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5.7 GREENHOUSE GASES

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?	☐	☐	☐	☑

5.7.1 Introduction

This section assesses the potential greenhouse gas (GHG) impacts that would result from the Proposed Project, particularly for short-term construction emissions and long-term operations. For the purpose of the greenhouse gas analysis, all of the components of the Proposed Project are treated as a single project. These components include expansion of the existing 69/12 kilovolt (kV) Artesian Substation, reconductoring of the existing double circuit 69kV power line located between the Artesian and Bernardo Substations, construction of new underground 69kV power line getaways outside the existing Artesian and Bernardo Substations, and minor modifications at the existing Bernardo and Rancho Carmel Substations.

The Proposed Project would not generate enough GHG emissions to have a significant impact on the environment and would not conflict with any applicable plan for reducing GHG emissions. Impacts would be less than significant and temporary during construction and would have no impact during operations.

5.7.2 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 air quality plans and/or standards. Information for this section was obtained from internet searches of federal, state, and regional/local websites.

This analysis of GHG impacts used the latest version of the CalEEMod, Version 2013.2.2. CalEEMod contains emissions factors from the CARB's OFFROAD Model for heavy construction equipment and CARB's EMFAC2011 Model for on-road vehicles. This analysis covers construction in the short term and operation and maintenance in the long term. In addition, manual calculations of long-term GHG emissions resulting from potential leakage of sulfur hexafluoride from new gas insulated circuit breakers at the Artesian Substation were

performed. Refer to Appendix 5.3-A and Appendix 5.7-A, SF_6 Emissions Calculations, for additional details.

5.7.3 Existing Conditions

This section describes the regulations and regulatory agencies that have jurisdiction over the Proposed Project, regional climate and meteorology, and existing air quality conditions in the area.

5.7.3.1 Greenhouse Gases and Global Climate Change 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 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 the 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 carbon dioxide (CO_2); therefore, CO_2 has a global warming potential of 1. The other main GHGs that have been attributed to human activity include methane (CH_4), which has a global warming potential of 21, and nitrous oxide (N_2O), which has a global warming potential of 310. Table 5.7-1, Global Warming Potentials and Atmospheric Lifetimes of Greenhouse Gases, presents the global warming potential and atmospheric lifetimes of common GHGs.

Table 5.7-1: Global Warming Potentials and Atmospheric Lifetimes of Greenhouse Gases

GHG	Formula	100-Year Global Warming Potential
Carbon Dioxide	CO_2	1
Methane	CH_4	21
Nitrous Oxide	N_2O	310
Sulfur Hexafluoride	SF_6	23,900
Source: *CFR Title 40 Part 98 Subpart A.*		

Federal

Endangerment Finding

On April 17, 2009, the USEPA issued its proposed endangerment finding for GHG emissions. On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the Federal 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], SF_6, and

perfluorocarbons [PFCs] 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 emission standards for light-duty vehicles, which were jointly proposed by USEPA and the DOT's National Highway Safety Administration on September 15, 2009.

Mandatory Reporting of Greenhouse Gases, 40 CFR Part 98

USEPA's rule entitled 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, requires reporting about SF_6 from gas insulated substations and circuit breakers.

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 (lbs) (7,838 kilograms) of SF_6 and/or PFCs must also 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 that each electric power system facility must 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;
- Switchgear, including closed-pressure and hermetically sealed-pressure switchgear;
- Gas-insulated lines containing SF_6 or PFCs;
- Gas containers such as pressurized cylinders;
- Gas carts;
- Electric power transformers; and
- Other containers of SF_6 or PFCs.

Only the Proposed Project's transmission circuit breakers would contain SF_6. The capacity of SDG&E's overall electric power system facilities exceeds 17,820 lbs. SDG&E therefore would report on SF_6 from the Proposed Project's circuit breakers as part of its overall reporting under Subpart DD.

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, and 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, the CARB compiled statewide anthropogenic GHG emissions and sinks, which include processes that uptake GHG. The inventory includes estimates for CO_2, CH_4, N_2O, SF_6, HFCs, and PFCs. The current inventory covers 1990 to 2013, and is summarized in Table 5.7-2. 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, which include 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 5.7-2: State of California Greenhouse Gases Emissions by Sector

Sector	Total 1990 Emissions ($MMTCO_2e$)	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%	93.66	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]MMTCO2e refers to million metric tons of carbon dioxide equivalent emissions.
Source: Staff Report – California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit, California Air Resources Board, November 16, 2007.

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

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 climate change emissions from light duty passenger vehicle fleet by an estimated 18 percent in 2020 and by 27 percent in 2030.

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

Senate Bill 1078, approved in 2002, requires retail sellers of electricity to provide at least 20 percent of their supply from renewable sources by 2017. Senate Bill 107 changed the target date to 2010. In November 2008, Governor Schwarzenegger signed Executive Order S-14-08, which expands the Renewables Energy Standard to 33 percent by 2020. In April 2011, the California legislature enacted Senate Bill 2X, which mandates the Renewables Portfolio Standard of 33 percent by 2020 for investor-owned and publicly-owned utilities.

Executive Order S-3-05

In June 2005, Governor Schwarzenegger signed Executive Order S-3-05 to set GHG emissions reductions targets for the State of California. The state's first GHG emissions targets were:

- Reduce GHG emissions to 2000 levels by 2010;
- Reduce GHG emissions to 1990 levels by 2020; and
- Reduce GHG emissions to 80 percent below 1990 levels by 2050.

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

In September 2006, Governor 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 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 both 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 percent by 2020, and adopting 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). CARB's SF_6 regulation sets the maximum emission rate for SF_6-containing equipment at

10 percent by 2011. The maximum allowable emission rate decreases by one percent each year. In 2020, the threshold will remain at one percent.

Senate Bill 97

Governor Schwarzenegger approved Senate Bill 97 in August 2007. The bill acknowledges that climate change is an issue that requires analysis under CEQA. Executive Order S-21-09, signed by Governor Schwarzenegger in September 2009, directs CARB to work with the CPUC and CEC to implement the Renewables Portfolio Standard of 33 percent by 2020. The CEQA guidelines implementing the bill became effective in March 2010.

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

Assembly Bill 1826

Assembly Bill 1826 was signed by Governor Brown in October 2014. The law requires local jurisdictions across California to implement recycling programs for organic waste created by businesses. Depending upon how much is generated per week, businesses will be required to recycle organic waste on and after April 1, 2016. This was enacted to reduce the quantity of organic waste in landfills to reduce the GHG emissions from landfills.

Executive Order B-30-15

Executive Order B-30-15 was signed by Governor Brown in April 2015. It established an interim target to those established in Executive Order S-3-05 of reducing GHG emissions to 40 percent below 1990 levels by 2030.

Local

Because the CPUC has exclusive jurisdiction over the siting, design, and construction of the Proposed Project, the Proposed Project is not subject to local discretionary land use regulations. The following discussion of the local regulations relating to GHG emissions is provided for informational purposes. As outlined in the following subsections, the construction and operation of the Proposed Project will not conflict with any environmental plans, policies, or regulations adopted by agencies with jurisdiction over local regulations related to GHG emissions.

San Diego County

<u>Ozone Air Quality Management Plan</u>

The San Diego County Air Pollution Control District (SDAPCD) SIP predicts that state and local programs will allow the County to reach attainment status for the federal eight-hour ozone AAQS (per the SIP submitted to the EPA in June 2007). It is anticipated that the EPA will designate San Diego County as a nonattainment area for the new 0.075-part-per-million eight-hour O_3 standard, and the SDAPCD will be required to submit an updated SIP to address the new, more stringent standard at that time. The SDAPCD maintains the Regional Air Quality Strategy (RAQS), which demonstrates how the district will eventually meet the state O_3 AAQS and details the measures and regulations that focus on managing and reducing O_3 precursors.

The RAQS control measures concentrate on stationary sources that are under the SDAPCD's jurisdiction.

Climate Action Plan

The County of San Diego adopted their Climate Action Plan in June 2012. The Climate Action Plan was developed to address the issues of growth and climate change within the County of San Diego. In November 2013, the County of San Diego released their Guidelines for Determining Significance for Climate Change which includes a framework for determining the significance of GHG emissions from development projects. More specifically, it indicates that a project will have a significant impact if it increases operational greenhouse gas emissions, either directly or indirectly, by 2,500 $MTCO_2e$ per year.[1] This threshold is designed for projects that include residential, commercial, civic, light industrial uses, or a mixture of these uses. In addition, construction-related emissions do not need to be separately analyzed or included as an assessment against this threshold as construction emissions for land use projects in San Diego County were incorporated into the threshold.

City of San Diego

In March 2015, the City of San Diego released its Draft Climate Action Plan, which identifies measures to effectively meet GHG reduction targets for 2020 and 2035. This plan was developed in response to the mitigation required as part of the 2008 General Plan and will also serve as a Qualified GHG Reduction Plan for the purposes of tiering under CEQA through 2020. The plan includes strategies for reducing GHG emissions through the development of energy- and water-efficient buildings; use of clean and renewable energy sources; replacement of automobile use with bicycles, walking, and public transportation; reduction of waste; and development of flexible policies to adapt to climate change.

SDG&E Programs

SDG&E has been engaged in programs to increase energy efficiency for many years. It has also increased the portion of its electricity generation portfolio generated by renewable resources of energy.

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 California Energy Commission's (CEC) Energy Action Plan to meet growth first with conservation, then with renewable sources of electricity, and finally with new fossil-fueled 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.

[1] Though this threshold was invalidated through legal action in 2014, it was used as a reference for the purpose of this analysis.

The LTPP includes the following programs to reduce GHG emissions:

- Energy efficiency, which will reduce needed capacity by 487 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; and
- New peaker plants to back up intermittent renewables and support retirement of older plants.

Forecasted reductions from these programs are greater than 1.5 million metric tons (MMT) carbon dioxide equivalent (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.

5.7.4 Potential Impacts

The operation and maintenance activities required for the Proposed Project will not change significantly from those currently required for the existing system; thus, no additional operation-related impacts related to greenhouse gases will occur. Therefore, the impact analysis addresses both construction and operation and maintenance emissions, but is focused on construction activities that are required as described in Chapter 3.0, Project Description.

5.7.4.1 Significance Criteria

Standards of significance were derived from Appendix G of the *CEQA Guidelines*. Under these guidelines, the Proposed Project could have a potentially significant impact greenhouse gas emissions if it will:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHG.

5.7.4.2 Question 7a – Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

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 GHG emissions are summarized in Table 5.7-3, Greenhouse Gas Construction Emissions. Emission calculations are provided in Appendices 5.3-A.

Table 5.7-3: Greenhouse Gas Construction Emissions

	GHG Emissions		
	CO_2	CH_4	N_2O
Total GHG Emissions	2,360.9	0.7	0.0
Global Warming Potential	1	21	310
CO_2 Equivalent	2,360.9	14.1	0.0
CO_2 Equivalent Total	2,375.0		

The SDAPCD has not adopted a GHG significance threshold for use in CEQA analyses. Both the South Coast Air Quality Management District (SCAQMD) and the County of San Diego have adopted significance thresholds for industrial projects of 10,000 MT of CO_2e annual emissions which has been adopted for use in this analysis. The total construction CO_2e emissions of 2,375 metric tons are below 10,000 MT of CO_2e annually. 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 transmission and power lines and periodic maintenance activities. These activities already occur and would not generate a significant amount of GHG emissions from vehicles and/or equipment used to inspect and maintain the facilities. New circuit breakers being installed will be insulated with SF_6, which is a GHG and the circuit breakers have potential to emit GHG. An emissions rate of 1% has been assumed, which is very conservative for the current technology, for an estimated annual leakage of 24.7 pounds SF_6 per year which is 268 metric tons CO_2e per year (refer to Appendix 5.7-A) and not contribute appreciably to the threshold of 10,000 MT adopted by the SCAQMD and County of San Diego. The emissions associated with operation and maintenance of the Proposed Project would be well below the significance thresholds.

5.7.4.3 Question 7b – Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Construction – No Impact

The Proposed Project's GHG emissions from construction are below the County of San Diego's and SCAQMD's significance threshold. 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. Therefore, there would be conflict with any applicable plan, policy or regulation. Accordingly, there would be no impact associated with construction.

Operation & Maintenance – No Impact

By virtue of the Proposed Project's 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. Also, transmission and power line circuit breakers are the only equipment for the Proposed Project that contain SF_6. SDG&E has ongoing

standard internal programs and practices that ensure compliance with CARB's SF_6 regulations and maximum emissions rate. Those programs and practices would not change as a result of the Proposed Project. 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. There would be no impact.

5.7.5 Applicant Proposed Measures

Because GHG impacts would be less than significant, no APMs are required or proposed.

5.7.6 Detailed Discussion of Significant Impacts

Based upon the preceding analysis, no significant impacts relating to greenhouse gases are anticipated from the Proposed Project.

5.7.7 References

California Air Resources Board (CARB). 2008. *AB 32 Scoping Plan*. Online: http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm. Last accessed December 22, 2015.

California Air Resources Board (CARB). 2014. California Greenhouse Gas Emission Inventory 2000-2012. Online: http://www.arb.ca.gov/cc/inventory/pubs/reports/ghg_inventory_00-12_report.pdf. Last accessed June 16, 2015.

California Air Resources Board (CARB). 2015. California Greenhouse Gas Emission Inventory Program. Online: http://www.arb.ca.gov/cc/inventory/inventory.htm. Last accessed December 22, 2015.

City of San Diego. 2011. *Significance Determination Thresholds*. January 2011.

County of San Diego, Department of Planning and Land Use. 2012. *County of San Diego, Report Format and Content Requirements, Greenhouse Gas Analyses and Reporting*. June 20.

San Diego Air Pollution Control District (SDAPCD). 2015. 2009-2013. *Five-Year Air Quality Summary*. Online: http://www.sdapcd.org/info/reports/5-year-summary.pdf. Accessed on June 15.

South Coast Air Quality Management District (SCAQMD). 1993. *CEQA Air Quality Handbook.*

South Coast Air Quality Management District (SCAQMD). 2008. *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plans*. December 5.

United Nations Framework Convention on Climate Change, Global Warming Potentials. Online: http://unfccc.int/ghg_data/items/3825.php. Site visited on June 15, 2015.