

5.7 Greenhouse Gas Emissions

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"/>

5.7.1 Setting

The proposed project is in the Bay Area Air Quality Management District (BAAQMD). Emissions from project-related construction and operational activities would occur within the jurisdiction of the BAAQMD and the California Air Resources Board (CARB).

Globally, temperature, precipitation, sea level, ocean currents, wind patterns, and storm activity are all affected by the presence of greenhouse gases (GHG) in the atmosphere. Human activity contributes to emissions of six primary GHGs: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF₆). Human-caused emissions of GHGs are linked to climate change. How global climate change may affect California’s public health, infrastructure and natural resources is described in the 2009 Biennial Report of the California Climate Action Team (Cal EPA 2010). The Climate Action Team found that:

“Extreme events from heat waves, floods, droughts, wildfires and bad air quality are likely to become more frequent in the future and pose serious challenges to Californians. They pose growing demands on individuals, businesses and governments at the local, state, and federal levels to minimize vulnerabilities, prepare ahead of time, respond effectively, and recover and rebuild with a changing climate and environment in mind.”

Emissions of carbon dioxide occur largely from combustion of fossil fuels. Other GHG emissions tracked by State inventories occur in much smaller quantities. However, the global warming potential of CH₄ is about 21 times that of CO₂. The use of sulfur hexafluoride or SF₆ in power transformers and circuit breakers at power plants and substations also poses a concern, because this pollutant can slowly escape from the equipment, and it has an extremely high global warming potential (one pound of SF₆ is the equivalent warming potential of approximately 23,900 pounds of CO₂). When quantifying GHG emissions, the different global warming potentials of GHG pollutants are usually taken into account by normalizing their rates to an equivalent CO₂ emission rate (CO₂e).

In 2008, California produced approximately 478 million metric tonnes of CO₂ equivalent (478 MMTCO₂e), equal to about 525 million tons, or about one percent of the 49,000 MMTCO₂e emitted globally (IPCC 2007).¹⁰ Statewide GHG emissions in 1990 were 427 MMTCO₂e (CARB 2007). Within the BAAQMD portion of Sonoma County, transportation is the largest source category of GHG emissions (51 percent) at 2.1 MMTCO₂e/yr, and electricity generation, cogeneration, and imports sources are 0.6 MMTCO₂e/yr or 14 percent of the area’s GHG emissions (PG&E 2010).

¹⁰ One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.

The inventory of California GHG emissions shows that electricity generation and imports make up about 25 percent of the statewide emissions, as shown in Table 5.7-1.

Table 5.7-1. 2008 California Greenhouse Gas Emissions Inventory

Source Category	2008 (MMTCO ₂ e/yr)	Percent of Total
Transportation	175.0	36.6
Electric Power (Generation and Imported)	116.4	24.4
Commercial and Residential	43.1	9.0
Industrial	92.7	19.4
Recycling and Waste	6.7	1.4
High Global Warming Potential Gas (including SF ₆ losses)	15.7	3.3
Agriculture	28.1	5.9
Forestry (excluding carbon sinks)	0.2	< 0.1
Total Emissions	477.8	100

Source: CARB 2010a.

Applicable Regulations

U.S. EPA GHG Mandatory Reporting Program (40 CFR Part 98). This rule requires mandatory reporting of GHG emissions for industrial facilities and power plants that emit more than 25,000 MTCO₂e emissions per year. Currently, there are no federal regulations limiting GHG emissions from the proposed project.

CEQA Guidelines. On December 31, 2009, the California Natural Resources Agency adopted amendments to the State CEQA Guidelines to change how public agencies review the environmental impacts of GHG emissions and energy use. These amendments, which were approved by the Office of Administrative Law on February 16, 2010, became effective on March 18, 2010, and became mandatory for most public agencies approximately 120 days later (see CEQA Guidelines, §15007, subd. (d)(2)).

California Global Warming Solutions Act of 2006 (AB32). This law requires CARB to adopt a statewide greenhouse gas emissions limit equivalent to the statewide GHG emissions levels in 1990 (427 MMTCO₂e) to be achieved by 2020. A longer range GHG reduction goal was set in June 2005 by California Executive Order S-3-05, which requires an 80 percent reduction of greenhouse gases from 1990 levels by 2050. CARB adopted the 2020 statewide target and mandatory reporting requirements in December 2007, and the statewide AB32 Scoping Plan, discussed in detail below, in December 2008 (CARB 2008).

California Air Resources Board AB32 Scoping Plan. The AB32 Scoping Plan (CARB 2008) identifies how emission reductions will be achieved for significant sources of GHG via regulations, market mechanisms, and other actions. Many sectors of the California economy may need to make wholesale changes in how services or goods are provided. Key elements of the Scoping Plan are a 33 percent Renewables Portfolio Standard (RPS) for electricity, aggressive energy efficiency targets, and a cap-and-trade system that includes the electricity sector. Statewide plans and programs for GHG management that stem from AB32 are within the sole jurisdiction of the CARB. Since CARB must fulfill its mandate to achieve the maximum technologically feasible and cost-effective GHG emission reductions, the proposed project would be subject to requirements for GHG control, namely for use of SF₆ in the substation switchgear.

CARB SF₆ Regulations (17 CCR 95350). In early 2010, CARB adopted a regulation for reducing SF₆ emissions from electric power system gas insulated switchgear (CARB 2010b). 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; (4) produce a SF₆ gas container inventory; and (5) keep all information current for CARB enforcement staff inspection and verification.

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 tonnes per year.

California Renewable Energy Programs. In 2002, California established its initial Renewable Portfolio Standard (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).

California Renewable Energy Resources Act of 2011 (SB X1-2). 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 of: an average of 20 percent from 2011 through 2013, a minimum of 20 percent thereafter through 2016, and a minimum of 25 percent by December 31, 2016. This codified the requirement to achieve 33 percent RPS statewide by the end of 2020, as specified in the AB 32 Scoping Plan (CARB 2008).

Sonoma County Community Climate Action Plan. In 2005, the nine cities in Sonoma County and the County of Sonoma set a goal to reduce local greenhouse gas emissions 25 percent below 1990 levels by 2015. The Community Climate Action Plan was released in October 2008. Solutions identified for the electric power sector include: maximizing energy and water efficiency; local government development of renewable energy; incentivizing use of electric heat pumps and solar hot water heaters; and instituting a green building ordinance (Climate Protection Campaign 2008). The Sonoma County Transportation Authority and the Regional Climate Protection Authority (RCPA), created in 2009, oversee local agency coordination on climate change issues and establish a local clearinghouse for efforts to reduce GHG emissions.

5.7.2 Environmental Impacts and Mitigation 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 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 4-5 in the Project Description), as well as any adopted mitigation measures identified by this Initial Study.

For the analysis of whether the quantity of direct and indirect GHG emissions generated by the project would be considered potentially significant, this analysis uses BAAQMD's GHG screening level of 10,000 metric tonnes per year (10,000 MTCO_{2e}/yr) for operational-related activities of new stationary sources in the CEQA process (BAAQMD 2011). BAAQMD's guidelines do not identify any threshold for construction-related activities.

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

The proposed project would generate GHG emissions through construction activities and substation operation. These emissions are discussed in more detail below.

Construction Impacts

DURING CONSTRUCTION, LESS THAN SIGNIFICANT. The proposed project involves construction of a substation covering 2.6 acres. The project would also require rebuilding 1.5 miles of power lines and reconductoring of 1.8 miles of overhead and underground distribution lines. The GHG emissions from construction activities are considered in the following context. First, the period of construction would be short-term, taking place in phases over eight months. Second, the construction workforce would consist of up to 15 workers for the substation and up to 16 for associated distribution line work. These workers would commute from within the general region of the project. Construction-phase GHG emissions are quantified in Table 5.7-2. Construction equipment that would be used for the proposed project is shown in Table 4-3 (Substation Construction – Typical Equipment Use) in Section 4 (Project Description). The construction workforce is described in detail Section 4.10.3 (Construction Workforce and Schedule) in the Project Description.

During construction, GHG emissions would be generated by vehicles and equipment. Diesel and gasoline-powered construction equipment at work sites would include loaders, graders, backhoes, cranes, demolition equipment, and trucks for lifts, delivery, concrete, water, and work crews. An estimated total of 353.6 MTCO₂ would be generated over the entire duration of construction activities for the Windsor Substation Project.

Table 5.7-2. Construction-Phase GHG Emissions (MTCO₂e) – Windsor Substation Project

	2012	2013	Total
Emissions from Construction Activity	70.0	283.6	353.6
Emissions from Construction Activity including APMs	59.5	241.0	300.5

Note: Motor vehicle emissions of CO₂-equivalent are approximately 95 percent CO₂.
One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
Source: PG&E 2011 (Estimated using URBEMIS 2007 9.2.4 and EMFAC 2007 Ver2.3.A).

Construction-phase GHG emissions associated with construction and commuter vehicles would be minimized by **APM AQ-6** (encouraging carpooling to the site), **APM AQ-7** (use of fuel-efficient construction equipment), **APM AQ-8** (minimizing unnecessary idling time), **APM AQ-9** (encouraging use of natural gas power vehicles for passenger cars and light duty trucks), **APM AQ-10** (minimizing welding and cutting), and **APM AQ-11** (recycling construction waste). The full text of these measures is in Table 4-5 (Applicant Proposed Measures) in the Project Description. Table 5.7-2 shows the estimated construction GHG emissions including the implementation of these APMs. Emissions during construction would be considered less than significant under the BAAQMD recommendations, which do not include a threshold for construction activities, and the emission rate would fall well below the comparable threshold for operational-related GHG emissions (10,000 MTCO₂e/yr). Therefore, construction would not generate GHG emissions at a level that may have a significant impact, and the impact related to GHG emissions from project construction would be less than significant.

Operations and Maintenance Impacts

DURING OPERATION, LESS THAN SIGNIFICANT. During operation, emissions would result from the operation of vehicles used for periodic visits for electrical switching and routine maintenance. PG&E personnel would visit the substation on a monthly basis or as needed under emergency conditions. There would be an estimated 250 vehicle miles per month (for light-duty plus heavy-duty trucks) for substation maintenance and repairs. Because the substation would not be staffed, there would be no vehicular emissions associated with regular commuting to and from the substation. The substation transformers would leak small amounts of SF₆, which is used as a circuit breaker electrical insulation medium. Although sulfur hexafluoride is a nonhazardous, inert gas, it has a global warming potential 23,900 times that of CO₂.

PG&E would incorporate the proposed project into its system-wide SF₆ emission reduction program. PG&E reports that since 1998, it has reduced SF₆ emissions from its transmission and distribution operations by 89 percent, and reduced absolute SF₆ emissions by 83 percent (PG&E 2010). PG&E would install new SF₆ breaker designs that are guaranteed to have an annual leak rate of one-half of one percent or less (**APM AQ-14**) and maintain substation breakers in accordance with company guidelines (**APM AQ-13**). With the implementation of these measures and compliance with the CARB SF₆ regulations, the potential for SF₆ leaks would be minimized.

Estimated GHG emissions from the operations phase of the project are shown in Table 5.7-3.

Table 5.7-3. Operation-Related GHG Emissions (MTCO₂e/yr) – Windsor Substation Project

	CO ₂	CH ₄	N ₂ O	SF ₆	Total
SF ₆ Process Loss	—	—	—	9.95	9.95
Light-Duty Truck (200 miles per month)	1.42	0.001	0.008	—	1.429
Heavy-Duty Truck (50 miles per month)	0.91	0.001	0.003	—	0.914
Substation Operations Total	2.33	0.002	0.011	9.95	12.29

Note: Motor vehicle emissions of CO₂-equivalent are approximately 95 percent CO₂.
One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
Source: PG&E 2010.

The project’s GHG emissions would be well below the BAAQMD threshold for operational-related GHG emissions (10,000 MTCO₂e/yr). Therefore, the impact of GHG emissions from project operations would be less than significant, and no mitigation is required.

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. With total GHG emissions at an estimated 12.29 MTCO₂e/yr, the project would fall well below the federal reporting threshold for stationary sources (25,000 MTCO₂e/yr), and therefore, would not be subject to federal reporting. The proposed substation 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 Sonoma County’s ability to achieve its GHG reduction goals. PG&E would comply with CARB SF₆ regulations to inventory and report amounts leaked, 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, and this impact would be less than significant. No mitigation is required.

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