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3.8 GREENHOUSE GAS EMISSIONS

This section evaluates the environmental effects of greenhouse gas (GHG) emissions that may result directly or indirectly from the project. The analysis in this section describes the applicable regulations and programs, presents the existing GHG effects and California GHG emissions trends, identifies the criteria used for determining the significance of environmental impacts, lists applicant-proposed measures (APMs) that would be incorporated into the project to avoid or substantially lessen potentially significant impacts to the extent feasible, and describes the potential GHG impacts of the proposed project. The analysis is based on a review of existing resources, technical data, and applicable laws, regulations, plans, and policies, as well as the following technical reports prepared for the project:

- *Air Quality and Greenhouse Gas Technical Report, Soda Mountain Solar Project,* SWCA Environmental Consultants (SWCA) (2025) (Appendix C)

3.8.1 Regulatory Setting

3.8.1.1 Federal

DESERT RENEWABLE ENERGY CONSERVATION PLAN

In September 2016, the Bureau of Land Management (BLM) adopted the Desert Renewable Energy Conservation Plan (DRECP) Land Use Plan Amendment (LUPA) to the California Desert Conservation Area (CDCA) Plan, Bishop Resource Management Plan, and Bakersfield Resource Management Plan. The DRECP LUPA addresses solar, wind, geothermal energy generation, and transmission projects on 10.8 million acres of BLM-administered lands in the desert regions of southern California (BLM 2016).

The BLM DRECP LUPA establishes several land use classifications, including Development Focus Areas (DFAs), Variance Process Lands (VPLs), Recreation Management Areas, General Public Lands, and various conservation land use designations. In DFAs, renewable energy projects are incentivized and permitting is streamlined. Renewable energy projects may be implemented on VPLs, but they must first be evaluated under a variance process and then approved by the BLM to proceed through National Environmental Policy Act (NEPA) environmental review. General Public Lands are BLM-administered lands that do not have a specific land allocation or designation associated with energy development, conservation, or recreation. These lands are not needed to fulfill the DRECP biological conservation or renewable energy strategy. These areas are available to renewable energy applications but do not benefit from permit review streamlining or other incentives.

BLM Conservation Areas include National Landscape Conservation System lands, Areas of Critical Environmental Concern (ACECs), and Wildlife Allocations. Recreation Management Areas are designated for recreation actions. This designation includes Extensive Recreation Management Areas, which entail management specifically to address recreation use and demand; and Special Recreation Management Areas, which are high-priority areas for recreation and have unique value and importance for recreation.

The majority of the project site is located on DRECP General Public Lands, and the generation-tie line route is within the Soda Mountains Expansion ACEC.

U.S. ENVIRONMENTAL PROTECTION AGENCY

On April 2, 2007, in *Massachusetts v. EPA* (549 US 497), the Supreme Court found that GHGs are air pollutants covered by the Clean Air Act (CAA). The Court held that the U.S. Environmental Protection Agency (EPA) must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare or whether the science is too uncertain to make a reasoned decision. In making these decisions, EPA is required to follow the language of Section 202(a) of the CAA.

On April 17, 2009, the EPA Administrator signed proposed "endangerment" and "cause or contribute" findings for GHGs under Section 202(a) of the CAA. EPA held a 60-day public comment period, considered public comments, and issued final findings. EPA found that six GHGs taken in combination endanger both the public health and the public welfare of current and future generations. The EPA also found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the greenhouse effect as air pollution that endangers public health and welfare under CAA Section 202(a) (Appendix C).

Specific GHG regulations that the EPA has adopted to date are as follows:

- **40 CFR Part 98. Mandatory Reporting of Greenhouse Gases Rule.** This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons (MTs) of carbon dioxide equivalent (CO_2e) emissions per year. The project would not trigger GHG reporting as required by this regulation.
- **40 CFR Part 52. Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule.** EPA has mandated that Prevention of Significant Deterioration (PSD), and Title V requirements apply to facilities whose stationary source CO_2e emissions exceed 100,000 tons per year. The project would not trigger PSD or Title V permitting under this regulation.

3.8.1.2 State

EXECUTIVE ORDER S-3-05

Executive Order S-3-05 was established by Governor Arnold Schwarzenegger in June 2006 and establishes statewide emission reduction targets through the year 2050 as follows:

1. By 2010, reduce GHG emissions to 2000 levels.
2. By 2020, reduce GHG emissions to 1990 levels.
3. By 2050, reduce GHG emissions to 80% below 1990 levels.

This Executive Order does not include any specific requirements that pertain to the project; however, future actions taken by the state to implement these goals may affect the project, depending on the specific implementation measures that are developed.

EXECUTIVE ORDER B-55-18

In September 2018, Executive Order B-55-18 established a new statewide goal to achieve carbon neutrality as soon as possible, no later than 2045, and to achieve and maintain net negative emissions thereafter. The California Air Resources Board (CARB) was directed to develop the framework for implementing the goal of carbon neutrality. Executive Order B-30-15 (April 2015) established a California GHG reduction target of 40% below 1990 levels by 2030. One purpose of this interim target is

to ensure California meets its target of reducing GHG emissions to 80% below 1990 levels by 2050 (Executive Order S-3-05, June 2005). This executive order also specifically addresses the need for climate adaptation and directs state agencies to update the California Climate Adaptation Strategy to identify how climate change will affect California infrastructure and industry and what actions the state can take to reduce the risks posed by climate change. Senate Bill (SB) 32 of 2016 codified this GHG emissions target to 40% below the 1990 level by 2030.

CALIFORNIA RENEWABLE PORTFOLIO STANDARD PROGRAM

Electric utilities in California must procure a minimum quantity of the sales from eligible renewable energy resources as specified by Renewable Portfolio Standard (RPS) requirements. To integrate renewable generators on the grid, optimize the delivery of growing amounts of renewable energy production, and facilitate achieving the targeted GHG reductions, the California legislature has also authorized energy agencies to establish energy storage procurement targets.

The Clean Energy and Pollution Reduction Act of 2015 (SB 350) established California's State policy objectives on long-term energy planning and procurement as signed into law on October 7, 2015. The 100 Percent Clean Energy Act of 2018 (SB 100) revised the RPS targets to establish the policy that eligible renewable energy resources and zero-carbon resources supply 100% of retail sales of electricity to California end-use customers and 100% of electricity procured to serve all state agencies by December 31, 2045. With SB 350 and SB 100, California's objectives include the following:

- To set the RPS for the procurement of California's electricity from renewable sources at 33% by 2020, 50% by 2026, and 60% by 2030
- To plan for 100% of total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by December 31, 2045
- To double the energy efficiency savings in electricity and natural gas end uses by retail customers by 2030

CAP-AND-TRADE PROGRAM

The California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation (Cap-and-Trade Program) was initially approved by CARB in 2011. The Cap-and-Trade Program applies to covered entities that fall within certain source categories, including petroleum refiners and suppliers of transportation fuels and is triggered when facility emissions exceed 25,000 MTs of CO_2e in a year. The covered entities must hold compliance instruments sufficient to cover the actual GHG emissions, as evidenced through CARB's Mandatory Reporting Regulation requirements. This means that transportation fuel suppliers bear the GHG compliance obligation in the Cap-and-Trade Program for the GHG emissions from motor vehicle and off-road equipment fuels used by construction workforces and crews.

SENATE BILL 1368

California SB 1368 was enacted in 2006 and required the California Public Utilities Commissions (CPUC) to establish a carbon dioxide (CO_2) emissions standard for base load generation owned by or under long-term contract with publicly owned utilities. The CPUC established a GHG Emissions Performance Standard (EPS) of 1,100 pounds of CO_2 per megawatt-hour (MWh). SB 1368 also requires the posting of notices of public deliberations by publicly owned companies on the CPUC website and establishes a process to determine compliance with the EPS. The project, as a renewable energy generation facility, is determined by rule to comply with the GHG EPS requirements of SB 1368.

ASSEMBLY BILL 32

California Assembly Bill (AB) 32, also known as the Global Warming Solutions Act of 2006, requires CARB to establish a statewide GHG emissions cap for 2020 based on 1990 emission levels. AB 32 requires CARB to adopt regulations that identify and require selected sectors or categories of emitters of GHGs to report and verify their statewide GHG emissions, and CARB is authorized to enforce compliance with the program. Under AB 32, CARB is also required to adopt a statewide GHG emissions limit equivalent to the statewide GHG emissions levels in 1990, which must be achieved by 2020. CARB established this limit in December 2007 at 427 million MTs of CO_2e. This is approximately 30% below forecasted "business-as-usual" emissions of 596 million MTs of CO_2e in 2020 and about 10% below average annual GHG emissions during the period of 2002 through 2004 (Appendix C).

To achieve maximum technologically feasible and cost-effective GHG emission reductions, AB 32 permits the use of market-based compliance mechanisms and requires CARB to monitor compliance with and enforce any rule, regulation, order, emission limitation, emissions reduction measure, or market-based compliance mechanism that it adopts. CARB has adopted nine early action measures for implementation, including ship electrification at ports, reduction of high global warming potential (GWP) gases in consumer products, heavy-duty vehicle greenhouse gas emission reduction (aerodynamic efficiency), reduction of perfluorocarbons (PFCs) from semiconductor manufacturing, improved landfill gas capture, reduction of hydrofluorocarbon (HFC)-134a from do-it-yourself motor vehicle servicing, sulfur hexafluoride (SF_6) reductions from the non-electric sector, a tire inflation program, and a low carbon fuel standard.

SENATE BILL 97

In 2007, the California State Legislature passed SB 97, which required amendment of the State California Environmental Quality Act (CEQA) Guidelines to incorporate analysis of, and mitigation for, GHG emissions from projects subject to CEQA. The amendments, which took effect on March 18, 2010, added Section 15064.4 to the State CEQA Guidelines, specifically addressing the potential significance of GHG emissions.

Section 15064.4 neither requires nor recommends a specific analytical methodology or quantitative criteria for determining the significance of GHG emissions. Rather, the section calls for a "good faith effort" to "describe, calculate or estimate" GHG emissions and indicates that the analysis of the significance of any GHG impacts should include consideration of the extent to which the project would

1. increase or reduce GHG emissions;
2. exceed a locally applicable threshold of significance; or
3. comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions."

The State CEQA Guidelines also state that a project may be found to have a less than significant impact related to GHG emissions if it complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions (14 California Code of Regulations 15064(h)(3)). Importantly, the State CEQA Guidelines do not require or recommend a specific analytical methodology or provide quantitative criteria for determining the significance of GHG emissions.

CALIFORNIA CODE OF REGULATIONS 95350 ET SEQ.

In 2010, CARB adopted the Regulation for Reducing Sulfur Hexafluoride Emissions From Gas Insulated Switchgear (Section 17 CCR Section 95350 et seq.). The purpose of this regulation is to achieve GHG

emission reductions by reducing SF_6 emissions from gas-insulated switchgear. Owners of such switchgear must not exceed maximum allowable annual emissions rates, reduced each year until 2020, after which annual emissions must not exceed 1 percent. Owners must regularly inventory gas insulated switchgear equipment, measure quantities of SF_6, and maintain records of these for at least three years. Additionally, by June 1 each year, owners also must submit an annual report to CARB's Executive Officer for emissions that occurred during the previous calendar year.

In December 2021, CARB adopted amendments to the Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear, to update the phase out of SF_6 in gas-insulated switchgear. The new phase out schedule begins in January 2025 with all switchgear needing to be SF_6 free by January 2033. Under this resolution, CARB has developed a timeline for phasing out SF_6 equipment in California and created incentives to encourage owners to replace SF_6 equipment. The California Office of Administrative Law approved this rulemaking in December 2021 and the Resolution went into effect January 1, 2022.

ENERGY ACTION PLAN

The California Energy Commission and CPUC first adopted the Energy Action Plan in 2003 and subsequently adopted a second plan and an update in 2005 and 2008, respectively. The 2003 plan established an electricity "loading order" as the preferred sequence for meeting electricity demands. The loading order lists energy efficiency and demand response first, renewable resources second, and clean and efficient natural gas-fired power plants third. When renewable energy is available to the grid, the California Independent System Operator (CAISO) requests turndown of fossil power production from unspecified dispatchable fossil fuel plants to make way for the use of the renewable energy resources.

3.8.1.3 Local

SAN BERNARDINO GREENHOUSE GAS REDUCTION PLAN UPDATE

The San Bernardino Greenhouse Gas Reduction Plan (GHGRP) Update is an update to the 2011 San Bernardino County GHGRP. The GHGRP Update presents a target for the year 2030, which is to reduce emissions to 40% below 2007 levels. This goal would put the county on a path toward the state's long-term goal to achieve statewide carbon neutrality (zero net emissions) by 2045 (San Bernardino 2021).

SAN BERNARDINO COUNTYWIDE PLAN

The San Bernardino Countywide Plan (San Bernardino County 2024a), adopted by the Board of Supervisors in 2020, updates and expands the County's General Plan by addressing the physical, social, and economic issues facing the unincorporated portions of the county. The Countywide Plan consists of the Policy Plan, the Business Plan, and a communities plan. The Policy Plan, based on the former General Plan, consists of 11 elements: Land Use, Housing, Infrastructure and Utilities, Transportation and Mobility, Natural Resources, Renewable Energy and Conservation, Cultural Resources, Hazards, Personal and Property Protection, Economic Development, and Health and Wellness. The Business Plan consists of a policy-based governance element along with an implementation plan. The communities plan consists of 35 Community Action Guides that provide a framework for communities to create future character and independent identity through community actions.

The following policies identified in the Natural Resources element of the Countywide Plan are relevant to this analysis (San Bernardino County 2024b).

Goal NR-1 Air Quality. Air quality that promotes health and wellness of residents in San Bernardino County through improvements in locally-generated emissions.

- **Policy NR-1.1 Land use.** We promote compact and transit-oriented development countywide and regulate the types and locations of development in unincorporated areas to minimize vehicle miles traveled and greenhouse gas emissions.
- **Policy NR-1.2 Indoor air quality.** We promote the improvement of indoor air quality through the California Building and Energy Codes and through the provision of public health programs and services.
- **Policy NR-1.3 Coordination on air pollution.** We collaborate with air quality management districts and other local agencies to monitor and reduce major pollutants affecting the county at the emission source.
- **Policy NR-1.4 Military coordination on air quality.** We collaborate with the military to avoid or minimize impacts on military training and operations from air pollution and haze.
- **Policy NR-1.5 Sensitive land uses.** We consider recommendations from the California Air Resources Board on the siting of new sensitive land uses and exposure to specific source categories.
- **Policy NR-1.6 Fugitive dust emissions.** We coordinate with air quality management districts on requirements for dust control plans, revegetation, and soil compaction to prevent fugitive dust emissions.
- **Policy NR-1.7 Greenhouse gas reduction targets.** We strive to meet the 2040 and 2050 greenhouse gas emission reduction targets in accordance with state law.
- **Policy NR-1.8 Construction and operations.** We invest in County facilities and fleet vehicles to improve energy efficiency and reduce emissions. We encourage County contractors and other builders and developers to use low-emission construction vehicles and equipment to improve air quality and reduce emissions.
- **Policy NR-1.9 Building design and upgrades.** We use the [California Green Building Standards] CALGreen Code to meet energy efficiency standards for new buildings and encourage the upgrading of existing buildings to incorporate design elements, building materials, and fixtures that improve environmental sustainability and reduce emissions.

3.8.2 Environmental Setting

Global climate change refers to the changes in average climatic conditions on Earth as a whole, including changes in temperature, wind patterns, precipitation, and storms. Global warming, a related concept, is the observed increase in the average temperature of the Earth's atmosphere and oceans in recent decades. There is a general scientific consensus that global climate change is occurring, caused in whole or in part by increased emissions of GHGs, which keep the Earth's surface warm by trapping heat in the Earth's atmosphere, in much the same way as glass traps heat in a greenhouse. The Earth's climate is changing, because human activities, primarily the combustion of fossil fuels, are altering the chemical composition of the atmosphere through the buildup of GHGs. GHGs are released by the combustion of fossil fuels, land clearing, agriculture, and other activities and lead to an increase in the greenhouse effect. Although climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change (IPCC) by the United Nations and World Meteorological Organization in 1988 has led to increased efforts devoted to GHG emissions reduction and climate change research and policy.

Regarding the adverse effects of global warming, AB 2538 states, "Global warming poses a serious threat to the economic well-being, public health, natural resources and the environment of California." Over the past few decades, the energy intensity of the national and state economy has been declining due to the shift to a more service-oriented economy. California ranked fifth lowest among the states in CO_2 emissions from fossil fuel consumption per unit of gross state product. However, in terms of total CO_2 emissions, California is second only to Texas in the nation and is the 16th largest source of climate change emissions in the world, exceeding most nations.

3.8.2.1 Greenhouse Gas Background

GHGs include CO_2, methane (CH_4), nitrous oxide (N_2O), HFCs, PFCs, and SF_6. Carbon is the most abundant GHG. Other GHGs are less abundant but have higher GWP than CO_2. Thus, emissions of other GHGs are frequently expressed in the equivalent mass of CO_2, denoted as CO_2e. Forest fires, decomposition, industrial processes, landfills, and consumption of fossil fuels for power generation, transportation, heating, and cooking are the primary sources of GHG emissions. The primary GHGs attributed to global climate change are described below.

CARBON DIOXIDE

In the atmosphere, carbon generally exists in its oxidized form, as CO_2. Natural sources of CO_2 include the respiration (breathing) of humans, animals, and plants; volcanic outgassing; decomposition of organic matter; and evaporation from the oceans. Anthropogenic sources of CO_2 include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. Anthropogenic sources of CO_2 amount to over 30 billion tons per year, globally (SWCA 2024; see Appendix C). Natural sources release substantially larger amounts of CO_2. However, natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of human-made CO_2. Consequently, the gas is building up in the atmosphere.

METHANE

CH_4 is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Decomposition occurring in landfills accounts for the majority of human-generated CH_4 emissions in California and in the United States as a whole. Agricultural processes, such as intestinal fermentation in livestock, manure management, and rice cultivation, are also significant sources of CH_4 in California.

NITROUS OXIDE

N_2O is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. N_2O is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion produce N_2O, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used, as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion are the primary sources of human-generated N_2O emissions in California.

HYDROFLUOROCARBONS, PERFLUOROCARBONS, SULFUR HEXAFLUORIDE

HFCs are used primarily as substitutes for ozone (O_3)-depleting substances regulated under the Montreal Protocol (1987), an international treaty that was approved on January 1, 1989, and was designated to protect the O_3 layer by phasing out the production of several groups of halogenated hydrocarbons

believed to be responsible for O_3 depletion. PFCs and SF_6 are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no primary aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry leads to greater use of PFCs.

The use of SF_6 in electric utility systems and switchgear, including circuit breakers, poses a concern because this pollutant has an extremely high GWP (one pound of SF_6 is the equivalent warming potential of approximately 24,600 pounds of CO_2) (IPCC 2021a).[1] SF_6 is inert and non-toxic, and is encapsulated in circuit breaker assemblies. SF_6 is a GHG with substantial global warming potential because of its chemical nature and long residency time within the atmosphere. However, under normal conditions, it would be completely contained in the equipment and SF_6 would only be released in the unlikely event of a failure, leak, or crack in the circuit breaker housing. New circuit breaker designs have been developed over the past several years to minimize the potential for leakage, compared to that of past designs.

The magnitude of the impact on global warming differs among GHGs. The effect each GHG has on climate change is measured as a combination of the volume of its emissions and its GWP. GWPs are one type of simplified index based upon radiative properties used to estimate the potential future impacts of emissions of different gases upon the climate system, expressed as a function of how much warming would be caused by the same mass of CO_2. Thus, GHG emissions are typically measured in terms of pounds or tons of CO_2e. GWP are based on a number of factors, including the radiative efficiency (heat-absorbing ability) of each gas relative to that of CO_2, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO_2. The larger GWP, the more that a given gas warms the Earth compared to CO_2 over that time period. HFCs, PFCs, and SF_6 have a greater GWP than CO_2. In other words, these other GHGs have a greater contribution to global warming than CO_2 on a per-mass basis. However, CO_2 has the greatest impact on global warming because of the relatively large quantities of CO_2 emitted into the atmosphere.

A summary of the atmospheric lifetime and GWP of selected gases is presented in Table 3.8-1. As indicated in this table, GWPs range from 1 to 23,500 based on IPCC assessment reports (ARs). IPCC has released three ARs—AR4, AR5, and AR6—with updated GWPs; however, CARB reports the statewide GHG inventory using the AR4 GWPs (IPCC 2007), which is consistent with international reporting standards. By applying the GWP ratios, one can tabulate the project-related equivalent mass of CO_2, denoted as CO_2e emissions, in MTs per year.

[1] A global warming potential of 23,900 was used to convert emissions to CO_2e. This value is based on the global warming potential in the USEPA Mandatory Reporting Program Regulations (40 Code of Federal Regulations Part 98, Subpart A), and deviates from the use of GWPs from the IPCC 6th Assessment Report which was used for the conversion of CH_4 and N_2O.

Table 3.8-1. Global Warming Potentials

GHG	GWP Values for 100-year Time Horizon		
	AR4	AR5	AR6
Carbon dioxide (CO_2)	1	1	1
Methane (CH_4)	25	28	Fossil origin: 29.8 Non-fossil origin: 27.2
Nitrous oxide (N_2O)	298	265	273
Select hydrofluorocarbons (HFCs)	124–14,800	4–12,400	–
Sulfur hexafluoride (SF_6)	22,800	23,500	24,600

Source: SWCA 2024 (Appendix C).

3.8.2.2 Greenhouse Gas Emissions Inventories

U.S. GREENHOUSE GAS EMISSIONS

Per the EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2022* (EPA 2024), In 2022, total gross U.S. greenhouse gas emissions were 6,343.2 million metric tons of CO_2e. Total gross U.S. emissions decreased by 3.0% from 1990 to 2022, down from a high of 15.2% above 1990 levels in 2007. Gross emissions increased from 2021 to 2022 by 0.2% (14.4 MMT CO_2e). Net emissions (including sinks) were 5,489.0 MMT CO_2 Eq. in 2022. Overall, net emissions increased by 1.3 percent from 2021 to 2022 and decreased by 16.7% from 2005 levels. Between 2021 and 2022, the increase in total greenhouse gas emissions was driven largely by an increase in CO_2 emissions from fossil fuel combustion across most end-use sectors due in part to increased energy use from the continued rebound of economic activity after the height of the COVID-19 pandemic. In 2022, CO_2 emissions from fossil fuel combustion increased by 1.0 percent relative to the previous year and were 1.1 percent below emissions in 1990. Carbon dioxide emissions from natural gas use increased by 5.2% (84.8 MMT CO_2e.) from 2021, while CO_2 emissions from coal consumption decreased by 6.1% (58.6 MMT CO_2e.) from 2021 to 2022. The increase in natural gas consumption and associated emissions in 2022 is observed across all sectors except U.S. Territories, while the coal decrease is due to reduced use in the electric power sector. Emissions from petroleum use also increased by 0.9% (19.0 MMT CO_2e.) from 2021 to 2022.

STATEWIDE GHG EMISSIONS

According to California's 2000–2022 GHG emissions inventory, California emitted 371.1 MMT CO_2e in 2022 (CARB 2024). The sources of GHG emissions in California include transportation, industrial uses, electric power production from both in-state and out-of-state sources, commercial and residential uses, agriculture, high global-warming potential substances, and recycling and waste. The California GHG emission source categories (as defined in CARB's 2008 Scoping Plan [CARB 2009]) and their relative contributions in 2022 are presented in Table 3.8-2. Total GHG emissions in 2022 were approximately 42.9 MMT CO_2e less than 2016 emissions. The 2016 statewide GHG inventory fell below 1990 levels, consistent with AB 32. The declining trend in GHG emissions, coupled with programs that will continue to provide additional GHG reductions going forward, demonstrates that California will continue to reduce emissions below the 2020 target of 431 MMTCO_2e (CARB 2024) and toward the 2050 target (80% below 1990 levels by 2050 [consistent with Executive Order S-3-05]). The California GHG inventory for 2018 through 2022 is presented in Table 3.8-2.

Table 3.8-2. California Greenhouse Gas Inventory

Parameter	Unit	Year				
		2018	**2019**	**2020**	**2021**	**2022**
Transportation	MMT CO2e	164.8	161.7	135.2	145.1	139.9
	Percentage	40.2%	40.1%	36.7%	38.2%	37.7%
Electric power	MMT CO2e	65.0	60.2	59.5	62.3	59.8
	Percentage	15.8%	14.9%	16.1%	16.4%	16.1%
Industrial	MMT CO2e	82.3	80.9	73.6	74.2	72.7
	Percentage	20.0%	20.0%	20.0%	19.5%	19.6%
Commercial and residential	MMT CO2e	37.5	40.6	39.0	38.8	39.5
	Percentage	9.1%	10.1%	10.6%	10.2%	10.6%
Agriculture	MMT CO2e	32.0	31.2	31.4	30.4	29.8
	Percentage	7.8%	7.7%	8.5%	8.0%	8.0%
Recycling and waste	MMT CO2e	20.6	20.8	21.3	21.3	21.3
	Percentage	5.0%	5.1%	5.8%	5.6%	5.7%
High GWP	MMT CO2e	8.2	8.3	8.5	8.3	8.2
	Percentage	2.0%	2.0%	2.3%	2.2%	2.2%
Total net emissions	MMT CO2e	**410.5**	**403.7**	**368.5**	**380.4**	**371.1**

Source: CARB 2024.

3.8.3 Impact Analysis

This analysis quantifies the project's total annual GHG emissions from construction. This analysis evaluates the significance of the project's GHG emissions by assessing the project's consistency with CEQA guidance.

3.8.3.1 Thresholds of Significance

The determinations of significance of project impacts are based on applicable policies, regulations, goals, and guidelines defined by the CEQA Environmental Checklist Form in Appendix G of the State CEQA Guidelines. The project would be considered to have a significant effect on GHG emissions if the effects exceed the significance criteria described below:

1. Generate GHG 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 GHGs.

3.8.3.2 Methodology

This analysis focuses on the potential change of GHG emissions due to implementation of the project. GHG emissions would result from both construction and operation of the project. Specific methodologies used to evaluate these emissions are discussed below and in Appendix C. This analysis includes an estimate of the GHG emissions that would be avoided because of the proposed solar facilities' ability to produce electricity from renewable resources. The analysis is based on project specifics and default values in the latest version of CalEEMod. Accordingly, this analysis has been conducted using the newest

tools that are accepted by the regulatory agencies. The project's SF6 consumption has also been estimated.

SF_6 EMISSIONS

CEC Appendix B Item (E) GHG requires "The emission rates of criteria pollutants and greenhouse gases (CO2, CH4, N2O, and SF_6) from the stack, cooling towers, fuels and materials handling processes, delivery and storage systems, and from all onsite secondary emission sources". The project does not include stacks, cooling towers, fuels and materials handling processes or delivery and storage systems. The project would have the potential for fugitive emissions of SF_6 from circuit breakers and emissions factors for SF_6 consumption are discussed in Section 3.8.3.4.

The project would include 500-kV circuit breakers that contain SF_6. New circuit breaker designs have been developed over the past several years to minimize the potential for leakage (CARB 2018). In addition, the equipment would comply with CARB's Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear regulations. CARB's current regulations require that switchgear does not exceed a maximum allowable annual SF_6 emissions rate (leakage rate) of 1 percent. The only equipment within the substations and switchyards that would have SF_6 gas would be the six 500-kV circuit breakers. The utility switchyard would require five circuit breakers and the substation would require one circuit breaker.

BESS EFFICIENCY

The average loss in round-trip efficiency for the life of a lithium-ion BESS is approximately 15%, although loss in round trip efficiency is dropping as the technology is getting more efficient (Grimaldi, et al 2023). Assuming the 300 megawatt-hour (MWh) BESS completes 1 full cycle per day and is entirely charged from the grid, this would require approximately 3.6 hours of charging at full capacity per day and would result in approximately 45MWh of lost round-trip efficiency per day, or 16,425 MWh of lost round-trip efficiency per year. LADWP is the energy provider that would serve the project during times when solar power is unavailable. The most current available Power Content Label published by the California Energy Commission for LADWP indicates that the GHG emissions intensity factor under the base plan is 499 pounds of CO_2e per MWh (LADWP 2023). With California's anticipated achievement of carbon neutrality by 2045, an annual reduction of 24.95 pounds CO_2e per MWh is applied to the 499 pounds of CO_2e per MWh GHG emissions intensity factor. The cumulative impact of the annual incremental reduction accounts for additional renewable energy facilities built during the life of the project, and subsequent exponential decay of natural gas power generation by 2045.Therefore, total indirect GHG emissions from round-trip efficiency loss would total approximately 39,035 MT CO_2e, if the BESS were charged only by the grid. This is a conservative estimate as the BESS would be charged by the project's solar arrays. This estimate also is based on the 2023 emission intensity factors for electricity provided by LADWP and does take into account reductions in emission intensity factors over the life of the project as additional renewable energy is added to LADWP's power mix..

BESS REFRIGERANT

The Per the Tesla UL9540A and Fire Protection Engineering and UL 9540A Interpretation Report (Appendix A [confidential] of the Air Quality and Greenhouse Gas Technical Report [Appendix C]), the Appendix C discusses the refrigerant used for BESS cooling.

3.8.3.3 Applicant-Proposed Measures

The applicant has identified and committed to implement the following APMs as part of the proposed project to avoid or substantially lessen potentially significant impacts to GHG emissions, to the extent feasible. The APMs, where applicable, are discussed in Section 3.3.3.5 Applicant-Proposed Measures.

3.8.3.4 Impact Assessment

Impact GHG-1: Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment? (Less than Significant)

CONSTRUCTION

Construction of the project would result in GHG emissions, which are primarily associated with use of off-road construction equipment, on-road vendor trucks, and worker vehicles. Total GHG emissions from all phases of construction activities were amortized over the estimated 40-year life of the project and added to the annual operational emissions of GHGs. The project would offset GHG emissions through renewable energy generation and thereby result in environmental benefits by lessening the impacts of global climate change; therefore, the annual displaced GHG emissions were estimated to include all direct and indirect emissions associated with implementation of the project. Project decommissioning emissions were not calculated, as the equipment and fuel types that would exist 30 or more years in the future are unknown. Also, as described above, it is anticipated that the decommissioning emissions would be lower than the construction emissions.

Project construction emissions were calculated and compared to the Mojave Desert Air Quality Management District (MDAQMD) daily and annual significance thresholds. Construction emissions were also amortized over a 40-year project lifetime. CalEEMod was used to calculate the annual GHG emissions based on the construction scenario described. Construction of the project is anticipated to last approximately 18 months. On-site sources of GHG emissions include off-road equipment and off-site sources, including haul trucks, vendor trucks, and worker vehicles. Table 3.8-3 presents total daily and annual construction emissions for the project from on-site and off-site emission sources.

As shown in Table 3.8-3, the estimated total GHG emissions during construction would be approximately 8,178 MTs CO_2e over the construction period, which is below the MDAQMD threshold. Estimated project-generated construction emissions amortized over 40 years would be approximately 2047 MTs CO_2e per year. As with project-generated construction criteria air pollutant emissions, GHG emissions generated during construction of the project would occur only when construction is active, lasting only for the duration of the construction period, and would not represent a long-term source of GHG emissions. Therefore, construction activities would not generate GHG emissions, either directly or indirectly, which would have an adverse effect on the environment.

Table 3.8-3. Estimated Daily and Annual Construction Greenhouse Gas Emissions

Construction Years	CO_2	CH_4	N_2O	CO_2e
Daily emissions (pounds per day)				
2026	55,476	1.34	4.00	56,792
2027	49,643	0.83	3.97	50,850
Total	**105,119**	**2.17**	**7.97**	**107,642**
MDAQMD daily GHG threshold*	N/A	N/A	N/A	497,137
Threshold exceeded?	***N/A***	***N/A***	***N/A***	***No***
Annual emissions (tons per year)				
2026	4,870	0.08	0.39	4,993
2027	3,090	0.03	0.31	3,185

Construction Years	CO_2	CH_4	N_2O	CO_2e
Total	**7,960**	**0.11**	**0.70**	**8,178**
40-year amortized construction emissions				*204*
MDAQMD annual GHG threshold†	N/A	N/A	N/A	90,718
Threshold exceeded?	***N/A***	***N/A***	***N/A***	***No***

Source: SWCA 2025 (see Appendix C).

Note: N/A = not applicable.

* The MDAQMD daily GHG threshold is 548,000 short tons converted to metric tons.

† The MDAQMD annual GHG threshold is 100,000 short tons converted to metric tons.

OPERATION

Operation of the project would generate GHG emissions through motor vehicle trips to and from the project site and water use. CalEEMod was used to calculate the annual GHG emissions based on the operational assumptions described in Appendix C. The estimated operational project-generated GHG daily and annual emissions are shown in Table 3.8-4 and Table 3.8-5, respectively.

Table 3.8-4. Estimated Daily Operational Greenhouse Gas Emissions

Sector	GHG Emissions (pounds per day)			
	CO_2	CH_4	N_2O	CO_2e
Mobile	9,711.10	0.03	1.07	10,057.44
Area	27.26	<0.005	<0.005	27.35
Energy	144.40	0.01	0.005	144.95
Water	52.18	0.23	0.01	59.66
Waste	5.34	0.53	0.00	18.67
Refrigeration	N/A	N/A	N/A	1.04
Circuit Breaker SF_6	0	0	0	6.07
Stationary	0	0	0	0
Total	**9,914**	**0.80**	**1.07**	**10,315**
			Total operational daily GHGs	***10,315***
			MDAQMD daily significance threshold*	***497,137***

Source: SWCA 2025 (Appendix C).

Notes: N/A = not applicable. Emissions reflect operational year 2028.

* The MDAQMD daily GHG threshold is 548,000 short tons converted to metric tons.

Table 3.8-5. Estimated Annual Operational Greenhouse Gas Emissions

Sector	GHG Emissions (metric tons per year)			
	CO_2	CH_4	N_2O	CO_2e
Mobile	1,148	<0.005	0.13	1,188
Area	2.23	<0.005	<0.005	2.23
Energy	23.91	<0.005	<0.005	24.00
Water	8.64	0.04	<0.005	9.88
Waste	0.88	0.09	0.00	3.09

Refrigeration	N/A	N/A	N/A	0.17
Circuit Breaker SF_6	0	0	0	2,214
Stationary	0	0	0	0
Total	**1,184**	**0.13**	**0.13**	**3,441**
			Amortized construction emissions	204
			Total annual operational + amortized construction GHGs	***3,645***
			Total operational (30 years) + amortized construction GHGs	***137,844***
			Displaced annual emissions (from project operation)	***300,786***
			MDAQMD annual significance threshold	***90,718***

Source: SWCA 2025 (Appendix C).

Notes: N/A = not applicable. Emissions reflect operational year 2028.

* The MDAQMD GHG threshold is 100,000 short tons converted to metric tons.

Indirect sources of emissions can be of different forms. The project generates electricity from solar energy, a renewable source, and as such, is an indirect source of reduction in fossil fuel-powered electricity generation. The project would provide a renewable energy resource that would displace generation from higher GHG emitting sources. The Greenhouse Gas Equivalencies Calculator was used, which uses the AVoided Emissions and geneRation Tool (AVERT) U.S. national weighted average CO_2 marginal emission rate to convert reductions of kilowatt-hours into avoided units of CO_2 emissions (EPA 2023c). For a 300-MW solar facility, AVERT calculates that 331,560 tons (300,786 metric tons) per year would be avoided by placing the project into operation. Energy use related to cooling of the BESS is anticipated to be offset by the power generated by the project's solar facilities.

Approximately 63 percent of total operational emissions are associated with the emissions of SF_6, which is a component in the circuit breakers of the project. The project would include one circuit breaker to support the substation and utility switchyard (five circuit breakers with space to add one additional in the future). As detailed in the methodology section (Section 3.8.3.2), the use of SF_6 in electric utility systems and switchgear, including circuit breakers, poses a concern, because this pollutant has an extremely high global warming potential (one pound of SF_6 is the equivalent warming potential of approximately 24,600 pounds of CO_2). The amount of SF_6 in each circuit breaker can vary based on the manufacture. Annual leakage for a typical General Electric 500 kV circuit breaker is ≤0.5% with the total weight around five kilograms per pole. There are three poles per circuit breaker for a total of 18 poles for all six circuit breakers, and total SF_6 gas weight of approximately 90 kilograms or 198 pounds (0.09 MT). Based on the global warming potential of SF_6, the circuit breakers would result in up to 2,214 MT of CO_2e emissions, annually.

In compliance with CARB regulations, the applicant would be required to regularly inventory gas insulated switchgear equipment, measure quantities of SF_6 and submit an annual report to CARB. In addition, the analysis assumed that all circuit breakers would contain SF_6 as a conservative analysis. As discussed in the regulatory section, CARB has implemented phasing requirements for the elimination of SF_6 from electrical equipment, including circuit breakers. While the analysis assumes that all circuit breakers would contain SF_6, it is possible that circuit breakers in the later phases may not contain SF_6 and/or as circuit breakers are replaced they would be replaced with non-SF_6 technology. Additionally, the analysis assumed the maximum amount of SF_6 per circuit breaker and depending on the circuit breaker actually used, SF_6 content may be substantially less than assumed in the analysis. Therefore, GHG emissions reported for the project are conservative.

As shown in Table 3.8-5, estimated annual project-generated GHG emissions would be approximately 3,441 MT CO_2e per year as a result of project operations only. After summing the amortized project

construction emissions, total GHGs generated by the project would be approximately 3,645 MT CO_2e per year. The project's annual indirect GHG emissions from the displacement of fossil fuel–fired electricity generation is significantly higher than the project's annualized direct and indirect emissions sources; consequently, the overall effect of the project would reduce GHG emissions. Therefore, the project would have a beneficial GHG emissions impact, and impacts would be **less than significant**.

Impact GHG-2: Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs? (Less than Significant)

Currently, there are no federal, state, or local climate change or GHG emissions regulations that address the GHG emissions during project construction. There are a number of federal, state, and local plans and policies, and GHG emissions reduction strategies that are potentially applicable to the project operation, either directly or indirectly. The project operation is consistent with the following:

- The project would be consistent with the AB 32 scoping plan strategies to increase the total amount of renewable energy sources consistent with the goal of the state's RPS.
- The project would be consistent with CARB's emission reduction strategy presented in the Scoping Plans (2022 and 2008). The 2008 Scoping Plan specifically addresses critical measures directed at emission sources that are included in the cap-and-trade program that are designed to achieve cost-effective emissions reductions while accelerating the necessary transition to the low carbon economy.
- The project would be consistent with the San Bernardino County Policy Plan and GHG Plan.
- The project implementation would help California meet its RPS requirements.

The project would help promote California's GHG policies by creating renewable energy resources and would not exceed the applicable GHG screening levels shown in Table 3.8-4 and Table 3.8-5. Therefore, the project would not conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions. Moreover, projects that are consistent with an applicable plan, policy, or regulation adopted to reduce GHG emissions are considered less than significant during construction, operation, and reclamation. Furthermore, GHG emissions from the project, as shown in Appendix C, would not generate substantial GHG emissions during construction or operation. Therefore, impacts would be **less than significant**.

3.8.4 Mitigation Measures

No mitigation is required.

3.8.5 Cumulative Impacts

Impact C-GHG-1: Would the impacts of the proposed project, in combination with other past, present, and reasonably foreseeable future projects, contribute to a cumulative impact related to GHG emissions? (Less than Significant)

The analysis of a project's GHG emissions is inherently a cumulative impacts analysis, because climate change is a global problem, and the emissions from any single project alone would be negligible. Accordingly, the analysis above considers the potential for the project to contribute to the cumulative impact of global climate change. Table 3.8-3 through Table 3.8-5 show the estimated annual project-generated GHG emissions as a result of project construction and operation. Given that the project would displace GHG emissions during operations, the project would generate construction and operation GHG

emissions that are below the MDAQMD threshold and that would not conflict with applicable reduction plans and policies. Additionally, given that GHG emission impacts are cumulative in nature, the project's incremental contribution to cumulatively significant GHG emissions would be **less than significant**.

3.8.6 Laws, Ordinances, Regulations, and Standards

Federal, state, and local Laws, Ordinances, Regulations, and Standards (LORS) applicable to greenhouse gas emissions are discussed and summarized in Table 3.8-6.

Table 3.8-6. Laws, Ordinances, Regulations, and Standards

LORS	Administering Agency	Applicability	Compliance
Mojave Desert Air Quality Management District Rules and Air Quality Management Plans	Mojave Desert Air Quality Management District	Regulates greenhouse gas emissions throughout the Mojave Desert Air Basin	Section 3.3.3.5, 3.8.3.4
County of San Bernardino Greenhouse Gas Reduction Plan	County of San Bernardino Planning Department	Identifies a path to achieve the state's long-term goal for statewide carbon neutrality	Section 3.3.3.5, 3.8.3.4

3.8.7 Agencies Contacted and Permits

A list of agencies that were contacted during preparation of this application is provided in Appendix V, Table 2-1. Permits Required for Soda Mountain Solar Project. Federal, state, and local permits applicable to greenhouse gas emissions are also summarized in Appendix V, Table 2-1 and below in Table 3.8-7.

Table 3.8-7. Permits Required

Regulatory Agency	Permit Required	Agency Contact	Schedule
Mojave Desert Air Quality Management District	Dust Control Plan (Construction)	Brad Poiriez, Executive Director 14306 Park Avenue, Victorville, CA 92392 760-245-166 bradp@mdaqmd.ca.gov	Prior to construction.
Mojave Desert Air Quality Management District	Dust Control Plan – Solar Project	Brad Poiriez, Executive Director 14306 Park Avenue, Victorville, CA 92392 760-245-166 bradp@mdaqmd.ca.gov	Prior to the generation of one MW of electrical energy or covering at least one acre

Pursuant to Assembly Bill 205 subsection 25545.1(b)(1), the CEC retains exclusive authority over permitting and supersedes any applicable local statute, ordinance, or regulation. However, the Applicant and CEC would collaborate with the County of San Bernardino on review of this Opt-in Application to ensure compliance with County rules and regulations.

3.8.8 References Cited

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