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4.7 Greenhouse Gas Emissions

Would the Project:	Potentially Significant Impact	Potentially Significant Unless APMs Incorporated	Less Than Significant Impact	No Impact
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	❒	❒	☑	❒
b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	❒	❒	❒	☑

4.7.1 Introduction

This section of the PEA describes the existing conditions in the Proposed Project area and potential impacts relating to greenhouse gases (GHG) associated with construction and operation of the Proposed Project. Construction may result in temporary, short-term emissions of GHGs due to combustion of fossil fuels in construction equipment and vehicles. However, the Proposed Project would not generate GHG emissions, either directly or indirectly, that would have a significant impact on the environment or conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.

4.7.2 Methodology

Federal, state, and regional/local regulations and policies were consulted to determine the Proposed Project's level of compliance with and potential impacts to applicable climate action plans and/or GHG standards. Information for this section was obtained from Internet searches of federal, state, and regional/local websites. Refer also to Appendix 4.7-A for additional discussion of the methods used to predict GHG impacts resulting from the Proposed Project.

This analysis of GHG impacts used the emissions factors from the California Air Resources Board's (CARB) OFFROAD Model (CARB 2007a) for heavy construction equipment and CARB's EMFAC2011 Model (CARB 2011) for on-road vehicles for the construction (short-term) and operational (long-term) analyses. Emissions factors from the OFFROAD Model were based on the South Coast Air Quality Management District's (SCAQMD) composite off-road emissions factors (SCAQMD 2012), since these emissions factors are representative of the construction fleet for Southern California. The San Diego Air Pollution Control District (APCD) does not provide San Diego-specific emissions factors from the OFFROAD Model.

The analysis of GHG evaluates the Proposed Project's potential to generate GHG emissions for the construction and operational phases of the Proposed Project. GHG emissions were calculated with the intent of identifying the biggest contributors of GHGs.

4.7.3 Existing Conditions

Global climate change refers to changes in average climatic conditions on Earth as a whole, including temperature, wind patterns, precipitation, and storms. Global temperatures are moderated by naturally occurring atmospheric gases, including water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which are known as GHGs. These gases allow solar radiation (sunlight) into Earth's atmosphere, but prevent radiative heat from escaping, thus warming Earth's atmosphere.

Gases that trap heat in the atmosphere are often called greenhouse gases, analogous to a greenhouse. GHGs are emitted by both natural processes and human activities. The accumulation of GHGs in the atmosphere regulates Earth's temperature. Emissions from human activities, such as burning fossil fuels for electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere.

The proposed Salt Creek Substation site is undeveloped and not currently a source of GHG emissions. The Existing Substation is currently operating, but is not a major source of GHG emissions because its emissions of carbon dioxide equivalents (CO_2e) are below California's reporting threshold of 25,000 metric tons (MT) of CO_2e annually. The staging areas that would be used for construction are undeveloped and are not currently a source of GHG emissions. The new 5-mile-long 69-kV transmission line (TL 6965), the 69-kV transmission line loop-in (TL 6910), and the underground 12-kV distribution circuits from the Salt Creek Substation would be constructed in transmission corridors that are not existing sources of GHG emissions.

4.7.3.1 Regulatory Background

Global climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns, over a period of time. Global climate change may result from natural factors, natural processes, and/or human activities that change the composition of the atmosphere.

Different GHGs have varying global warming potentials. Global warming potential is the effectiveness of a gas or aerosol to trap heat in the atmosphere. According to USEPA, global warming potential is the "cumulative radiative forcing effect of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas." The reference gas for global warming potential is CO_2; therefore, CO_2 has a global warming potential of 1. The other main GHGs that have been attributed to human activity are CH_4, which has a global warming potential of 21, and N_2O, which has a global warming potential of 310. Table 4.7-1, presents the global warming potential and atmospheric lifetimes of common GHGs.

Table 4.7-1: Global Warming Potentials and Atmospheric Lifetimes of Greenhouse Gases

GHG	Formula	100-Year Global Warming Potential	Atmospheric Lifetime (Years)
Carbon Dioxide	CO_2	1	Variable
Methane	CH_4	21	12 ± 3
Nitrous Oxide	N_2O	310	120
Sulfur Hexafluoride	SF_6	23,900	3,200

Source: California Climate Action Registry 2009

Federal

Endangerment Finding

On April 17, 2009, USEPA issued its proposed endangerment finding for GHG emissions. On December 7, 2009, USEPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the Clean Air Act:

> **Endangerment Finding:** USEPA found that the current and projected concentrations of the six key well-mixed GHGs (CO_2, CH_4, N_2O, hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [SF_6]) in the atmosphere threaten the public health and welfare of current and future generations.
>
> **Cause or Contribute Finding:** USEPA found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

The endangerment findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing USEPA's proposed GHG emissions standards for light-duty vehicles, which were jointly proposed by USEPA and the U.S. Department of Transportation (DOT)'s National Highway Safety Administration on September 15, 2009.

Mandatory Reporting of Greenhouse Gases, 40 CFR Part 98

USEPA's rule titled Mandatory Reporting of Greenhouse Gases (40 CFR Part 98) requires mandatory reporting of GHGs for certain facilities. Subpart DD of the rule, titled Electrical Transmission and Distribution Equipment Use, applies to SF_6 reporting from gas-insulated substations. The proposed Salt Creek Substation would be an air-insulated substation, rather than a gas-insulated substation.

Under the final Mandatory Reporting Rule for Additional Sources of Fluorinated GHGs, owners and operators of electric power system facilities with a total nameplate capacity that exceeds 17,820 pounds (7,838 kilograms) of SF_6 and/or PFCs must report emissions of SF_6 and/or PFCs from the use of electrical transmission and distribution equipment. Owners or operators must

collect emissions data; calculate GHG emissions; and follow the specified procedures for quality assurance, missing data, recordkeeping, and reporting.

The rule requires each electric power system facility operator to report total SF_6 and PFC emissions (including emissions from equipment leaks, installation, servicing, decommissioning, and disposal, and from storage cylinders) from the following types of equipment:

- Gas-insulated substations
- Circuit breakers
- Switchgears, including closed-pressure and hermetically sealed pressure switchgears
- Gas-insulated lines containing SF_6 or PFCs
- Gas containers such as pressurized cylinders
- Gas carts
- Electric power transformers
- Other containers of SF_6 or PFCs

Since the proposed Salt Creek Substation would be an air-insulated substation, only the Proposed Project's transmission circuit-breakers would contain SF_6.

Facilities subject to Subpart DD began monitoring GHG emissions on January 1, 2011, in accordance with the methods specified in Subpart DD. The deadline for reporting is March 31 of each year, unless that date falls on a weekend, in which case the report is due the next business day.

State

California Health and Safety Code Section 38505(g) defines GHGs as any of the following compounds: CO_2, CH_4, N_2O, HFCs, PFCs, or SF_6. CO_2, followed by CH_4 and N_2O, are the most common GHGs that result from human activity.

In the State of California GHG Inventory, CARB compiled statewide anthropogenic GHG emissions and sinks, which include processes that uptake GHG emissions (Table 4.7-2, State of California Greenhouse Gas Emissions by Sector). The inventory includes estimates for CO_2, CH_4, N_2O, SF_6, HFCs, and PFCs. The current inventory covers 1990 through 2008, and is summarized in Table 4.7-2, below. Data sources used to calculate this GHG inventory include California and federal agencies, international organizations, and industry associations. Calculation methodologies applied are consistent with guidance from the Intergovernmental Panel on Climate Change (IPCC). The 1990 emissions level is the sum total of sources and sinks from all sectors and categories in the inventory. CARB's original inventory was divided into seven broad sectors and categories: agriculture, commercial, electricity generation, forestry, industrial, residential, and transportation. The latest inventory includes GHG emissions from recycling and waste management, high-global-warming potential gas emissions, and reductions in GHG emissions related to forestry (forestry sinks).

Table 4.7-2: State of California Greenhouse Gas Emissions by Sector

Sector	Total 1990 Emissions ($MMTCO_2e$)[1]	Percent of Total 1990 Emissions	Total 2008 Emissions ($MMTCO_2e$)	Percent of Total 2008 Emissions
Agriculture	23.4	5%	28.06	6%
Commercial	14.4	3%	14.68	3%
Electricity Generation	110.6	26%	116.35	25%
Forestry (excluding sinks)	0.2	<1%	0.19	<1%
Industrial	103.0	24%	92.66	20%
Residential	29.7	7%	28.45	6%
Transportation	150.7	35%	174.99	37%
Recycling and Waste			6.71	1%
High Global Warming Potential Gases			15.65	3%
Forestry Sinks	(6.7)		(3.98)	

[1] $MMTCO_2e$ refers to million metric tons of carbon dioxide equivalent emissions.
Source: CARB 2007b

The following subsections describe regulations and standards adopted by California to address global climate change issues.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, then-governor Arnold Schwarzenegger signed California Assembly Bill (AB) 32, the Global Warming Solutions Act, into law. Pursuant to AB 32, CARB adopted a comprehensive AB 32 Scoping Plan in December 2008, which outlined programs designed to achieve the 2020 GHG reduction goal of 174 million metric tons (MMT) of CO_2e emissions through regulations, market mechanisms, and other actions.

For the electricity sector, the scoping plan adopted CPUC's fundamental recommendations for investor-owned and publicly owned utilities to continue and increase implementation of programs designed to reduce emissions, including energy efficiency programs, increasing the use of electricity supplies obtained from renewable generation sources to 33% by 2020, and the adoption of a cap and trade system to ensure an overall reduction of emissions from electric generation.

The AB 32 Scoping Plan Measure H-6 led to CARB's Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear (17 CCR, Sections 95350–95359). The proposed Salt Creek Substation would be an air-insulated substation, rather than a gas-insulated substation.

Equipment containing SF_6 would, therefore, only be used for transmission circuit breakers. CARB's SF_6 regulation sets the maximum emissions rate for SF_6-containing equipment at 10% by 2011. The maximum allowable emissions rate decreases by 1% each year. In 2020, the threshold would remain at 1%.

State Standards Addressing Vehicular Emissions

California AB 1493 (Pavley), enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light-duty trucks. CARB adopted the regulations on September 24, 2009, to reduce GHG emissions in new passenger vehicles from 2009 through 2016. CARB has estimated that the regulations will reduce emissions from the light-duty passenger vehicle fleet by an estimated 18% in 2020 and by 27% in 2030.

Senate Bills 1078 and 107 and Executive Order S-14-08

Senate Bill (SB) 1078 requires retail sellers of electricity to provide at least 20% of their supply from renewable sources by 2017. SB 107 changed the target date to 2010. In November 2008, then-governor Schwarzenegger signed Executive Order S-14-08, which expands the Renewables Energy Standard to 33% by 2020. In April 2011, the California legislature enacted SB 2X, which mandates the Renewables Portfolio Standard of 33% by 2020 for investor-owned and publicly owned utilities.

Executive Order S-21-09

Executive Order S-21-09 directs CARB to work with the CPUC and the California Energy Commission (CEC) to implement the Renewables Portfolio Standard of 33% by 2020.

On May 5, 2011, CPUC adopted Order Instituting Rulemaking 11-05-005 to open a new proceeding for the Renewables Portfolio Standard.

CARB is also working with the California Independent System Operator and other load balancing authorities to address reliability, renewable integration requirements, and interactions with wholesale power markets. CARB established a "loading order" in its Energy Action Plan for resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health.

SDG&E Programs

SDG&E has been engaged for many years in activities to reduce GHG emissions. These activities include programs to increase energy efficiency and efforts to meet the Renewables Portfolio Standard of 33% of its supply from renewable sources by 2020. In 2011, 20.8% of SDG&E's retail sales were from renewable energy sources.

SDG&E submits a mandatory Long-Term Procurement Plan (LTPP) to the CPUC that describes its strategy for meeting forecasted load during the next 10 years. The LTPP must be consistent with the "loading order" prescribed in the CEC's Energy Action Plan to meet growth first with conservation, then with renewable sources of electricity, and finally with new fossil fuel sources

to the extent necessary. New generation sources must be consistent with the LTPP. The CPUC approved SDG&E's most recent LTPP in September 2008.

The LTPP includes the following programs to reduce GHG emissions:

- Energy efficiency, which will reduce needed capacity by 487 megawatts (MW) by 2016
- Demand response, which will reduce needed capacity by 249 MW by 2016
- Renewables, which will provide 318 MW in 2010 and 727 MW in 2016
- New peaker plants to back up intermittent renewables and support retirement of older plants

Forecasted reductions from these programs are greater than 1.5 MMT CO_2e per year. These efforts will reduce carbon intensity by one-third while accommodating continued population growth, and will ensure consistency with the applicable plans, policies, and regulations adopted by California to reduce GHG emissions.

4.7.4 Potential Impacts

4.7.4.1 Significance Criteria

Standards for determining impact significance were derived from Appendix G of the CEQA Guidelines. Under these guidelines, the Proposed Project could have a potentially significant impact to GHGs if it would:

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

The San Diego APCD has not established GHG thresholds under CEQA. Both the SCAQMD and the County of San Diego have adopted a significance threshold of 10,000 MT of CO_2e emissions annually for industrial sources, below which levels an industrial project would not generate GHG emissions that would have a significant impact on the environment. The SCAQMD and the County of San Diego recommend amortizing construction emissions over a 30-year period to account for their contribution to GHG emissions over the lifetime of the Proposed Project.

Question 4.7a – Generate Greenhouse Gas Emissions, Either Directly or Indirectly

Impacts from GHG emissions are not direct impacts, but would have the potential for cumulative impacts on the environment. The Summary Report from the California Climate Change Center uses a range of emissions scenarios developed by the IPCC to project a series of potential warming ranges (i.e., temperature increases) that may occur in California during the 21st century. Three warming ranges were identified: lower warming range (3.0 to 5.5°F), medium warming range (5.5 to 8.0°F), and higher warming range (8.0 to 10.5°F). The report then presents an analysis of future projected climate changes in California under each warming-range scenario.

According to the summary report, substantial temperature increases would result in a variety of impacts to the people, economy, and environment of California. These impacts would result from a projected increase in extreme conditions, with the severity of impacts depending on actual future emissions of GHGs and associated warming.

Construction – Less-than-Significant Impact

The main source of GHG emissions associated with the Proposed Project would be fossil fuel combustion during construction. GHG emissions for construction were calculated using the same approach as criteria pollutant emissions for overall construction emissions. Estimated GHGs emissions are summarized in Table 4.7-3, Greenhouse Gas Construction Emissions. Emission calculations are provided in Appendix 4.7-A, Emissions Calculations.

Table 4.7-3: Greenhouse Gas Construction Emissions

	GHG Emissions (metric tons)		
	CO_2	CH_4	N_2O
TOTAL EMISSIONS, Duration of Construction	3,359	0.55	1.77
Global Warming Potential	1	21	310
CO_2 Equivalent	3,359	12	549
CO_2 Equivalent Total	3,921		
Amortized Construction Emissions (amortized over 30 years)	131		

Both the SCAQMD and the County of San Diego have adopted significance thresholds for industrial projects of 10,000 MT of CO_2e annual emissions. The City of Chula Vista also uses the SCAQMD's significance criteria for evaluating significant impacts. The total annualized construction CO_2e emissions of 131 MT for the Proposed Project is below the County of San Diego's and the SCAQMD's significance threshold of 10,000 MT of CO_2e annually for industrial projects. This level of GHG emissions would be less than significant.

Operation & Maintenance – Less-than-Significant Impact

Operation and maintenance activities would include regular inspection of the substation and transmission line and periodic maintenance activities. These activities would generate a minor amount of GHG emissions from vehicles and/or equipment used to inspect and maintain the facilities. GHG emissions associated with operation and maintenance would be well below the significance thresholds.

Equipment that contains SF_6 has the potential to contribute to GHG emissions during operation and maintenance of the Proposed Project. The proposed Salt Creek Substation would be air

insulated, rather than gas insulated. Only the Proposed Project's transmission circuit breakers would contain SF_6.

The Proposed Project would have six transmission circuit breakers. Each circuit breaker is estimated to hold 33 pounds of SF_6. The Proposed Project would, therefore, use a total of 198 pounds of SF_6.

New SF_6 equipment, including the Proposed Project's transmission circuit breakers, has a low leak rate of approximately 0.1% annually per industry standards. The Proposed Project would include design and operational features that would decrease the SF_6 emissions rate to approximately 0.1%, which is well below the maximum allowable SF_6 emissions rate of 1% that CARB has established for 2020 (Section 3.8, Project Design Features and Ordinary Construction/Operations Restrictions). With a leak rate of 0.1% annually, the Proposed Project would emit 0.198 pound of SF_6. Since SF_6 has a global warming potential of 23,900, the Proposed Project would have 4,732 pounds (2.15 MT) of CO_2e for operations and maintenance. This level falls below the County of San Diego's and the SCAQMD's significance threshold of 10,000 MT of CO_2e annually for industrial projects. Accordingly, impacts would be less than significant.

Question 4.7b – Conflict with an Applicable Plan, Policy, or Regulation

Construction – No Impact

The Proposed Project's GHG emissions from construction are below the County of San Diego's and the SCAQMD's significance threshold when amortized over a 30-year period, as recommended by the County of San Diego and the SCAQMD. Equipment and vehicles supporting construction of the Proposed Project would comply with the requirements implemented by CARB to reduce GHG emissions and would be consistent with AB 32's goals. Accordingly, there would be no impact associated with construction.

Operation & Maintenance – No Impact

The proposed Salt Creek Substation would be air insulated. Equipment containing SF_6 would only be for the transmission circuit breakers. SDG&E has on-going standard internal programs and practices that ensure compliance with the applicable SF_6 regulations and air quality plan, and those programs and practices would not change as a result of the Proposed Project (Section 3.8, Project Design Features and Ordinary Construction/Operations Restrictions). By virtue of its compliance with applicable rules and regulations and its similarity to existing operation and maintenance requirements, the Proposed Project is consistent with AB 32's goals. Emissions would not differ from emissions levels for operations and maintenance under existing rules and regulations. Accordingly, no impact would occur.

By complying with applicable rules and regulations and following SDG&E's design and operational features to decrease GHG emissions, the Proposed Project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Accordingly, there would be no impact.

4.7.5 Project Design Features and Ordinary Construction/Operations Restrictions

With implementation of the ordinary construction restrictions, as outlined within Section 3.8, Project Design Features and Ordinary Construction/Operations Restrictions, potential impacts related to GHG, including SF_6, would remain less than significant.

4.7.6 Applicant-Proposed Measures

Because impacts related to GHG emissions are less than significant, no APMs are required or proposed.

4.7.7 Detailed Discussion of Significant Impacts

Based on the above analyses, no significant impacts have been identified for the Proposed Project, and no APMs are required or proposed.

4.7.8 References

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