

5.7 Greenhouse Gas Emissions

5.7.1 Environmental Setting

Globally, temperatures, precipitation, sea levels, ocean currents, wind patterns, and storm activity are all affected by the presence of greenhouse gases (GHG). Unlike criteria air pollutants or toxic air contaminants that are of regional and/or local concern, human-caused emissions of GHGs are linked to climate change on a global scale. GHGs allow ultraviolet radiation to enter the atmosphere and warm the Earth's surface and prevent some infrared radiation emitted by the Earth from escaping back into space. The largest anthropogenic source of GHGs is fossil fuel combustion, which results primarily in carbon dioxide (CO₂) emissions.

Scientific research indicates that observed climate change is most likely a result of increased GHG emissions associated with human activity (IPCC, 2007). Global climate change describes a collection of phenomena, such as increasing temperatures and rising sea levels, occurring across the globe due to increasing anthropogenic emissions of GHGs (EPA, 2011).

Efforts to manage the anthropogenic drivers of global climate change focus on six primary greenhouse gases, namely, CO₂, methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

California produced in 2008 approximately 478 million metric tons of CO₂ equivalent (478 MMTCO₂e), equal to about 525 million tons, or about one percent of 49,000 MMTCO₂e emitted globally (IPCC, 2007).² The main sources of GHG emissions in California are the transportation and energy sectors. Some of the potential effects of future climate change on California resources include the following (CCCP, 2009):

- Warming would raise the elevation of the snow line, reduce spring snowmelt, and increase winter runoff. Additional winter runoff generally is not storable because of flood control needs. Reduced spring snowmelt runoff would result in decreased early summer storage at major foothill reservoirs and decreased hydroelectric production.
- Higher temperatures and reduced snowmelt would compound the problem of providing suitable cold water habitat for salmon species.
- Sea level rise would affect the Sacramento–San Joaquin River Delta, worsening existing levee problems; cause more saltwater intrusion; and adversely affect many coastal marshes and wildlife reserves.
- Increasing temperatures would increase agricultural demands for water and increase stress on native vegetation, potentially allowing for an increase in pest and insect epidemics and a higher frequency of large, damaging wildfires.

Rules and Regulations

California Global Warming Solutions Act (AB 32). The California Global Warming Solutions Act of 2006, Assembly Bill 32 (AB 32) requires that California's greenhouse gas (GHG) emissions be reduced to 1990 levels by 2020. The reduction will be accomplished through an enforceable statewide cap on global warming emissions to be phased in beginning 2012. AB 32 directs the CARB to develop regulations and a mandatory reporting system to track and monitor global warming emissions levels (AB 32, Chapter 488,

² One metric ton (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.

Statutes of 2006). The CARB Climate Change Scoping Plan, approved December 2008, provides the framework for achieving California's goals.

In passing AB 32, the California Legislature found that:

Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

The regulations implementing AB 32 are in development and being phased-in at this time. The CPUC is taking steps to address climate change in advance of project-specific GHG requirements. For example, the CPUC established requirements for the utilities under the Electricity Greenhouse Gas Emission Standards Act (SB 1368; PUC §8340 *et seq*), which requires that base load generation and contracts be subject to a GHG Emission Performance Standard of 1,100 pounds (or 0.5 metric tons) of carbon dioxide (CO₂) per megawatt-hour (MWh) of electricity produced. The Emission Performance Standard applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or longer, including contracts with power plants located outside of California.³

Implementation of the Climate Change Scoping Plan requires careful coordination on the State's energy policies, meaning that CPUC and CARB work together to implement GHG programs affecting production and delivery of electricity, especially one key element: achieving a renewable energy mix of 33 percent that is reliably delivered to electricity customers. Additionally, the Intergovernmental Panel on Climate Change (IPCC), an international scientific body, has established that one of its Key Mitigation Technologies and Practices for Energy Supply is improved energy supply and distribution efficiency (IPCC, 2007).

Mandatory Reporting of Greenhouse Gas Emissions (17 CCR 95100). Mandatory reporting of GHG emissions applies to electric generating facilities with a nameplate capacity equal or greater than 1 MW capacity and GHG emissions exceeding 2,500 metric tons per year. As an Electric Power Entity under this rule, PG&E must report GHG emissions associated with providing electricity to end-use customers.

California Renewable Energy Programs. In 2002, California initially established its RPS, with the goal of increasing the percentage of renewable energy in the State's electricity mix to 20 percent by 2017. State energy agencies recommended accelerating that goal, and California Executive Order S-14-08 (November 2008) required California utilities, including PG&E, to reach the 33 percent renewable electricity goal by 2020, consistent with the AB32 Scoping Plan (CARB, 2008). In April 2011, Senate Bill 2 of the 1st Extraordinary Session (SB X1-2) was signed into law. SB X1-2 expressly applies the new 33 percent RPS by December 31, 2020 to all retail sellers of electricity and establishes renewable energy standards for interim years prior to 2020.

CARB SF₆ Regulations (17 CCR 95350). In 2010, CARB adopted a regulation for reducing SF₆ emissions from electric power system gas insulated switchgear. The regulation requires owners of such switchgear to: (1) annually report their SF₆ emissions; (2) determine the emission rate relative to the SF₆ capacity of the switchgear; (3) provide a complete inventory of all gas insulated switchgear and their SF₆ capacities;

³ See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

(4) produce a SF₆ gas container inventory; and (5) keep all information current for CARB enforcement staff inspection and verification.

San Joaquin Valley Air Pollution Control District Guidelines. To assist lead agencies, project proponents, permit applicants, and interested parties in assessing and reducing the impacts of project-specific GHGs on global climate change, SJVACPD has adopted two guidance and policy documents: *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA*, and *District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency* (SJVAPCD, 2009a and 2009b). Neither of these documents directly apply to PG&E’s power line project (i.e., the project is not a land use development and not a notable stationary source).

Merced County General Plan. A policy identified in the Air Quality Element of the Merced General Plan states that Merced County will prepare a Climate Action Plan to achieve reductions in greenhouse gas emissions (Merced County, 2011). The Plan has not yet been issued.

- Although the SJVAPCD has not established significance criteria for GHG emissions, the significance of project-related GHG impacts may be evaluated using the October 24, 2008, CARB Preliminary Draft Staff Proposal for Setting Significance Thresholds for GHGs (CARB, 2008). In that proposal, CARB suggested significance thresholds for industrial and residential/commercial projects; however, no significance thresholds for construction have been established. CARB’s preliminary draft proposal suggests a quantitative threshold of 7,000 metric tons of CO₂e per year for operational emissions (excluding transportation) for industrial projects.

Applicant Proposed Measures

PG&E proposes to implement measures during the design, construction, and operation of the Proposed Project to ensure it would occur with minimal environmental impacts in a manner consistent with applicable rules and regulations. Applicant Proposed Measures (APMs) are considered part of the Proposed Project and are considered in the evaluation of environmental impacts. CPUC approval would be based upon PG&E adhering to the Proposed Project as described in this document, including this project description and the APMs (see Table 5.7-1), as well as any adopted mitigation measures identified by this Initial Study.

Table 5.7-1. Applicant Proposed Measures (APMs) Related to Greenhouse Gas Emissions

APM Number	Issue Area
Air Quality	
APM AQ-3	Avoid and Minimize Potential Sulfur Hexafluoride (SF₆) Emissions. PG&E will continue to include the project substations in PG&E’s system-wide SF ₆ emission reduction program, which includes inventorying and monitoring system-wide SF ₆ leakage rates and employing X-ray technology to inspect internal circuit breaker components to eliminate dismantling of breakers and reduce accidental releases. New project breakers will have a manufacturer’s guaranteed SF ₆ leakage rate of 0.5 percent per year or less and will be maintained in accordance with PG&E’s maintenance guidelines.

5.7.2 Environmental Impacts and Assessment

GREENHOUSE GAS EMISSIONS

Would the project:

	Potentially Significant Impact	Less than Significant With Mitigation 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Significance criteria established by CEQA Guidelines, Appendix G.

a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

LESS THAN SIGNIFICANT IMPACT – CONSTRUCTION. Project construction would result in emission of GHGs from on-site construction equipment and off-site worker trips. Anticipated GHG emissions were calculated by the applicant for all construction-related activities (PG&E, 2011). The GHGs due to fuel use and combustion are CO₂, CH₄, and N₂O. Methane and N₂O emissions represent less than 1 percent of the combustion emissions, and although these compounds have greater global warming potential, they were not included in the GHG calculations (PG&E, 2011). Other GHGs such as SF₆, hydrofluorocarbons, and perfluorocarbons were not included in the construction emission calculations because construction activities would not emit these constituents.

Project activity data and emissions presented in this chapter are summarized from the applicant’s construction and operation emissions forecast for the Cressey-Gallo 115 kV Power Line Project, which is included as Appendix D in this IS/MND (PG&E, 2011). The results of detailed construction GHG emission calculations are presented in Appendix D (Construction and Operation Emissions) (PG&E, 2011). Construction emissions were estimated using construction equipment emission factors available at the time of project design, from URBEMIS2007 and truck emission factors from EMFAC2007, which would conservatively over-state emissions from the anticipated construction equipment fleet. Approximately 843 MT CO₂ would be emitted over the entire construction phase of the project. Implementation of air quality-related APMs would reduce short-term GHG emissions by approximately 5.4 percent to 797 metric tons of CO₂. GHG construction emissions from the Proposed Project amortized over a project life of 30 years and added to negligible operation emissions would fall well below the interim numerical threshold of 7,000 MTCO₂e per year. As such, the level of GHG emissions generated by the project would not have a significant impact on the environment, and the impact would be less than significant.

LESS THAN SIGNIFICANT IMPACT – OPERATIONS AND MAINTENANCE. Installation of new circuit breakers at Cressey and Gallo Substations would result in a very small increase in emissions of the GHG SF₆. These potential SF₆ emissions are presented in Table 5.7-2 (PG&E, 2011). The new circuit breakers installed at Cressey and Gallo Substations would be required to comply with recently adopted standards for SF₆-insulated circuit breakers. Based on SF₆ emission rates at the maximum leakage rate allowed by the manufacturer of 0.5 percent, the GHG emissions would be minor. The emission calculations are included in Appendix D (PG&E, 2011). This level of GHG would not have a significant impact on the environment, and the impact associated with the GHG emissions would be less than significant.

Table 5.7-2. Potential SF₆ Process Loss Emissions

Substation Name	Number of 115 kV Circuit Breakers	SF ₆ Emissions (metric tons/year)	CO ₂ e Emissions (metric tons/year)
Cressey	2	0.00033	7.8
Gallo	2	0.00033	7.8
Total			16

It was assumed that each circuit breaker will contain 72 pounds of SF₆ with a conservative leakage rate of 0.5 percent. A global warming potential (GWP) of 23,900 was used to convert SF₆ emissions to CO₂e emissions. This value is based on the GWP in the USEPA Mandatory Reporting Regulation (40 CFR Part 98, Subpart A).
Source: See Appendix D (PG&E, 2011).

b. Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

LESS THAN SIGNIFICANT IMPACT. The Climate Change Scoping Plan, approved by CARB on December 12, 2008 (CARB, 2008), provides an outline of actions to reduce California’s GHG emissions. The scoping plan requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs.

The Proposed Project would improve the infrastructure used in distribution of California’s energy supply, and it would not affect California’s ability to supply renewable energy. The Proposed Project would not affect PG&E’s ability to meet its RPS obligations. Similarly, the Proposed Project would not affect or conflict with Merced County’s ability to achieve its GHG reduction goals.

Maintenance of project facilities would be incorporated into existing PG&E activities so GHG emissions from maintenance activities are not anticipated to increase as a result of this project. PG&E would comply with CARB SF₆ regulations to inventory, report, and minimize SF₆ leaks through the use of new technology. By complying with these requirements, the Proposed Project would not conflict with any applicable GHG management plan, policy, or regulation. Therefore, this impact would be less than significant.

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