Application for CEQA Streamlining Under the "Jobs and Economic Improvement through Environmental Leadership Act (AB 900) (Public Resources Code Section 21178 *et seq.*)

This application was prepared in accordance with the Governor's Guidelines for Streamlining Judicial Review under the California Environmental Quality Act (CEQA), which is provided by the Governor's Office of Planning and Research (http://opr.ca.gov/s_californiajobs.php). This application includes the necessary information to enable the Governor to determine whether the project satisfies the statutory requirements for CEQA streamlining.

PROJECT INFORMATION

Project Title: Soitec Solar Energy Project

Project Applicant: Soitec Solar Development, LLC

Project Location: Boulevard, California an Unincorporated Community of San Diego County

Project Description: The proposed Soitec Solar Energy Project (Project) consists of two sub-components, including the Tierra del Sol Solar Farm, which would be a 60 megawatt (MW) net solar power generating installation, and the Rugged Solar Farm, which would be an up-to 84 MW net solar power generating installation. Both the Tierra del Sol and Rugged Solar Farms will be located in an unincorporated portion of San Diego County. The Project will utilize concentrating photovoltaic (CPV) electric generation system technology for the generation of solar energy. The entire up-to-144 MW Project would be developed over an area of approximately 1,185 acres of privately-owned land, plus the necessary transmission line rights-of-way, the precise location and length of which shall be finalized at a future date.

CONSISTENCY WITH STATUTORY REQUIREMENTS FOR CEQA STREAMLINING

The following information is provided to illustrate that the Project satisfies the statutory requirements for CEQA streamlining as defined by the criteria set forth in the Governor's Guidelines for Streamlining Judicial Review under CEQA (Public Resources Code (PRC) Section 21178 et seq.).

1. The Project meets the criteria set forth in PRC Section 21180(b)(2).

PRC Section 21180(b)(2). *A clean renewable energy project that generates electricity exclusively through wind or solar, but not including waste incineration or conversion.*

The Project will be an up-to 144 megawatt (MW) net solar power generating CPV system installation located in an unincorporated portion of San Diego County. The entire 144 MW project would be comprised of two sub-components—the Tierra del Sol Solar Farm, with a capacity of up to 60 MW, and the Rugged Solar Farm, with a capacity of up to 84 MW.

2. The Project meets the requirements of PRC Section 21181.

PRC Section 21181. *This chapter does not apply to a project if the applicant fails to notify a lead agency prior to the release of the draft environmental impact report for public comment that the applicant is electing to proceed pursuant to this chapter. The lead agency shall notify the Secretary of the Natural Resources Agency if the applicant fails to provide notification pursuant to this section.*

The County of San Diego shall act as lead agency under CEQA for the Project. On November 7, 2012, San Diego County was notified that the Project intends to seek certification under the Jobs and Economic Improvement through Environmental Leadership Act, and is planning on including the requisite public notification information in the Draft EIR.

See Attachment A, Soitec communication to County giving notice of intent to seek AB 900 certification.

3. The Project will satisfy the minimum investment requirement of PRC Section 21183(a).

PRC Section 21183(a). *The project will result in a minimum investment of one hundred million dollars ($100,000,000) in California upon completion of construction.*

Soitec's investment in California is expected to exceed one hundred million dollars ($100,000,000) for each of the Tierra del Sol and Rugged Solar Farms individually, and when considered collectively as the Project.

Soitec's capital expenditures for the entire Project are expected to be approximately $469,000,000, based on anticipated project costs of $268,000,000 for the Rugged Solar Farm, and $201,000,000 for the Tierra del Sol Solar Farm. Accordingly, the Project is expected to far exceed the one hundred million dollar ($100,000,000) minimum investment in California in accordance with PRC Section 21183(b).

See Attachment B, Soitec letter from Clark Crawford substantiating minimum investment.

4. The prevailing and living wage requirements of PRC Section 21183(b) will be satisfied.

PRC Section 21183(b). *The project creates high-wage, highly skilled jobs that pay prevailing wages and living wages and provide construction jobs and permanent jobs for Californians, and helps reduce unemployment.*

PRC Section 21183(b) will be satisfied. The Project will create high-wage,

highly skilled jobs for construction professionals including but not limited to carpenters, electricians, and heavy equipment operators that pay prevailing wages and living wages, and will provide permanent jobs for Project operating staff. By virtue of its job creation and indirect economic benefits, the Project will also reduce unemployment.

The total number of construction workers (consisting of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel) is expected to be up to 266 workers during peak construction periods over an approximate 12-18 month period. The average on-site construction workforce would consist of approximately 150 construction, supervisory, support, and construction management personnel.

Approximately 35 permanent, full-time personnel would be employed at the solar plant sites during daytime working hours assuming all units are operational. Temporary personnel would be employed, as needed, during seasonal periods when panel washing is required. The plant electricians and instrumentation technicians would perform activities such as the tightening of mechanical fasteners, replacement of damaged or exposed wiring, tracker-drive maintenance or fluid replenishment, or PCS maintenance such as filter replacement, equipment testing, or minor equipment repair. Occasionally, there will be a need to replace a CPV panel. Currently the life of the Project is anticipated to be 30 years.

See Attachment B, Soitec letter from Clark Crawford substantiating prevailing and living wage commitment.

5. The project will not result in any net additional greenhouse gas (GHG) emissions pursuant to PRC Section 21183(c).

PRC Section 21183(c) *The project does not result in any net additional emission of greenhouse gases, including greenhouse gas emissions from employee transportation, as determined by the State Air Resources Board pursuant to Division 25.5 (commencing with Section 38500) of the Health and Safety Code.*

A Climate Change and Greenhouse Gas Emissions Analysis was prepared for Rugged by AECOM, and a Greenhouse Gas Analysis Technical Report was prepared for Tierra del Sol by Dudek. *See* Attachments C and D.

As discussed in the Rugged and Tierra del Sol analyses, the proposed Project will emit the following:

Rugged

The Rugged Solar Farm is expected to result in greenhouse gas emissions totaling 5,670 metric tons carbon dioxide equivalent ($MTCO_2e$) during construction, and 15,540 $MTCO_2e$ (518 x 30 years) during its thirty-year operating life, for total life-time

emissions of 21,210 $MTCO_2e$.

Importantly, the Rugged Solar Farm is expected to produce enough energy to reduce greenhouse gas emissions from traditional fossil fuel electrical generation by approximately 106,990 $MTCO_2e$ per year, or 3,209,700 $MTCO_2e$ over the life of the facility.[1]

Subtracting the Rugged Solar Farm's anticipated life-time greenhouse gas emissions from construction and operations, from its anticipated greenhouse gas offset, **results in a total reduction in greenhouse gas emissions of 3,188,490 $MTCO_2e$.**

Tierra del Sol

The Tierra del Sol Solar Farm is expected to result in greenhouse gas emissions totaling 2,663 $MTCO_2e$ during construction, and 12,480 $MTCO_2e$ (416 x 30 years) during its thirty-year operating life, for total emissions of 15,143 $MTCO_2e$.

Importantly, the Tierra del Sol Solar Farm is expected to produce renewable energy with minimal greenhouse gas emissions, thereby reducing greenhouse gas emissions from traditional fossil fuel electrical generation by an estimated 81,334 $MTCO_2e$ per year, or 2,440,020 $MTCO_2e$ over the life of the facility.[2]

Subtracting the Tierra del Sol Solar Farm's anticipated life-time greenhouse gas emissions from construction and operations, from its anticipated greenhouse gas offset, **results in a total reduction in greenhouse gas emissions of 2,424,887 $MTCO_2e$.**

Project

The following table summarizes the Project's greenhouse gas emissions for construction and operations, as compared to its anticipated greenhouse gas offset.

Table 1. Project Greenhouse Gas Emissions (in $MTCO_2e$)

	Rugged	**Tierra del Sol**	**Project**
Construction	5,670	2,663	**8,333**
Operations	15,540	12,480	**28,020**
Total $MTCO_2e$ Emissions	**21,210**	**15,143**	**36,353**
$MTCO_2e$ Offset	(3,209,700)	(2,440,020)	(5,649,720)
Total $MTCO_2e$ Emissions	**(3,188,490)**	**(2.424.887)**	**(5,613,377)**

As discussed in the greenhouse gas analyses prepared for the Project (see Attachments C and D), the proposed up-to-144 MW solar Project will result in the displacement of greenhouse gas-intensive forms of energy production, and therefore, will **result in an overall net reduction in GHG emissions of 5,613,377 $MTCO_2e$.**

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1 See Attachment C, Climate Change and Greenhouse Gas Emissions Analysis, Appendix A, Rugged GHG Emissions Offset.

2 See Attachment D, Tierra del Sol Greenhouse Gas Analysis Technical Report, Appendix A, Tierra del Sol GHG Emissions Offset.

Project Offsets

As demonstrated above, the Project already will result in an overall net reduction in GHG emissions of **5,617,377** $MTCO_2e$ over the life of the Project. On that basis, Soitec does not believe that any additional offsets are required to substantiate PRC Section 21183(c)'s requirement that the project not "result in any net additional emission of greenhouse gases."

Nevertheless, Soitec will obtain voluntary greenhouse gas credits to offset its total construction and operational greenhouse gas emissions totaling 36,353 $MTCO_2e$ from a qualified greenhouse gas emissions broker such as Evolution Markets, based in San Francisco, California, or from a similar type of broker that deals directly with voluntary credit generators. From such a broker Soitec would secure 36,353 MT of greenhouse gas credits or similar carbon offsets to mitigate the construction and operations of the Project.

6. **There will be a binding agreement between the project proponent and the lead agency establishing the requirements set forth in PRC sections 21183(d), (e), and (f).**

PRC Section 21183(d). *The project applicant has entered into a binding and enforceable agreement that all mitigation measures required pursuant to this division to certify the project under this chapter shall be conditions of approval of the project, and those conditions will be fully enforceable by the lead agency or another agency designated by the lead agency. In the case of environmental mitigation measures, the applicant agrees, as an ongoing on, that those measures will be monitored and enforced by the lead agency for the life of the obligation.*

PRC Section 21183(e). *The project applicant agrees to pay the costs of the Court of Appeal in hearing and deciding any case, including payment of the costs for the appointment of a special master if deemed appropriate by the court, in a form and manner specified by the Judicial Council, as provided in the Rules of Court adopted by the Judicial Council pursuant to subdivision (f) of Section 21185.*

PRC Section 21183(f). *The project applicant agrees to pay the costs of preparing the administrative record for the project concurrent with review and consideration of the project pursuant to this division, in a form and manner specified by the lead agency for the project.*

A programmatic EIR is being prepared for the proposed Project pursuant to CEQA. Prior to approval of the Project, the EIR must be certified by the lead agency (San Diego County) and a mitigation monitoring and reporting plan must be adopted. It is expected that mitigation measures resulting from this application for CEQA streamlining will be included in the mitigation monitoring and reporting plan and/or as conditions of project approval. The applicant will be required to implement all mitigation measures contained in the mitigation monitoring and reporting plan and adhere to all conditions of project approval set forth by San Diego County.

Soitec Solar Development, LLC agrees to pay the costs described in PRC sections 21183 (e) and (f), should such costs arise. See Attachment B, Soitec letter from Clark Crawford indicating such commitment.

* * * * *

As Vice President for Soitec Solar Development, LLC, I am authorized to acknowledge and to bind the Project as outlined above.

Signature of Applicant Representative: _____

Clark Crawford, Vice President

Soitec Solar Development, LLC

Date: 12/21/12

Attachments:

Attachment A Soitec written communication to/from County re: intent to seek AB 900 certification

Attachment B Soitec letter from Clark Crawford substantiating Soitec's AB 900 commitments

Attachment C AECOM, Climate Change and Greenhouse Gas Emissions Analysis (Rugged Solar Farm)

Attachment D Dudek, Greenhouse Gas Analysis Technical Report (Tierra del Sol Solar Farm)

ATTACHMENT A

Soitec written communication to/from County
re: intent to seek AB 900 certification

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November 7, 2012

VIA ELECTRONIC MAIL

County of San Diego
Planning & Development Services
c/o Mark Wardlaw, Director
5510 Overland Ave, 3rd Floor, Room 310,
San Diego, CA 92123

AB 900 Application for Environmental Leadership Certification

Dear Mr. Wardlaw,

As we indicated to County staff in our meeting on August 23, 2012, Soitec will be applying for certification as an "environmental leadership" project by the Governor's office under AB 900 for its Tierra del Sol and Rugged solar energy projects. See Cal. Pub. Res. Code §§ 21178 et seq. Designation as an "environmental leadership" project is limited to a narrow class of projects (including renewable solar energy projects) that, among other things, will invest a minimum of $100,000,000 in California, will create high-wage, highly skilled jobs, and will not result in a net emission of greenhouse gases. Cal. Pub. Res. Code § 21183(a) – (f). In return, "environmental leadership" projects are entitled to unique streamlining and informational benefits that will inure to the benefit of the County and the public.

As required by the AB 900 regulations, please consider this letter as official written notice of our intention to seek certification under AB 900. We look forward to working with the County as a team to make this a successful project, so please do not hesitate to contact me if you have any questions about the certification process.

Best Regards,

Clark Crawford,
VP Sales and Business Development

Electronic cc:

Rich Grunow, County of San Diego, PDS
David Sibbet, County of San Diego, PDS
Larry Hofreiter, County of San Diego, PDS
Ashley Gungle, County of San Diego, PDS
Patrick Brown, Permitting Manager, Soitec Solar Development LLC.
Brison Ellinghaus, Project Manager, Soitec Solar Development LLC.
Ryan Waterman, Stoel Rives,
Whalen and Associates, Jim Whalen
Alchemy Consulting Group, Chris Brown,

ATTACHMENT B

Soitec letter from Clark Crawford substantiating
Soitec's AB 900 commitments

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www.soitec.com

January 2, 2012

State Clearinghouse
1400 Tenth Street
Sacramento, CA 95814

Soitec Solar Development LLC AB 900 Application

To Whom It May Concern:

Soitec Solar Development LLC ("Soitec") has filed an application under the Jobs and Economic Improvement through Environmental Leadership Act of 2011 (the "Act") (Pub. Res. Code, § 21178 et seq.). This letter is submitted to support and augment the information provided in that application, and specifically addresses the requirements found in Public Resources Code section 21183.

The Soitec Solar Energy Project (the "Project") is comprised of two sub-component projects, the Rugged Solar Farm, with a capacity of up-to 84 megawatts (MW), and the Tierra del Sol Solar Farm, with a capacity of 60 MW, to be built in San Diego County, California. The capital expenditures for the entire Project are estimated to represent an investment approaching $500,000,000.00 Therefore, the Project is expected to far exceed the one hundred million dollar minimum investment in California in accordance with Public Resources Code section 21183(a).

During construction, the Soitec Solar Energy Project will create high-wage, highly skilled jobs for construction professionals. Soitec intends to contract with Union-affiliated contractors and pay wages as negotiated through appropriate collective bargaining agreements for non-artisan on site craft labor. These wages are anticipated to meet or exceed the prevailing wages for job classifications as set forth by the Davis-Bacon and Related Acts, 40 U.S.C. 3141 et seq., which provides workers with the right to receive at least the locally prevailing wage rate and fringe benefits, as determined by the Department of Labor, for the type of work performed. San Diego County has not adopted a living wage. However, should the County adopt a living wage going forward, Soitec commits to complying with any wage requirements contained therein.

As required by Public Resources Code section 21183(d), Soitec agrees that all mitigation measures required pursuant to CEQA to certify the Project under the Act shall be conditions of approval, and those conditions will be fully enforceable by the County of San Diego or another agency designated by the County. Soitec agrees that all environmental mitigations measures required to certify the Project under the Act will be monitored and enforced by the County for the life of the obligation.

As required by Public Resources Code section 21183(e), Soitec agrees to pay the costs of the Court of Appeal in hearing and deciding any case, including payment of the costs of the appointment of a special master if deemed appropriate by the court, in a form and manner specified by the Judicial Council, as provided in the Rules of Court adopted by the Judicial Council pursuant to the Act.

As required by Public Resources Code section 21183(f), Soitec agrees to pay the costs of preparing the administrative record for the Project, in a form and manner specified by the County, concurrent with review and consideration of the Project pursuant to CEQA and the Act.

Finally, as Vice President of Business Development and Sales North America for Soitec Solar Inc. and the sole member of Soitec Solar Development LLC, I am authorized to acknowledge and to bind the Project as outlined above.

Best Regards,

Clark Crawford,
VP Sales and Business Development

Electronic cc:

Mark Wardlaw, Director Planning and Development Services, County of San Diego
Mark Richards, Corporate Counsel, Soitec Solar USA
Patrick Brown, Permitting Manager, Soitec Solar Development LLC.
Brison Ellinghaus, Project Manager, Soitec Solar Development LLC.
Ryan Waterman, Stoel Rives, San Diego CA
Elizabeth Cason, Stoel Rives, San Diego CA
Whalen and Associates, Jim Whalen
Alchemy Consulting Group, Chris Brown

ATTACHMENT C

AECOM, Climate Change and Greenhouse Gas Emissions Analysis (Rugged Solar Farm)

RUGGED SOLAR LLC PROJECT
CLIMATE CHANGE AND
GREENHOUSE GAS EMISSIONS ANALYSIS

Major Use Permit 3300-12-007

Prepared for:

County of San Diego
Department of Planning and Land Use
Contact: Larry Hofreiter
5201 Ruffin Road, Suite B
San Diego, California 92123
(858) 694-2960

Project Proponent:

Rugged Solar LLC
c/o Soitec Solar Development LLC
4250 Executive Square, Suite 770
San Diego, California 92037

Prepared by:

AECOM
1420 Kettner Boulevard, Suite 500
San Diego, California 92101
(619) 233-1454

December 2012

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
APN	Assessor's Parcel Numbers
APS	Alternative Planning Strategy
ARB	California Air Resources Board
CAA	Clean Air Act
CAL/EPA	California Environmental Protection Agency
CAPCOA	California Air Pollution Control Officers Association
CCAA	California Clean Air Act
CCCC	California Climate Change Center
CEC	California Energy Commission
CPV	concentrating photovoltaic
CEQA	California Environmental Quality Act
CH_4	methane
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
DOT	Department of Transportation
DPLU	Department of Planning and Land Use
DWR	California Department of Water Resources
EPA	Environmental Protection Agency
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
IPCC	Intergovernmental Panel on Climate Change
kV	kilovolt
MMT	million metric tons
MW	megawatt
MPO	Metropolitan Planning Organization
MT	metric tons
N_2O	nitrous oxide
PFCs	perfluorocarbons
RPS	Renewable Portfolio Standard
RTP	Regional Transportation Plan
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCS	Sustainable Communities Strategy
SF_6	sulfur hexafluoride
TAC	toxic air contaminants

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CHAPTER 1.0
INTRODUCTION

Rugged Solar LLC proposes the development of an 80 megawatts (MW) AC concentrating photovoltaic (CPV) renewable energy project (Project) near Boulevard, California, an unincorporated community in San Diego County. The purpose of this report is to discuss global climate change and existing greenhouse gas (GHG) emission sources; summarize applicable federal, state, and local regulations; and analyze potential GHG impacts to global climate change associated with the construction and operation of the Project.

Emissions of GHGs have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. Global climate change also has the potential to result in sea level rise (resulting in flooding of low-lying areas), affect rainfall and snowfall (leading to changes in water supply and runoff), affect temperatures and habitats (affecting biological and agricultural resources), and result in many other adverse effects.

Legislation, regulations, and executive orders on the subject of climate change have established federal and statewide contexts and processes for developing an enforceable cap on GHG emissions. Given the nature of environmental consequences from GHGs and global climate change, the California Environmental Quality Act (CEQA) requires that lead agencies evaluate the cumulative impacts of GHGs, even relatively small additions, on a global basis. Small contributions to this cumulative impact of global climate change (from which significant effects are occurring and are expected to worsen over time) may be potentially significant.

The Project would provide non-fossil-fuel-based electricity and would support the state's goal to obtain 33% of all electricity from renewable sources. The amount of carbon savings that would be derived from implementation of the Project, as opposed to implementation of a carbon-based power plant, is estimated at 106,990 MT CO_2e per year. After accounting for annual operational emissions and amortized construction emissions of 707 MT CO_2e per year, the Project would result in net carbon savings of 106,283 MT CO_2e per year.

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CHAPTER 2.0
AFFECTED ENVIRONMENT

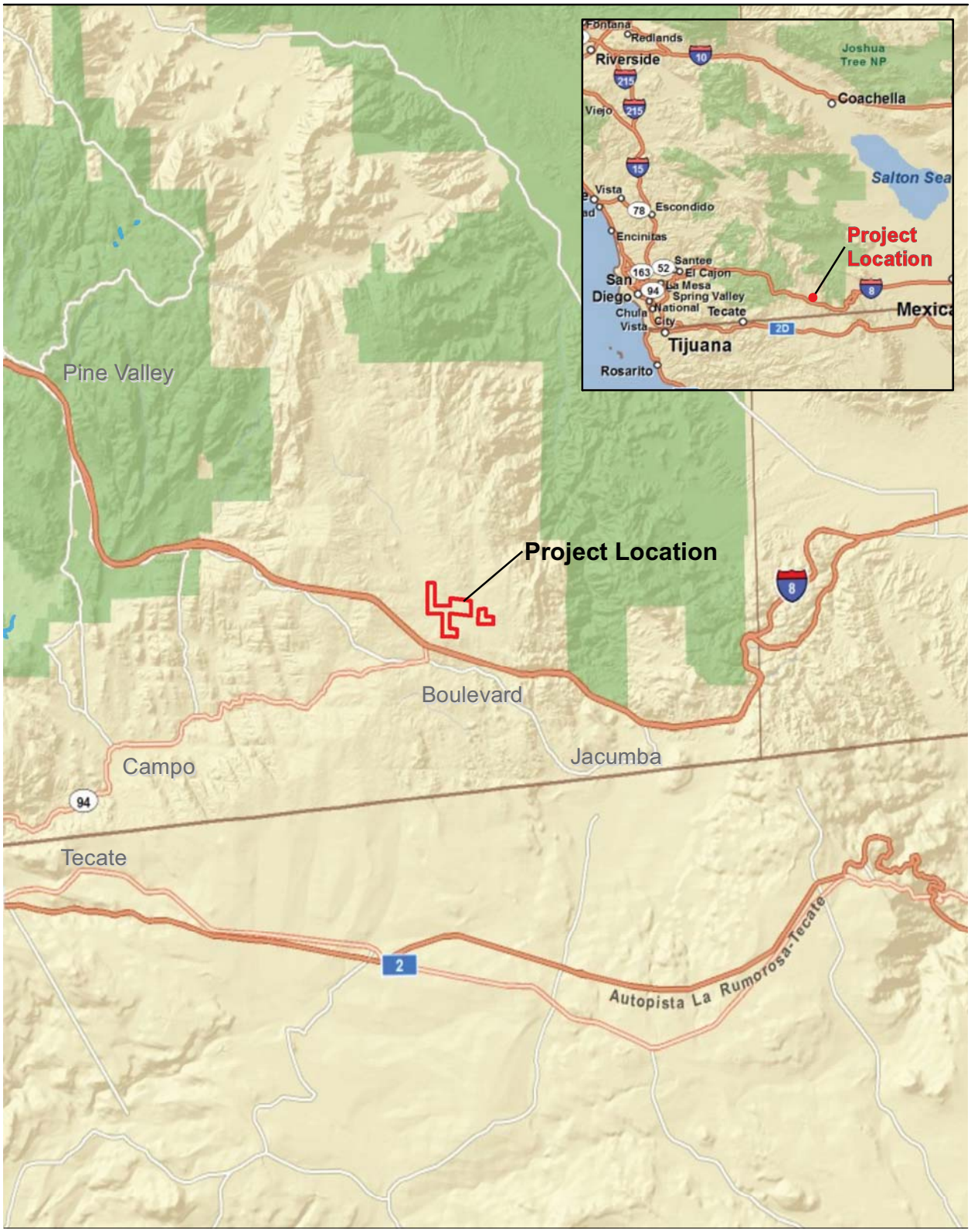
PROJECT LOCATION

Figure 1 shows the Project's relationship to San Diego County, which is located in southern California in the unincorporated community of Boulevard. Figure 2 shows the project's relationship to the surrounding unincorporated community of Boulevard and provides the context of local geography/major landforms/points of interest. The project site is located approximately 1.25 miles north of Interstate 8 (I-8) and extends roughly 2 miles between Ribbonwood Road and approximately 0.5 mile east of McCain Valley Road.

PROJECT DESCRIPTION

The Project would produce up to 80 megawatts (MW) of alternating current (AC) solar generating capacity. The Project would consist of approximately 3,588 concentrating photovoltaic electric generation systems utilizing dual axis tracking CPV trackers on 765 acres in southeastern San Diego County in the unincorporated community of Boulevard, California. In addition to the CPV trackers and inverter transformer units, the Project includes the following primary components:

- A collection system linking the CPV trackers to the on-site Project substation composed of (i) 1,000-volt (V) direct current underground conductors leading to (ii) 34.5-kilovolt (kV) underground and overhead AC conductors.
- A 7,500-square-foot (sf) (60 feet by 125 feet) operations and maintenance (O&M) building.
- A 2-acre on-site private collector substation site with a pad area of 6,000 sf (60 feet by 100 feet) with maximum height of 35 feet and includes a 450-sf (15 feet by 30 feet) control house.
- 61 Inverter/Transformer enclosures. The dimensions of each inverter unit are 10 feet by 25 or 40 feet (250 or 400 sf each) with a total structure height of up to 12 feet.



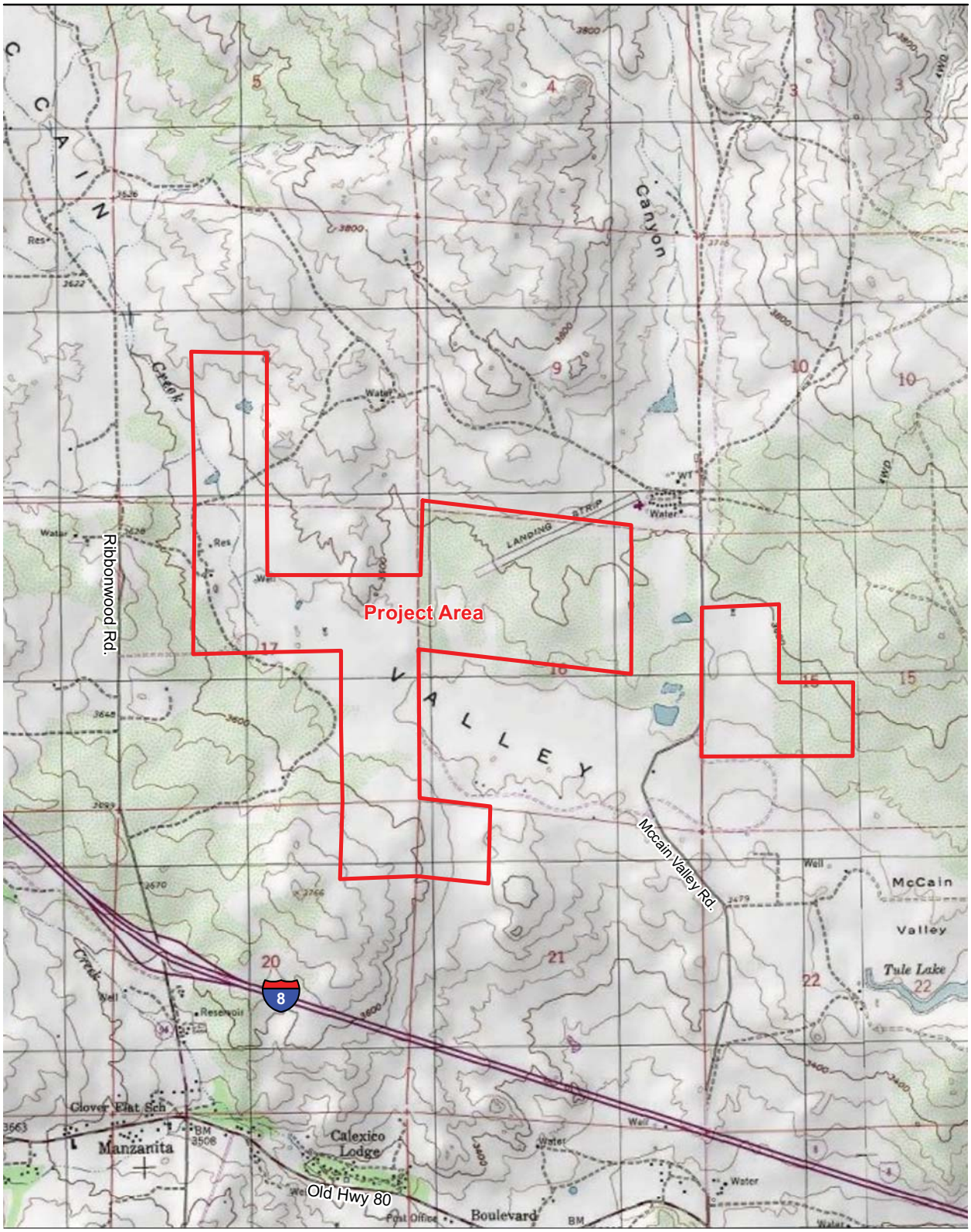
Source: Soitec 2011; AECOM 2011; ESRI 2011

5 2.5 0 5 Miles

Scale: 1 = 316,800; 1 inch = 5 mile(s)

Figure 1
Regional Map

Path: \\ussdg2fp001\data\Projects\2011\11280175.01_Concentrix_S\06GIS\6.3_Layout\Reports\ProjectDescription\Rugged\RegionalMap.mxd, 2/17/2012, HarrisT



Source: USGS; Soitec 2011; AECOM 2011

Live Oak Springs USGS Quadrangle, San Diego County

0.5 0.25 0 0.5 Miles

1:31,680 1 inch = 0.5 mile(s)

Figure 2
Vicinity Map

Path: \\ussdg2fp001\data\Projects\2011\11280175.01_Concentrix_S\06GIS\6.3_Layout\Reports\ProjectDescription\Rugged\VicinityMap.mxd, 2/17/2012, HarrisT

- A 3-mile overhead generator transmission line (gen-tie) connecting the on-site substation to SDG&E's proposed new Boulevard Substation.
- 20.5 miles of newly constructed load-bearing on-site access roads.
- 46.5 miles of graded, non-load-bearing dirt service roads.
- Three permanent on-site water wells for project construction, the O&M building and to facilitate washing of the CPV trackers.
- Two 20,000 gallon water storage tanks to be located at the O&M building and to be dedicated exclusively for fire suppression.
- Three additional on-site 20,000 gallon water storage tanks to support tracker washing. Each of these three 20,000 gallon water storage tanks would include 10,000 gallons of water dedicated solely for fire suppression. The outlet on the tank for tracker washing and any other non-fire uses would be located at the midpoint on the tank making it impossible to draw the water level down below 10,000 gallons in each tank for non-fire suppression use.
- A septic tank system and leach field for the O&M building.
- 6-foot perimeter fencing topped with an additional 1 foot of security barbed wire

ENVIRONMENTAL SETTING

Climate is the accumulation of daily and seasonal weather events over a long period of time, whereas weather is defined as the condition of the atmosphere at any particular time and place (Ahrens 2003). The Project is located in a climatic zone characterized as dry-summer subtropical or Mediterranean.

Scientific Basis of Climate Change

Certain gases in Earth's atmosphere, classified as GHGs, play a critical role in determining Earth's surface temperature. As solar radiation enters Earth's atmosphere from space, a portion of the radiation is absorbed by the Earth's surface and a smaller portion of this radiation is reflected back toward space. The absorbed radiation is emitted from Earth as low-frequency infrared radiation; however, the infrared radiation is absorbed by GHGs in the atmosphere. As a result, the radiation that otherwise would have escaped back into space is instead "trapped" in the atmosphere, resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is

responsible for maintaining a habitable climate on Earth. Without the greenhouse effect, Earth would not be able to support life as we know it.

Key GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Human-generated emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of Earth's climate, known as global climate change or global warming. It is unlikely that global climate change of the past 50 years can be explained without acknowledging the contribution from human activities (IPCC 2007).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants (TAC), which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (approximately 1 day), GHGs have much longer atmospheric lifetimes of 1 year to several thousand years, which allow GHGs to be dispersed around Earth. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood by scientists who study atmospheric chemistry that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 54% is sequestered within 1 year through ocean uptake, northern hemisphere forest regrowth, and other terrestrial sinks. The remaining 46% of human-caused CO_2 emissions remains stored in the atmosphere (Seinfeld and Pandis 1998).

Similarly, impacts of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and TACs. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; suffice it to say, the quantity is enormous, and no single project alone would measurably contribute to a noticeable incremental change in the global average temperature, or to a global, local, or micro climate. From the standpoint of CEQA, GHG impacts to global climate change are inherently cumulative.

Global Climate Trends and Associated Impacts

Trends of Climate Change

Warming of the climate system is now considered to be unequivocal (IPCC 2007), with global surface temperature increasing approximately 1.33 degrees Fahrenheit (°F) over the last 100 years. The rate of increase in global average surface temperature over the last 100 years has not been consistent; the last three decades have warmed at a much faster rate—on average, 0.32°F per decade. Nine of the 10 warmest years in the instrumental record of global average surface temperature have occurred since 2000 (NOAA 2011). Continued warming is projected to increase the global average temperature by 2°F to 11°F over the next 100 years.

The causes of this warming have been identified as both natural processes and as the result of human actions. The Intergovernmental Panel on Climate Change (IPCC) concluded that variations in natural phenomena, such as solar radiation and volcanoes, produced most of the warming from pre-industrial times to 1950, and had a small cooling effect afterward. However, after 1950, increasing GHG concentrations resulting from human activity, such as fossil fuel burning and deforestation, have been responsible for most of the observed temperature increase.

Impacts of Climate Change

Over the same period that increased global warming has occurred, many other changes have occurred or are predicted to occur in other natural systems. Sea levels have risen; precipitation patterns throughout the world have shifted, with some areas becoming wetter and others drier; wildfires are predicted to increase in number and intensity; extreme weather events such as heat waves have increased; and numerous other conditions have been observed. Although it is difficult to prove a definitive cause-and-effect relationship between global warming and other observed changes to natural systems, there is a high level of confidence within the scientific community that these changes are a direct result of increased global temperatures caused by increased presence of GHGs in the atmosphere (IPCC 2007). Historical trends and predictions of future climate change effects in the above topic areas are discussed below.

Precipitation and Snowpack

An analysis of trends in total annual precipitation in the western United States by the National Weather Service's Climate Prediction Center provides evidence that annual precipitation has increased in much of California, the Colorado River Basin, and elsewhere in the west since the mid-1960s (DWR 2006). When these same precipitation data are sorted into three regions—northern, central, and southern California—trends show that precipitation in the northern portion of the state appears to have increased slightly from 1890 to 2002, and precipitation in the central and southern portions of the state show slightly decreasing trends. Although existing data indicate some level of change in precipitation trends in California, more analysis is needed to determine whether changes in California's regional annual precipitation totals have occurred as the result of climate change or other factors (DWR 2006).

As a result of climate change, global average precipitation is expected to increase during the 21st century. While precipitation is generally expected to increase on a global scale, significant regional variations in precipitation trends can be expected. Specifically in California, precipitation is projected to increase in the northern region during the winter months.

Various California climate models provide mixed results regarding forecasted changes in total annual precipitation in the state through the end of this century. Therefore, no conclusion on an increase or decrease can be provided (IPCC 2007). Although global climate change models generally predict an increase in overall precipitation on a worldwide scale, there is no such consistency among the results of regional models applied to California.

An increase in the global average temperature is expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada Mountains. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), and is a major water source for the state. According to the California Energy Commission (CEC) (2006a), the snowpack portion of the water supply could potentially decline from 30% to 90% by the end of the 21st century.

California's annual snowpack, on average, has the greatest accumulations from November through the end of March. The snowpack typically melts from April through

July. As temperatures rise, a declining proportion of total precipitation falls as snow, more winter runoff occurs, and remaining snow melts sooner and faster in spring. In some basins, spring peak runoff may increase; in others, runoff volumes may shift to earlier in the spring and winter months (DWR 2006). In some instances, runoff peak levels may increase and occur earlier. California's reservoir managers use snowmelt to help fill reservoirs once the threat of large winter and early spring storms and related flooding risks have passed.

An analysis conducted by the California Department of Water Resources (DWR) (2006) on the effect of rising temperatures on snowpack shows that a 5.4°F rise in average annual temperature would likely cause snowlines to rise approximately 1,500 feet. This would result in an annual loss of approximately 5 million acre-feet of water storage in the snowpack. This would represent a loss of approximately 23% of the total storage capacity of all key reservoirs in California (DWR 2012).

Sea Level Rise

Another major area of concern related to global climate change is sea level rise. Worldwide average sea level appears to have risen approximately 0.4 to 0.7 feet over the past century based on data collected from tide gauges around the globe, coupled with satellite measurements taken over approximately the last 15 years (IPCC 2007). Various gauge stations along the California coast show an increase similar to the global trends. Rising average sea level over the past century has been attributed primarily to warming of the world's oceans, the related thermal expansion of ocean waters, and the addition of water to the world's oceans from the melting of land-based polar ice (IPCC 2007). Melting sea-based polar ice will have a much smaller impact on sea level rise, and is not currently modeled in sea level rise estimates (Shepherd et al. 2010).

A consistent rise in sea level has been recorded worldwide over the last 100 years. According to IPCC, sea level rise is expected to continue, and increase by up to 23 inches by the year 2099 (IPCC 2007). Other climate models estimate an even greater increase in sea level rise of 55 inches by the year 2100 (DWR 2008). Although these projections are on a global scale, the rate of relative sea level rise experienced at many locations along California's coast correlates well with the worldwide average rate of rise observed over the past century. Therefore, it is reasonable to expect that changes in worldwide average sea level will also be experienced along California's coast through

this century (DWR 2006); however, the amount and timing of the expected sea level rise that will be experienced along California's coast is uncertain.

Heat Waves

Historically, extreme warm temperatures in the San Diego region have mostly occurred in July and August, but as climate warming continues, the occurrences of these events will likely begin in June and could continue to take place into September. All simulations indicate that hot daytime and nighttime temperatures (heat waves) will increase in frequency, magnitude, and duration (San Diego Foundation 2008).

Wildfires

Different climate change models yield somewhat different predictions about the frequency, timing, and severity of future Santa Ana wind conditions (which are a major driver of large wildfires in San Diego County), leading to uncertainty about how fire regimes may change in the future. Analyses by the California Climate Change Center (CCCC) show that significant increases in large wildfire occurrences and burned areas are likely to occur by mid-century, with very large increases by 2085. The latter is mainly due to the effects of projected temperature increases on evapotranspiration, compounded by reduced precipitation (CCCC 2009).

Greenhouse Gas Emission Sources

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, electric utility, residential, commercial, and agricultural sectors. Emissions of CO_2 are byproducts of fossil fuel combustion, and CH_4, a highly potent GHG, is the primary component in natural gas and is associated with agricultural practices and landfills. N_2O is also largely attributable to agricultural practices and soil management. For purposes of accounting for and regulating GHG emissions, sources of GHG emissions are grouped into emissions sectors. The California Air Resources Board (ARB) identifies the following main GHG emissions sectors that account for most anthropogenic GHG emissions generated within California:

- *Transportation:* On-road motor vehicles, recreational vehicles, aviation, ships, and rail

- *Electricity:* Use and production of electrical energy
- *Industry:* Mainly stationary sources (e.g., boilers and engines) associated with process emissions
- *Commercial and Residential:* Area sources, such as landscape maintenance equipment, fireplaces, and consumption of natural gas for space and water heating
- *Agriculture:* Agricultural sources that include off-road farm equipment; irrigation pumps; crop residue burning (CO_2); and emissions from flooded soils, livestock waste, crop residue decomposition, and fertilizer volatilization (CH_4 and N_2O)
- *High Global Warming Potential (GWP) Gases:* Refrigerants and electrical insulation (e.g., SF_6), among other sources
- *Recycling and Waste:* Waste management facilities and landfills; primary emissions are CO_2 from combustion and CH_4 from landfills and wastewater treatment

State Greenhouse Gas Emissions Inventory

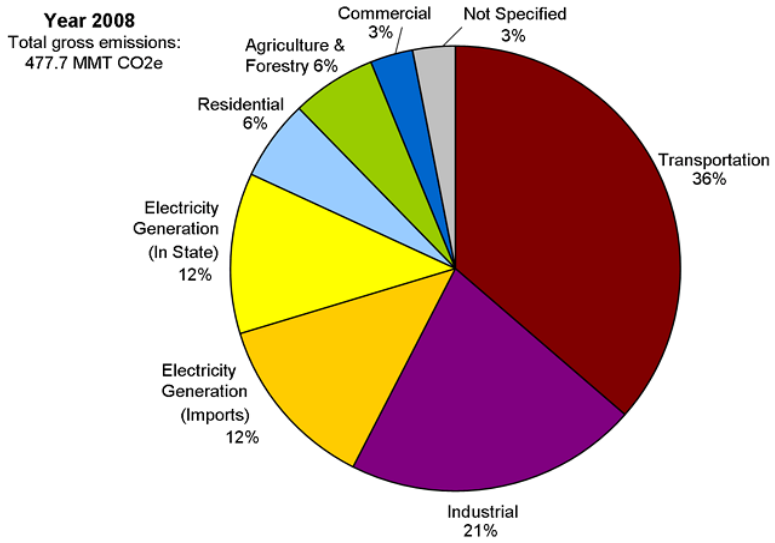
ARB performs an annual GHG inventory for emissions and sinks of the six major GHGs (CO_2, CH_4, N_2O, hydrofluorocarbons, chlorofluorocarbons, and SF_6). As shown in Figure 3, California produced 477.7 million gross metric tons (MT) of CO_2 equivalent (CO_2e) in 2008 (ARB 2010a).

CO_2e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential (GWP) of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere.

Expressing emissions in CO_2e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

The inventory is divided into the ARB-created categories or sectors of emissions: transportation, electricity generation, industrial, commercial, residential, agriculture and forestry, and not specified (i.e., recycling and waste, and high GWP gases). Combustion of fossil fuel in the transportation sector was the single largest source of California's

Figure 3
2008 California GHG Emissions by Sector (2000–2008 Emission Inventory)



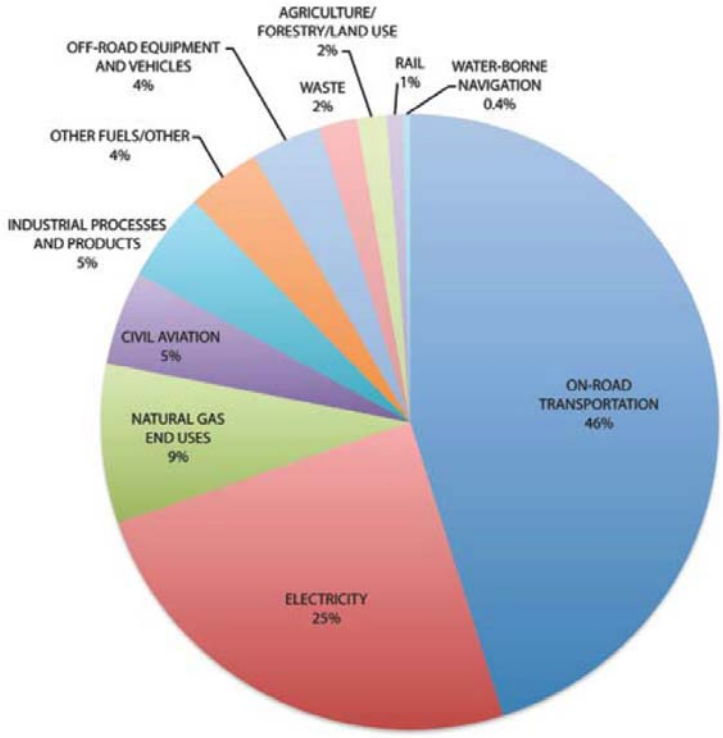
MMT=million metric tons

GHG emissions in 2008, accounting for 36% of total GHG emissions in the state. The transportation sector was followed by the electric power sector, which accounts for 24% of total GHG emissions in the state (including in- and out-of-state sources), and the industrial sector, which accounts for 21% of total GHG emissions in the state (ARB 2010a).

Regional Greenhouse Gas Emission Inventory

The University of San Diego School of Law, Energy Policy Initiative Center prepared a GHG inventory for San Diego County (Anders et al. 2008). The inventory included estimates of GHG emissions for 1990, 2006, and 2020. Based on the existing inventory and the projections for the region, the University of San Diego found that emissions of GHGs must be reduced to 33% below "business-as-usual" conditions to achieve 1990 emission levels by the year 2020. As shown in Figure 4, total GHG emissions in San Diego County in 2006 were estimated to be 34 million metric tons (MMT) of CO_2e. Transportation is the largest emissions sector, accounting for 16 MMT of CO_2e, or 46% of total emissions. Energy consumption, including electricity and natural gas use, is the next largest source of emissions, at 34% of the total.

Figure 4
San Diego County's Greenhouse Gas Emissions by Economic Sector (2006)



REGULATORY SETTING

Federal Plans, Policies, Regulations, and Laws

The U.S. Environmental Protection Agency (EPA) is the federal agency responsible for implementing the federal Clean Air Act (CAA). The U.S. Supreme Court ruled on April 2, 2007, that CO_2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs.

Proposed Endangerment and Cause or Contribute Findings for GHG under the CAA

On December 7, 2009, EPA signed two distinct findings regarding GHGs under Section 202(a) of the CAA (FR 2009):

- **Endangerment Finding**: The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—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.

- **Cause or Contribute Finding**: The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution, which threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action was a prerequisite to finalizing EPA's proposed GHG emissions standards for light-duty vehicles. On November 16, 2011, the Department of Transportation's (DOT) and EPA proposed stringent federal GHG and fuel economy standards for model years 2017 to 2025 passenger cars and light-duty trucks. In addition to the standards for light-duty vehicles, DOT and EPA announced standards on August 9, 2011, to reduce GHG emissions and improve the fuel efficiency of heavy-duty trucks and buses.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA published the Final Mandatory Greenhouse Gas Reporting Rule (Reporting Rule) in the Federal Register (FR 2010b). The Reporting Rule requires reporting of GHG data and other relevant information from fossil fuel and industrial GHG suppliers, vehicle and engine manufacturers, and all facilities that would emit 25,000 MT or more of CO_2e per year. Facility owners are required to submit an annual report with detailed calculations of facility GHG emissions due on March 31 for emissions in the previous calendar year. The Reporting Rule also mandates recordkeeping and administrative requirements to enable EPA to verify the annual GHG emissions reports. Owners of existing facilities that commenced operation prior to January 1, 2011, are required to submit an annual report for calendar year 2011.

State Plans, Policies, Regulations, and Laws

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA).

Assembly Bill 1493

Assembly Bill (AB) 1493 (ARB 2002), signed in 2002, required that ARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state."

In 2004, ARB adopted standards requiring automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily for the transportation of persons) beginning with the 2009 model year. For passenger cars and light-duty trucks, the GHG emissions limits for the 2016 model year are approximately 37% lower than the limits for the first year of the regulations, the 2009 model year. Before the regulations could go into effect, EPA had to grant California a waiver under the CAA, allowing California to regulate GHG emissions from motor vehicles within the state. EPA granted the waiver in 2009.

In April 2010, DOT and EPA established GHG gas emissions and fuel economy standards for model years 2012–2016 light-duty cars and trucks. In the fall of 2010, California accepted compliance with these federal GHG standards as meeting similar state standards as adopted in 2004, resulting in the first coordinated national program.

Executive Order S-3-05

Executive Order S-3-05 (Caltrans 2005), signed in June 2005, proclaimed that the State of California is vulnerable to the impacts of climate change. Executive Order S-3-05 declared that increased temperatures could reduce the Sierra Nevada's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total GHG emissions targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050.

Executive Order S-3-05 directed the Secretary of the California Environmental Protection Agency (CAL/EPA) to (1) coordinate a multi-agency effort to reduce GHG emissions to the target levels and (2) submit biannual reports to the governor and the

State Legislature describing progress made toward reaching the emission targets, impacts of global warming on California's resources, and mitigation and adaptation plans to combat these impacts. The Secretary of the CAL/EPA created the California Climate Action Team, made up of members from various state agencies and commissions, which is responsible for implementing global warming emissions-reduction programs. The California Climate Action Team is also responsible for reporting on the progress made toward meeting the statewide GHG targets.

Assembly Bill 32 Climate Change Proposed Scoping Plan

In December 2008, ARB adopted its Climate Change Scoping Plan (Scoping Plan), which was revised in 2011 to account for new economic activity levels. The Scoping Plan contains the main strategies California will implement to achieve reduction of approximately 80 MMT of CO_2e, or 16% from California's projected 2020 emissions level of 507 MMT of CO_2e under a "business-as-usual" scenario. The Scoping Plan also includes ARB-recommended GHG reductions for each emissions sector of California's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- Improved emissions standards for light-duty vehicles (26.1 MMT CO_2e)
- The Low-Carbon Fuel Standard (15.0 MMT CO_2e)
- Energy efficiency measures in buildings and appliances, and the widespread development of combined heat and power systems (16.7 MMT CO_2e)
- A renewable portfolio standard for electricity production (12 MMT CO_2e)

The Scoping Plan does state that land use planning and urban growth decisions will play an important role in the state's GHG reductions, since local governments have primary authority to plan, zone, approve, and permit land development to accommodate population growth and the changing needs of their jurisdictions.

The Scoping Plan expects a reduction of approximately 5.0 MMT CO_2e per year from local land use changes associated with implementation of Senate Bill (SB) 375, discussed below. The Scoping Plan does not include any direct discussion about GHG emissions generated by construction activity.

Cap and Trade

As a key part of the ARB Scoping Plan, the final adoption of regulations for the Cap and Trade program (ARB 2011) by the ARB board is an important step to the state meeting its GHG reduction goals. This program will first set an aggressive cap, or maximum limit, on emissions; sources covered by the program then receive authorizations to emit in the form of emissions allowances, with the total amount of allowance limited by the cap. Each source can design its own compliance strategy to meet the overall reduction requirement, including sale or purchase of allowances, installation of pollution controls, and implementation of efficiency measures. Individual control requirements are not specified under a cap and trade program, but each emissions source must surrender allowances equal to its actual emissions to comply. Sources must also completely and accurately measure and report all emissions in a timely manner to guarantee that the overall cap is achieved.

In the first compliance period, which will be in place from 2013 through 2014, the regulations will impose allowance obligations on the electricity distribution entities in California (both for in-state generation and out-of-state generation imported into the state) and certain large industrial facilities in specified industries whose GHG emissions exceed 25,000 MT CO_2e. In the second compliance period, starting January 1, 2015, producers and importers of natural gas and other fossil fuels will become subject to the regulations.

Executive Order S-1-07

Executive Order S-1-07 (ARB 2007), signed in 2007, establishes a goal that the carbon intensity of transportation fuels sold in California should be reduced by a minimum of 10% by 2020. ARB identified this Low Carbon Fuel Standard as a discrete early action item under AB 32. The final ARB resolution (No. 09-31) was issued on April 23, 2009.

Senate Bill 1078, Senate Bill 107, and Senate Bill X1-2

SB 1078 (CEC 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20% of their supply from renewable sources by 2017. SB 107 changed the target date to 2010. Executive Order S-14-08 expands the state's Renewable Energy Standard to 33% renewable power by 2020. This new goal was codified in 2011 with the passage of SB X1-2. In 2009, San

Diego Gas & Electric (SDG&E), which provides electricity and natural gas to the Project site, used 10% renewable energy to provide electricity to customers (SDG&E 2009). To meet the goals set out in SB X1-2, a significant effort will be needed to reduce overall energy used in the state through energy efficiency efforts and a large effort to increase the amount of renewable energy generated and purchased by SDG&E.

Senate Bill 97

Signed in August 2007, SB 97 (OPR 2007) acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the California Office of Planning and Research to prepare, develop, and transmit to the California Natural Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions under CEQA (CNRA 2009). On February 16, 2010, the Office of Administrative Law approved the CEQA amendments and filed them with the Secretary of State for inclusion in the California Code of Regulations. The CEQA amendments became effective on March 18, 2010. The amended guidelines establish two new guidance questions in the Environmental Checklist of CEQA Guidelines Appendix G. The amendments do not establish a GHG emissions threshold, but allow a lead agency to develop, adopt, and apply its own threshold of significance or use those developed by other agencies or experts.

Senate Bill 375

Signed in September 2008, SB 375 (LC 2008) aligns regional transportation planning efforts, regional GHG-reduction targets, and land use and housing allocations. It requires Metropolitan Planning Organizations (MPOs), such as the San Diego Association of Governments (SANDAG), to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which would prescribe land use allocations in that MPO's Regional Transportation Plan (RTP). ARB has established reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets are to be updated every 8 years, but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets.

SANDAG became the first MPO in the state to adopt an SCS when it adopted the 2050 RTP in October 2011. This regional planning document included an SCS that will

achieve the GHG emissions reduction goals set by ARB of 7% per capita GHG reductions from passenger vehicles by 2020 and 13% by 2035.

SB 375 also extends the minimum period for the Regional Housing Needs Allocation cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City or county land use policies (including general plans) are not required to be consistent with the RTP (and associated SCS or APS). However, new provisions of CEQA would incentivize qualified projects that are consistent with an approved SCS or APS, which would be categorized as "transit priority projects." ARB adopted regional targets on September 23, 2010 (ARB 2010b).

Regional and Local Plans, Policies, Regulations, and Ordinances

ARB's Scoping Plan (ARB 2008) states that local governments are "essential partners" in the effort to reduce GHG emissions. The Scoping Plan also acknowledges that local governments have "broad influence and, in some cases, exclusive jurisdiction" over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations. Many of the proposed measures to reduce GHG emissions rely on local government actions. The Scoping Plan encourages local governments to reduce GHG emissions by approximately 15% from current levels, which were 469 MMT CO_2e at the time the Scoping Plan was created and are expected to rise to 507 MMT CO_2e by 2020 under a "business-as-usual" scenario (ARB 2008).

San Diego Air Pollution Control District

The San Diego Air Pollution Control District has no regulations relative to GHG emissions.

San Diego County

San Diego County has no regulations relative to GHG emissions, but it does have a Green Building Incentive Program that is a voluntary program to promote energy- and resource-efficient building design. Incentives, in the form of fast-track plan checking and fee reductions, are offered to developers who use recycled materials in construction, install irrigation systems that use greywater, build projects that exceed California's Title 24 guidelines (i.e., the energy efficiency standards), or install photovoltaic electricity

generation systems (solar power). The San Diego County General Plan Update was adopted by the County of San Diego Board of Supervisors in August 2011. The General Plan contains numerous policies in the Land Use, Mobility, Conservation and Open Space, and Housing Elements to address climate change. Adopted policies in the General Plan Update address the following major strategies:

- Reduce vehicle trips generated, gasoline/energy consumption, and GHGs.
- Reduce non-renewable electrical and natural gas energy consumption and generation (energy efficiency).
- Increase generation and use of renewable energy sources.
- Reduce water consumption.
- Reduce and maximize reuse of solid wastes.
- Promote CO_2-consuming landscapes.
- Maximize preservation of open spaces, natural areas, and agricultural lands.
- Reduce risk from wildfire, flooding, and other hazards resulting from climate change.
- Conserve and improve water supply due to shortage from climate change.
- Promote agricultural lands for local food production.
- Provide education and leadership.

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CHAPTER 3.0
ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

ANALYSIS METHODOLOGY

A single project is unlikely to have a significant impact on the environment related to climate change. However, the cumulative effect of various human activities involving emissions of GHGs has been clearly linked to quantifiable changes in the composition of the atmosphere, which in turn have been shown to be the main cause of global climate change (IPCC 2007). Although it is extremely unlikely that a single project would contribute significantly to climate change, the analysis of the environmental effects of GHG emissions from the Project is addressed as a cumulative impact analysis because cumulative emissions from many projects would affect global GHG concentrations and the climate system.

Pursuant to full disclosure and according to CEQA Guidelines that state, “A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of greenhouse gas emissions resulting from a project,” both the total GHG emissions associated with the Project and the net change in GHG emissions from existing conditions are quantified. These are used as criteria to determine whether the associated emissions would substantially help or hinder the state’s ability to attain the goals identified in AB 32 (i.e., reduction of statewide GHG emissions to 1990 levels by 2020).

The analysis of GHG emissions in this report recognizes that the impact that GHG emissions have on global climate change does not depend on whether the emissions are generated by stationary, mobile, or area sources, or whether they are generated in one region or another. Land uses need to be “GHG efficient” to attain AB 32 goals. Projects that meet specified minimum performance standards, such as those described in an existing plan or mitigation program for the reduction of emissions or specific measures adopted as part of a general plan, long-range development plan, or GHG emissions-reduction plan—can be identified as projects that are consistent with or surpass the goals of AB 32.

Construction Emissions

Construction-related GHG emissions would be associated with typical construction activities, such as site grading, CPV unit installation, embedded emissions in the water that will be used during construction, and vehicle engine exhaust from construction equipment, vendor trips, and construction employee commute trips. Construction emissions would be temporary and would subside after completion of the Project. Construction at the project site would require up to about 18 months and is anticipated to begin in 2014. Construction of the gen-tie line would take an additional 2 to 3 months, and would occur in 2015 after completion of the on-site construction activities.

Emissions from construction equipment and construction vehicles related to hauling materials and workers to and within the site were estimated using URBEMIS 2007 Version 9.2.4 (URBEMIS), Road Construction Emissions Model, Version 6.3.2, and EMFAC 2011 (EMFAC). URBEMIS is designed to estimate construction and operational emissions from land use development projects. The Road Construction Emissions Model was developed to estimate the emissions from linear projects, such as bridges, roads, or pipelines. EMFAC was developed by ARB for the purposes of estimating CO_2 emissions from on-road vehicle activity. Additionally, emission factors used from EMFAC account for statewide GHG reduction programs for the transportation sector such as the Low Carbon Fuel Standard and Pavely fuel efficiency regulations.

URBEMIS was used to estimate off-road construction equipment and fugitive dust emissions associated with (1) site clearing and grading, (2) trenching and construction of electrical transmission facilities, (3) solar CPV assembly and installation, and (4) construction of the substation and O&M building. The Road Construction Emissions Model was used to estimate off-road construction equipment emissions associated with construction of 20.5 miles of access roads and 46.5 miles of service roads. The Road Construction Emissions Model was also used to estimate emissions associated with construction of the gen-tie line. Haul trips associated with delivery of materials to the project site and construction worker commutes were estimated using emission factors from EMFAC. Materials were assumed to be transported from the Rancho Bernardo area of San Diego, which is the likely location for production of the solar modules. Detailed modeling outputs and assumptions are available in Appendix A.

Operational Emissions

After construction, day-to-day activities associated with operation of the Project would generate minimal GHG emissions from a limited number of sources. GHG emissions were estimated using Project-based activity data, provided by the applicant, and the most recent and relevant emissions factors. Emissions estimates for employee vehicle trips to and from the facility were made using OFFROAD 2007 and EMFAC emission factors. EMFAC emission factors account for statewide GHG reduction programs such as the Low-Carbon Fuel Standard and Pavley fuel efficiency regulations. For emissions resulting from energy used at the facility, an emission factor was calculated that forecasts the SDG&E emission factor in 2020, provided it meets the Renewable Portfolio Standard (RPS) and provides 33% of electricity from renewable sources. A forecasted emissions factor was created for 2020 as that is the year established by AB 32 as a target for achieving reduced statewide GHG emissions (ARB 2008). This forecasted emissions factor was based on the utility-specific emissions factor for SDG&E from 2009, attained from the *Power Generation/Electric Utility Reporting Protocol* report submitted to the California Climate Action Registry by SDG&E (CCAR 2009) and the 2009 annual *Power Content Label* (SDG&E 2009) reported to CEC. There is no stationary use of any other fuels.

On-site operations activity would include in-place panel washing not more frequently than every 6 to 8 weeks by mobile crews who would also be available for dispatch whenever on-site repairs or other maintenance are required (approximately 9 washes per year). A tanker truck and smaller “satellite” panel washing trucks would be used for panel washing. On-site water storage tanks, installed to provide water for fire protection will include additional capacity available for panel washing.

Operational activities associated with maintenance of the gen-tie line would include light- and heavy-duty vehicles for pole structure brushing, herbicide application, and equipment repair. Electric transmission lines may be inspected several times a year via helicopter. Helicopter emissions were estimated using emission factors from the California Climate Action Registry.

While the water used for this project will come from local wells, at this time there is no information about the depth of the wells. This would be required to determine the energy required to pump water to the surface and the associated GHG emissions. Because of this limitation, a more conservative estimate of GHG emissions associated with the

water used for the project was used that estimates emissions for the transportation, conveyance, and treatment of water that would be used on-site. To estimate these emissions, emission factors from the CEC's 2006 report, *Refining Estimates of Water-Related Energy Use in California* (CEC 2006b), were used.

A limited amount of wastewater would be conveyed to a water reclamation facility. To be conservative, the IPCC method for estimating emissions from wastewater facilities, as found in the Wastewater Treatment and Discharge chapter of the IPCC *Guidelines for National Greenhouse Gas Inventories* (IPCC 2006), was used to estimate emissions from the treatment of wastewater generated at the facility. This likely overestimates wastewater emissions because, unlike municipal wastewater, no organic material, which drives GHG emissions in wastewater treatment, would be added to the wastewater coming from the Project.

CRITERIA FOR DETERMINING SIGNIFICANCE OF EFFECTS

There are no quantitative federal or state significance criteria for global climate change impacts or GHG emissions that pertain to this Project. At the state level, climate change must be addressed in CEQA documents according to Appendix G of the CEQA Guidelines. The selection of significance criteria for this analysis is based on the environmental checklist in Appendix G of the CEQA Guidelines. According to the guidelines, the Project under consideration would result in a significant impact related to climate change if it would result in either of the following:

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

The County of San Diego Department of Planning and Land Use (DPLU) developed an interim approach for evaluating GHG emissions impacts. The California Air Pollution Control Officers Association (CAPCOA) published various screening thresholds for determining when a climate change analysis would be needed. DPLU recommends using the 900 MT of CO_2e per year screening criteria referenced in the CAPCOA white paper (CAPCOA 2008) for determining which projects require further analysis and mitigation. Table 1 describes the general sizes of projects that would generally require a more detailed climate change analysis.

Table 1
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 DPLU 2010

If a project meets the above size criteria or does not exceed 900 MT of CO_2e per year, then the climate change impacts would be considered less than significant. If a project exceeds 900 MT of CO_2e per year, DPLU recommends that the significance be based on whether the project would impede the implementation of AB 32. To demonstrate that a project would not impede the implementation of AB 32, the guidance recommends that a project should demonstrate how the carbon emissions generated by the project would be reduced to 33% below projected "business-as-usual" levels in 2020. The 33% reduction target is based on the San Diego County Greenhouse Gas Inventory: An Analysis of Regional Emissions and Strategies to Achieve AB 32 Targets (Anders et al. 2008).

At the time of this writing, no federal, state, regional, or local air quality regulatory agency has adopted a quantitative threshold of significance for construction-related GHG emissions. Many California air districts recommend that construction emissions associated with a project be amortized over the life of the project (typically 30 years) and added to the operational emissions. Therefore, modeled construction-related GHG emissions associated with the Project are discussed first, then operational GHG emissions are totaled and the amortized construction emissions are added to the operational emissions.

IMPACT ANALYSIS

Impact 1: Generation of Construction-Related and Operational Greenhouse Gas Emissions That Have a Cumulative Effect on the Environment

GHG emissions generated by construction of the Project would be primarily in the form of CO_2. Although emissions of other GHGs, such as CH_4 and N_2O, are important with

respect to global climate change, the emissions levels of these other GHGs from on- and off-road vehicles used during construction are relatively small compared to the level of CO_2 emissions, even when factoring in the relatively larger GWP of CH_4 and N_2O.

Construction-related GHG emissions 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 Project.

Construction of the Project would involve localized clearing and grading, construction of primary and secondary access roads, installation of CPV foundations, trenching within each building block for the collection system and communications system, installation of small concrete footing at each pair of inverters and attendant transformer, and installation of a secondary 34.5 kV collection system, including a wood pole mounted 34.5 kV "trunk line," leading to the 34.5/69 kV project step-up substation and an on-site operations and maintenance facility.

While GHG emissions persist in the atmosphere for extended periods of time, construction-related emissions would only be generated during the construction period, which is expected to be up to about 18 months. The maximum construction emissions over the construction period for the Project would be approximately 5,678 MT CO_2e. When this total is amortized over the 30-year life of the project, the annual construction emissions would be approximately 189 MT CO_2e per year.

Operational emissions would come from direct and indirect emissions sources generated by mobile sources, embedded in electricity and water uses, and emissions that are emitted during the treatment of wastewater generated at the Project site. Mobile source emissions would be associated with activities such as vehicle travel required for maintenance of the CPV units and the surrounding site. On-site operational activity would include in-place panel washing as often as approximately every 6 to 8 weeks, but expected to be required about four times per year. Panel washing is expected to require 6.5 gallons per tracker, but no more than 24 gallons of water would be required to wash each tracker. Each washing event would be completed by two washing trucks deployed across the site.

There would also be some usage of grid-provided electricity to power the CPV 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. Table 2 shows the summary of operational GHG emissions estimated for the Project. The annual operational emissions levels were estimated using the best available methodologies and emission factors available at the time of writing this technical report. Additional details are available in Appendix A.

Table 2
Project GHG Emissions

Emissions Source	Unmitigated Project Emissions of CO_2e per Year
Off-Road Equipment/On-Road Vehicles	165
Energy	346
Water	7
Wastewater	<1
Total (Operational)	518
Total Amortized Construction	189
Total (Operational + Amortized Construction)	707

Note: Totals may not add correctly due to rounding.

As shown in Table 2, the Project would result in approximately 707 MT CO_2e per year. This is an increase of 707 MT CO_2e per year from existing emissions levels, because the existing site is currently used for grazing with minimal GHG emissions resulting from this activity.

As shown in Table 2, the total construction-related and operational CO_2e emissions associated with the Project would be less than the screening criteria of 900 MT CO_2e recommended by DPLU. Therefore, the Project would not require further quantification and would not be anticipated to impede the implementation of AB 32. The Project would not generate GHG emissions, either directly or indirectly, that would have a significant impact on the environment. The impact would be less than significant.

Mitigation Measure: No mitigation is required.

Impact 2: Conflict with an Applicable Plan, Policy, or Regulation Adopted to Reduce Greenhouse Gas Emissions

ARB's Scoping Plan is the most applicable state plan to evaluate the Project's actions because it provides the outline for actions to reduce California's GHG emissions and meet the goals set in AB 32. For more information regarding the Scoping Plan see

"Assembly Bill 32 Climate Change Proposed Scoping Plan" on page 20. The Scoping Plan includes measures that would indirectly address GHG emissions levels associated with construction activity, including the phasing in of cleaner technology for diesel engine fleets (including construction equipment) and the development of a Low Carbon Fuel Standard. Policies formulated under the mandate of AB 32, either directly or indirectly applicable to construction-related activities, are assumed to be implemented during construction of the Project if those policies and laws are developed before construction begins. Therefore the Project construction would not conflict with the Scoping Plan.

Although construction and operation of the Project would result in an increase of GHG emissions, it is aligned with the goals of AB 32. The Project would provide non-fossil-fuel-based electricity and would support the state's goal to obtain 33% of all electricity from renewable sources and, therefore, help to achieve 1990 statewide emissions levels by 2020.

Because the electricity generated by the Project may be provided to a utility company in an effort to meet that company's RPS mandate, the Project 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, to demonstrate that the Project is aligned with and supporting the goals of AB 32, the Scoping Plan, and the RPS, the amount of carbon savings that would be derived from implementation of the Project, as opposed to implementation of a carbon-based power plant, was estimated for this report.

The total amount of carbon savings from implementation of the Project is estimated at 106,990 MT CO_2e per year. After accounting for annual operational emissions and amortized construction emissions of 707 MT CO_2e per year (as shown in Table 2), the Project would result in net carbon savings of 106,283 MT CO_2e per year. As these emissions reductions are accounted for by a utility that will be using them to meet its RPS goal, the reductions are not factored into the significance findings for this report; however, quantifying them does demonstrate that the Project will assist the state in meeting its RPS goal.

As discussed earlier, the Project would not exceed the screening criteria for GHG emissions recommended by San Diego County DPLU. The approach to developing a threshold of significance for GHG emissions is to identify the level of emissions for

which a project would not be expected to substantially conflict with existing California legislation that has been adopted to reduce statewide GHG emissions. The Project's estimated GHG emissions of 707 MT CO_2e are below the 900 MT CO_2e threshold and would not conflict with any applicable plan, policy, or regulation for the purpose of reducing GHG emissions. This impact would be less than significant.

Mitigation Measure: No mitigation is required.

CHAPTER 4.0
EFFECTS OF GLOBAL CLIMATE CHANGE ON THE PROJECT

The level of significance of the impact of global climate change on the Project cannot be determined with certainty because of the variability in climate change models. However, an expected increase in the annual average temperature attributable to global climate change is projected to result in numerous effects in California, such as changes in precipitation patterns, snowpack, runoff, sea level rise, and water quality. Effects on precipitation and snowpack would affect runoff and surface water, but would not affect the physical conditions of the Project site. The Project is located at an elevation that would not be at or affected by a rising sea level, and increased cloud cover is not likely to cause a significant effect on operations.

The Project would achieve consistency with state plans and goals, and enhance achievement of the objectives to protect California's natural resources against the detrimental effects of climate change by generating 80 MW of renewable energy. This would help the state reach its goal, as described in SB X1-2, to obtain 33% of all electricity from renewable sources.

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CHAPTER 5.0
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APPENDIX A

Model Assumptions and Outputs

Rugged GHG Emissions Summary

Construction

	Total GHG Emissions (MT CO_2e)
Rugged Solar	
Off-Road Equipment - 2014	1,875
Off-Road Equipment - 2015	1,529
On-Road Emissions	1,943
Water	111
Gen-Tie Line - 2015	220
Total	5,678
Total Amortized Construction (30 Years)	189

Operations

	Total GHG Emissions (MT CO_2e)
Off-Road Equipment	49.53
On-Road Vehicles	106.93
Gen-Tie Line	8.24
Total Off-Road Equipment/On-Road Vehicles	164.70
Electricity	346.26
Water	6.64
Waste Water	0.35
Total	518
Total Amortized Construction	189
Total (Operational + Amortized Construction)	707

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

Project Name: Rugged - Grading - Trenching - Electrical Transmission - Tracker Installation

Project Location: South Coast AQMD

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2014 TOTALS (tons/year unmitigated)	1.24	10.19	4.97	0.00	10.00	0.42	10.42	2.09	0.39	2.47	1,515.86
2014 TOTALS (tons/year mitigated)	1.24	10.19	4.97	0.00	1.10	0.42	1.52	0.23	0.39	0.62	1,515.86
Percent Reduction	0.00	0.00	0.00	0.00	88.99	0.00	85.41	88.97	0.00	75.11	0.00
2015 TOTALS (tons/year unmitigated)	1.04	8.17	4.20	0.00	0.00	0.33	0.33	0.00	0.31	0.31	1,410.59
2015 TOTALS (tons/year mitigated)	1.04	8.17	4.20	0.00	0.00	0.33	0.33	0.00	0.31	0.31	1,410.59
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

2014	1.24	10.19	4.97	0.00	10.00	0.42	10.42	2.09	0.39	2.47	1,515.86
Fine Grading 03/01/2014-06/30/2014	0.40	3.27	1.66	0.00	10.00	0.14	10.14	2.09	0.13	2.22	439.57
Fine Grading Dust	0.00	0.00	0.00	0.00	10.00	0.00	10.00	2.09	0.00	2.09	0.00
Fine Grading Off Road Diesel	0.37	3.02	1.49	0.00	0.00	0.13	0.13	0.00	0.12	0.12	374.24
Fine Grading On Road Diesel	0.02	0.24	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	53.30
Fine Grading Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.03
Building 07/01/2014-08/31/2015	0.33	2.43	1.11	0.00	0.00	0.10	0.10	0.00	0.09	0.09	385.35
Building Off Road Diesel	0.33	2.43	1.11	0.00	0.00	0.10	0.10	0.00	0.09	0.09	385.35
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 07/01/2014-08/31/2015	0.52	4.49	2.20	0.00	0.00	0.18	0.19	0.00	0.17	0.17	690.95
Trenching Off Road Diesel	0.52	4.49	2.06	0.00	0.00	0.18	0.18	0.00	0.17	0.17	668.38
Trenching Worker Trips	0.00	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.56
2015	1.04	8.17	4.20	0.00	0.00	0.33	0.33	0.00	0.31	0.31	1,410.59
Building 07/01/2014-08/31/2015	0.40	2.86	1.41	0.00	0.00	0.11	0.11	0.00	0.10	0.10	505.04
Building Off Road Diesel	0.40	2.86	1.41	0.00	0.00	0.11	0.11	0.00	0.10	0.10	505.04
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 07/01/2014-08/31/2015	0.64	5.31	2.79	0.00	0.00	0.22	0.22	0.00	0.20	0.20	905.56
Trenching Off Road Diesel	0.63	5.30	2.62	0.00	0.00	0.22	0.22	0.00	0.20	0.20	875.99
Trenching Worker Trips	0.00	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.57

Phase Assumptions

Phase: Fine Grading 3/1/2014 - 6/30/2014 - Default Fine Site Grading/Excavation Description

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Total Acres Disturbed: 455

Maximum Daily Acreage Disturbed: 7

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 1376.93 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 292.47

Off-Road Equipment:

1 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 7/1/2014 - 8/31/2015 - Default Trenching Description

Off-Road Equipment:

1 Bore/Drill Rigs (291 hp) operating at a 0.75 load factor for 8 hours per day

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

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

1 Generator Sets (549 hp) operating at a 0.74 load factor for 8 hours per day

1 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

2 Trenchers (63 hp) operating at a 0.75 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 7/1/2014 - 8/31/2015 - Default Building Construction

Off-Road Equipment:

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

2 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day

3 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

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1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

2 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day

1 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2014	1.24	10.19	4.97	0.00	1.10	0.42	1.52	0.23	0.39	0.62	1,515.86
Fine Grading 03/01/2014-06/30/2014	0.40	3.27	1.66	0.00	1.10	0.14	1.24	0.23	0.13	0.36	439.57
Fine Grading Dust	0.00	0.00	0.00	0.00	1.10	0.00	1.10	0.23	0.00	0.23	0.00
Fine Grading Off Road Diesel	0.37	3.02	1.49	0.00	0.00	0.13	0.13	0.00	0.12	0.12	374.24
Fine Grading On Road Diesel	0.02	0.24	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	53.30
Fine Grading Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.03
Building 07/01/2014-08/31/2015	0.33	2.43	1.11	0.00	0.00	0.10	0.10	0.00	0.09	0.09	385.35
Building Off Road Diesel	0.33	2.43	1.11	0.00	0.00	0.10	0.10	0.00	0.09	0.09	385.35
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 07/01/2014-08/31/2015	0.52	4.49	2.20	0.00	0.00	0.18	0.19	0.00	0.17	0.17	690.95
Trenching Off Road Diesel	0.52	4.49	2.06	0.00	0.00	0.18	0.18	0.00	0.17	0.17	668.38
Trenching Worker Trips	0.00	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.56

2015	1.04	8.17	4.20	0.00	0.00	0.33	0.33	0.00	0.31	0.31	1,410.59
Building 07/01/2014-08/31/2015	0.40	2.86	1.41	0.00	0.00	0.11	0.11	0.00	0.10	0.10	505.04
Building Off Road Diesel	0.40	2.86	1.41	0.00	0.00	0.11	0.11	0.00	0.10	0.10	505.04
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trenching 07/01/2014-08/31/2015	0.64	5.31	2.79	0.00	0.00	0.22	0.22	0.00	0.20	0.20	905.56
Trenching Off Road Diesel	0.63	5.30	2.62	0.00	0.00	0.22	0.22	0.00	0.20	0.20	875.99
Trenching Worker Trips	0.00	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.57

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 3/1/2014 - 6/30/2014 - Default Fine Site Grading/Excavation Description

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

Project Name: Rugged - Building Construction

Project Location: South Coast AQMD

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2014 TOTALS (tons/year unmitigated)	0.20	1.40	0.65	0.00	0.00	0.06	0.06	0.00	0.05	0.05	222.43
2015 TOTALS (tons/year unmitigated)	0.23	0.61	0.31	0.00	0.00	0.02	0.02	0.00	0.02	0.02	108.04

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

2014	0.20	1.40	0.65	0.00	0.00	0.06	0.06	0.00	0.05	0.05	222.43
Building 07/01/2014-03/31/2015	0.20	1.40	0.65	0.00	0.00	0.06	0.06	0.00	0.05	0.05	222.43
Building Off Road Diesel	0.20	1.40	0.65	0.00	0.00	0.06	0.06	0.00	0.05	0.05	222.43
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015	0.23	0.61	0.31	0.00	0.00	0.02	0.02	0.00	0.02	0.02	108.04
Building 07/01/2014-03/31/2015	0.09	0.61	0.31	0.00	0.00	0.02	0.02	0.00	0.02	0.02	107.84
Building Off Road Diesel	0.09	0.61	0.31	0.00	0.00	0.02	0.02	0.00	0.02	0.02	107.84
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 03/01/2015-03/31/2015	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
Architectural Coating	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20

Phase Assumptions

Phase: Building Construction 7/1/2014 - 3/31/2015 - Default Building Construction

Off-Road Equipment:

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

1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day

1 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day

1 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

Phase: Architectural Coating 3/1/2015 - 3/31/2015 - Type Your Description Here

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

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Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

Construction Related Mitigation Measures

Road Construction Emissions Model, Version 6.3.2

Emission Estimates for -> Rugged - Service & Access Roads Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	3.2	14.2	27.3	1.1	1.1	-	1.0	1.0	-	3,154.3
Grading/Excavation	2.7	14.7	21.9	1.2	1.2	-	1.0	1.0	-	2,876.2
Drainage/Utilities/Sub-Grade	1.4	6.7	9.7	0.6	0.6	-	0.6	0.6	-	1,167.7
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (pounds/day)	3.2	14.7	27.3	1.2	1.2	-	1.0	1.0	-	3,154.3
Total (tons/construction project)	0.5	2.4	3.7	0.2	0.2	-	0.2	0.2	-	483.6

Notes:

Project Start Year ->	2014
Project Length (months) ->	18
Total Project Area (acres) ->	162
Maximum Area Disturbed/Day (acres) ->	7
Total Soil Imported/Exported (yd^3/day)->	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Rugged - Service & Access Roads Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	1.4	6.4	12.4	0.5	0.5	-	0.5	0.5	-	1,433.8
Grading/Excavation	1.2	6.7	10.0	0.5	0.5	-	0.5	0.5	-	1,307.4
Drainage/Utilities/Sub-Grade	0.6	3.1	4.4	0.3	0.3	-	0.3	0.3	-	530.8
Paving	-	-	-	-	-	-	-	-	-	-
Maximum (kilograms/day)	1.4	6.7	12.4	0.5	0.5	-	0.5	0.5	-	1,433.8
Total (megagrams/construction project)	0.4	2.2	3.4	0.2	0.2	-	0.2	0.2	-	438.6

Notes:

Project Start Year ->	2014
Project Length (months) ->	18
Total Project Area (hectares) ->	66
Maximum Area Disturbed/Day (hectares) ->	3
Total Soil Imported/Exported (meters ^{3}/day)->	0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model

Version 6.3.2

Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a
yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C25.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type		
Project Name	ugged - Service & Access Roads	
Construction Start Year	2014	Enter a Year between 2005 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	18.0	months
Predominant Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	67	miles
Total Project Area	162.4	acres
Maximum Area Disturbed/Day	7.0	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported		yd^3/day
Soil Exported		yd^3/day
Average Truck Capacity	20.0	yd^3 (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months	2005	%	2006	%	2007	%
Grubbing/Land Clearing	3.00	1.80	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	8.00	7.20	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	7.00	6.30	0.00	0.00	0.00	0.00	0.00	0.00
Paving	0.00	2.70	0.00	0.00	0.00	0.00	0.00	0.00
Totals	18.00	18.00						

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions

User Input	User Override of Soil Hauling Defaults	Default Values
Miles/round trip		30
Round trips/day		0
Vehicle miles traveled/day (calculated)		0

Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)	0.76	9.04	4.74	0.36	0.29	1880.47
Emission rate (grams/trip)	9.63	7.32	157.57	0.01	0.01	188.75
Pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
Tons per contruction period	0.00	0.00	0.00	0.00	0.00	0.00

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions

	User Override of Worker Commute Default Values	Default Values
Miles/ one-way trip		20
One-way trips/day		2
No. of employees: Grubbing/Land Clearing	0.00	174
No. of employees: Grading/Excavation	0.00	177
No. of employees: Drainage/Utilities/Sub-Grade	0.00	175
No. of employees: Paving	0.00	176

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.104	0.189	1.990	0.033	0.018	426.680
Emission rate - Grading/Excavation (grams/mile)	0.104	0.189	1.990	0.033	0.018	426.680
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.095	0.172	1.826	0.021	0.018	426.491
Emission rate - Paving (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Grubbing/Land Clearing (grams/trip)	0.687	0.289	6.716	0.140	0.013	193.100
Emission rate - Grading/Excavation (grams/trip)	0.687	0.289	6.716	0.140	0.013	193.100
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.639	0.268	6.242	0.140	0.013	193.383
Emission rate - Paving (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Grubbing/Land Clearing	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Grub/Land Clear	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Grading/Excavation	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Grading/Excavation	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Drainage/Utilities/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Drain/Util/Sub-Grade	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Paving	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Paving	0.000	0.000	0.000	0.000	0.000	0.000
tons per construction period	0.000	0.000	0.000	0.000	0.000	0.000

Water truck default values can be overriden in cells C91 through C93 and E91 through E93.

Water Truck Emissions

	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust		2		80
Grading/Excavation - Exhaust		2		80
Drainage/Utilities/Subgrade		1		40

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.76	9.04	4.74	0.36	0.29	1880.47
Emission rate - Grading/Excavation (grams/mile)	0.76	9.04	4.74	0.36	0.29	1880.47
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.70	8.17	4.26	0.32	0.26	1884.38
Pounds per day - Grubbing/Land Clearing	0.27	3.19	1.67	0.13	0.10	662.72
Tons per const. Period - Grub/Land Clear	0.02	0.28	0.15	0.01	0.01	58.32
Pound per day - Grading/Excavation	0.27	3.19	1.67	0.13	0.10	662.72
Tons per const. Period - Grading/Excavation	0.02	0.28	0.15	0.01	0.01	58.32
Pound per day - Drainage/Utilities/Subgrade	0.06	0.72	0.38	0.03	0.02	166.02
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.06	0.03	0.00	0.00	12.78

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust

	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing	0.00	7	0.0	0.0	0.0	0.0
Fugitive Dust - Grading/Excavation	0.00	7	0.0	0.0	0.0	0.0
Fugitive Dust - Drainage/Utilities/Subgrade	0.00	7	0.0	0.0	0.0	0.0

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
2.00	2	Rubber Tired Dozers	2.89	12.48	24.07	0.99	0.91	2491.58
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	134	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	2.9	12.5	24.1	1.0	0.9	2491.6
	Grubbing/Land Clearing	tons per phase	0.1	0.4	0.8	0.0	0.0	82.2

Grading/Excavation Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
	2	Graders	1.45	7.67	11.02	0.61	0.56	1295.74
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00

		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
	2	Rubber Tired Loaders	1.01	5.41	7.71	0.42	0.39	917.73
0.00	1	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	134	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	2.5	13.1	18.7	1.0	0.9	2213.5
	Grading	tons per phase	0.2	1.2	1.6	0.1	0.1	194.8

Drainage/Utilities/Subgrade	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
	1	Graders	0.69	3.83	5.07	0.28	0.26	647.87
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	134	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
1.00	2	Trenchers	0.63	2.51	3.89	0.33	0.30	353.84

		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	1.3	6.3	9.0	0.6	0.6	1001.7
	Drainage	tons per phase	0.1	0.5	0.7	0.0	0.0	77.1

Paving	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Pavers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
	3	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	134	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Paving	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0
Total Emissions all Phases (tons per construction period) =>			0.4	2.1	3.1	0.2	0.2	354.1

Equipment default values for horsepower, load factor, and hours/day can be overridden in cells C285 through C317, E285 through E317, and G285 through G317.

Equipment		Default Values Horsepower		Default Values Load Factor		Default Values Hours/day
Aerial Lifts		60		0.46		8
Air Compressors		106		0.48		8
Bore/Drill Rigs		291		0.75		8
Cement and Mortar Mixers		10		0.56		8
Concrete/Industrial Saws		19		0.73		8
Cranes		399		0.43		8
Crushing/Proc. Equipment		142		0.78		8
Excavators		168		0.57		8

Forklifts		145		0.30		8
Generator Sets		549		0.74		8
Graders		174		0.61		8
Off-Highway Tractors		267		0.65		8
Off-Highway Trucks		479		0.57		8
Other Construction Equipment		75		0.62		8
Other General Industrial Equipment		238		0.51		8
Other Material Handling Equipment		191		0.59		8
Pavers		100		0.62		8
Paving Equipment		104		0.53		8
Plate Compactors		8		0.43		8
Pressure Washers		1		0.60		8
Pumps		53		0.74		8
Rollers		95		0.56		8
Rough Terrain Forklifts		93		0.60		8
Rubber Tired Dozers		357		0.59		8
Rubber Tired Loaders		157		0.54		8
Scrapers		313		0.72		8
Signal Boards		20		0.78		8
Skid Steer Loaders		44		0.55		8
Surfacing Equipment		362		0.45		8
Sweepers/Scrubbers		91		0.68		8
Tractors/Loaders/Backhoes		108		0.55		8
Trenchers		63		0.75		8
Welders		45		0.45		8

0

END OF DATA ENTRY SHEET

Total Estimated Water for Temporary Project Construction					
Activity	**Time Frame (workdays)[1]**	**Water Use (gallons)**	**Acres**	**Total Estimated Water Demand (gallons)**	**Total Estimated Water Demand (acre-feet)**
Site preparation (clearing, grading)[2]	40	52,400	428	22,427,200	68.83
Application of Water/Soil Binding Agent[3]	260	3,300	428	1,412,400	4.33
Total Construction Water				**23,839,600**	**73.16**

1. Assumes 20 workdays per month
2. Assumes 0.160 acre-feet of water per acre (ac-ft/ac) would be used for site preparation (Project Description)
3. Assumes 0.01 acre-feet (3,300 gallons) of water application per acre (Project Description)

Rugged GHG Emission From Construction Water Usage		
Energy Factor for Outdoor water use for Southern CA (kWh/MG) [1]	**MWh**	**Emission Factor CO_2 [2] (lb/MWh)**
11,110	264.86	919.64
CH_4 [2]	**N_2O[2] (lb/MWh)**	**Total CO_2e**
0.029	0.01	110.92

1- CEC. 2006 (December).Refining Estimates of Water-Related Energy Use in California prepared by Navigant Consulting, Inc.

2 -Emission factor: LGOP 2010 V1.1 Table G.7 California Grid Average Electricity Emission

Gen-Tie Line - Emissions Summary
Construction

	Total Annual Emissions (metric tons/year)
	CO2e
Site Access Roads	
Pole Installation	
Conductor Installation	
Maximum Daily	
Total	220
Total Amortized Construction (30 Years)	7

Operations

	Total Annual Emissions (metric tons/year)
	CO2e
On-Road Emissions	8
Total	8
Total Amortized Construction	7
Total (Operational + Amortized Construction)	16

Gen-Tie Line - Off-Road Construction/Worker Commutes

Emission Estimates for -> Rugged - Gen-Tie Line Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
	-	-	-	-	-	-	-	-	-	-
Site Access Roads	9.6	45.1	73.3	26.1	3.3	22.8	7.8	3.1	4.7	9,711.7
Pole Installation	4.4	19.7	30.8	24.1	1.4	22.8	6.0	1.2	4.7	7,083.2
Conductor Installation	1.8	7.6	15.3	0.6	0.6	-	0.5	0.5	-	2,490.6
Maximum (pounds/day)	9.6	45.1	73.3	26.1	3.3	22.8	7.8	3.1	4.7	9,711.7
Total (tons/construction project)	0.1	0.5	0.9	0.5	0.0	0.5	0.1	0.0	0.1	158.7

Notes:
Project Start Year -> 2015
Project Length (months) -> 3
Total Project Area (acres) -> 9
Maximum Area Disturbed/Day (acres) -> 2
Total Soil Imported/Exported (yd^3/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in

Emission Estimates for -> Rugged - Gen-Tie Line Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
	-	-	-	-	-	-	-	-	-	-
Site Access Roads	4.3	20.5	33.3	11.9	1.5	10.3	3.5	1.4	2.2	4,414.4
Pole Installation	2.0	9.0	14.0	11.0	0.6	10.3	2.7	0.6	2.2	3,219.7
Conductor Installation	0.8	3.4	7.0	0.3	0.3	-	0.2	0.2	-	1,132.1
Maximum (kilograms/day)	4.3	20.5	33.3	11.9	1.5	10.3	3.5	1.4	2.2	4,414.4
Total (megagrams/construction project)	0.1	0.5	0.8	0.5	0.0	0.4	0.1	0.0	0.1	144.0

Notes:
Project Start Year -> 2015
Project Length (months) -> 3
Total Project Area (hectares) -> 4
Maximum Area Disturbed/Day (hectares) -> 1
Total Soil Imported/Exported ($meters^3$/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.
Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in

Source: Road Construction Emissions Model, Version 6.3.2

Road Construction Emissions Model

Version 6.3.2

Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a
yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C25.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	Rugged - Gen-Tie Line	
Construction Start Year	2015	Enter a Year between 2005 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	2.5	months
Predominant Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	3	miles
Total Project Area	9.1	acres
Maximum Area Disturbed/Day	2.3	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported		yd^3/day
Soil Exported		yd^3/day
Average Truck Capacity	20.0	yd^3 (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program Calculated Months	2005	%	2006	%	2007	%
Grubbing/Land Clearing		0.25	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.50	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	1.00	0.88	0.00	0.00	0.00	0.00	0.00	0.00
Paving	1.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00
Totals	2.50	2.50						

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions

User Input	User Override of Soil Hauling Defaults	Default Values
Miles/round trip		30
Round trips/day		0
Vehicle miles traveled/day (calculated)		0

Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)	0.69	8.02	4.18	0.32	0.26	1885.03
Emission rate (grams/trip)	9.02	7.09	144.56	0.01	0.01	179.14
Pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
Tons per contruction period	0.00	0.00	0.00	0.00	0.00	0.00

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions

	User Override of Worker Commute Default Values	Default Values
Miles/ one-way trip	16.80	20
One-way trips/day		2
No. of employees: Grubbing/Land Clearing		10
No. of employees: Grading/Excavation		13
No. of employees: Drainage/Utilities/Sub-Grade		13
No. of employees: Paving		11

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Grading/Excavation (grams/mile)	0.094	0.169	1.799	0.033	0.018	426.460
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.094	0.169	1.799	0.033	0.018	426.460
Emission rate - Paving (grams/mile)	0.094	0.169	1.799	0.033	0.018	426.460
Emission rate - Grubbing/Land Clearing (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Grading/Excavation (grams/trip)	0.631	0.264	6.163	0.140	0.013	193.430
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.631	0.264	6.163	0.140	0.013	193.430
Emission rate - Paving (grams/trip)	0.631	0.264	6.163	0.140	0.013	193.430
Pounds per day - Grubbing/Land Clearing	0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Grub/Land Clear	0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Grading/Excavation	0.125	0.148	1.874	0.037	0.014	332.660
Tons per const. Period - Grading/Excavation	0.001	0.001	0.010	0.000	0.000	1.830
Pounds per day - Drainage/Utilities/Sub-Grade	0.125	0.148	1.874	0.037	0.014	332.660
Tons per const. Period - Drain/Util/Sub-Grade	0.001	0.002	0.021	0.000	0.000	3.659
Pounds per day - Paving	0.134	0.148	1.874	0.037	0.014	372.113
Tons per const. Period - Paving	0.001	0.002	0.021	0.000	0.000	4.093
tons per construction period	0.004	0.004	0.052	0.001	0.000	9.582

Water truck default values can be overriden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of Default # Water Trucks	Program Estimate of Number of Water Trucks	User Override of Truck Miles Traveled/Day	Default Values Miles Traveled/Day
Grubbing/Land Clearing - Exhaust		1		40
Grading/Excavation - Exhaust		1		40
Drainage/Utilities/Subgrade		1		40

	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Emission rate - Grading/Excavation (grams/mile)	0.69	8.02	4.18	0.32	0.26	1885.03
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.69	8.02	4.18	0.32	0.26	1885.03
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Grading/Excavation	0.06	0.71	0.37	0.03	0.02	166.08
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.91
Pound per day - Drainage/Utilities/Subgrade	0.06	0.71	0.37	0.03	0.02	166.08
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.01	0.00	0.00	0.00	1.83

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing		0	0.0	0.0	0.0	0.0
Fugitive Dust - Grading/Excavation		2.275	22.8	0.3	4.7	0.1
Fugitive Dust - Drainage/Utilities/Subgrade		2.275	22.8	0.2	4.7	0.0

Off-Road Equipment Emissions

Grubbing/Land Clearing	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
	1	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
	1	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
	6	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	0.0	0.0	0.0	0.0	0.0	0.0
	Grubbing/Land Clearing	tons per phase	0.0	0.0	0.0	0.0	0.0	0.0

Grading/Excavation	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
3.00	1	Excavators	1.54	9.74	10.87	0.59	0.55	1642.09
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
	1	Graders	0.68	3.83	5.00	0.28	0.25	647.87
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Off-Highway Trucks	1.12	3.41	8.13	0.29	0.27	1559.66
	0	Other Construction Equipment	0.07	0.42	0.49	0.04	0.03	65.47
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Plate Compactors	0.02	0.09	0.11	0.00	0.00	14.83
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Rollers	0.44	2.03	2.80	0.23	0.21	299.86
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
4.00		Rubber Tired Dozers	5.51	23.37	45.06	1.85	1.70	4983.15
0.00	1	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	6	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	9.4	42.9	72.4	3.3	3.0	9212.9
	Grading	tons per phase	0.1	0.2	0.4	0.0	0.0	50.7

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	CO2 pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
2.00		Bore/Drill Rigs	1.18	5.81	8.11	0.25	0.23	3283.48
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Cranes	0.57	1.91	4.86	0.18	0.16	739.64
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
	1	Graders	0.68	3.83	5.00	0.28	0.25	647.87
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
1.00		Off-Highway Trucks	1.12	3.41	8.13	0.29	0.27	1559.66
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	6	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
	1	Trenchers	0.63	2.51	3.85	0.32	0.30	353.84
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	4.2	17.5	29.9	1.3	1.2	6584.5
	Drainage	tons per phase	0.0	0.2	0.3	0.0	0.0	72.4

Paving	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5	CO2
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
8.00		Aerial Lifts	0.30	1.59	2.15	0.16	0.15	256.60
		Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00
3.00		Other General Industrial Equipment	1.40	4.08	13.03	0.41	0.38	1861.89
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Pavers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1	Rollers	0.00	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00	0.00
0.00	6	Signal Boards	0.00	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	1.7	5.7	15.2	0.6	0.5	2118.5
	Paving	tons per phase	0.0	0.1	0.2	0.0	0.0	23.3
Total Emissions all Phases (tons per construction period) =>			0.1	0.5	0.9	0.0	0.0	146.4

Equipment default values for horsepower, load factor, and hours/day can be overridden in cells C285 through C317, E285 through E317, and G285 through G317.

Equipment		Default Values Horsepower		Default Values Load Factor		Default Values Hours/day
Aerial Lifts		60		0.46	2.00	8
Air Compressors		106		0.48		8
Bore/Drill Rigs		291		0.75		8
Cement and Mortar Mixers		10		0.56		8
Concrete/Industrial Saws		19		0.73		8
Cranes		399		0.43		8
Crushing/Proc. Equipment		142		0.78		8
Excavators		168		0.57		8
Forklifts		145		0.30		8
Generator Sets		549		0.74		8
Graders		174		0.61		8
Off-Highway Tractors		267		0.65		8
Off-Highway Trucks		479		0.57		8
Other Construction Equipment		75		0.62		8
Other General Industrial Equipment		238		0.51		8
Other Material Handling Equipment		191		0.59		8
Pavers		100		0.62		8
Paving Equipment		104		0.53		8
Plate Compactors		8		0.43		8
Pressure Washers		1		0.60		8
Pumps		53		0.74		8
Rollers		95		0.56		8
Rough Terrain Forklifts		93		0.60		8
Rubber Tired Dozers		357		0.59		8
Rubber Tired Loaders		157		0.54		8
Scrapers		313		0.72		8
Signal Boards		20		0.78		8
Skid Steer Loaders		44		0.55		8
Surfacing Equipment		362		0.45		8
Sweepers/Scrubbers		91		0.68		8
Tractors/Loaders/Backhoes		108		0.55		8
Trenchers		63		0.75		8
Welders		45		0.45		8

Gen-Tie Line
On-Road Construction Emissions

					Total Emissions (tons)			
	Total Daily Round Trips	Distance	Average Daily Mileage	Total Mileage	CO_2	CH_4	N_2O	Total GHG Emissions (Metric Tons)
Pole Installation	8	134	1,072	21,440	41	0.00012	0.00011	37
Concrete Trucks	16	70	1,120	22,400	42	0.00013	0.00012	39
Total			**2,192**	**43,840**	**83.17**	**0.00**	**0.00**	**75.75**

Notes:
Material delivery for pole installation assumes 67 miles per trip from San Diego to the project site
Concrete trucks are assumed to travel approximately 35 miles from Alpine to the project site
Emission factors from EMFAC 2011 for San Diego County

Gen-Tie Line - Operational Emissions
Heavy-Duty Vehicles

					Total Emissions (tons)			
	Total Trips	Distance	Average Daily Mileage	Total Mileage	CO_2	CH_4	N_2O	Total GHG Emissions (Metric
Equipment Repair Vehicles	3	38	228	1,140	2.16	0.00001	0.00001	2

Notes:
Assumes 3 HHDT for equipment repair
Mileage is based on distance from Alpine to the project site (approximately 35 miles) and length of the Gen-Tie line (3 miles)

Light-Duty Vehicles

					Total Emissions (tons)			
	Total Trips	Distance	Average Daily Mileage	Total Mileage	CO_2	CH_4	N_2O	Total GHG Emissions (Metric
Pole Structure Brushing	3	38	228	5,472	2.119	0.0002	0.0002	1.99

Notes:
Assumes 3 worker vehicles, 3 LDA vehicles for pole structure brushing, 3 employee vehicles for herbicide application, and 3 LDA vehicles for equipment repair
Mileage is based on distance from Alpine to the project site (approximately 35 miles) and length of the Gen-Tie line (3 miles)

					Total Emissions (tons)			
	Total Trips	Distance	Average Daily Mileage	Total Mileage	CO_2	CH_4	N_2O	Total GHG Emissions (Metric
Herbicide Application	3	38	228	5,472	2.119	0.0002	0.0002	1.99

Notes:
Assumes 3 worker vehicles, 3 LDA vehicles for pole structure brushing, 3 employee vehicles for herbicide application, and 3 LDA vehicles for equipment repair
Mileage is based on distance from Alpine to the project site (approximately 35 miles) and length of the Gen-Tie line (3 miles)

					Total Emissions (tons)			
	Total Trips	Distance	Average Daily Mileage	Total Mileage	CO_2	CH_4	N_2O	Total GHG Emissions (Metric
Equipment Repair	3	38	228	1,140	0.441	0.0000	0.0000	0.42

Notes:
Assumes 3 worker vehicles, 3 LDA vehicles for pole structure brushing, 3 employee vehicles for herbicide application, and 3 LDA vehicles for equipment repair
Mileage is based on distance from Alpine to the project site (approximately 35 miles) and length of the Gen-Tie line (3 miles)

Helicopter

					Total Emissions (tons)			
	Fuel Consumption Per Hour (gal)	Hours per Day	Days Per Year	Total Hours	CO_2	CH_4	N_2O	Total GHG Emissions (Metric
	15	8	2	16	2.003	0.002	0.000	1.86

Notes:
Helicopter assumed to be a Robinson 44 model with a fuel consumption of 15 gal/hr. U.S. Department of Interior, National Business Center, Aviation Management Directive
Emission factors for fuel consumption from California Climate Action Registry

					Total Emissions (tons)			
Total	Total Trips		Average Daily Mileage	Total Mileage	CO_2	CH_4	N_2O	Total GHG Emissions (Metric
	12		912	13,224	8.85	0.00	0.00	8.24

Rugged Solar Farm - Operational Emissions

Off-Road Equipment

					Total Emissions (tons)			
Equipment	**Equipment Category**	**Number**	**Hours Per Day**	**Total Days**	**CO2**	**CH4**	**NO2**	**Total GHG Emissions (Metric Tons)**
Generators	Generator Sets Composite	2	1	50	54.38	0.00		49.53

Panel Washing

					Total Emissions (tons)			
	Total Trips	**Distance**	**Average Daily Mileage**	**Total Mileage**	**CO_2**	**CH_4**	**N_2O**	**Total GHG Emissions (Metric Tons)**
Water Truck	1	5	10	360	0.68	0.00000	0.00000	0.62

					Total Emissions (tons)			
	Total Trips	**Distance**	**Average Daily Mileage**	**Total Mileage**	**CO_2**	**CH_4**	**N_2O**	**Total GHG Emissions (Metric Tons)**
Satellite Washing Trucks	10	5	100	3,600	1.764	0.0001	0.0001	1.65

Operations

					Total Emissions (tons)			
	Total Trips	**Distance**	**Average Daily Mileage**	**Total Mileage**	**CO_2**	**CH_4**	**N_2O**	**Total GHG Emissions (Metric Tons)**
Worker Vehicles	15	35	1,050	277,200	107.344	0.0087	0.0113	101.03

					Total Emissions (tons)			
	Total Trips	**Distance**	**Average Daily Mileage**	**Total Mileage**	**CO_2**	**CH_4**	**N_2O**	**Total GHG Emissions (Metric Tons)**
Personnel Transport Vehicles	2	5	20	5,280	2.587	0.0002	0.0002	2.42

					Total Emissions (tons)			
	Total Trips	**Distance**	**Average Daily Mileage**	**Total Mileage**	**CO_2**	**CH_4**	**N_2O**	**Total GHG Emissions (Metric Tons)**
Service Trucks	1	5	10	2,640	1.294	0.0001	0.0001	1.21

					Total Emissions (tons)			
Total					**CO_2**	**CH_4**	**N_2O**	**Total GHG Emissions (Metric Tons)**
					168.05	0.01	0.01	156.46

Rugged - Electricity-Related GHG Emissions

Equipment Electricity Assumptions			
Equipment	**Electricity Draw (watts)[1]**	**Assumptions**	**Annual Energy Usage (kWh)**
Per Tracker:			
Tracker Control Unit:	50	The control unit only uses energy during daylight hours	219
Tracker Motor (only one used at a time):	250	Each tracker motor runs for one minute every hour	18
Air Drying Unit:	192	per day and for 10 hours every 3 weeks	103
Total Per Tracker			**341**
Per Building Block:			
Field communications:	300	Operates during daylight hours	1314
Inverters:	100	The Inverter operates at night	438
PV Box Ventilation:	173	Operates during daylight hours	758
Total Per Building Block			**2510**
1 - Equipment energy usage information and assumptions come from Rugged Solar LLC			

Rugged GHG Emission from Electricity Usage				
# of Building Block	**# of CPV units[3]**	**Building Block Annual Energy usage**	**Tracker annual kWh usage**	**Total Annual kWh**
61	3,588	153,094	1,222,109	1,375,203
CO2 Emission Coefficient[1] (lbs/kWh)	**CH4 Emission Coefficient[2] (lbs/kWh)**	**N20 Emission Coefficient[2] (lbs/kWh)**	**Annual Emissions (MT CO2e/yr)**	
0.55014	0.000029	0.000014	346	
1 - Estimated 2020 SDG&E emission factor with 33% renewable energy				
2 - LGOP Table G.7 California Grid Average Electricity Emission Factors (1990-2007)				
3 - From most recent Project Description				

Rugged Operational Water Use	
Dust Suppression	
Number of gallons/acre[1]	1650
Acres[2]	428
Water use/year (gallons)	706,200
Water use/year (acre-feet)	2.17
Panel Washing	
Washes/year	9
Number of Trackers	3,588
Gallons/tracker/wash	24
water use/year (gallons)	775,008
water use/year (acre-feet)	2.38
Total water use (gallons/year)	**1,481,208**
Total water use (acre-feet/year)	**4.55**
1. Based on suppression activities of 3,300 gallons every 2 years 2. Based on constructed acres within the project site. Open space areas are not included in estimates for dust suppression 3. 1 acre-foot = 325,851 gallons	

Rugged GHG Emission From Operational Water Usage		
Energy Factor for Outdoor water use for Southern CA (kWh/MG)[1]	**MWh**	**Emission Factor CO_2 [2] (lb/MWh)**
11,110	16.46	919.64
Emission Factor CH_4 [2] (lb/MWh)	**Emission Factor N_2O[2] (lb/MWh)**	**Total CO_2e Emissions (MT CO_2e/yr)**
0.029	0.01	6.89
1- CEC. 2006 (December).Refining Estimates of Water-Related Energy Use in California prepared by Navigant Consulting, Inc.		
2 -Emission factor: LGOP 2010 V1.1 Table G.7 California Grid Average Electricity Emission Factors (1990-2007)		

Rugged GHG Emissions from Wastewater

Facility/Jurisdiction	Influent Emissions					
	Influent (MGD)	Influent (gal/yr)	Influent BOD* (mg/L)	Influent BOD (kg/yr)	Adjusted BOD Emission Factor (kg CH4/kg BOD)	Influent Emissions (MT CO_2e)
Joint Water Pollution Control Plant/LA County Sanitation District	0.0001954	71,328	439	119	0.12	**0.33**

Effluent Emissions						
Effluent (MGD)	Effluent (gal/yr)	Effluent Nitrogen Content (mg/L)	Effluent Nitrogen Content (kg/yr)	N2O Emissions (kg/yr)	Effluent Emissions (MT CO_2e)	Total Emissions (MT CO2e)
0.0001954	71,328	40	10.80	0	**0.0251**	**0.3522**

* Likely an overestimate as treatment facility takes in industrial waste.

Source: Intergovernmental Panel on Climate Change 2006. IPCC Guidelines for National Greenhouse Gas Inventories; Chapter 6: Wastewater Treatment and Discharge

Rugged GHG Emissions Offset

Maximum Installed Capacity (MW_{DC})	kWh_{AC} per Installed kW_{DC}	Annual Output Output (kWh)	CO_2 Emission Factor (lb/kWh)	CH_4 Emission Factor (lb/kWh)	N_2O Emission Factor (lb/kWh)	Annual GHG Offset
105.235	2,083	219,204,505	1.071	0.000029	0.000014	106,990

Notes:

CO_2 emission factor based on 739.05 lb/MWh in 2008 and

Source:

http://www.sdge.com/sites/default/files/FINAL092610_PowerLabel.pdf

ATTACHMENT D

Dudek, Greenhouse Gas Analysis Technical Report (Tierra del Sol Solar Farm)

Greenhouse Gas Analysis Technical Report
Tierra del Sol Solar Farm Project
Major Use Permit 3300-12-010
Rezone 3600-12-005
Boulevard, San Diego County, California

Project Proponent:

Tierra del Sol LLC
c/o Soitec Solar Development LLC
4250 Executive Square, Suite 770
San Diego, California 92037

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024

DECEMBER 2012

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GLOSSARY OF TERMS AND ACRONYMS

CARB	California Air Resources Board
CEC	California Energy Commission
CO_2	Carbon dioxide
CO_2E	Carbon dioxide equivalent
CH_4	Methane
CEQA	California Environmental Quality Act
EPA	Environmental Protection Agency
kW	Kilowatts
N_2O	Nitrous oxide
NHTSA	National Highway Traffic Safety Administration
MW	Megawatts
SDAPCD	San Diego County Air Pollution Control District

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EXECUTIVE SUMMARY

The proposed Tierra Del Sol Solar Farm Project (Project) would produce up to 60 megawatts (MW) (alternating current) of electricity and would consist of approximately 2,538 concentrating photovoltaic (CPV) trackers on 420 acres in southeastern San Diego County near the unincorporated community of Boulevard, California. As proposed, the project will be developed in two phases. Phase I would include the construction and operation of 45 MW on approximately 330 acres. Phase II would consist of the construction and operation of 15 MW on approximately 90 acres.

The greenhouse gas (GHG) analysis evaluates the potential for significant adverse impacts related to GHG emissions and climate change as a result of the proposed project's construction and operational emissions.

GHG emissions generated by the proposed project associated with construction equipment and vehicles, operations and maintenance vehicular traffic, electrical generation, and water supply were estimated. The amortized annual construction emissions are included in the overall GHG emission estimates. The estimated GHG emissions would be 505 metric tons carbon dioxide equivalent (CO2E) per year. As such, project emissions would not exceed the 900-metric-ton threshold as indicated in the County of San Diego's DPLU Interim Guidance for Greenhouse Gas Analysis – Industrial Use/East Otay Mesa Specific Plan (County of San Diego 2010), which was used as guidance for determining significance of GHG emissions from project implementation.

Based on estimates by the project proponent, the project would generate 2,083 kilowatt-hours alternating current annually per installed kilowatt (based on the direct current capacity of the CPV trackers). This factor reflects the available daylight hours, conversion of direct current to alternating current, and various system losses. Using the installed CPV capacity of 80 MW (80,000 kilowatts) direct current, the project is anticipated to generate 166,640,000 kilowatts per year. Based on reported CO2 emissions per kilowatt-hour for San Diego Gas & Electric 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 potential CO2 reduction would be 1.071 pounds CO2 per kilowatt-hour. Thus, the proposed project would provide a potential reduction of 81,334 metric tons CO2E per year if the electricity generated by the proposed product were to be used instead of electricity generated by fossil-fuel sources. After accounting for the amortized construction and annual operational emissions of 505 metric tons CO2E per year, the net reduction in GHG emissions would be 80,829 metric tons CO2E. This reduction is not considered in the significance determination of the proposed project's GHG emissions but is provided for disclosure purposes.

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1.0 INTRODUCTION

1.1 Purpose of the Report

The purpose of this report is to estimate and evaluate the greenhouse gas (GHG) emission impacts associated with construction and operation of the proposed project and their potential contribution to climate change. Impacts relative to climate change are evaluated based on guidance provided in the County of San Diego's (County's) *DPLU Interim Guidance for Greenhouse Gas Analysis – Industrial Use/East Otay Mesa Specific Plan* (County of San Diego 2010).

1.2 Project Location and Description

Solar Farm

The proposed project is situated south of Tierra Del Sol Road and immediately north of the US/Mexico International Border, approximately 3.5 miles south of SR-94 in the eastern portion of unincorporated San Diego County. Figure 1, Regional Map, shows the project's relationship within San Diego County. Figure 2, Vicinity Map, shows the project's relationship to the surrounding unincorporated community of Boulevard.

The proposed Tierra Del Sol Solar Farm Project (Project) would produce up to 60 megawatts (MW) (alternating current) of solar energy and would consist of approximately 2,538 concentrating photovoltaic (CPV) trackers on 420 acres in southeastern San Diego County near the unincorporated community of Boulevard, California. As proposed, the project will be developed in two phases. Phase I would include the construction and operation of 45 MW (1,919 CPV trackers) on approximately 330 acres. Phase II would consist of the construction and operation of 15 MW (619 CPV trackers) on approximately 90 acres (Figure 3, Preliminary Site Plan). The project includes a Major Use Permit (MUP) to authorize a Major Impact Utility Pursuant to Sections 1350, 2705, and 2926 of the Zoning Ordinance. The project will also require a Rezone to remove Special Area Designator "A" and ensure compliance with Section 5100 of the Zoning Ordinance. An Agricultural Preserve Disestablishment will also be required to develop the project site as proposed.

Individual tracker dimensions are approximately 48 feet across by 25 feet tall. Each CPV Tracker unit would be mounted on a 28-inch steel mast (steel pole), which would be supported by either (i) extending it into the ground up to 20 feet and encasing it in concrete, or (ii) attaching it to a concrete foundation sized to be suitable to adequately support the CPV Tracker based on wind loading and soil conditions at the site. The preferred method would be to set the mast by vibratory pile driving methods depending upon soil conditions.

In its most vertical position and depending on foundation design, the top of each tracker would not exceed 30 feet above grade, and the lower edge would not be less than 1 foot above ground level. In its horizontal "stow" mode (for high winds), each tracker would have a minimum ground clearance of 13 feet 6 inches.

Power from the CPV system in each Building Block would be delivered from each tracker to a conversion station through a 1,000 volt (V) DC underground collection system. The underground 1,000 V DC collection system construction footprint would include a trench of 1 to 2 feet in width and a depth of up to approximately 4 feet. It is anticipated that power from the CPV systems on site would be separated into three 34.5-kilovolt (kV) underground collection circuits, each delivering approximately 20 MW of power to the Project substation.

Each 34.5 kV underground branch circuit associated with Phase I would connect to a 34.5 kV overhead trunk line on the project site for delivery to the Project substation. These two collection circuits for Phase I would be run overhead on an above ground trunk line adjacent to the south side of the Southwest Power Link right of way. This trunk line would be approximately 1.2 miles long and would have two 34.5 kV circuits and deliver a total of 45 MW. The above ground trunk line would utilize steel poles and would be approximately 50-75 feet high and spaced about 300-500 feet apart. The minimum ground clearance of the 34.5 kV lines would be 30 feet. The maximum hole dimensions for steel pole foundations would be 24 inches in diameter and approximately 20 feet deep. Phase 2 will connect to the Project substation entirely via one 34.5 kV underground branch circuit and the underground 34.5 kV collection system construction footprint would include a trench of three to four feet in width and a depth of up to approximately four feet. Base material would be installed in all trenches to (i) ensure adequate drainage, and (ii) to ensure sufficient thermal conductivity and electrical insulating characteristics below and above collection system cables.

The project will include construction of a 34.5/138 kV step-up substation site (located within the northeast corner of the project site and adjacent to the O&M annex site), which would increase the voltage received from the overhead and underground collector system from 34.5 to 138 kV. Switching and transformer equipment as well as a control house and a parking area for utility vehicles would be located within the 3-acre substation site and for security purposes (and to allow for nighttime inspections) lighting would be installed near substation equipment, the control shelter, and on the entrance gates.


Riverside County
San Diego County
Imperial County
Salton Sea
Pacific Ocean
MEXICO
Project Site
Rainbow
Fallbrook
Camp Pendleton North
Bonsall
Camp Pendleton South
Oceanside
Vista
Hidden Meadows
Valley Center
San Marcos
Escondido
Carlsbad
Encinitas
Ramona
San Diego Country Estates
Poway
San Diego
Santee
Lakeside
Alpine
Harbison Canyon
El Cajon
La Mesa
Casa de Oro-Mount Helix
Rancho San Diego
Lemon Grove
Spring Valley
Jamul
National City
Bonita
Chula Vista
Imperial Beach
Borrego Springs
Julian
Pine Valley
Boulevard
Campo
Jacumba
0 5 10 Miles
DUDEK
7123
FIGURE 1
Regional Map
AIR QUALITY ANALYSIS - TIERRA DEL SOL SOLAR FARM

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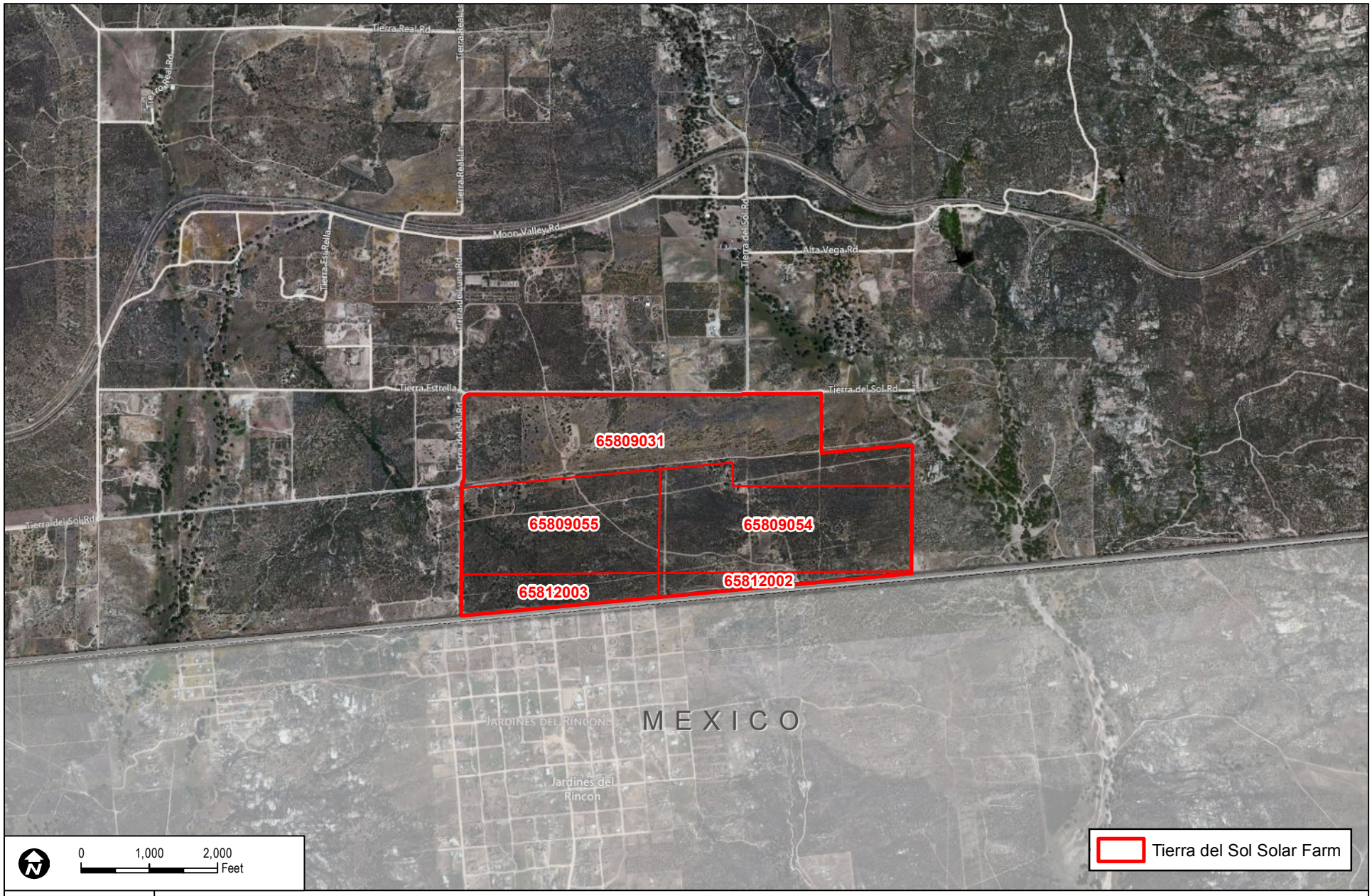

DUDEK

7123

SOURCE: SanGIS 2012; Bing Maps

FIGURE 2

Vicinity Map

AIR QUALITY ANALYSIS - TIERRA DEL SOL SOLAR FARM

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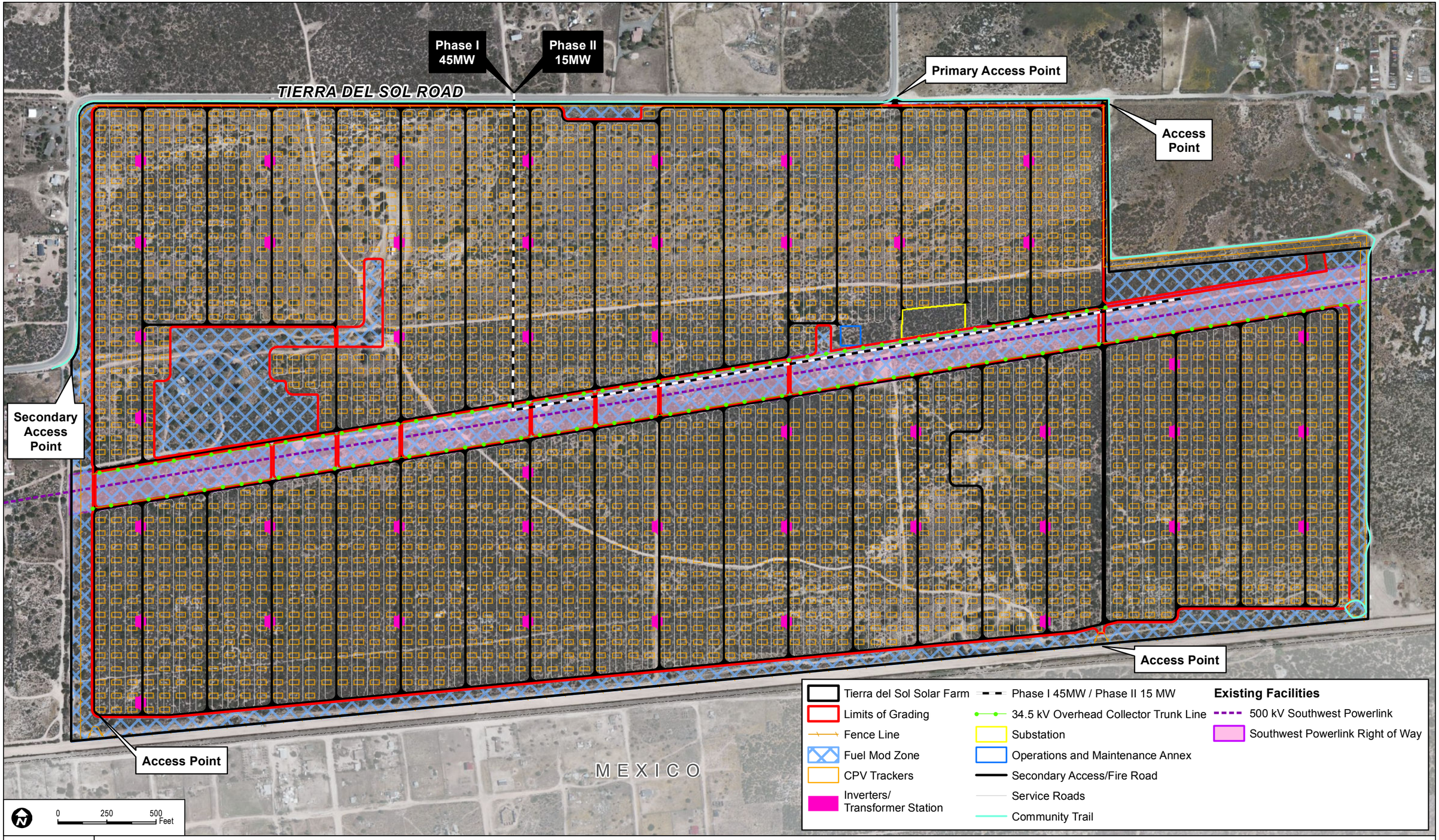

DUDEK

7123

SOURCE: SanGIS 2011; AECOM 2012; Soitec 2012; Bing Maps

FIGURE 3

Preliminary Site Plan

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A backup power and storm positioning system would bring the CPV system into the horizontal position ("storm position") in case the electrical power is cut or if there is an approaching storm that could be damaging to the CPV System. The backup power and storm positioning system would consist of two redundant systems: (1) two independent sets of emergency generators, or (2) two independent sources of utility-supplied power. If emergency generators would be used, they would be nominally rated at 680 kilowatts (kW) each.

A 4-acre operations and maintenance (O&M) annex site would be located adjacent to the substation site and would house operations and maintenance supplies, telecommunications equipment and rest facilities all within a 7,500-square-foot, single-story building. It is anticipated that in-place tracker washing would occur every 6 to 8 weeks by mobile crews who will also be available for dispatch whenever on-site repairs or other maintenance are required. Tracker washing will be undertaken using a tanker truck and smaller "satellite" tracker washing trucks. On-site water storage tanks may be installed to facilitate washing.

Project construction would consist of several phases including site preparation, development of staging areas and site access roads, solar CPV assembly and installation, and construction of electrical transmission facilities. The project would require a total of approximately 352 acres of site preparation activities prior to solar CPV installation, in addition to approximately 66 acres of fire buffer preparation involving non-motorized brush clearing techniques. After site preparation, initial project construction would include the development of the staging and assembly areas, and the grading of site access roads for initial CPV installation. The Project would be constructed over a period of up to approximately 12 months, which includes both Phase I and II.

Gen-Tie Line

The alignment and right-of-way for the interconnection from the proposed project site to the Boulevard rebuilt substation (gen-tie) has not been finalized. An alignment of approximately 6 miles is being considered for development by Tierra del Sol Solar Farm LLC.

The gen-tie alignment would require the setting of new steel transmission poles and conductor installed along the poles to deliver power from the project site to the nearest substation. Access to each steel pole location would be constructed prior to clearing activities. Once access has been established, temporary work area measuring 80 feet x 80 feet around each steel pole location would be cleared of vegetation in order to assist in pole installation.

Each transmission line pole would have a maximum height of 97 feet depending upon location. The span lengths between poles would be dependent on terrain. The cable span lengths would

generally be 650 feet. Given the project alignment is approximately 6 miles it is anticipated the gen-tie would require construction of approximately 49 steel poles.

Several of the pole site locations are accessible from existing dirt access roads; however, new access roads will need to be constructed at some pole locations. Based on a preliminary design, it is anticipated that approximately 1.5 miles of new access roads will be required for construction of the steel poles. The total disturbance associated with access roads, pull sites and staging areas is anticipated to be approximately 18.2 acres.

To install the steel poles for the gen-tie, access roads will need to be constructed to access pole locations where existing access roads are not present. Steel poles will be installed into the excavation which is likely to be around 10 to 20 feet deep, depending on the soils and height of the pole. Holes will be formed via use of a truck-mounted auger and will excavate between 8 to 12 cubic yards of soil. Poles will then be delivered to the site via a flat-bed truck and lifted into place with a crane. The gap between the excavation and steel pole will then be backfilled with concrete.

Conductor wire stringing will be completed following pole installation. The work will be primarily completed from bucket trucks and pull sites located along the right of way. Rollers will be temporarily attached to the lower end of the insulators to allow the conductor to be pulled along the line. A rope will then be pulled onto the rollers from structure to structure. Once the rope is in place, it will be attached to a steel cable and pulled back through the sheaves. The conductor will then be attached and pulled back through the sheaves and into place using conventional tractor-trailer pulling equipment located at pull and tension sites along the line. The pulling through each structure will be done under a controlled tension to keep it elevated and away from obstacles.

Construction of the gen-tie alignment is anticipated to take place over a 5-month period, concluding at approximately the same time as the solar farm. Access road construction will occur for the first month of construction followed by pole foundation excavation and installation for 2 months and conductor stringing for 2 months.

2.0 EXISTING CONDITIONS

2.1 Existing Setting

Project Site

The Project is situated south of Tierra Del Sol Road and immediately north of the United States (U.S.)–Mexico International Border and is traversed by San Diego Gas & Electric's 500 kV Southwest Power Link, which consists of 4 lattice steel towers. The site area lies within the Tierra Del Sol US Geological Survey (USGS) 7.5-minute quadrangle, Township 18 South, Range 6 East, Section 13.

The project site is undeveloped but has remnants of some small structures associated with previous ranching activities located near the western portion and middle of the project site that would be demolished during construction. The entire project site is fenced. The U.S.–Mexico border fence is located adjacent to the southern portion of the project site. The area is accessed through locked gates and dirt roads that traverse the project site. Nearby sensitive receptors include single-family residences located adjacent to the project site.

The project site is located in a desert transition zone dominated by the chaparral plant community. The site was previously utilized for an active ranching operation. The project site is within the Boulevard Community Planning Area of San Diego County's General Plan; the land use designation is Rural with a permitted density of 1 dwelling unit per 80 acres. Existing zoning is General Rural (S92) and Agriculture (A72). The Boulevard planning area requires a minimum lot size of 1 unit per eight acres due to the County's Groundwater Ordinance. The site is located at an elevation of approximately 3,700 to 3,566 feet above mean sea level. The project site is located within San Diego County's draft East County Multiple Species Conservation Program (MSCP) Plan Area. The majority of the project site was previously disturbed by extensive grazing activities; however, chaparral vegetation has become more established which provides moderate value for wildlife species.

2.2 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 (CO2), methane (CH4), nitrous oxide (N2O), ozone (O3), and water vapor (H2O). Some GHGs, such as CO2, CH4, and N2O, occur naturally and are emitted to the atmosphere through natural processes and human activities. Of these gases, CO2 and CH4 are emitted in the greatest quantities from human activities. Emissions of CO2 are largely byproducts of fossil fuel combustion, whereas CH4 results mostly from off-gassing associated with agricultural practices and landfills. Man-made GHGs, which have a much greater heat-absorption potential than CO2, include fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6), and nitrogen trifluoride (NF3), 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 CH4 is 21, and the GWP of N2O is 310. Total GHG emissions are expressed as a function of how much warming would be caused by the same mass of CO2. Thus, GHG gas emissions are typically measured in terms of pounds or tons of "CO2 equivalent" (CO2E).1

2.3 Contributions to Greenhouse Gas Emissions

In 2010, the United States produced 6,822 million metric tons of CO2E (MMT CO2E) (EPA 2012). The primary GHG emitted by human activities in the United States was CO2, representing approximately 84% of total GHG emissions. The largest source of CO2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 94% of the CO2 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 MMT CO2E of GHGs, including emissions resulting from out-of-state electrical generation

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

(CARB 2011). 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 1, GHG Sources in California.

Table 1
GHG Sources in California

Source Category	Annual GHG Emissions (MMT CO_2E)	% of Total
Agriculture	32.13	7.03%
Commercial and residential	42.95	9.40%
Electricity generation	103.58a	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 2011.
Notes: [a]Includes emissions associated with imported electricity, which account for 48.05 $MMTCO_2E$ annually.

2.4 Potential Effects of Human Activity on Climate Change

According to the California Air Resources Board (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 O3 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 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 includes 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 O3 formation by 25% to 85% (depending on the future temperature scenario) in high O3 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).

2.5 Regulatory Setting

2.5.1 Federal Activities

Massachusetts vs. EPA. On April 2, 2007, in *Massachusetts v. EPA*, the Supreme Court directed the U.S. 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. On December 7, 2009, the Administrator signed a final rule with two distinct findings regarding GHGs under Section 202(a) of the Clean Air Act:

- The Administrator found that elevated concentrations of GHGs—CO2, CH4, N2O, HFCs, PFCs, and SF6—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—CO2, CH4, N2O, 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 Clean Air Act.

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 Clean Air Act, and 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 the President Obama's May 2009 announcement of a national program to reduce greenhouse gases 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 million metric tons 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 2011, the EPA and NHTSA approved the first-ever program to reduce GHG emissions and increase fuel efficiency for medium- and heavy-duty vehicles (EPA and NHTSA 2011). Effective November 14, 2011, the CO_2 emissions and fuel efficiency standards of this regulation apply to model year 2014 to 2018 combination tractors (i.e., semi trucks), heavy-duty pickup trucks and vans, and vocational vehicles including transit and school buses. This regulation covers vehicles with a gross vehicle weight rating of 8,500 pounds or greater; medium-duty passenger vehicles are covered by the previous regulation for passenger cars and light-duty trucks. In addition, the EPA has adopted standards to control HFC leakage from air conditioning systems in combination tractors and heavy-duty pickup trucks and vans as well as CH_4 and N_2O standards for heavy-duty engines, pickup trucks, and vans. Phased in through model year 2017, the CO_2 and fuel consumption standards for combination trailers depend on the weight class, cab type, and roof length. The CO_2 standards are expressed in grams CO_2 per ton-mile, while the fuel consumption standards are expressed in gallons per 1,000 ton-miles, each accounting for the carrying capacity of the tractor and trailer. These standards represent an overall fuel consumption and CO_2 emissions reduction of up to 23 percent when compared to a baseline 2010 model year. The CO_2 and fuel consumption standards for heavy-duty pickup trucks and vans are applied as corporate average values and are phased in with increasing stringency from model year 2014 to 2018. The final EPA standards for heavy-duty pickup trucks and vans for 2018 (including a separate standard to control air conditioning system leakage) represent a GHG reduction of 17% for diesel vehicles and 12% for gasoline vehicles compared to a 2010 baseline. Due to the variety of vocational vehicles, many of which involve a body installed on a chassis, the CO_2 and fuel consumption standards are applied to the chassis manufacturers. Like the CO_2 and fuel consumption standards for combination tractors, the standards for vocation vehicles are expressed in grams CO_2 per ton-mile and gallons per 1,000 ton-miles, respectively. Upon final implementation, the EPA standards for vocational vehicles, which apply initially to model year 2014 to 2016 and then to model year 2017 vehicles, are expected to reduce GHG emissions by 6 to 9% compared to a 2010 baseline.

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 CO2 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 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 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 five 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 greenhouse gas reductions and fuel economy improvements that are not captured by the standards test procedures.

2.5.2 State of California

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 Clean Air Act, 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. 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.

AB 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 SF6 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 million metric tons CO2E. 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 CO2 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
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State of California's long term commitment to AB 32 implementation.

SB 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.

SB 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 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.

The Natural Resources Agency adopted the CEQA Guidelines Amendments on December 30, 2009. 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 greenhouse gas emissions on the environment:
    - The extent to which the project may increase or reduce greenhouse gas 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]

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 Game (CDFG), is directed to lead this effort. Pursuant to a Memorandum of Understanding between the CEC and CDFG creating the Renewable Energy Action Team, these agencies will create a "one-stop" process for permitting renewable energy power plants.

SB 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 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

[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).

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.

2.5.3 County of San Diego

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 2012). 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 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 2, GHG Sources in San Diego County, unincorporated San Diego County emitted approximately 4.51 MMT CO_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 MMT CO_2E). Emission sources and emission estimates by sector are shown in Table 2.

Table 2
GHG Sources in San Diego County

Source Category	Annual GHG Emissions (MMT CO_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%

Table 2
GHG Sources in San Diego County

Source Category	Annual GHG Emissions (MMT CO_2E)	% of Total
Energy	1.12	25%
Totals	4.51	100.00%

Source: County of San Diego 2012.

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 (SDCGHGI) 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.

3.0 SIGNIFICANCE CRITERIA AND ANALYSIS METHODOLOGIES

3.1 State of California

The State of California has developed guidelines to address the significance of climate change impacts based on Appendix G of the CEQA Guidelines, which provides guidance that 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 SDAPCD has adopted emission-based thresholds for GHG emissions under CEQA. OPR's 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."

3.2 County Climate Change Analysis Screening Criteria

As indicated in the County's *DPLU Interim Guidance for Greenhouse Gas Analysis – Industrial Use/East Otay Mesa Specific Plan* (County of San Diego 2010), any commercial or light industrial use that exceeds a screening criteria threshold of 900 metric tons of carbon dioxide equivalent (CO_2E)[4] per year would be required to prepare a Climate Change analysis. The 900-metric-ton 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

[4] The CO_2 equivalent for a gas is derived by multiplying the mass of the gas by the associated GWP, such that metric tons CO_2E = (metric tons of a GHG) x (GWP of the GHG). For example, the GWP for CH_4 is 21. This means that emissions of 1 metric ton of methane are equivalent to emissions of 21 metric tons of CO_2.

CAPCOA white paper references a 900-metric-ton guideline as a conservative threshold for requiring further analysis and mitigation. Table 3, Project Size Thresholds, shows the general sizes of projects that would generally require a more detailed climate change analysis based on the 900-metric-ton threshold.

Table 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 DPLU 2010

If a project meets the above size criteria or does not exceed 900 metric tons CO_2e per year, then the climate change impacts would be considered less than significant.

For project's whose emissions exceed the screening threshold, the project needs to demonstrate that it would reduce overall GHG emissions to 33% below business as usual. The 33% reductions should be an overall reduction for operational emissions, construction-related emissions, and vehicular-related GHG emissions (County of San Diego 2010). Construction emissions are to be amortized over a project life of 30 years and added to the operational emissions. Business as usual is defined as the emissions that would be generated prior to AB 32 related emission restrictions.

This approach ensures that new development with the potential to make cumulatively considerable contributions to climate change will incorporate appropriate mitigation measures and not result in a conflict with the goals of AB 32.

4.0 PROJECT IMPACT ANALYSIS

The significance criteria described in Section 3.0 were used to evaluate impacts associated with the construction and operation of the proposed project.

4.1 Significance of Impacts Prior to Mitigation

The project proponent has stated that the project is scheduled to commence construction in August 2013 and would be completed within 1 year for both Phase I and Phase II. Construction phases and associated durations were provided by the project proponent and include the following subphases:

- Site demolition and clearing and road construction (12 weeks, Phase I)
- Underground electric/communications cable installation (17 weeks, Phase I; 9 weeks, Phase II)
- Tracker mast installation (14 weeks, Phase I; 9 weeks, Phase II)
- Tracker installation (21 weeks, Phase I; 9 weeks, Phase II)
- Substation construction (28 weeks, Phase I)
- Operations and maintenance building construction (13 weeks, Phase I).
- Gen-tie (21 weeks, commencing prior to completion of Phase II)

Project completion is anticipated in August 2014. Details of the construction schedule including heavy construction equipment hours of operation and duration, worker trips, and equipment mix are included in Appendix A.

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 project would involve in-place tracker washing that would occur every 6 to 8 weeks by mobile crews who will also be available for dispatch whenever on-site repairs or other maintenance are required. Tracker washing will be undertaken using a tanker truck and smaller "satellite" tracker washing trucks. On-site water storage tanks may be installed to facilitate washing. A 4-acre operations and maintenance (O&M) annex site would be located adjacent to the substation site and would house operations and maintenance 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 are described in more detail below.

Pole or Structure Brushing. Certain poles or structures would require the removal of vegetation to increase aerial patrol effectiveness or to reduce fire danger. Vegetation would be removed using mechanical equipment, such as chainsaws, weed trimmers, rakes, shovels, and brush hooks. A crew of three workers would typically conduct this work. A 100-foot-diameter area around each transmission structure would be required. Poles are typically inspected on an annual basis to determine if vegetation removal around poles is required.

Application of Herbicides. To prevent vegetation from reoccurring around structures, Soitec may use herbicides in accordance with SDG&E's Herbicides and Application Procedures. The utility SDG&E normally utilizes one or more of 16 herbicides. These herbicides are identified in a U.S. Fish and Wildlife Service (USFWS) letter to SDG&E, along with their recommendations. The application of herbicides generally requires one person and takes only minutes to spray around the base of the pole within a radius of approximately 10 feet. The employee would either walk from the nearest access road to apply the herbicide or drive a pick-up truck directly to each pole location as access permits.

Equipment Repair and Replacement. Poles or structures support a variety of equipment, such as conductors, insulators, switches, transformers, lightning arrest devices, line junctions, and other electrical equipment. In order to maintain uniform, adequate, safe, and reliable service, electrical equipment may need to be added, repaired, or replaced during operations. An existing transmission structure may be removed and replaced with a larger/stronger structure at the same location or a nearby location, due to damage or changes in conductor size. Equipment repair or replacement generally requires a crew to gain access to the location of the equipment to be repaired or replaced. The crew normally consists of four people with two to three trucks, a boom or line truck, an aerial-lift truck, and an assist truck. If no vehicle access exists, the crew and material are flown in by helicopter.

Insulator Washing. The 138 kV transmission line would use polymer insulators that do not require washing.

Use of Helicopters. Each electric transmission line is inspected several times a year via helicopter. Helicopters may also be used to deliver equipment, position poles and structures, string lines, and position aerial markers, as required by Federal Aviation Administration regulations.

4.2 Construction GHG Emissions

GHG emissions would be associated with the construction phase of the proposed project (solar farm and gen-tie line) through use of construction equipment and vehicle trips. Emissions of CO2 from off-road equipment used the construction phase of the project were estimated using emission rates derived using CARB's offroad equipment model, OFFROAD2007, available online (http://www.arb.ca.gov/msei/offroad/ offroad.htm). Emissions of all pollutants from on-road trucks and passenger vehicles were estimated using emission factors derived using CARB's motor vehicle emission inventory program, EMFAC2011, available online (http://www.arb.ca.gov/msei/modeling.htm).

Vehicle miles traveled (VMT) for paved road travel by workers are based on default value (16.8 miles one-way) from the URBEMIS 2007, Version 9.2.4, land use and air emission model (Jones & Stokes 2007), and equipment delivery truck VMT are based on 85 mile one-way routes from Rancho Bernardo where equipment deliveries would originate.[5]

The results were adjusted to estimate CH4 and N2O emissions in addition to CO2. The CO2 emissions from off-road equipment and vehicles and delivery trucks, which are assumed to be diesel fueled, were adjusted by a factor derived from the relative CO2, CH4, and N2O for diesel fuel as reported in the California Climate Action Registry's (CCAR) General Reporting Protocol for transportation fuels and the global warming potential for each GHG (CCAR 2009). The CO2 emissions associated with construction worker trips were multiplied by a factor based on the assumption that CO2 represents 95% of the CO2E emissions associated with passenger vehicles (EPA 2005). The results were then converted from annual tons per year to metric tons per year. Table 4, Estimated Construction GHG Emissions, shows the estimated annual GHG construction emissions associated with the proposed project, as well as the 30-year amortized construction emissions.

Table 4
Estimated Construction GHG Emissions (metric tons/year)

Construction Year	CO_2E Emissions
2013	1,267.70
2014	1,395.49
30-year amortized emissions	88.77

Source: OFFROAD2007, EMFAC 2011. See Appendix A for complete results.

[5] VMT = one-way miles × 2 × number of trips

4.3 Operational GHG Emissions

The following section discusses the calculations of GHG emissions resulting from the primary sources of GHGs associated with the operation of the proposed project. Operation of the project would produce GHG emissions associated with worker vehicles, personnel transport vehicles, washing vehicles (heavy-duty diesel water trucks), service trucks, helicopters, emergency generators, electricity consumption, and water supply during operation and maintenance for the solar project. GHG emissions from natural gas use and creation of solid waste are not associated with the proposed project. At the present time, the substation is not expected to include any equipment that uses sulfur hexafluoride, which is a GHG associated with high-voltage switching devices at some substations.

4.3.1 Motor Vehicles

The proposed project would impact air quality through the vehicular traffic generated by operations and maintenance vehicles including worker vehicles, on-site personnel transport vehicles, washing vehicles and a service truck. Worker trip distances for operation and maintenance of the solar farm were conservatively estimated for the model inputs as originating in Alpine (approximately 35 miles one-way). All other operation and maintenance vehicles were assumed to be staged at a location near the project site, resulting in an estimated 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.

Annual CO2 emissions from motor vehicle trips associated with the proposed project were quantified using EMFAC2011. The CO2 emissions from diesel-fueled washing vehicles were adjusted by a factor derived from the relative CO2, CH4, and N2O for diesel fuel as reported in the CCAR's General Reporting Protocol for transportation fuels and the global warming potential for each GHG (CCAR 2009). CH4 and N2O emissions from all other motor vehicles during operation of the project were accounted for by multiplying the estimated CO2 emissions by a factor based on the assumption that CO2 represents 95% of the CO2E emissions associated with passenger vehicles (EPA 2005). As summarized in Table 5, Estimated Operational GHG Emissions, total annual operational GHG emissions from motor vehicles would be 97.65 metric tons CO2E per year. Additional detail regarding these calculations can be found in Appendix A.

4.3.2 Helicopters

Helicopters would be used for surveillance and inspection of the gen-tie line. To best represent helicopter emissions during maintenance and inspection activities, a Robinson 44 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 Robinson 44 model aircraft and the CO_2 emission factor for aviation gasoline as reported in the California Climate Action Registry's (CCAR) *General Reporting Protocol* for transportation fuels (CCAR 2009). The GHG emissions estimate is based on two inspections of the gen-tie line, 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 California Climate Action Registry's (CCAR) *General Reporting Protocol* for transportation fuels and the global warming potential for each GHG (CCAR 2009).

4.3.3 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 one 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 5. Refer to Appendix A for additional information.

4.3.4 Electrical Generation

Annual electricity use for the proposed O&M annex was based upon estimated generation rates for land uses in the San Diego Gas & Electric service area (see Appendix A). 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 San Diego Gas & Electric (see Appendix A). 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 CO2 and to a smaller extent CH4 and N2O. Annual electricity emissions were estimated using the reported CO2 emissions per

kilowatt-hour for San Diego Gas & Electric (SDG&E 2010), which would provide electricity for the project, adjusted to reflect 33% renewable energy in 2020. The contributions of CH4 and N2O for powerplants in California were obtained from the CCAR's General Reporting Protocol (CCAR 2009), which were adjusted for their GWPs. The proposed project would consume an estimated 1,050,306 kilowatt-hours per year, generating approximately 263.61 metric tons CO2E annually as shown in Table 5 (see Appendix A for complete results).

4.3.5 Water Supply

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 washing the CPV trackers was based upon information provided by the project proponent and would result in a water consumption rate of approximately 3.68 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). GHG emissions from electrical generation were calculated as described in Section 4.3.3. As shown in Table 5, annual water use would result in approximately 1.96 metric tons CO_2E per year (see Appendix A).

4.3.6 Summary of GHG Emissions

As shown in Table 5, total annual GHG emissions from construction and operation of the proposed project would be approximately 505 metric tons CO_2E per year.

Table 5
Estimated Operational GHG Emissions (metric tons/year)

Source	CO_2E Emissions
Motor Vehicles	97.65
Helicopters	2.04
Emergency Generators	50.97
Electrical Generation	263.61
Water Supply	1.96
30-year amortized construction emissions	88.77
Total	505.00

Source: EMFAC2011; CCAR 2009; EPA 2005; CEC 2006 . See Appendix A for complete results.

Because the total project GHG emissions would not exceed the County's screening threshold of 900 metric tons CO2E, the impact would be less than significant.

4.4 Project Design Features and Mitigation Measures

No mitigation measures would be required.

4.5 GHG Emission Benefits

In keeping with the renewable enegy target under the Scoping Plan and as required by SB X1 2, the proposed project would provide a source of renewable energy to assist San Diego Gas & Electric achieve the Renewable Portfolio Standard of 33% by 2020. Renewable energy, in turn, potentially offsets GHG emissions generated by fossil-fuel power plants. In 2010, 60% and 4% of San Diego Gas & Electric's portfolio were generated from natural gas and coal, respectively (SDG&E n.d.). Based on estimates by the project proponent, the project would generate 2,083 kilowatt-hours alternating current annually per installed kilowatt (based on the direct current capacity of the CPV trackers). This factor reflects the available daylight hours, conversion of direct current to alternating current, and various system losses. Using the installed CPV capacity of 80 MW (80,000 kilowatts) direct current, the project is anticipated to generate 166,640,000 kilowatts per year. Based on reported CO_2 emissions per kilowatt-hour for San Diego Gas & Electric 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 potential CO_2 reduction would be 1.071 pounds CO_2 per kilowatt-hour. The contributions of CH_4 and N_2O for powerplants in California were obtained from the CCAR's *General Reporting Protocol* (CCAR 2009), which were adjusted for their GWPs. Thus, the proposed project would provide a potential reduction of 81,334 metric tons CO_2E per year if the electricity generated by the proposed product were to be used instead of electricity generated by fossil-fuel sources. After accounting for the amortized construction and annual operational emissions of 745 metric tons CO_2E per year, the net reduction in GHG emissions would be 80,829 metric tons CO_2E. This reduction is not considered in the significance determination of the proposed project's GHG emissions but is provided for disclosure purposes.

4.6 Conclusion

The proposed project's potential effect on global climate change was evaluated, and GHG emissions were estimated. The project is estimated to result in construction and operational GHG emissions of approximately 505 metric tons CO_2E. As such, the proposed project would not exceed the 900-metric-ton threshold as described in the *DPLU Interim Guidance for Greenhouse Gas Analysis – Industrial Use/East Otay Mesa Specific Plan*, and it is therefore not likely to impede the implementation of AB 32. The project would therefore have a less-than-significant impact on climate change.

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APPENDIX A

Greenhouse Gas Emission Calculations

Tierra del Sol Solar Farm Project
GHG Emissions Summary

	CO_2 (tons/yr)	CO_2E (Mtons/yr)
CONSTRUCTION		
2013		
Off-Road Diesel	521.26	477.21
Diesel Trucks	794.65	721.70
Passenger Vehicles	72.05	68.80
Total for 2013	1,387.96	**1,267.70**
2014		
Off-Road Diesel	408.70	374.16
Diesel Trucks	966.53	877.80
Passenger Vehicles	150.30	143.53
Total for 2014	1,525.54	**1,395.49**
Amortized Construction Emissions		*88.77*
OPERATION		
Light-Duty Vehicles	99.37	94.89
Heavy-Duty Diesel Trucks	3.04	2.76
Helicopter	2.20	2.04
Emergency Generators	55.68	50.97
Electrical Generation		263.61
Water Supply		1.96
Total Operational	160.28	**416.23**

CONSTRUCTION

Tierra del Sol Solar Farm Project
Construction Emissions Summary

CO2

Activity	2013 Emissions (tons/yr)		2014 Emissions (tons/yr)
Offroad Emissions			
Site Demolition and Clearing/Road Construction	133.96		--
Underground Electric/Communications Cable Installation	32.22		24.17
Tracker Mast Installation	166.00		128.51
Tracker Installation	19.98		65.44
Substation Construction	122.50		37.78
O&M Building Construction	46.60		—
Gen-Tie Line Construction	—		152.80
OFFROAD ANNUAL TOTAL	**521.26**		**408.70**
Onroad Emissions	**866.70**		**1,116.83**
ANNUAL EMISSIONS	**1,387.96**		**1,525.54**

Tierra del Sol Solar Farm Project
Off Road Equipment Emissions

2013 EMISSIONS

Equipment	# of Units	Hrs/Day	Duration (Days)	Category	2013 Emissions (lb/day) CO2	2013 Emissions (tons/year) CO2
Site Demolition and Clearing/Road Construction						
Tractor/Loader/Backhoes	1	8	60	Off-Road	537.04	16.11
Crawler Tractors	2	8	60	Off-Road	1822.00	54.66
Scrapers	2	4	60	Off-Road	2106.37	63.19
				PHASE SUBTOTAL	**4465.41**	**133.96**
Underground Electric/Communications Cable Installation						
Tractor/Loader/Backhoes	2	6	80	Off-Road	805.56	32.22
				PHASE SUBTOTAL	**805.56**	**32.22**
Tracker Mast Installation						
Skid Steer Loader	1	6	62	Off-Road	181.49	5.63
Bore/Drill Rigs	4	8	62	Off-Road	5173.24	160.37
				PHASE SUBTOTAL	**5354.73**	**166.00**
Tracker Installation						
Cranes	1	8	40	Off-Road	999.10	19.98
				PHASE SUBTOTAL	**999.10**	**19.98**
Substation Construction						
Cranes	1	8	107	Off-Road	999.10	53.45
Aerial Lifts	1	4	107	Off-Road	138.76	7.42
Excavators	1	6	107	Off-Road	717.01	38.36
Forklifts	1	8	107	Off-Road	434.78	23.26
				PHASE SUBTOTAL	**2,289.64**	**122.50**
O&M Building Construction						
Cranes	1	8	65	Off-Road	999.10	32.47
Forklifts	1	8	65	Off-Road	434.78	14.13
				PHASE SUBTOTAL	**1433.87**	**46.60**
					2013 TOTALS	**521.26**

2014 EMISSIONS

Equipment	# of Units	Hrs/Day	Duration (Days)	Category	2014 Emissions (lb/day) CO2	2014 Emissions (tons/year) CO2
Underground Electric/Communications Cable Installation						
Tractor/Loader/Backhoes	2	6	60	Off-Road	805.55	24.17
				PHASE SUBTOTAL	**805.55**	**24.17**
Tracker Mast Installation						
Skid Steer Loader	1	6	48	Off-Road	181.50	4.36
Bore/Drill Rigs	4	8	48	Off-Road	5173.12	124.15
				PHASE SUBTOTAL	**5,354.62**	**128.51**
Tracker Installation						
Cranes	1	8	131	Off-Road	999.10	65.44
				PHASE SUBTOTAL	**999.10**	**65.44**
Substation Construction						
Cranes	1	8	33	Off-Road	999.10	16.49
Aerial Lifts	1	4	33	Off-Road	138.76	2.29
Excavators	1	6	33	Off-Road	717.01	11.83
Forklifts	1	8	33	Off-Road	434.78	7.17
				PHASE SUBTOTAL	**2,289.64**	**37.78**
Gen-Tie Line Construction						
Access Road Construction						
Crawler Tractors	4	8	20	Off-Road	3,644.00	36.44
Excavators	3	8	20	Off-Road	2,868.03	28.68
Graders	1	8	20	Off-Road	1,061.05	10.61
Rollers	1	8	20	Off-Road	535.93	5.36
				PHASE SUBTOTAL	**8,109.01**	**81.09**
Pole Installation						
Bore/Drill Rigs[1]	2	8	40	Off-Road	2,586.56	51.73
Cranes	1	8	40	Off-Road	999.10	19.98
				PHASE SUBTOTAL	**3,585.66**	**71.71**
				Gen-Tie Line Phase Total	**11,694.67**	**152.80**
					2014 TOTALS	**408.70**

Source (Equipment Specs): Soitec. 2012 Tierra del Sol Solar Farm - Construction Schedule and Equipment. May 2012.

1. Assumed bore/drill rig would generate comparable emissions to truck-mounted augar used during pole installation

Tierra del Sol Solar Farm Project
Off-Road Equipment Emission Rates

Equipment	Category	2013 Emission Rates (lb/hr)	2014 Emission Rates (lb/hr)
		CO2	CO2
Site Demolition and Clearing/Road Construction			
Tractor/Loader/Backhoes	Off-Road	67.130	67.129
Crawler Tractors	Off-Road	113.875	113.875
Scrapers	Off-Road	263.297	263.297
Underground Electric/Communications Cable Installation			
Tractor/Loader/Backhoes	Off-Road	67.130	67.129
Tracker Mast Installation			
Skid Steer Loaders	Off-Road	30.248	30.249
Bore/Drill Rigs	Off-Road	161.664	161.660
Tracker Installation			
Cranes	Off-Road	124.887	124.887
Substation Construction			
Cranes	Off-Road	124.887	124.887
Aerial Lifts	Off-Road	34.691	34.691
Excavators	Off-Road	119.501	119.501
Forklifts	Off-Road	54.347	54.347
O&M Building Construction			
Cranes	Off-Road	124.887	124.887
Forklifts	Off-Road	54.347	54.347
Gen-Tie Line Construction			
Crawler Tractors	Off-Road	113.875	113.875
Excavators	Off-Road	119.501	119.501
Graders	Off-Road	—	132.631
Rollers	Off-Road	—	66.991
Bore/Drill Rigs	Off-Road	161.664	161.660
Cranes	Off-Road	124.887	124.887

Source (Emission Factors): OFFROAD2011 - ROG, NOx, PM10; OFFROAD2007 - CO, SOx, CO2.

Tierra del Sol Solar Farm Project
On Road Equipment Emissions

2013 EMISSIONS

Vehicle Type	Trips/Day	No. of Units	Distance (mi)	Duration (days)	Category	2013 Emissions (lb/day) CO2	2013 Emissions (lbs/month) CO2
August							
Worker Vehicles[1]	18		16.8	20	On-Road	270.18	5,403.58
Delivery Trucks[4]	12		85.0	20	On-Road	4,084.17	81,683.46
Water Trucks (On-Site)[2]		2	120.0	20	On-Road	960.98	19,219.64
Water Trucks (Off-Site)[3]	72		11.0	20	On-Road	3,171.24	63,424.80
Dump Trucks[4]		4	60.0	20	On-Road	960.98	19,219.64
September							
Worker Vehicles[1]	68		16.8	20	On-Road	1,020.68	20,413.53
Delivery Trucks[5]	18		85.0	20	On-Road	6,126.26	122,525.19
Water Trucks (On-Site)[2]		2	120.0	20	On-Road	960.98	19,219.64
Water Trucks (Off-Site)[3]	72		11.0	20	On-Road	3,171.24	63,424.80
Dump Trucks[4]		4	60.0	20	On-Road	960.98	19,219.64
Concrete Trucks[6]	20		40.0	20	On-Road	3,203.27	64,065.46
October							
Worker Vehicles[1]	86		16.8	20	On-Road	1,290.86	25,817.12
Delivery Trucks[5]	28		85.0	20	On-Road	9,529.74	190,594.74
Water Trucks (On-Site)[2]		2	120.0	20	On-Road	960.98	19,219.64
Water Trucks (Off-Site)[3]	72		11.0	20	On-Road	3,171.24	63,424.80
Dump Trucks[4]		4	60.0	20	On-Road	960.98	19,219.64
Concrete Trucks[6]	10		40.0	20	On-Road	1,601.64	32,032.73
November							
Worker Vehicles[1]	146		16.8	20	On-Road	2,191.45	43,829.06
Delivery Trucks[5]	50		85.0	20	On-Road	17,017.39	340,347.75
Commissioning Trips[7]	8		16.8	20	On-Road	120.08	2,401.59
Water Trucks		1	60.0	20	On-Road	240.25	4,804.91
Dump Trucks[4]		4	60.0	20	On-Road	960.98	19,219.64
Concrete Trucks[6]	10		40.0	20	On-Road	1,601.64	32,032.73
December							
Worker Vehicles[1]	146		16.8	20	On-Road	2,191.45	43,829.06
Delivery Trucks[5]	50		85.0	20	On-Road	17,017.39	340,347.75
Commissioning Trips[7]	8		16.8	20	On-Road	120.08	2,401.59
Water Trucks		1	60.0	20	On-Road	240.25	4,804.91
Dump Trucks[4]		4	60.0	20	On-Road	960.98	19,219.64
Concrete Trucks[6]	10		40.0	20	On-Road	1,601.64	32,032.73
						TOTAL 2013	**1,733,399.39**

Tierra del Sol Solar Farm Project
On Road Equipment Emissions

2014 EMISSIONS

Vehicle Type	Trips/Day	No. of Units	Distance (mi)	Duration (days)	Category	2014 Emissions (lb/day) CO2	2014 Emissions (lbs/month) CO2
January							
Worker Vehicles[1]	146		16.8	20	On-Road	2,192.24	43,844.75
Delivery Trucks[5]	46		85.0	20	On-Road	14,947.51	298,950.17
Commissioning Trips[7]	8		16.8	20	On-Road	120.12	2,402.45
Water Trucks[2]		1	60.0	20	On-Road	229.37	4,587.47
Dump Trucks[4]		4	60.0	20	On-Road	917.49	18,349.88
Feburary							
Worker Vehicles[1]	146		16.8	20	On-Road	2,192.24	43,844.75
Delivery Trucks[5]	46		85.0	20	On-Road	14,947.51	298,950.17
Commissioning Trips[7]	8		16.8	20	On-Road	120.12	2,402.45
Water Trucks[2]		1	60.0	20	On-Road	229.37	4,587.47
March							
Worker Vehicles[1]	146		16.8	20	On-Road	2,192.24	43,844.75
Delivery Trucks[5]	46		85.0	20	On-Road	14,947.51	298,950.17
Commissioning Trips[7]	8		16.8	20	On-Road	120.12	2,402.45
Water Trucks[2]		1	60.0	20	On-Road	229.37	4,587.47
Gen-Tie Line							
Worker Vehicles[1]	24	12	16.8	20	On-Road	360.37	7,207.36
Delivery Trucks[8]	6	3	67.0	20	On-Road	1,536.80	30,736.05
Water Trucks[9]		3	30.0	20	On-Road	344.06	6,881.21
April							
Worker Vehicles[1]	112		16.8	20	On-Road	1,681.72	33,634.33
Delivery Trucks[5]	28		85.0	20	On-Road	9,098.48	181,969.67
Commissioning Trips[7]	5		16.8	20	On-Road	75.08	1,501.53
Water Trucks[2]		1	60.0	20	On-Road	229.37	4,587.47
Gen-Tie Line							
Worker Vehicles[1]	8	4	16.8	20	On-Road	120.12	2,402.45
Delivery Trucks[8]	8		67.0	20	On-Road	2,049.07	40,981.40
Water Trucks[9]		1	30.0	20	On-Road	114.69	2,293.74
Concrete Trucks[6]	16		40.0	20	On-Road	2,562.62	51,252.37
May							
Worker Vehicles[1]	34		16.8	20	On-Road	510.52	10,210.42
Delivery Trucks[5]	8		85.0	20	On-Road	2,599.57	51,991.33
Water Trucks[2]		1	60.0	20	On-Road	229.37	4,587.47

Tierra del Sol Solar Farm Project
On Road Equipment Emissions

2014 EMISSIONS

Vehicle Type	Trips/Day	No. of Units	Distance (mi)	Duration (days)	Category	2014 Emissions (lb/day) CO2	2014 Emissions (lbs/month) CO2
Gen-Tie Line							
Worker Vehicles[1]	8	4	16.8	20	On-Road	120.12	2,402.45
Delivery Trucks[8]	8		67.0	20	On-Road	2,049.07	40,981.40
Water Trucks[9]		1	30.0	20	On-Road	114.69	2,293.74
Concrete Trucks[6]	16		40.0	20	On-Road	2,562.62	51252.36649
June							
Worker Vehicles[1]	136		16.8	20	On-Road	2,042.08	40,841.69
Delivery Trucks[5]	38		85.0	20	On-Road	12,347.94	246,958.83
Commissioning Trips[7]	8		16.8	20	On-Road	120.12	2,402.45
Water Trucks[2]		1	60.0	20	On-Road	229.37	4,587.47
Gen-Tie Line							
Worker Vehicles[1]	30	15	16.8	20	On-Road	450.46	9,009.20
Bucket Trucks[10]		8	20.0	20	On-Road	611.66	12,233.25
Pull Site Tensioners[11]		3	20.0	20	On-Road	53.63	1,072.52
Water Trucks[9]		1	30.0	20	On-Road	114.69	2,293.74
July							
Worker Vehicles[1]	136		16.8	20	On-Road	2,042.08	40,841.69
Delivery Trucks[5]	38		85.0	20	On-Road	12,347.94	246,958.83
Commissioning Trips[7]	8		16.8	20	On-Road	120.12	2,402.45
Water Trucks[2]		1	60.0	20	On-Road	229.37	4,587.47
Gen-Tie Line							
Worker Vehicles[1]	30	15	16.8	20	On-Road	450.46	9,009.20
Bucket Trucks[10]		8	20.0	20	On-Road	611.66	12,233.25
Pull Site Tensioners[11]		3	20.0	20	On-Road	53.63	1,072.52
Water Trucks[9]		1	30.0	20	On-Road	114.69	2,293.74
						TOTAL 2014	**2,233,669.48**

1. Trips per day - assumes 85% reduction in worker trips due to carpooling
   Employee commute distance - home to work (H-W) rural trip length of 16.8 miles as identified in Appendix D, Table 4.2 of CalEEMod User's Guide for the SDAB/SDAPCD/San Diego County
2. Assumes water trucks will be operating at 15 mph for 8 hours per day during site preparation (120 mi/day), and 4 hours per day following site preparation activities (60 mi/day)
3. Assumes 307,500 gallons/day of water is imported from Jacumba Community Services District (approx. 11 miles) during August, September, and October for site preparation and road construction
4. Assumes dump trucks will be operating at 15 mph for 4 hours per day = 60 mi/day
5. Materials delivery coming from Rancho Bernardo, San Diego
6. Assumes concrete trucks will be coming from Alpine, which is the nearest populated area that could feasibly supply concrete trucks
7. Employee commute distance - home to work (H-W) rural trip length of 16.8 miles as identified in Appendix D, Table 4.2 of CalEEMod User's Guide for the SDAB/SDAPCD/San Diego County
8. Gen-tie materials delivery coming from San Diego
9. Assumes water trucks during gen-tie construction will be operating at 15 mph for 2 hours per day = 30 mi/day
10. Assumes bucket trucks will be operating intermittently at 10 mph for an equivalent of 2 hours per day = 20 mi/day
11. Assumes tensioners will be operating intermittently at 10 mph for an equivalent of 2 hours per day = 20 mi/day

Tierra del Sol Solar Farm Project
EMFAC2011 Modeling Results and Emission Factor Calculations

LDA

CALYR	VMT/1000	Fuel	POLLUTANT	PROCESS	EMISSIONS	BASIS
2013	43117	GAS	ROG	Total	11.423	Day
2013	186	DSL	ROG	Total	0.011	Day
2013	43117	GAS	NOx	Total Ex	9.855	Day
2013	186	DSL	NOx	Total Ex	0.144	Day
2013	43117	GAS	CO	Total Ex	108.227	Day
2013	186	DSL	CO	Total Ex	0.057	Day
2013	43117	GAS	SOx	Total Ex	0.176	Day
2013	186	DSL	SOx	Total Ex	0.001	Day
2013	43117	GAS	PM10	Total	2.257	Day
2013	186	DSL	PM10	Total	0.017	Day
2013	43117	GAS	PM2.5	Total	0.962	Day
2013	186	DSL	PM2.5	Total	0.011	Day
2013	43117	GAS	CO2	Total Ex	17435.79	Day
2013	186	DSL	CO2	Total Ex	76.44	Day
2014						
2014	43614	GAS	ROG	Total	10.173	Day
2014	190	DSL	ROG	Total	0.009	Day
2014	43614	GAS	NOx	Total Ex	8.915	Day
2014	190	DSL	NOx	Total Ex	0.133	Day
2014	43614	GAS	CO	Total Ex	97.134	Day
2014	190	DSL	CO	Total Ex	0.051	Day
2014	43614	GAS	SOx	Total Ex	0.178	Day
2014	190	DSL	SOx	Total Ex	0.001	Day
2014	43614	GAS	PM10	Total	2.271	Day
2014	190	DSL	PM10	Total	0.016	Day
2014	43614	GAS	PM2.5	Total	0.962	Day
2014	190	DSL	PM2.5	Total	0.010	Day
2014	43614	GAS	CO2	Total Ex	17646.734	Day
2014	190	DSL	CO2	Total Ex	78.503	Day

LDT1

CALYR	VMT/1000	VEH TECH	POLLUTANT	PROCESS	EMISSIONS	BASIS
2013	6258	GAS	ROG	Total	3.295	Day
2013	7	DSL	ROG	Total	0.001	Day
2013	6258	GAS	NOx	Total Ex	2.706	Day
2013	7	DSL	NOx	Total Ex	0.006	Day
2013	6258	GAS	CO	Total Ex	29.394	Day
2013	7	DSL	CO	Total Ex	0.003	Day
2013	6258	GAS	SOx	Total Ex	0.030	Day
2013	7	DSL	SOx	Total Ex	0.000	Day
2013	6258	GAS	PM10	Total	0.346	Day
2013	7	DSL	PM10	Total	0.001	Day
2013	6258	GAS	PM2.5	Total	0.156	Day
2013	7	DSL	PM2.5	Total	0.001	Day
2013	6258	GAS	CO2	Total Ex	2915.62	Day
2013	7	DSL	CO2	Total Ex	2.75	Day
2014						
2014	6327	GAS	ROG	Total	3.052	Day
2014	7	DSL	ROG	Total	0.001	Day
2014	6327	GAS	NOx	Total Ex	2.478	Day
2014	7	DSL	NOx	Total Ex	0.006	Day
2014	6327	GAS	CO	Total Ex	26.716	Day
2014	7	DSL	CO	Total Ex	0.003	Day
2014	6327	GAS	SOx	Total Ex	0.030	Day
2014	7	DSL	SOx	Total Ex	0.000	Day
2014	6327	GAS	PM10	Total	0.346	Day
2014	7	DSL	PM10	Total	0.001	Day
2014	6327	GAS	PM2.5	Total	0.155	Day
2014	7	DSL	PM2.5	Total	0.001	Day
2014	6327	GAS	CO2	Total Ex	2951.180	Day
2014	7	DSL	CO2	Total Ex	2.890	Day

LDT2

CALYR	VMT/1000	VEH TECH	POLLUTANT	PROCESS	EMISSIONS	BASIS
2013	16353	GAS	ROG	Total	4.429	Day
2013	7	DSL	ROG	Total	0.000	Day
2013	16353	GAS	NOx	Total Ex	5.697	Day
2013	7	DSL	NOx	Total Ex	0.006	Day
2013	16353	GAS	CO	Total Ex	46.750	Day
2013	7	DSL	CO	Total Ex	0.003	Day
2013	16353	GAS	SOx	Total Ex	0.091	Day
2013	7	DSL	SOx	Total Ex	0.000	Day
2013	16353	GAS	PM10	Total	0.852	Day
2013	7	DSL	PM10	Total	0.001	Day
2013	16353	GAS	PM2.5	Total	0.362	Day
2013	7	DSL	PM2.5	Total	0.001	Day
2013	16353	GAS	CO2	Total Ex	9017.60	Day
2013	7	DSL	CO2	Total Ex	2.76	Day
2014						
2014	16522	GAS	ROG	Total	4.125	Day
2014	7	DSL	ROG	Total	0.000	Day
2014	16522	GAS	NOx	Total Ex	5.104	Day
2014	7	DSL	NOx	Total Ex	0.006	Day
2014	16522	GAS	CO	Total Ex	42.486	Day
2014	7	DSL	CO	Total Ex	0.002	Day
2014	16522	GAS	SOx	Total Ex	0.092	Day
2014	7	DSL	SOx	Total Ex	0.000	Day
2014	16522	GAS	PM10	Total	0.858	Day
2014	7	DSL	PM10	Total	0.001	Day
2014	16522	GAS	PM2.5	Total	0.363	Day
2014	7	DSL	PM2.5	Total	0.000	Day
2014	16522	GAS	CO2	Total Ex	9110.407	Day
2014	7	DSL	CO2	Total Ex	2.967	Day

HHDT

CALYR	VMT/1000	VEH TECH	POLLUTANT	PROCESS	EMISSIONS	BASIS
2013	1640	DSL	ROG	Total	0.947	Day
2013	1640	DSL	NOx	Total Ex	18.545	Day
2013	1640	DSL	CO	Total Ex	4.299	Day
2013	1640	DSL	SOx	Total Ex	0.031	Day
2013	1640	DSL	PM10	Total	0.696	Day
2013	1640	DSL	PM2.5	Total	0.544	Day
2013	1640	DSL	CO2	Total Ex	3283.86	Day
2014						
2014	1718	DSL	ROG	Total	0.740	Day
2014	1718	DSL	NOx	Total Ex	16.866	Day
2014	1718	DSL	CO	Total Ex	3.452	Day
2014	1718	DSL	SOx	Total Ex	0.033	Day
2014	1718	DSL	PM10	Total	0.484	Day
2014	1718	DSL	PM2.5	Total	0.344	Day
2014	1718	DSL	CO2	Total Ex	3455.453	Day

2013 Emission Factors

Reactive Organic Gases		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker/Commissioning Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,302	6,265	16,359	65,926	1,640
ROG	tons/day	11.43	3.30	4.43	19.16	0.95
	g/mi	0.24	0.48	0.25	0.26	0.52

Oxides of Nitrogen		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,302	6,265	16,359	65,926	1,640
NOx	tons/day	10.00	2.71	5.70	18.42	18.54
	g/mi	0.21	0.39	0.32	0.25	10.26

Carbon Monoxide		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,302	6,265	16,359	65,926	1,640
CO	tons/day	108.28	29.40	46.75	184.43	4.30
	g/mi	2.27	4.26	2.59	2.54	2.38

Sulfur Oxides		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,302	6,265	16,359	65,926	1,640
SOx	tons/day	0.18	0.03	0.09	0.30	0.03
	g/mi	0.00	0.00	0.01	0.00	0.02

Particulate Matter (PM10)		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,302	6,265	16,359	65,926	1,640
PM10	tons/day	2.27	0.35	0.85	3.47	0.70
	g/mi	0.05	0.05	0.05	0.05	0.38

Particulate Matter (PM2.5)		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,302	6,265	16,359	65,926	1,640
PM2.5	tons/day	0.97	0.16	0.36	1.49	0.54
	g/mi	0.02	0.02	0.02	0.02	0.30

Carbon Dioxide		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,302	6,265	16,359	65,926	1,640
CO_2	tons/day	17,512.23	2,918.36	9,020.36	29,450.95	3,283.86
	g/mi	366.89	422.60	500.22	405.27	1,816.26

2014 Emission Factors

Reactive Organic Gases		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
ROG	tons/day	10.18	3.05	4.13	17.36	0.74
	g/mi	0.21	0.44	0.23	0.24	0.39

Oxides of Nitrogen		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
NOx	tons/day	9.05	2.48	5.11	16.64	16.87
	g/mi	0.19	0.36	0.28	0.23	8.91

Carbon Monoxide		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
CO	tons/day	97.19	26.72	42.49	166.39	3.45
	g/mi	2.01	3.83	2.33	2.26	1.82

Sulfur Oxides		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
SOx	tons/day	0.18	0.03	0.09	0.30	0.03
	g/mi	0.00	0.00	0.01	0.00	0.02

Particulate Matter (PM10)		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
PM10	tons/day	2.29	0.35	0.86	3.49	0.48
	g/mi	0.05	0.05	0.05	0.05	0.26

Particulate Matter (PM2.5)		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
PM2.5	tons/day	0.97	0.16	0.36	1.49	0.34
	g/mi	0.02	0.02	0.02	0.02	0.18

Carbon Dioxide		LDA	LDT1	LDT2	LDA+LDT1+LDT2 Total (Worker Trucks)	HHDT (Delivery Trucks)
VMT	1000 mi/day	43,804	6,334	16,529	66,667	1,718
CO2	tons/day	17,725.24	2,954.07	9,113.37	29,792.68	3,283.86
	g/mi	367.10	423.10	500.18	405.41	1,734.06

Source: EMFAC2011 online results for San Diego County

1. "Total Exhaust" emissions used for all pollutants, except ROG, PM10, and PM2.5. ROG is calculated using the "Total" emissions. PM10 and PM2.5 emissions are calculated using "Total" emissions, which include exhaust, brake wear (BW) and tire wear (TW).

OPERATION

Tierra del Sol Solar Farm Project
GHG Emissions Summary

	CO_2 (tons/yr)	CO_2E (Mtons/yr)
OPERATION		
Light-Duty Vehicles	99.37	94.89
Heavy-Duty Diesel Trucks	3.04	2.76
Helicopter	2.20	2.04
Emergency Generators	55.68	50.97
Electrical Generation		263.61
Water Supply		1.96
Total Operational	160.28	**416.23**

Tierra del Sol Solar Farm Project
Operational Emissions[1]

						2014 Emissions (lbs/day)	tons/year[4]
	Trips/day	**# of Units**	**Distance (mi)**	**Vehicle Type**		**CO2**	**CO2**
Solar Farm							
Worker Vehicles[2]	10		35.0	LDA/LDT		625.64	82.58
Personnel Transport Vehicles[3]		2	10.0	LDT2		22.05	2.91
Washing Vehicles[3]		1	10.0	HHDT		38.23	0.69
Satellite Washing Vehicles[3]		2	10.0	LDT2		22.05	0.40
Service Trucks[3]		1	10.0	LDT2		11.03	1.46
Emergency Generators		2		N/A		2,227.20	55.68
Gen-Tie Line							
Pole/Structure Brushing[2]	6	3	41.0	LDA/LDT		439.73	5.28
Herbicide Application[2]	6	3	41.0	LDA/LDT		439.73	5.28
Equipment Repair[2]	8	3	41.0	LDA/LDT		586.31	1.47
Equipment Repair[2]		3	41.0	HHDT		940.43	2.35
Helicopter Inspection	2	1	67.0	Helicopter		4,392.96	2.20
						Total	**160.28**

1. Operational Emissions would result primarily from mobile sources including all operation and maintenance vehicles. It was assumed operation of the O&M building and Substation would not result in area source emissions generated from natural gas or landscaping.
2. Conservatively estimated employees for O&M would be coming from Alpine + length of the gen-tie line = 41 miles one-way
3. Patrick Rowe, Soitec; correspondence with Jason Paukovits - AECOM
4. Assumed 22 work days per month for 12 months = 264 days/year for worker vehicles
Assumed washing would occur every 6-8 weeks or 9 washings per year, 4 days/wash = 36 days/year for washing vehicles

Helicopter Emissions

Model[5]	Fuel Consumption[6] (gal/hr)	Emission Factor (kg CO2/gal)[7]	CO2 Emissions (lbs/hr)	(hrs/day)	Useage (days/yr)	
R44	15	8.32	274.56	8	2	

5. Robinson 44 helicopter representative of type of helicopter for use during operation and maintenance
6. Source: Interagency Aviation Training. 2010. Aircraft Identification Library. (https://www.iat.gov/aircraft_library/index.asp). U.S. Department of Interior, National Business Center, Aviation Management Directive accessed November 28, 2012 at (http://amd.nbc.gov/akro/akflight/pdf/ex2.pdf)
7. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, Tables C.3 and C.6.*

Tierra del Sol Solar Farm Project
Diesel Engine-Generator Emissions

No. of Units	2	
Engine Rating	680	kW
	960	HP
Operating Schedule (per unit)*	1.0	hr/day
	50.0	hr/year

	CO_2
gm/BHP-hr	526.18
Data Source	1
Pounds/hour	2,227
Pounds/day	2,227
Pounds/year	111,360
Metric tons/year	50.5

Notes:
*Assumed 50 hours per year for testing and maintenance.
Sources:
1. AP-42, Section 3.4, Table 3.4-1.

Tierra del Sol Solar Farm Project
Greenhouse Gas Emissions from Project Electrical Demand

Land Use	Units	Electrical Demand Factor[1] (kW-hr/unit/yr)	Electric Demand (kW-hr/yr)	CO_2E Emission Factor[2] (lbs CO_2E/kW-hr)	Annual CO_2E Emissions (Mtons CO_2E/yr)
Miscellaneous (O&M Bldg.)	7.50 ksf	9,720	72,900	0.553	18.30
Trackers/Inverters/Other			977,406	0.553	245.31
Total			1,050,306		263.61

Utility Region: SDG&E

Sources:

1. Itron, Inc. 2006. *California Commercial End-Use Survey*. Prepared for California Energy Commission, CEC-400-2006-005. March.
2. San Diego Gas & Electric. 2010. Annual Entity Emissions: Electric Power Generation/Electric Utility Sector. http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP(March 26).xls adjusted to reflect an increase in renewables from 10% in 2009 to 33% in 2020 and California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions,* Version 3.1, Table C.2.

Notes:

CO_2E	Carbon dioxide equivalent
kW-hr	kilowatt-hour
MT	metric tons (= 2,204.623 lbs)

Tierra del Sol Solar
Other Operational Electricity Usage

Equipment (per tracker)	Electrical Draw (watts)	Notes	Daily Operating Hours	Annual Electricity Usage (kWh)
Tracker Control Unit	50	Control unit uses energy during sunlight hours only.	12	219
Tracker Motor	250	Tracker motor runs for 1 minute every hour	12	18
Air Drying Unit	192	Air drying unit runs 1 hour per day and 10 hours every 3 weeks		103
Total per Tracker				341
Number of Trackers	2,538			
Total Annual Electricity Usage				**864,468**

Equipment (per Building Block)	Electrical Draw (watts)	Notes	Daily Operating Hours	Annual Energy Usage (kWh)
Field Communications	300	Operates during sunlight hours	12	1,314
Inverters	100	Operates at night	12	438
PV Box Ventilation	173	Operates during sunlight hours	12	758
Total per Building Block				2,510
Number of Building Blocks	45			
Total Annual Electricity Usage				**112,938**
Grand Total Annual Elecricity				**977,406**

Tierra del Sol Solar Farm Project
Greenhouse Gas Emissions from Project Water Supply

Land Use	Units	Acre-Feet per Year[1]	Electrical Demand Factor[2] (kW-hr/AF)	Electric Demand (kW-hr/yr)	CO_2E Emission Factor[3] (lbs CO_2E/kW-hr)	Annual CO_2E Emissions (Mtons CO_2E/yr)
N/A	N/A	3.68	2,117	7,791	0.553	1.96

Sources:

1. Project Description for the Tierra del Sol Solar Project - Average monthly water usage is 10,472 gallons
   http://www.sandiego.gov/water/conservation/tips.shtml
2. California Energy Commission. 2006. *Refining Estimates of Water Related Energy Use in California.*
   (Northern California factor for water supply and conveyance for local (non-SWP) water)
   http://www.energy.ca.gov/2006publications/CEC-500-2006-118/CEC-500-2006-118.PDF
3. San Diego Gas & Electric. 2010. Annual Entity Emissions: Electric Power Generation/Electric Utility Sector.
   http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP(March 26).xls
   and California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*
   Version 3.1, Table C.2.

Notes:

CO_2E	Carbon dioxide equivalent
kW-hr	kilowatt-hour
Mtons	metric tons (= 2,204.62 lbs)

Tierra del Sol Solar Farm Project
CO_2-to-CO_2 Equivalent Factors

	Source	Units	CO_2	CH_4	N_2O	CO_2E/CO_2
Global Warming Potential			1	21	310	
Diesel Equipment	1	kg/gal	10.15	0.00058	0.00026	1.009
Diesel Trucks	2	g/mi	1,450.00	0.0051	0.0048	1.001
Passenger Vehicles	3					1.053
Helicopters	4	g/gal	8,320.00	7.04	0.11	1.022
Electrical Generation	5	lb/MWh	550.18	0.0302	0.0081	1.006

Serving Utility: SDG&E

1. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, Tables C.6 and C.7.
2. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, Tables C.3 and C.4.
3. US EPA, Office of Transportation and Air Quality. 2005. *Greenhouse Gas Emissions from a Typical Passenger Vehicle* (EPA420-F-05-004), p. 4.
4. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, Tables C.3 and C.6.
5. San Diego Gas & Electric. 2010. Annual Entity Emissions: Electric Power Generation/Electric Utility Sector. http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP(March 26).xls adjusted to reflect an increase in renewables from 10% in 2009 to 33% in 2020 and California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, Table C.2.