviewed in a subsequent analysis. Therefore, **PDF-GHG-1** is incorporated to evaluate GHG impacts associated with the operation of the LanEast solar farm and to identify project-specific measures to reduce operational GHG emissions, thereby reducing potential impacts to **less than significant**.

**Decommissioning Impacts**

The expected lifespan of the LanEast solar farm is estimated to be 30 to 40 years or longer (although for the purposes of amortizing construction GHG emissions a 30-year lifetime was assumed). At the end of the useful life of the solar farm, two alternative scenarios are possible: (1) re-tool the technology and contract to sell energy to a utility; (2) if no other buyer of the energy emerges, the solar plant can be decommissioned and dismantled.

Similar to the Tierra del Sol and Rugged solar farms, dismantling the LanEast solar farm would entail disassembly of the solar facilities and substantive restoration of the site. Impacts associated with closure and decommissioning of the solar farm site would be temporary and would be associated with disassembly and removal of all detachable aboveground elements of the installation; removal of tracker masts and any other structural elements, including those that penetrate the ground surface to a depth of 2 feet below grade; and reuse of the land consistent with the Zoning Ordinance, which could include ground surface restoration to surrounding grade and reseeding with appropriate native vegetation. Decommissioning activities would be expected to result in substantially lower GHG emissions compared to construction activities due to more stringent engine and motor vehicle standards at the time of decommissioning (e.g., in 30 years all off-road diesel engines will meet Tier 4 or better requirements at a minimum, and motor vehicles will meet future fuel efficiency and GHG emissions standards). As with the construction emissions, the emissions resulting from decommissioning are expected to be well below the County's 900 $MTCO_2E$ per year threshold, and impacts would be **less than significant**.

**GHG Emissions Offset Benefits**

In keeping with the renewable energy target under the Scoping Plan and as required by SB X1 2, the proposed LanEast solar farm would provide a source of renewable energy to achieve the RPS of 33% by 2020. Renewable energy, in turn, potentially offsets GHG emissions generated by fossil-fuel power plants. Detailed calculations of emission offsets cannot be conducted at this time as project-level information is currently not available. However, it is anticipated that the LanEast solar farm would provide similar reductions of GHGs per year when compared to the Tierra del Sol and Rugged solar farms if the electricity generated by the LanEast solar farm were to be used instead of electricity generated by fossil-fuel sources.

LanWest

**Construction Impacts**

Construction-related GHG emissions from the LanWest solar farm would be generated by sources such as heavy-duty off-road equipment, trucks hauling materials to the site, and worker commutes during construction of the solar farm. Depending on the construction activities occurring on a given day, construction-related GHG emissions would vary substantially. During periods of moderate activity, GHG emissions could be generated from a combination of heavy-duty construction equipment, haul trucks, and construction worker vehicles. During a period of heavy construction activity, GHG emissions could be generated from all identified construction sources. During periods of lower levels of construction activity, emissions would be generated primarily from construction worker trips.

Overall, construction of the LanWest solar farm would require similar equipment and construction activities as discussed above for the Tierra del Sol and Rugged solar farms (with the exception that the LanWest site would not include rock crushing activities). Construction activities would be temporary and short-term in nature and would vary day to day depending on the nature or phase of construction (e.g., demolition/land clearing, grading and excavation, tracker installation). Based on the size of the site in comparison to the Tierra del Sol and Rugged solar farms as previously analyzed, and the activities that would be required for construction, construction-related GHG emissions are not expected to exceed the County's screening level thresholds. However, site design, construction schedule, and equipment fleet has not yet been determined; therefore, a quantitative analysis cannot be conducted at this time and there is no guarantee emissions would not exceed County thresholds. Therefore, **PDF-GHG-1** is incorporated as it would evaluate the GHG emission impacts associated with the construction of the LanWest solar farm and would identify project-specific measures to reduce GHG emissions, thereby reducing potential impacts to **less than significant**.

**Operational Impacts**

Operational emissions would be generated from direct and indirect emissions sources including mobile sources, electricity and water usage, and emissions generated during the treatment of wastewater at the LanWest site. Mobile source emissions would be associated with activities such as vehicle travel required for maintenance of the trackers and the surrounding site. On-site operational activity would include in-place panel washing approximately every 6 to 8 weeks. No more than 24 gallons of water would be required to wash each tracker. Panel washing would occur on site for approximately 4 to 6 days per washing cycle.

Minimal grid-provided electricity would be used to power the trackers and communication/monitoring system on site. Consumption of water may result in indirect GHG emissions from electricity used to power any off-site conveyance, distribution, and treatment of water and associated wastewater.

The LanWest solar farm is anticipated to be smaller in size and scale, at approximately 6.5 MW, than both the proposed Tierra del Sol and Rugged solar farms (60 MW and 80 MW, respectively); therefore, it is expected that GHG emissions would be well below the County's 900 $MTCO_2E$ screening threshold. However, as previously discussed, quantification of the impact is based upon a theoretical site design, construction schedule, or equipment fleet. The project has not yet been defined and, therefore, GHG emissions for the LanWest solar farm must be reviewed in a subsequent analysis. Therefore, **PDF-GHG-1** is incorporated to evaluate GHG impacts associated with the operation of the LanWest solar farm and to identify project-specific measures to reduce operational GHG emissions, thereby reducing potential impacts to **less than significant**.

**Decommissioning Impacts**

The expected lifespan of the LanWest solar farm is estimated to be 30 to 40 years or longer (although for the purposes of amortizing construction GHG emissions a 30-year lifetime was assumed). At the end of the useful life of the solar farm, two alternative scenarios are possible: (1) re-tool the technology and contract to sell energy to a utility; (2) if no other buyer of the energy emerges, the solar plant can be decommissioned and dismantled.

Similar to the Tierra del Sol and Rugged solar farms, dismantling the LanWest solar farm would entail disassembly of the solar facilities and substantive restoration of the site. Impacts associated with closure and decommissioning of the solar farm site would be temporary and would be associated with disassembly and removal of all detachable aboveground elements of the installation; removal of tracker masts and any other structural elements, including those that penetrate the ground surface to a depth of 2 feet below grade; and reuse of the land consistent with the Zoning Ordinance, which could include ground surface restoration to surrounding grade and reseeding with appropriate native vegetation. Decommissioning activities would be expected to result in substantially lower GHG emissions compared to construction activities due to more stringent engine and motor vehicle standards at the time of decommissioning (e.g., in 30 years all off-road diesel engines will meet Tier 4 or better requirements at a minimum, and motor vehicles will meet future fuel efficiency and GHG emissions standards). As with the construction emissions, the emissions resulting from decommissioning are expected to be well below the County's 900 $MTCO_2E$ per year threshold, and impacts would be **less than significant**.

### GHG Emissions Offset Benefits

In keeping with the renewable energy target under the Scoping Plan and as required by SB X1 2, the proposed LanWest solar farm would provide a source of renewable energy to achieve the RPS of 33% by 2020. Renewable energy, in turn, potentially offsets GHG emissions generated by fossil-fuel power plants. Detailed calculations of emission offsets cannot be conducted at this time as project-level information is currently not available. However, it is anticipated that the LanWest solar farm would provide similar reductions of GHGs per year when compared to the Tierra del Sol and Rugged solar farms if the electricity generated by the LanWest solar farm were to be used instead of electricity generated by fossil-fuel sources.

## Proposed Project

### Construction Impacts

Table 3.1.3-9, Proposed Project – Estimated Construction GHG Emissions, shows the total annual GHG construction emissions associated with construction of the Proposed Project. As shown in Table 3.1.3-9, Proposed Project construction-related GHG emissions are estimated to be approximately 6,961 $MTCO_2E$ per year for Tierra del Sol and Rugged solar farms combined, which would be annualized at 232 $MTCO_2E$ per year over 30 years, which is less than the County of San Diego 900 $MTCO_2E$ screening threshold. Because the LanEast and LanWest solar farms are analyzed at a program-level in this EIR and limited information was available at the time this analysis was conducted, emission quantifications are not provided for these solar farms. Therefore, **PDF-GHG-1** is incorporated to require a site-specific analysis of GHG emission impacts associated with the construction of these solar farms and to identify project-specific measures to reduce GHG emissions. With incorporation of **PDF-GHG-1**, impacts related to the emission of GHGs from construction activities would be reduced to **less than significant**.

### Operational Impacts

Operation of the Proposed Project as a whole would produce GHG emissions associated with worker vehicles, personnel transport vehicles, washing vehicles (heavy-duty diesel water trucks), satellite washing vehicles (light-duty diesel trucks), service trucks, emergency generators, electricity consumption, and water supply during operation and maintenance. Operation of the Tierra del Sol gen-tie would include pole/structure brushing, herbicide application, equipment repair using heavy-duty diesel trucks and light-duty diesel trucks, and biannual helicopter inspections. At the present time, specific substation devices, such as transformers and circuit breakers, have not been identified; however, the substation may include gas-insulated switchgear (e.g., circuit breakers) that use $SF_6$, which is a GHG often associated with high-voltage switching devices. If the substation circuit breakers contain $SF_6$, they would potentially 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% (Blackman n.d.). For the 138 kV substation, the estimated total capacity of the circuit breakers could be up to 75 pounds (Mehl, pers. comm. 2013). $SF_6$ has a global warming potential of 23,900 using $CO_2$ at a reference value of 1 (UNFCCC 2012).

Estimated operational GHG emissions from operation and maintenance of the Tierra del Sol and Rugged solar farms are provided in Table 3.1.3-10, which include annualized construction GHG emissions. Because the LanEast and LanWest solar farms are analyzed at a program-level in this EIR and limited information was available at the time this analysis was conducted, emission quantifications are not provided for these solar farms. Therefore, **PDF-GHG-1** is included, which requires preparation of a site-specific GHG analysis to evaluate potential operational impacts and identify project-specific measures to reduce potential impacts.

As shown in Table 3.1.3-10, annual operational GHG emissions are estimated to be 1,240 $MTCO_2E$ per year for Tierra del Sol and Rugged solar farms combined, which would exceed the County of San Diego 900 $MTCO_2E$ screening threshold. However, the Tierra del Sol and Rugged solar farms both have been certified as Environmental Leadership Projects under the Jobs and Economic Improvement through Environmental Leadership Act (Assembly Bill 900) (PRC Section 21178 et seq.) which, as a prerequisite, requires that the projects would not result in any net additional GHG emissions pursuant to PRC Section 21183(c). To ensure the Tierra del Sol and Rugged solar farms would result in a zero net-increase in GHG emissions, the project applicants have committed to obtain voluntary carbon offsets or GHG credits from a qualified GHG emission broker to offset total projected construction and operational GHG emissions as stated in the *AB 900 Application for the Soitec Solar Energy Project* (attached as Appendix 3.1.3-3). Purchase of carbon offsets or credits, coupled with the net GHG benefit of renewable energy sources provided by the Tierra del Sol and Rugged solar farms, would in turn, assist in offsetting the net increase in GHG emission resulting from construction of the LanEast and LanWest solar farms. Therefore, because there would not be an overall net-increase in GHG emissions following implementation of the Proposed Project, impacts would be **less than significant**.

#### *3.1.3.3.2 Conflict with an Applicable Plan, Policy, or Regulation Adopted to Reduce Greenhouse Gas Emissions*

Guidelines for the Determination of Significance

For the purpose of this EIR, the County's *Interim Approach to Addressing Climate Change in CEQA Documents* (May 7, 2010) applies to both the direct impact analysis and the cumulative impact analysis. A significant impact would result if:

- The project would conflict with an applicable plan, policy, or regulation adopted to reduce greenhouse gas emissions.

## Analysis

### Tierra del Sol

As previously discussed, in keeping with the renewable energy target under the Scoping Plan and as required by SB X1 2, the proposed Tierra del Sol solar farm would provide a source of renewable energy to achieve the RPS of 33% by 2020. Renewable energy, in turn, potentially offsets GHG emissions generated by fossil-fuel power plants. Based on estimates by the project proponent, the Tierra del Sol solar farm would generate 2,083 kWh alternating current annually per installed kilowatt (based on the direct current capacity of the trackers). This factor reflects the available daylight hours, conversion of direct current to alternating current, and various system losses. Using the installed tracker capacity of 80 MW (80,000 kW) direct current (60 MW alternating current), the Tierra del Sol solar farm is anticipated to generate 166,640,000 kWh per year.

The contributions of $CH_4$ and $N_2O$ for power plants in California were obtained from the CCAR's General Reporting Protocol (CCAR 2009), which were adjusted for their GWPs. Thus, the proposed Tierra del Sol solar farm would provide a potential reduction of 81,334 $MTCO_2E$ per year if the electricity generated by the Tierra del Sol solar farm were to be used instead of electricity generated by fossil-fuel sources. Additional detail regarding these calculations can be found in Appendix 3.1.3-1. After accounting for the annualized construction and annual operational emissions of 518 $MTCO_2E$ per year, the net reduction in GHG emissions would be 80,816 $MTCO_2E$ per year. As previously mentioned, to ensure the Tierra del Sol and Rugged solar farms would result in a zero net-increase in GHG emissions, the project applicants have committed to obtain voluntary carbon offsets or GHG credits from a qualified GHG emission broker to offset total projected construction and operational GHG emissions as stated in the *AB 900 Application for the Soitec Solar Energy Project* (attached as Appendix 3.1.3-3).

Additionally, the Tierra del Sol solar farm would comply with the goals and objectives of the County of San Diego CAP. The County has established a GHG emissions-reduction target of 15% below 2005 levels by 2020 which reflects the recommendation by CARB and reduction targets established by other local governments in the area. Moreover, the CAP acknowledges the goals of Executive Order S-3-05, which calls for emissions reductions of 80% below 1990 levels by 2050 (County of San Diego 2012a). As discussed previously, the Tierra del Sol solar farm would provide a potential reduction in GHG emissions each year of operation if the electricity generated by the solar farm were to be used instead of electricity generated by fossil-fuel sources. Therefore, because the Tierra del Sol solar farm would assist in the attainment of the state's and County's goals by utilizing a renewable source of energy that could displace electricity generated by fossil-fuel-fired power plants, the solar farm would comply with the goals and objectives of the state and the CAP, and impacts would be considered **less than significant**.

It should be noted that the County of San Diego has drafted an update to the *Interim Approach to Addressing Climate Change in CEQA Documents* for evaluating a project's GHG emissions, which serve as the basis of significance determination provided in the CAP. This significance determination guidance includes three general thresholds and one threshold for projects that include stationary sources. One of these thresholds, known as the "bright line" threshold, recommends a 2,500 $MTCO_2E$ threshold for determining significance of operational GHG emissions. These updated guidelines are still in draft form and have yet to be approved.

### Rugged

Similar to the proposed Tierra del Sol solar farm, the proposed Rugged solar farm would provide a source of renewable energy to achieve the RPS of 33% by 2020.

The total amount of carbon savings from implementation of the Rugged solar farm is estimated at 106,990 $MTCO_2E$ per year. After accounting for annual operational emissions and annualized construction emissions of 722 $MTCO_2E$ per year, the Rugged solar farm would result in net carbon savings of 106,268 $MTCO_2E$ per year. Additional detail regarding these calculations can be found in Appendix 3.1.3-2. As previously mentioned, to ensure the Tierra del Sol and Rugged solar farms would result in a zero net-increase in GHG emissions, the project applicants have committed to obtain voluntary carbon offsets or GHG credits from a qualified GHG emission broker to offset total projected construction and operational GHG emissions as stated in the *AB 900 Application for the Soitec Solar Energy Project* (attached as Appendix 3.1.3-3).

Additionally, the Rugged solar farm would comply with the goals and objectives of the County of San Diego CAP. The County has established a GHG emissions-reduction target of 15% below 2005 levels by 2020 which reflects the recommendation by CARB and reduction targets established by other local governments in the area. Moreover, the CAP acknowledges the goals of Executive Order S-3-05, which calls for emissions reductions of 80% below 1990 levels by 2050 (County of San Diego 2012a). As discussed previously, the Rugged solar farm would provide a potential reduction in GHG emissions each year of operation if the electricity generated by the solar farm were to be used instead of electricity generated by fossil-fuel sources. Therefore, because the Rugged solar farm would assist in the attainment of the state's and County's goals by utilizing a renewable source of energy that could displace electricity generated by fossil-fuel-fired power plants, the solar farm would comply with the goals and objectives of the state and the CAP, and impacts would be considered **less than significant**.

### LanEast

Similar to the proposed Tierra del Sol and Rugged solar farms, the proposed LanEast solar farm would provide a source of renewable energy to achieve the RPS of 33% by 2020. Because the electricity generated by the LanEast solar farm may be provided to a utility company in an effort to meet that company's RPS mandate, LanEast is not able to take credit for the emissions reductions that would come from supplying clean, carbon-free electricity instead of electricity from a typical power plant. However, similar to the Tierra del Sol and Rugged solar farms, the LanEast solar farm would assist in the attainment of the state's goals and County's goals under the CAP by utilizing a renewable source of energy that could displace electricity generated by fossil-fuel-fired power plants. As such, the LanEast solar farm would not conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions, and impacts would be **less than significant**.

### LanWest

Similar to the proposed Tierra del Sol and Rugged solar farms, the proposed LanWest solar farm would provide a source of renewable energy to achieve the RPS of 33% by 2020. Because the electricity generated by the solar farm may be provided to a utility company in an effort to meet that company's RPS mandate, the solar farm is not able to take credit for the emissions reductions that would come from supplying clean, carbon-free electricity instead of electricity from a typical power plant. However, similar to the Tierra del Sol and Rugged solar farms, the LanWest solar farm would assist in the attainment of the state's goals and County's goals under the CAP by utilizing a renewable source of energy that could displace electricity generated by fossil-fuel-fired power plants. As such, the LanWest solar farm would not conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions, and impacts would be **less than significant**.

### Proposed Project

See the earlier discussion regarding Tierra del Sol, Rugged, LanEast, and LanWest. Based on Governor Schwarzenegger's call for a statewide 33% RPS, the Climate Change Scoping Plan anticipates that California will have 33% of its electricity provided by renewable resources by 2020. Additionally, AB 32 calls for a reduction in GHG emissions to 1990 levels by 2020. Over their lifespans, the individual Tierra del Sol, Rugged, LanEast, and LanWest solar farms, and therefore the Proposed Project as a whole, would assist in the attainment of the state's goals and County's goals under the CAP by utilizing a renewable source of energy that could displace electricity generated by fossil-fuel-fired power plants. The Proposed Project would therefore be consistent with state and County initiatives aimed at reducing GHG emissions, and impacts would be **less than significant**.

### *3.1.3.4 Cumulative Impact Analysis*

Geographic Extent

As GHG emissions and climate change are a global issue, any approved project regardless of its location has the potential to contribute to a cumulative global accumulation of GHG emissions (as opposed to the relatively temporary nature of pollutants related to air quality). In theory, the geographic extent of the cumulative contributions to GHGs and climate change is worldwide. However, lead agencies are only able to regulate GHG emissions within their respective jurisdictions; therefore, the geographic extent is primarily contingent upon the area over which lead agencies have authority. As such, the geographic extent for the purposes of the Proposed Project is the southeastern corner of the San Diego Air Basin.

Analysis

The Proposed Project would be constructed from 2014 to 2015 and would be constructed concurrently with, and in proximity to, other land use and infrastructure development projects (e.g., wind and solar facilities), several of which would result in significant construction-related GHG emissions. Construction-related GHG emissions would be associated with the use of construction equipment, heavy-duty truck trips, and worker vehicle trips. Once operational, the Proposed Project's construction impacts would eventually be offset following completion of construction activities resulting in a net beneficial impact, if the renewable source of energy could displace electricity generated by fossil-fuel-fired power plants. The Proposed Project's annualized construction emissions within the cumulative study area would not exceed the County's significance screening criteria. Additionally, AB 32 calls for a reduction in GHG emissions to 1990 levels by 2020. Over their lifespans, the Tierra del Sol, Rugged, LanEast, and LanWest solar farms, and therefore the Proposed Project as a whole, would assist in the attainment of the state's goals by utilizing a renewable source of energy that could displace electricity generated by fossil-fuel-fired power plants. The Proposed Project would therefore be consistent with state initiatives aimed at reducing GHG emissions and in the long-term, would not contribute to a cumulatively considerable significant impact. Cumulative impacts would be **less than significant**.

### *3.1.3.5 Conclusion*

The following discussion provides a synopsis of the conclusion reached in each of the above impact analyses, and the level of impact that would occur after mitigation measures are implemented.

### Generation of Construction-Related and Operational Greenhouse Gas Emissions

Annual operational GHG emissions under the Proposed Project, including annualized construction emissions, would exceed the County of San Diego 900 $MTCO_2E$ screening threshold; however, the Tierra del Sol and Rugged solar farms have been certified as Environmental Leadership Projects under the Jobs and Economic Improvement through Environmental Leadership Act (AB 900) (PRC Section 21178 et seq.) which, as a prerequisite, requires that the projects not result in any net additional GHG emissions pursuant to PRC Section 21183(c). There would not be a net-increase in GHG emissions following implementation of Rugged and Tierra del Sol solar farm sites under AB 900. Therefore, impacts would be **less than significant**.

With incorporation of **PDF-GHG -1** for the LanEast and LanWest solar farms, which call for preparation and approval of site-specific GHG technical reports, impacts for both solar farms are anticipated to be **less than significant**.

### Conflict with an Applicable Plan, Policy, or Regulation Adopted to Reduce Greenhouse Gas Emissions

Based on Governor Schwarzenegger's call for a statewide 33% RPS, the Climate Change Scoping Plan anticipates that California will have 33% of its electricity provided by renewable resources by 2020. Additionally, AB 32 calls for a reduction in GHG emissions to 1990 levels by 2020. Similarly, the County has established a GHG emissions-reduction target of 15% below 2005 levels by 2020 which reflects the recommendation by CARB and reduction targets established by other local governments in the area under the County's Climate Action Plan (CAP). Moreover, the CAP acknowledges the goals of Executive Order S-3-05, which calls for emissions reductions of 80% below 1990 levels by 2050 (County of San Diego 2012a). Over their lifespans, the Tierra del Sol, Rugged, LanEast, and LanWest solar farms, and therefore the Proposed Project as a whole, would assist in the attainment of the state's goals by utilizing a renewable source of energy that could displace electricity generated by fossil-fuel-fired power plants. The Proposed Project would therefore be consistent with state and County initiatives aimed at reducing GHG emissions, and impacts would be **less than significant**.

### Cumulative Greenhouse Gas Emission Impacts

Once operational, the Proposed Project's construction impacts would eventually be offset resulting in a net beneficial reduction in GHG emissions, and the Proposed Project's construction emissions within the cumulative study area would not exceed the County's significance screening criteria. Additionally, AB 32 calls for a reduction in GHG emissions to 1990 levels by 2020. Over their lifespans, the Tierra del Sol, Rugged, LanEast, and LanWest solar farms, and therefore the Proposed Project as a whole, would assist in the attainment of the state's goals by utilizing a renewable source of energy that could displace electricity generated by fossil-fuel-

fired power plants. The Proposed Project would therefore be consistent with state initiatives aimed at reducing GHG emissions and in the long-term, would not contribute to a cumulatively considerable significant impact. Cumulative impacts would be **less than significant**.

**Table 3.1.3-1**
**GHG Sources in California**

| Source Category | Annual GHG Emissions ($MMTCO_2E$) | % of Total |
|---|---|---|
| Agriculture | 32.13 | 7.03% |
| Commercial and residential | 42.95 | 9.40% |
| Electricity generation | 103.58[a] | 22.68% |
| Forestry (excluding sinks) | 0.19 | 0.04% |
| Industrial uses | 81.36 | 17.81% |
| Recycling and waste | 7.32 | 1.60% |
| Transportation | 172.92 | 37.86% |
| High-GWP substances | 16.32 | 3.57% |
| Totals | 456.77 | 100.00% |

Source: CARB 2011a.
Notes: [a] Includes emissions associated with imported electricity, which account for 48.05 $MMTCO_2E$ annually.

**Table 3.1.3-2**
**GHG Sources in San Diego County**

| Source Category | Annual GHG Emissions ($MMTCO_2E$) | % of Total |
|---|---|---|
| Transportation | 2.64 | 59% |
| Agriculture | 0.19 | 4% |
| Solid Waste | 0.14 | 3% |
| Wastewater | 0.05 | 1% |
| Potable Water | 0.24 | 5% |
| Other | 0.13 | 3% |
| Energy | 1.12 | 25% |
| Totals | 4.51 | 100% |

Source: County of San Diego 2012a.

**Table 3.1.3-3**
**Project Size Thresholds**

| Project Type | Size |
|---|---|
| Single-Family Residential | 50 units |
| Apartments/Condominiums | 70 units |
| General Commercial Office Space | 35,000 square feet |
| Retail Space | 11,000 square feet |
| Supermarket/Grocery Space | 6,300 square feet |

Source: County of San Diego 2010a.

**Table 3.1.3-4**
**Screening Criteria**

| Project/Plan Type | Screening Threshold |
|---|---|
| Single-Family Housing | 86 dwelling units |
| Low-Rise Apartment Housing | 121 dwelling units |
| Mid-Rise Apartment Housing | 136 dwelling units |
| High-Rise Apartment Housing | 144 dwelling units |
| Condominium or Townhouse Housing | 120 dwelling units |
| Congregate Care (Assisted Living) Facility | 239 dwelling units |
| Elementary or Middle School | 91,000 square feet |
| High School | 103,000 square feet |
| University/College (4-year) | 336 students |
| Library | 81,000 square feet |
| Restaurant | 12,000 square feet |
| Hotel | 106 rooms |
| Free-Standing Retail Store | 31,000 square feet |
| Shopping Center | 33,000 square feet |
| Convenience Market (24-hour) | 2,000 square feet |
| Office Building | 61,000 square feet |
| Office Park | 56,000 square feet |
| Hospital | 47,000 square feet |
| Warehouse | 141,000 square feet |
| Light Industrial Facility | 74,000 square feet |

Source: County of San Diego 2012b.
Notes: Land use types outlined in the table above are intended to correlate with those presented in the Institute of Transportation Engineers' *Trip Generation Manual* (8th Edition). Proposed project land use types will be compared with the land use types included in the screening table above to determine applicability. Low-rise apartments have one or two stories, such as garden apartments. Mid-rise apartments have between 3 and 10 stories. High-rise apartments are normally rental units in buildings with more than 10 stories. A shopping center includes a group of commercial establishments that is developed as a unit. A free-standing retail store (also known as "free-standing discount store") is a free-standing store with off-street parking that offers a wide range of customer services and would typically be open 7 days per week with relatively long hours. Office parks are normally in a suburban context and contain office buildings and support services arranged in a campus-type setting, whereas an office building would accommodate multiple tenants in a single structure. Light industrial facilities would typically involve assembly of processed or partially processed materials into products and would have an energy demand that is not substantially higher than office buildings of the same size and scale. Light industrial facilities would not typically generate dust, other air pollutants, light, or noise that it perceptible beyond the boundary of the subject property.

**Table 3.1.3-5**
**Tierra del Sol – Estimated Construction GHG Emissions**

| Construction Year | $CO_2E$ Emissions (metric tons/year) |
|---|---|
| 2014 | 1,327.56 |
| 2015 | 1,560.59 |
| Total Estimated Construction GHG Emissions | 2,888.15 |
| 30-year annualized emissions | 96.27 |

Source: OFFROAD2011 (CARB 2011b), EMFAC2011 (CARB 2011c). See Appendix 3.1.3-1 for complete results.

**Table 3.1.3-6**
**Tierra del Sol – Estimated Operational GHG Emissions**

| Source | $CO_2E$ Emissions (metric tons/year) |
|---|---|
| Motor Vehicles | 85.28 |
| Helicopters | 3.53 |
| Emergency Generators | 50.97 |
| Gas-Insulated Switchgear | 4.07 |
| Electrical Generation | 275.04 |
| Water Supply | 2.92 |
| Wastewater | 0.13 |
| Total Operational Emissions | 421.95 |
| 30-year annualized construction emissions | 96.27 |
| Total | 518.22 |

Source: EMFAC2011 (CARB 2011c); CCAR 2009; EPA 2005; CEC 2006. See Appendix 3.1.3.7-1 for complete results. Results may not add exactly due to rounding.

**Table 3.1.3-7**
**Rugged – Estimated Construction GHG Emissions**

| Construction Year | $CO_2E$ Emissions (metric tons/year) |
|---|---|
| 2014 | 2,418.40 |
| 2015 | 1,654.04 |
| Total Estimated Construction GHG Emissions | 4,072.44 |
| 30-year annualized emissions | 135.75 |

Source: See Appendix 3.1.3-2 for complete results.

**Table 3.1.3-8**
**Rugged – Estimated Operational GHG Emissions**

| Emissions Source | Unmitigated Project Emissions of $CO_2E$ (metric tons/year) |
|---|---|
| Motor Vehicles | 162.92 |
| Emergency Generators | 50.97 |
| Gas-Insulated Switchgear | 4.07 |
| Electrical Generation | 363.45 |
| Water Supply | 4.62 |
| Wastewater | 0.38 |
| Total Operational Emissions | 586.41 |
| 30-year annualized construction emissions | 135.75 |
| Total | 722.16 |

Source: See Appendix 3.1.3-2. Totals may not add correctly due to rounding.

**Table 3.1.3-9**
**Proposed Project (Tierra Del Sol and Rugged Sites) –**
**Estimated Construction GHG Emissions**

| Construction Year | $CO_2E$ Emissions (total metric tons/year) |
|---|---|
| 2014 | 3,745.96 |
| 2015 | 3,214.63 |
| Total Estimated Construction GHG Emissions | 6,960.59 |
| 30-year Annualized Annual Emissions | 232.01 |

Source: See Appendices 3.1.3-1 and 3.1.3-2.
Note: 2014 and 2015 emissions represent the aggregate of Tierra del Sol and Rugged solar farms emissions for those years.

**Table 3.1.3-10**
**Proposed Project (Tierra Del Sol and Rugged Sites) –**
**Estimated Operational GHG Emissions**

| Project | $CO_2E$ Emissions (total metric tons/year) |
|---|---|
| Tierra del Sol Operational Emissions | 421.95 |
| Tierra del Sol Annualized Construction Emissions | 96.27 |
| Rugged Operational Emissions | 586.41 |
| Rugged Annualized Construction Emissions | 135.75 |
| Total | 1,240.38 |

Note: See Appendices 3.1.3-1 and 3.1.3-2 for exact calculations.

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