

3.7 GREENHOUSE GAS EMISSIONS

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3.7.1 Definitions

Gases that trap heat in the atmosphere (i.e., GHGs) regulate the earth's temperature. The greenhouse gas effect is responsible for maintaining a habitable climate. The most common GHGs are carbon dioxide (CO₂) and water vapor. Other critical GHGs include methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). GHGs are released into the earth's atmosphere through a variety of natural processes and human activities. Some emission sources of GHGs are listed in Table 3.7-1.

Table 3.7-1 Greenhouse Gas Emission Sources

Source Category	Example Source	GHG
Energy	Electricity generation	CO ₂
	Transportation	N ₂ O
Industry	Refrigeration and cooling	HFCs
	Semi-conductor manufacturing	PFCs
	Substations	SF ₆
Agriculture	Crop fertilization	N ₂ O
	Livestock	CH ₄
Waste	Landfill operation	CH ₄

Each GHG has its own potency and effect upon the earth's energy balance, expressed in terms of a global warming potential (GWP), with CO₂ being assigned a value of 1 and SF₆ being several orders of magnitude stronger with a GWP of 23,500 (Intergovernmental Panel on Climate Change 2013). In GHG emission inventories, the weight of each gas is multiplied by its GWP and is measured in units of equivalent CO₂ (CO₂e).

An expanding body of scientific research supports the theory that global climate change is currently affecting weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, and that it will increasingly do so in the future. The climate and several naturally occurring resources within California could be adversely affected by global climate change. Increased precipitation and sea level rise could increase coastal flooding, saltwater intrusion, and degradation of wetlands. Mass migration and/or loss of plant and animal species could also occur. Potential effects of global climate change that could adversely affect human health include more extreme heat waves and heat-related stress; an increase in climate-sensitive diseases; more frequent and intense natural disasters such as flooding, hurricanes, and drought; and increased levels of air pollution.

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3.7.2 Statewide Greenhouse Gas Emission

Total gross California GHG emissions in 2014¹ were 441.5 million metric tons (MT) of CO₂e, a decrease of 2.8 million MT CO₂e compared to 2013. Table 3.7-2 shows the statewide GHG emissions estimated by CARB for the years 1990 and 2014 (CARB 2016b). During the 2000 to 2014 period, per capita GHG emissions in California have declined from a peak in 2001 of 13.9 metric tons per person to 11.4 metric tons per person in 2014 (an 18 percent decrease). The reduction in GHG emission generation during this time period have been attributed to energy efficiency and conservation efforts (CARB 2016a).

Table 3.7-2 California Greenhouse Gas Inventory

Source Category	1990 (million MT CO ₂ e)	2014 (million MT CO ₂ e)
Total Energy	386.41	367.70
<i>Energy Industries</i>	157.33	139.95
<i>Manufacturing Industries and Construction</i>	24.24	20.28
<i>Transport</i>	150.02	158.62
<i>Other Sectors</i>	48.19	41.02
<i>Non-Specified</i>	1.38	-
<i>Fugitive Emissions from Fuels</i>	5.25	7.84
Industrial Processes and Product Use	18.34	30.24
Agriculture, Forestry, and Other Land Use	19.11	32.85
Waste	9.42	10.73
Gross California Emissions	433.29	441.5

Sources: (CARB 2007, CARB 2016b)

3.7.3 Impact Analysis

Summary of Impacts

Table 3.7-3 presents a summary of the CEQA significance criteria and impacts from GHG emissions that would occur during construction, operation, and maintenance of the proposed project.

¹ The most recent year for which GHG emissions are available.

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Table 3.7-3 Summary of Proposed Project Impacts from Greenhouse Gas Emissions

Would the proposed project:	Potentially Significant Impact	Less than Significant Impact 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 an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Impact Discussion

a) Would the proposed project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	Significance Determination
	Less than significant

BAAQMD is the regional agency tasked with managing air quality in the SFBAAB. BAAQMD published the 2017 CEQA Air Quality Guidelines, which include thresholds for GHG emissions. BAAQMD has not proposed GHG thresholds for construction emissions. The proposed project is not a stationary source of emissions; therefore, the BAAQMD GHG threshold for projects that are not stationary sources are applied to this assessment. The BAAQMD GHG threshold for non-stationary sources is 1,100 MT CO₂e per year (BAAQMD 2017).

NSCAPCD is the agency tasked with managing air quality in the NCAB. NSCAPCD has not prepared significance thresholds for GHG emissions. The BAAQMD significance thresholds are used for analysis of all GHG emissions that would be generated by the proposed project.

Greenhouse gas emissions would be generated during construction of the proposed project from mid-2018 to ~~mid-2019~~early 2020. The assumptions and results of the GHG emissions modeling for construction of the proposed project are provided in Appendix C. The total estimated GHG emissions from proposed project construction activities are provided in Table 3.7-4. The construction emissions are amortized over a 30-year period, as shown in Table 3.7-4. The amortization of construction emissions is consistent with industry standard practice.

GHG emissions from operation and maintenance of the proposed project would primarily result from vehicle travel to and from the project alignment to conduct routine inspections. Vehicle emissions associated with transmission line operation and maintenance would be similar to existing conditions because PG&E currently conducts maintenance on the existing power line, and the conductor and pole replacement would not increase the intensity, frequency, or duration of inspections or maintenance. Operation and maintenance of the reconducted power line would have no impact on GHG emissions.

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Table 3.7-4 Greenhouse Gas Emissions Generated by the Proposed Project

Project Phase	CO ₂ Equivalent Emissions Per Year (MT CO ₂ e)
Construction Equipment and Vehicle Emissions	933
Construction Helicopter Operation Emissions	2,524
Total Construction Emissions	3,457
<i>Amortized Construction Emissions (30 years)</i>	115
<i>Annual Circuit Breaker SF₆ Leakage</i>	18
Total Annual Project Emissions ^a	133
BAAQMD Annual Significance Threshold	1,100
Exceeds Threshold?	No

Note:

^a Derived from the sum of the amortized construction emissions and the annual circuit breaker SF₆ leakage emissions.

Sources: (The RCH Group 2017, PG&E 2016, BAAQMD 2017)

The proposed project would include installation of two new gas insulated circuit breakers within Fulton Substation. The proposed gas insulated circuit breakers would contain SF₆ and replace air switches that do not contain SF₆. The proposed project could create a new source of GHGs as a result of leaks in the circuit breakers. CARB Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear (Sections 95350 to 95359, title 17, California Code of Regulations) requires a maximum leak rate of 1 percent SF₆ from the new circuit breakers. Assuming an SF₆ leak rate of 1 percent per year, the annual operational GHG emissions would be 36 MT CO₂e and less than significant. PG&E has proposed APM GHG-2, which requires that the new breakers have a manufacturer’s guaranteed maximum leakage rate of 0.5 percent per year or less for SF₆. With implementation of APM GHG-2, the annual GHG emissions from the new circuit breaker would be 18 MT CO₂e, as shown in Table 3.7-4. The total operational and 30-year amortized construction GHG emissions would be less than the BAAQMD operational threshold of 1,100 MT CO₂e per year. The impact from operational-related GHG emissions would remain less than significant.

Required APMs and MMs: APM GHG-2

b) Would the proposed project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	Significance Determination
	Less than significant

Construction

Climate Change Scoping Plan

The Global Warming Solutions Act of 2006 directed CARB to begin developing discrete early actions to reduce GHG emissions while also preparing the Climate Change Scoping Plan (Scoping Plan), which outlines a framework of measures that would eventually be adopted and

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implemented to reach AB 32 goals (CARB 2016a). CARB approved the Scoping Plan in 2008 and updated it in May 2014. In September of 2016, AB 32 was extended to achieve reductions in GHG of 40 percent below 1990 levels by 2030. The new plan, outlined in Senate Bill 32, involves increasing renewable energy use, putting more electric cars on the road, improving energy efficiency, and curbing emissions from key industries. Regulations are being phased in over time. Adopted regulations that correspond to elements of the Scoping Plan include the 33 percent Renewable Portfolio Standard by 2020 (Senate Bill X1-2), the Cap-and-Trade Program, and the Low Carbon Fuel Standard. Additional regulations have been adopted since the Scoping Plan that further the GHG emission reduction goals, including the 50 percent Renewable Portfolio Standard by 2030 (Senate Bill 350). Relevant recommended actions of the updated Scoping Plan are generally related to transportation/goods movement and gases with a high GWP (CARB 2014).

Since the updated Scoping Plan, CARB has prepared the Mobile Source Strategy, which addresses the current and proposed programs for reducing all mobile source emissions including GHG emissions. The Mobile Source Strategy identifies programs that the state and federal government have or will adopt, which further the goals of the Scoping Plan. Some programs provide incentives to facilitate increased purchase of new, lower emission light-, medium-, and heavy-duty vehicles to aid the state in achieving emission reduction goals. Other programs require certain engine years to upgrade the engine to newer, cleaner engines by specific dates or strict performance standards for specific model years. These programs for more stringent emission are required by state and federal law and monitored by CARB or USEPA (CARB 2016c); therefore, the vehicles used during construction of the proposed project are required to comply with the applicable GHG reduction programs for mobile sources. PG&E or the construction contractor are required to provide verification of compliance to CARB or USEPA under state and federal law. The proposed project would conform with relevant programs and recommended actions detailed in the Scoping Plan and Mobile Source Strategy. The proposed project would not conflict with regulations adopted to achieve the goals of the Scoping Plan. No impact would occur.

2017 Clean Air Plan

The proposed project would not conflict with the 2017 CAP because GHG emissions would be below the BAAQMD significance threshold for GHGs as shown in Table 3.7-4. The impact would be less than significant.

Sonoma County General Plan

The Sonoma County General Plan 2008 identifies actions for the County to implement including provision of alternatives to gas-powered vehicles and goals to reduce GHG emissions. The actions identified in the County's General Plan are outside the purview of the proposed project and the proposed project would not conflict with implementation of the actions to reduce GHGs. No impact would occur.

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Operation and Maintenance

Operation and maintenance activities for the proposed project would be approximately the same as existing conditions. PG&E would continue to regularly inspect, maintain, and repair conductor, poles, and substation facilities in the same manner. Emissions generated by equipment and vehicles during operation and maintenance of the proposed project would not be greater, nor would it conflict with the Scoping Plan, 2017 CAP, or local plans. No impact would occur.

Required APMs and MMs: None

3.7.4 Required Applicant Proposed Measures and Mitigation Measures

APM GHG-2: Minimize Sulfur Hexafluoride Emissions

- Incorporate Fitch Mountain Substation into PG&E's system-wide sulfur hexafluoride (SF₆) emission reduction program. CARB has adopted the Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear sections 95350 to 95359, title 17, California Code of Regulations, which requires that company-wide SF₆ emission rate not exceed 1 percent by 2020. Since 1998, PG&E has implemented a programmatic plan to inventory, track, and recycle SF₆ inputs, and inventory and monitor system-wide SF₆ leakage rates to facilitate timely replacement of leaking breakers. PG&E has improved its leak detection procedures and increased awareness of SF₆ issues within the company. X-ray technology is now used to inspect internal circuit breaker components to eliminate dismantling of breakers, reducing SF₆ handling and accidental releases. As an active member of USEPA's SF₆ Emission Reduction Partnership for Electrical Power Systems, PG&E has focused on reducing SF₆ emissions from its transmission and distribution operations, and has reduced the SF₆ leak rate by 89 percent and absolute SF₆ emissions by 83 percent.
- Require that the breakers at Fitch Mountain Substation have a manufacturer's guaranteed maximum leakage rate of 0.5 percent per year or less for SF₆.
- Maintain substation breakers in accordance with PG&E's maintenance standards.
- Comply with California Air Resources Board Early Action Measures as these policies become effective.

Applicable Locations: Fitch Mountain Substation

Performance Standards and Timing:

- **Before Construction:** Purchase circuit breakers with a guaranteed leak rate of 0.5 percent per year or less of SF₆
- **During Construction:** Install circuit breakers that meet the required maximum leak rate
- **After Construction:** Maintain circuit breakers according to PG&E maintenance standards

3.7.5 References

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