4.6 Greenhouse Gas Emissions

This section describes the applicable laws and regulations, existing conditions, and impact analysis for greenhouse gas (GHG) emissions.

4.6.1 Regulatory Setting

Federal

Although climate change and GHG reductions are concerns at the federal level, at this time, no federal legislation or regulations have been enacted related to GHG emissions reductions and climate change specifically. However, recent activity suggests that regulation may be forthcoming. Foremost among recent developments have been the U.S. Supreme Court's decision in *Massachusetts et al. v. U.S. Environmental Protection Agency*, the "Endangerment Finding," and the "Cause or Contribute Finding," which are described below. Despite these findings, the future of GHG regulation at the federal level is still uncertain and continues to evolve. Recent activity includes proposed standards for carbon dioxide (CO_2) emissions from new fossil fuel–fired electricity power plants by the U.S. Environmental Protection Agency (EPA) as outlined in *The President's Climate Action Plan*, issued in 2013. If approved, these standards would be the first to establish national GHG limits for the electric power industry.

Massachusetts et al. v. U.S. Environmental Protection Agency (2007)

Twelve U.S. states and cities, including California, in conjunction with several environmental organizations, sued EPA to regulate GHGs as a pollutant, pursuant to the federal Clean Air Act (CAA). The court ruled that the plaintiffs had standing to sue, finding that GHGs fit within the CAA's definition of a pollutant, and EPA's reasons for not regulating GHGs were insufficiently grounded.

Endangerment and Cause or Contribute Findings (2009)

On December 7, 2009, the EPA administrator found that current and projected concentrations of CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) threaten the public health and welfare of current and future generations (Endangerment Finding). Additionally, the administrator found that combined emissions of CO_2, CH_4, N_2O, and HFCs from motor vehicles contribute to atmospheric concentrations of GHG pollution that threaten public health and welfare through climate change (Cause or Contribute Finding). Although these findings do not themselves impose any requirements on industry or other entities, they were an important step in EPA's process to develop GHG regulation.

President's Council on Environmental Quality Draft Guidance (2010)

On February 18, 2010, Nancy Sutley, chair of the Council on Environmental Quality (CEQ), issued a memorandum that provided guidance regarding consideration of the effects of climate change and GHG emissions under the National Environmental Policy Act. The draft guidance suggests that the effects of projects that directly emit GHGs in excess of 25,000 metric tons (MT) of carbon dioxide equivalent (CO_2e) annually should be considered in a qualitative and quantitative manner. The CEQ does not propose this reference as a threshold for determining significance but as "a minimum standard for reporting emissions under the CAA." The draft guidance also recommends that the

cumulative effects of climate change on a proposed project should be evaluated. The draft guidance is still subject to public comment and will not be effective until issued in final form (Sutley 2010).

Corporate Average Fuel Economy Standards (2010/2012)

The current Corporate Average Fuel Economy (CAFE) standards, which went into effect in 2012 for vehicles, incorporate stricter fuel economy standards into one uniform federal standard. The standards are equivalent to those previously promulgated by the State of California (see the Assembly Bill 1493 discussion below). The changes are expected to reduce GHG emissions from new vehicles by roughly 25%, relative to business-as-usual (BAU) conditions, by 2016.

In October 2012, EPA and the National Highway Traffic Safety Administration (NHTSA) established the final rule for fleet-wide passenger car and light-truck model years 2017 to 2025. The new CAFE standards aim to reach an emissions rating of 163 grams of CO per mile, or the equivalent of 54.5 miles per gallon (mpg), by model year 2025. Fleet-wide fuel economy standards will become more stringent with each subsequent model year through 2025. Because of a statutory requirement that requires NHTSA to set average fuel economy standards 5 model years at a time, NHTSA requires model years 2017 to 2022 to have an industry fleet-wide average of 40.3 to 41.0 mpg and estimates that 2025 model year vehicles will range from 48.7 to 49.7 mpg (EPA 2012).

State

California has adopted statewide legislation to address issues related to various aspects of climate change and GHG emissions mitigation. Much of this establishes a broad framework for the State's long-term GHG reduction and climate change adaptation program. The governor of California has also issued several executive orders related to the State's evolving climate change policy. Of particular importance to local governments is the direction provided by the Assembly Bill (AB) 32 Scoping Plan, which recommends that local governments reduce their GHG emissions by a level consistent with State goals (i.e., 15% below current levels).

In the absence of federal regulations, GHG emissions are generally regulated at the state level, typically by setting emissions reduction targets for existing sources of GHG emissions, setting policies to promote renewable energy and increase energy efficiency, and developing statewide action plans. Summaries of key policies, legal cases, regulations, and legislation at the state level relevant to LCF are provided below. Key statewide GHG regulations that are directly applicable to the proposed project are also included below.

Assembly Bill 1493—Pavley Rules (2002, amendments 2009)/Advanced Clean Cars (2011)

AB 1493 required the California Air Resources Board (CARB) to develop and implement regulations to reduce automobile and light-truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009 model year. In June 2009, the EPA administrator granted a CAA waiver of preemption to California. This waiver allowed California to implement its own GHG emissions standards for motor vehicles beginning with model year 2009. CARB approved joint rulemaking efforts to reduce GHG emissions from passenger cars (model years 2017–2025) on December 31, 2012 (CARB 2012a).

Renewable Energy Standard/Renewables Portfolio Standard (2002/2006/2011)

Senate Bill (SB) 1078 (2002) and SB 107 (2006) created the Renewable Energy Standard (RES), which required electric utility companies to increase procurements from eligible renewable energy resources by at least 1% of their retail sales annually until reaching 20% by 2010. SB 2X 1 (2011) requires a Renewables Portfolio Standard (RPS), functionally the same thing as the RES, of 33% by 2020. The statewide average for the three largest electrical suppliers (Pacific Gas and Electric, Southern California Edison [SCE], and San Diego Gas & Electric) in 2012 was 19.89%.

AB 32, the Global Warming Solutions Act of 2006/2011 Update

AB 32 codified the State's GHG emissions target by requiring the state's global warming emissions to be reduced to 1990 levels by 2020. Since being adopted, CARB, the California Energy Commission, the California Public Utilities Commission (CPUC), and the Building Standards Commission have been developing regulations that will help meet the goals of AB 32 and Executive Order (EO) S-03-05. The scoping plan for AB 32 identifies specific measures to reduce GHG emissions to 1990 levels by 2020 and requires CARB and other state agencies to develop and enforce regulations and other initiatives for reducing GHGs. Specifically, the scoping plan articulates a key role for local governments by recommending that they establish GHG reduction goals for both their municipal operations and the community consistent with those of the State (i.e., approximately 15% below current levels) (CARB 2008).

In March 2011, the San Francisco Superior Court enjoined implementation of CARB's scoping plan, finding that the alternatives analysis and public review process violated both CEQA and CARB's certified regulatory program (*Association of Irritated Residents et al. v. California Air Resources Board*, Case No. CPF-09-509562, March 18, 2011). In response to this litigation, CARB adopted a new CEQA document (*Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document*) on August 24, 2011. CARB's staff re-evaluated the baseline in light of the economic downturn and updated the projected 2020 emissions to 545 million metric tons of CO_2e ($MMTCO_2e$). Two reduction measures (Pavley I and RPS [12 to 20%]) not previously included in the 2008 scoping plan baseline were incorporated into the updated baseline, further reducing the 2020 statewide emissions projection to 507 $MMTCO_2e$. The updated forecast of 507 $MMTCO_2e$ is referred to as the AB 32 2020 baseline. Reduction of an estimated 80 $MMTCO_2e$ is necessary to reduce statewide emissions to the AB 32 target of 427 $MMTCO_2e$ by 2020 (CARB 2011).

CARB released the *Draft Proposed First Update to the Scoping* Plan on February 10, 2014 and the Environmental Analysis for public review on March 14, 2014. The proposed Update to the Scoping Plan includes both a 2020 element and a post-2020 element. The 2020 element focuses on State, regional, and local initiatives that are being implemented now to assist in meeting the 2020 goal. The post-2020 element provides a high-level view of a long-term strategy for meeting the 2050 GHG goals, consistent with the goals set forth in EO S-3-05 and EO B-16-2012.

Executive Order S-03-05 (2005) and Executive Order B-16-2012 (2012)

EO S-03-05 is designed to reduce California's GHG emissions to (1) 2000 levels by 2010, (2) 1990 levels by 2020, and (3) 80% below 1990 levels by 2050. EO B-16-2012 establishes benchmarks for reducing transportation-related GHG emissions. It requires agencies to implement the Plug-in Electric Vehicle Collaborative and California Fuel Cell Partnership by 2015 and sets forth targets specific to the transportation section, including the goal of reducing transportation-related GHG emissions to 80% less than 1990 levels.

Executive Order S-01-07, Low-Carbon Fuel Standard (2007)

Governor Arnold Schwarzenegger set forth the low-carbon fuel standard (LCFS) for California. Under this executive order, the carbon intensity of California's transportation fuels is to be reduced by at least 10% by 2020. On December 29, 2011, a federal judge issued a preliminary injunction that blocked enforcement of the LCFS, ruling that the LCFS violates an interstate commerce clause (Georgetown Climate Center 2012). On July 15, 2013, the Fifth District Court of Appeals ruled to allow LCFS regulations to remain operative while CARB analyzes the smog-related impacts of LCFS implementation, including formulation of appropriate enforceable mitigation measures, and subsequently completes a full CEQA review, provided CARB attempts to meet its statutory requirements in good faith (see *Poet, LLC et al. v. California Air Resources Board* et al.).

Senate Bill 375 (Steinberg), Statutes of 2008

SB 375 requires Metropolitan Planning Organizations (MPOs) to incorporate a "sustainable communities strategy" (SCS) in their regional transportation plans that will achieve the GHG emissions reduction targets set by CARB. In February 2011, CARB finalized the regional targets. SB 375 also includes provisions for streamlined CEQA review for some infill projects, such as transit-oriented development. However, those provisions will not become effective until an SCS is adopted. The final targets require the Southern California Association of Governments (SCAG) to identify strategies that will reduce per capita GHG emissions from passenger vehicles by approximately 8% by 2020 and 13% by 2035 over the base year (i.e., 2005). SCAG adopted the final 2012 regional transportation plan, which incorporates the SCS, on April 4, 2012 (SCAG 2012).

State CEQA Guidelines (2011)

The 2011 State CEQA Guidelines include a new section (Section 15064.4) that specifically discusses the significance of GHG emissions. Section 15064.4 calls for a good-faith effort when describing, calculating, or estimating GHG emissions. Section 15064.4 also states that a determination of the significance of GHG impacts should consider whether the project would increase or reduce GHG emissions, exceed a locally applicable threshold of significance, or comply with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. The revisions also state that a project may be found to have a less-than-significant impact if it complies with an adopted plan that includes specific measures to reduce GHG emissions sufficiently (Section 15064(h)(3)). However, the revised guidelines do not require or recommend a specific analysis methodology or provide quantitative criteria for determining the significance of GHG emissions.

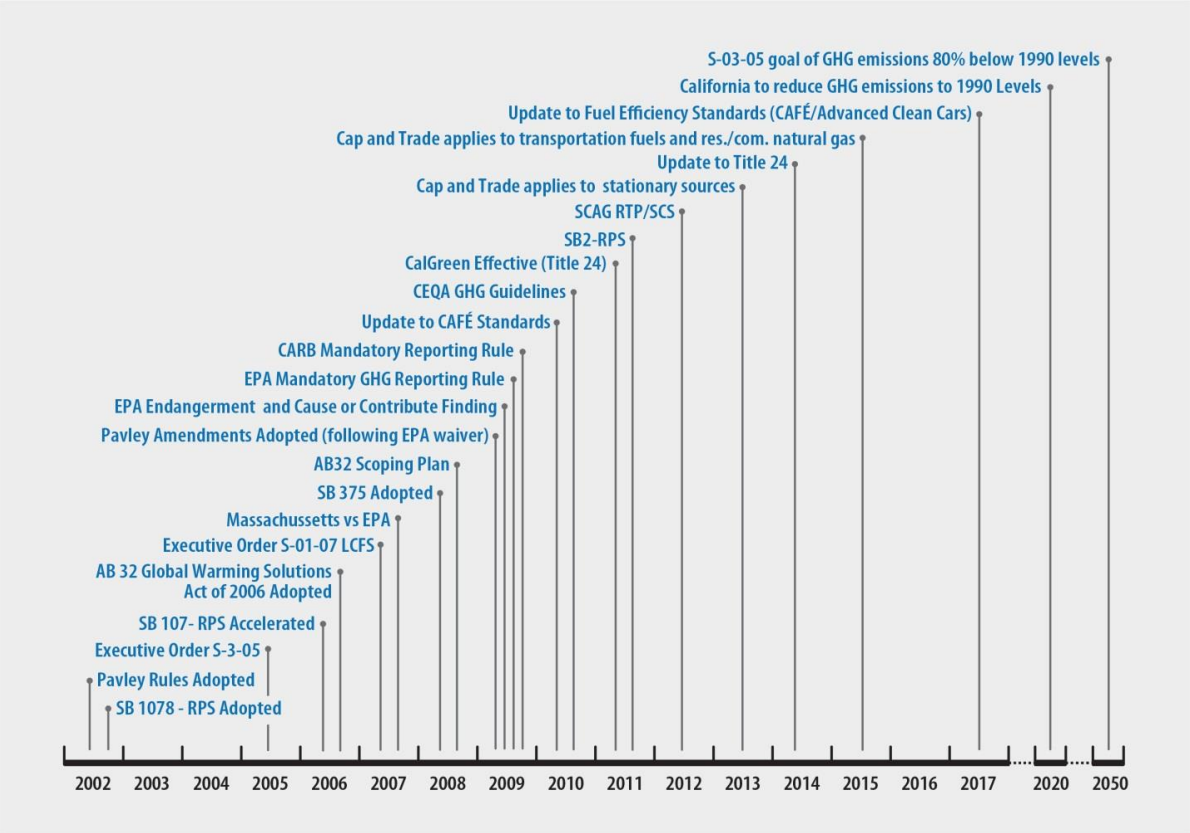
Cap and Trade (2012)

The development of a cap-and-trade program was included as a key reduction measure in CARB's AB 32 Climate Change Scoping Plan (CARB 2014a). The cap-and-trade emissions program developed by CARB took effect on January 1, 2012, with enforceable compliance obligations beginning January 1, 2013. The cap-and-trade program aims to regulate GHG emissions from the largest producers in the state by setting a statewide firm limit, or cap, on allowable annual GHG emissions. The cap contains three compliance phases. In compliance Phase 1, large emitters from the electric utility and industrial sectors come under the cap. In compliance Phase 2, which commences in 2015, fuels will be subject to the cap. Compliance Phase 3 will include electricity, industry, and fuels and will run until 2020. CARB administered the first auction on November 14, 2012, with many of the qualified

bidders representing corporations or organizations that produce large amounts of GHG emissions, including energy companies, agricultural and food industries, steel mills, cement companies, and universities (CARB 2012b). California is working closely with British Columbia, Ontario, Quebec, and Manitoba through the Western Climate Initiative to develop harmonized cap-and-trade programs that will deliver cost-effective emissions reductions. Two lawsuits have been filed against cap-and-trade efforts, but the cap-and-trade program will be implemented as is until further notice.

Figure 4.6-1 provides a timeline of key state and federal regulatory activity regarding GHG emissions and climate change.

Figure 4.6-1. Key Milestones in Federal and State Climate Legislation



Local

South Coast Air Quality Management District

As discussed in Section 4.2, *Air Quality*, the South Coast Air Quality Management District (SCAQMD) has primary responsibility for development and implementation of rules and regulations to attain the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) as well as permitting new or modified sources, developing air quality management plans, and adopting and enforcing air pollution regulations within the Basin. The AB 32 Scoping Plan does not provide an explicit role for local air districts with respect to implementing AB 32, but it does state that CARB will work actively with air districts in coordinating emissions reporting, encouraging and coordinating GHG reductions, and providing technical assistance in quantifying reductions. The ability of air districts to control emissions (both criteria pollutants and GHGs) is

provided primarily through permitting but also through their roles as a CEQA lead or commenting agency, the establishment of CEQA thresholds, and the development of analytical requirements for CEQA documents.

To provide guidance to local lead agencies regarding determining the significance of GHG emissions in their CEQA documents, SCAQMD's staff will be convening an ongoing GHG CEQA Significance Threshold Working Group. Members of the working group will include government agencies that implement CEQA and representatives from various stakeholder groups that provide input to SCAQMD's staff regarding the development of GHG CEQA significance thresholds.

On December 5, 2008, the SCAQMD Governing Board adopted a staff proposal for an interim GHG significance threshold of 10,000 MT per year for industrial permitting projects where SCAQMD is lead agency. The board letter, resolution, interim GHG significance threshold, draft guidance document, and attachments can be found under Board Agenda Item 31 on the December 5, 2008, Governing Board Meeting Agenda. No other quantitative thresholds have been developed by SCAQMD that would apply to the proposed project.

Southern California Association of Governments

SCAG is the federally designated MPO for the majority of the Southern California region. SCAG develops regional plans for transportation, growth management, hazardous waste management, housing, and air quality. The intent of the 2008 Regional Comprehensive Plan was to define and solve regional issues such as those related to housing, traffic, transportation, water, and air quality (SCAG 2008). The Compass Blueprint Growth Visioning effort and Two Percent Strategy encourage development that concentrates regional growth, consisting of mixed-use and walkable communities with ample open space, in existing and emerging areas along transportation corridors and in transit centers. Most recently, the 2012–2035 Regional Transportation Plan/Sustainable Communities Strategy outlined SCAG's plan for integrating transportation and land use planning in response to projected growth, housing needs, changing demographics, and transportation demands and in compliance with the GHG emissions-reduction goals set forth by CARB per SB 375 (SCAG 2012).

4.6.2 Environmental Setting

Global Climate Change

According to EPA, a GHG is any gas that absorbs infrared radiation in the atmosphere. This absorption traps heat within the atmosphere, maintaining the earth's surface temperature at a level higher than would be the case in the absence of GHGs. GHGs include water vapor, CO_2, CH_4, N_2O, ozone, PFCs, HFCs, and halogenated chlorofluorocarbons. Naturally occurring GHGs include water vapor, CO_2, CH_4, N_2O, and ozone. Human activities add to the levels of most of these naturally occurring gases. The sources and sinks of each GHG are discussed under *GHG Emissions Sources*, below.

Increasing levels of GHGs in the atmosphere result in an increase in the temperature of the earth's lower atmosphere, a phenomenon that is commonly referred to as *global warming*. Warming of the earth's lower atmosphere induces a suite of additional changes, including changes in global precipitation patterns; ocean circulation, temperature, and acidity; global mean sea level; species distribution and diversity; and the timing of biological processes. These large-scale changes are collectively referred to as *global climate change*.

The Intergovernmental Panel on Climate Change (IPCC) has been established by the World Meteorological Organization and United Nations Environment Programme to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. As the leading authority on climate change science, IPCC's best estimates are that average global temperature rise between 2000 and 2100 could range from 0.5 degrees Fahrenheit (°F) to 8.6°F (IPCC 2013). Large increases in global temperatures as high as 8.6°F could have massive deleterious impacts on natural and human environments.

Since the industrial revolution (approximately 1750), the concentration of CO_2 in the earth's atmosphere has increased from 270 parts per million (ppm) to roughly 391 ppm. Atmospheric concentrations of CH_4 and N_2O have similarly increased since the beginning of the industrial age. Since 1880, global average surface temperature has increased by 1.5°F, global average sea level has increased by nearly 190 millimeters (since 1901), and northern hemisphere snow cover (data available since 1920) has decreased by nearly 3 million square kilometers. These recently recorded changes can be attributed with a high degree of certainty to increased concentrations of GHGs in the atmosphere (IPCC 2013). Sinks of CO_2 (which remove rather than emit CO_2) include uptake by vegetation and dissolution into the ocean. Global GHG emissions greatly exceed the removal capacity of natural sinks. As a result, concentrations of GHGs in the atmosphere are increasing (CEC 2006).

GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants (TACs). Criteria air pollutants and TACs occur locally or regionally, and local concentrations respond to locally implemented control measures. The long atmospheric lifetimes of GHGs allow them to be transported long distances from sources and become well mixed, unlike criteria air pollutants, which typically exhibit strong concentration gradients away from point sources. GHGs and global climate change represent cumulative impacts. GHG emissions contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change.

Definition of Greenhouse Gases

The GHGs listed by the IPCC (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) (2013) are discussed in this section in order of abundance in the atmosphere. California law and the State CEQA Guidelines contain a similar definition of GHGs (Health and Safety Code Section 38505(g); 14 CCR Section 15364.5). Water vapor, the most abundant GHG, is not included in this list because its natural concentrations and fluctuations far outweigh its anthropogenic (human-made) sources.[1] The sources and sinks[2] of each of these gases are discussed in detail below. Generally, GHG emissions are quantified and presented in terms of $MMTCO_2e$ emitted per year. The primary GHGs associated with the project are CO_2, CH_4, and N_2O.

To simplify reporting and analysis, GHGs are commonly defined in terms of a global warming potential (GWP). The IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of CO_2e. The GWP of CO_2 is, by definition, 1. The GWP values used in this report are based on the IPCC Fifth Assessment Report (AR5) and United Nations Framework Convention on

[1] Although water vapor plays a substantive role in the natural greenhouse effect, the change in GHGs in the atmosphere due to anthropogenic actions is enough to upset the radiative balance of the atmosphere and result in global warming.

[2] A sink removes and stores GHGs in another form. For example, vegetation is a sink because it removes atmospheric CO_2 during respiration and stores the gas as a chemical compound in its tissues.

Climate Change reporting guidelines and defined in Table 4.6-1 (IPCC 2013). The AR5 GWPs are used in CARB's California inventory and AB 32 Scoping Plan estimate update (CARB 2014a).

Table 4.6-1: Lifetime, Global Warming Potential, and Abundance of Several Significant GHGs

Gas	Global Warming Potential (100 years)	Lifetime (years)[1]	Atmospheric Abundance
CO_2 (ppm)	1	50–200	391
CH_4 (ppb)	28	9–15	1,871
N_2O (ppb)	265	120	323

[1] Defined as the half-life of the gas.
Definitions: ppm = parts per million; ppb = parts per billion; ppt = parts per trillion.
Sources: Myhre et al. 2013

Carbon Dioxide (CO_2) is the most important anthropogenic GHG and accounts for more than 75% of all GHG emissions emitted by humans. Its atmospheric lifetime of 50 to 200 years ensures that atmospheric concentrations of CO_2 will remain elevated for decades, even after mitigation efforts to reduce GHG concentrations are promulgated (IPCC 2007). The primary sources of anthropogenic CO_2 in the atmosphere include fossil fuel usage (including motor vehicle fuels), gas flaring, cement production, and land use changes (including deforestation).

Methane (CH_4), the main component of natural gas, is the second most abundant GHG and has a GWP of 28 (IPCC 2013). Sources of anthropogenic emissions of CH_4 include growing rice, raising cattle, natural gas combustion, landfill outgassing, and coal mining (National Oceanic and Atmospheric Administration 2005).

Nitrous Oxide (N_2O) is a powerful GHG, with a GWP of 265 (IPCC 2013). Anthropogenic sources of N_2O include agricultural processes (e.g., fertilizer application), nylon production, fuel-fired power plants, nitric acid production, and vehicle emissions. N_2O is also used in rocket engines and racecars and as an aerosol spray propellant. In the U.S., more than 70% of N_2O emissions are related to agricultural soil management practices, particularly fertilizer applications.

GHG Emissions Sources

More than 97% of U.S. GHG emissions are the result of burning fossil fuels. Of these GHGs, approximately 82% are in the form of CO_2, 9% are CH_4, 6% are N_2O, and 3% are fluorinated gases. Fossil fuels are burned to power vehicles, create electricity, and generate heat, while fluorinated gases are man-made and result from industrial processes (EPA 2013). In California, vehicle emissions compose the largest source of CO_2 emissions, representing approximately 38% of statewide emissions in 2011. Electrical generation is the second-largest source of emissions in California, at 20% (CARB 2014b). On a national level, electrical generation is the largest emissions sector, while transportation is the second largest (EPA 2013). Other sources of GHG emissions generated within the U.S. include agriculture, land clearing, landfilling, refrigerants, and certain industrial processes.

Although many nations, including the U.S., regularly monitor and report GHG emissions, federal legislation to reduce global emissions has not been adopted and is the subject of much debate. EPA is presently pursuing regulation of GHGs through the federal CAA, following a U.S. Supreme Court ruling that clarified its authority under the CAA to do so. Many states, including California, as a

prominent leader, have passed legislation to reduce GHG emissions. California's GHG regulatory framework is discussed further in *Regulatory Setting*.

Greenhouse Gas Inventories

A GHG inventory is a quantification of all GHG emissions and sinks within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (i.e., for global and national entities) or on a small scale (i.e., for a particular building or person). Although many processes are difficult to evaluate, several agencies have developed tools to quantify emissions from certain sources.

U.S. Greenhouse Gas Emissions Inventory

EPA estimates that total U.S. GHG emissions for 2011 amounted to 6,702.3 $MMTCO_2e$, which represents an 8.4% increase over 1990 levels but a 1.6% decrease from 2010 levels. The decrease was due to a general decrease in carbon-intensive coal consumption as a result of increased hydropower and natural gas usage coupled with mild winter conditions, thereby reducing the amount of electricity used for heating. The largest contributors to U.S. GHG emissions in 2011 were electricity generation (33%), transportation (27%), and the industrial sector (20%). Emissions in the electricity generation, transportation, residential, commercial, and industrial sectors consist primarily of CO_2. GHG emissions from agriculture consist predominantly of CH_4 and N_2O. In general, industrial and, to a lesser extent, commercial emissions in the U.S. have declined over the last decade, while emissions in other sectors, such as transportation, have grown steadily. U.S. GHG emissions are responsible for approximately 18% of the global total (EPA 2013).

California Greenhouse Gas Emissions Inventory

In 2012, total California GHG emissions were estimated to be 458.7 $MMTCO_2e$. The transportation sector accounted for approximately 36% of total emissions, followed by electricity generation (21%), the industrial sector (19%), commercial and residential (9%), agriculture (8%) and other sources (6%) (CARB 2014a).

Annual statewide GHG emission inventories provide an important tool for establishing historical emission trends and tracking California's progress towards the 2020 goal. Over the period of 2000 to 2012, GHG emissions have decreased by 1.6%. California's per capita GHG emissions have generally decreased over the last 12 years from 13.7 metric tons of CO_2e per person in 2000 to 12.1 in 2012 (CARB 2014b).

La Cañada Flintridge Greenhouse Gas Emissions Inventory

LCF recently compiled a GHG inventory as part of its General Plan update. In 2007, LCF was responsible for an estimated 301,113 $MTCO_2e$ (0.301 $MMTCO_2e$); net emissions were an estimated 293,961 $MTCO_2e$ (0.294 $MMTCO_2e$), reflecting the influence of sinks on the total inventory (net CO_2 flux from landfill carbon, open space, and urban forestry). The majority of emissions were due to transportation and energy consumption; there are no industrial land uses within LCF. In 2007, the transportation sector accounted for approximately 54% of total emissions, commercial energy accounted for approximately 20%, and residential energy accounted for approximately 19%. Community-wide emissions are forecast to increase by 14% by 2020 under BAU conditions (ICF 2010).

4.6.3 Environmental Impact Analysis

Methodology

GHG emissions from development of the proposed project can be divided into two categories: those produced during construction and those produced during operations. The methodology for identifying construction- and operations-related emissions is presented below.

Construction

Construction of the proposed project would result in the short-term generation of GHG emissions. Mass total combustion exhaust emissions were estimated using a combination of off-road emissions factors and calculation methodologies from SCAQMD (i.e., CalEEMod, version 2013.2.2; SCAQMD 2013), CARB, and EPA. The GHG emissions analysis used the same construction quantities and modeling methodology described in Section 4.2, *Air Quality*.

GHG emissions estimates were based on a combination of client input and emissions calculation defaults within the CalEEMod and EMFAC2011 emissions calculation models. Below is a detailed description of the various emissions sources and the methods used to estimate emissions.

- GHG emissions from off-road construction equipment (loaders, cranes, etc.) were obtained from the CalEEMod User's Guide appendix, which considers the emissions factors per unit of activity (in grams per horsepower-hour) for each construction year. Emissions estimates associated with off-road construction equipment are based on CalEEMod default horsepower ratings and default load factors. Emissions factors for the gasoline-powered auger were obtained from the OFFROAD2007 model, assuming a 2.5-horsepower, handheld piece of "other lawn and garden equipment" because CalEEMod does not include auger emissions factors.
- GHG emissions from on-road sources (haul trucks, material deliveries, commuting employees) were estimated using exhaust emissions factors (in grams per mile) from the EMFAC2011 model and vehicle activity data from the project applicant. Emissions factors from the EMFAC2011 web tool are based on an annual average fleet operating at all speeds during each construction year. Emissions factors for haul and flat-bed trucks are based on the EMFAC T7 Tractor Trailer category, emissions factors for material deliveries for Specific Plan construction are based on an average of the EMFAC T6 small and heavy category, and emissions factors for commuting employees are based on an average of the EMFAC LDA and LDT1 categories. Daily activity associated with haul and delivery trips was obtained from the project applicant. Estimates of employees' daily commute trips were based on CalEEMod methodology, which assumes the number of workers is 1.25 times the number of pieces of equipment for all phases, except building construction and architectural coating. Vehicle one-way trip lengths are based on CalEEMod defaults, which are 20 miles for truck hauling, 7.4 miles per vendor trips (Los Angeles County portion of South Coast, commercial-nonwork trip), and 12.7 miles per employee trips (Los Angeles County portion of South Coast, home-work trip) (SCAQMD 2013).
- Emissions from the use of large trucks on site (boom/crane truck, water trucks, auger trucks, etc.) as well as crew trucks were estimated assuming these large on-road trucks idle on site for the duration of their respective daily activities. Idling emission factors for large diesel trucks were obtained from CARB's idling emission factors for diesel trucks. Idling CO_2 emission factor for crew trucks were obtained according to CARB methodology, which states to multiply emission rates for 5 mph vehicle travel by 5 to obtain a grams-per-idle-hour factor. Idling CH_4 and N_2O rates were obtained using CARB calculation methods.

- Helicopters would be used to bring in up to eight poles during SCE improvements. It was assumed that a single light-duty helicopter would be used and would operate up to 4 hours per day for up to 5 days. Helicopter GHG emissions were estimated using expected fuel consumption for a MD 500 D/E (U.S. Department of the Interior National Business Center 2006) and emission factors derived from the CPUC (2006 and 2007), U.S. Department of Energy (2008), and the Climate Registry (2014).

Consistent with SCAQMD guidance, total construction GHG emissions during Specific Plan construction and SCE improvements were summed and amortized over the life of the project, defined as 30 years , and added to operational emissions (described below). All emissions calculation worksheets and output files are provided in Appendix B.

Operations

Operation of the proposed project would result in a long-term source of GHG emissions. For purposes of a conservative analysis, it is assumed that the project would be fully built out and operational by 2019[3]. Operation of the proposed project would result in a long-term source of GHG emissions. Expansion at the school (i.e., the addition of 40 new students) would increase the number of motor vehicle trips. Furthermore, the auditorium would have a larger seating capacity (i.e., room for 200 additional guests to attend events). The additional building square footage and visitation would also increase the level of emissions from area sources on site (e.g., natural gas for space and water heating, electricity consumption, water consumption, and waste generation).

Annual operational GHG emissions associated with buildout of the proposed project were estimated with CalEEMod, version 2013.2.2, and based on net new building square footage, CalEEMod defaults (for all sources except vehicle trip rates), and motor vehicle trip estimates from the traffic impact analysis (Linscott, Law & Greenspan 2013). Emissions are presented at the annual time scale and compared with the threshold discussed below. All emissions calculation worksheets and modeling output files are provided in Appendix B.

Thresholds of Significance

For the purposes of the analysis in this EIR, which is made in accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant environmental impact related to GHG emissions 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 emissions of GHGs.

With respect to GHG emissions, State CEQA Guidelines Section 15064.4 provides guidance to lead agencies for determining the significance of impacts from GHG emissions. Section 15064.4(a) provides that a lead agency should make a good-faith effort based, to the extent possible, on scientific and factual data to describe, calculate, or estimate the amount of GHG emissions resulting

[3] Note that vehicle emission rates (on a per-mile basis) are projected to steadily decline over time due to implementation of federal and state fuel efficiency and emission standards. Assuming an earlier buildout year (for example, year 2019 versus year 2029) presents a conservative scenario, and emissions would likely be reduced over those presented in the analysis herein if buildout occurs later than 2019.

from a project. Section 15064.4(a) further provides that a lead agency shall have the discretion to determine, in the context of a particular project, whether (1) to use a model or methodology to quantify GHG emissions resulting from a project and which model methodology to use and/or (2) to rely on qualitative analysis or performance-based standards.

Pursuant to State CEQA Guidelines Section 15064.4(a), the analysis presented herein uses a model or methodology to quantify GHG emissions resulting from the project. The analysis contained herein provides a good-faith effort to describe, calculate, and estimate GHG emissions resulting from the project and compares those emissions with the chosen threshold level. A detailed description of the models and modeling methodology used in this analysis is provided in Section 4.2, *Air Quality*.

State CEQA Guidelines Section 15064.4(b) also provides that, when assessing the significance of impacts from GHG emissions, a lead agency should consider (1) the extent to which the project may increase or reduce GHG emissions compared with existing conditions, (2) whether the project's GHG emissions exceed a threshold of significance that the lead agency determines applies to the project, and (3) the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. The analysis of the potential impacts from the project's GHG emissions follows this approach.

There are currently no adopted quantitative thresholds relevant to the project. Although SCAQMD has adopted a 10,000 MT significance threshold level for industrial projects, this threshold would not be applicable to the proposed project because the project is an educational land use project that does not fit into the industrial project category. SCAQMD has not adopted a threshold level for educational projects. However, SCAQMD has drafted a screening-level threshold of 3,000 MT per year for commercial projects. Although the proposed project is not technically a commercial project, the suggested screening-level thresholds for all other land use types are higher than 3,000 MT of CO_2e per year. As such, both direct and indirect GHG emissions from the project are discussed with respect to the 3,000 MT criteria.

Note that GHGs and climate change are exclusively cumulative impacts; there are no non-cumulative GHG emissions impacts from a climate change perspective (CAPCOA 2008). Therefore, in accordance with scientific consensus regarding the cumulative nature of GHGs, the discussion herein analyzes the cumulative contribution of project-related GHG emissions.

Construction Impacts

GHG Emissions

Short-term construction activities would result in GHG emissions from fuel combustion associated with on- and off-road construction equipment and vehicles. Emissions from the approximately 3-year construction period are summarized in Table 4.6-2. Consistent with SCAQMD draft guidelines, construction emissions are summed and amortized over a 30-year project life and added to operational emissions, which are discussed below.

Table 4.6-2: Estimate of Project-Related GHG Emissions (metric tons)

Project Element	**CO_2e**
Specific Plan	
Parking Garage	
Demolition and Site Preparation	9
Excavation and Shoring	27
Garage Construction	141
Finishes and Landscaping	8
Arts and Humanities Building	
Demolition and Site Preparation	29
Excavation and Shoring	43
Basement Construction	208
Building Construction	94
Finishes and Landscaping	37
High School Building Remodeling	
Demolition and Site Preparation	16
Excavation and Shoring	30
Basement Construction	78
Building Construction	95
Finishes and Landscaping	23
Athletic Concourse	
Demolition and Site Preparation	9
Excavation and Grading	9
Building and Tennis Courts	49
Finishes and Landscaping	1
Total Construction Emissions—Specific Plan	905
SCE Construction	
Survey	1
R/W Clearing	11
Temporary Guard Structure Installation	7
Transfer Existing Conductor	25
Wood/H-Frame/LWS Pole Removal	3
LWS Pole /H-Frame Haul	4
LWS Pole/H-Frame Assembly	6
Install LWS Pole/H-Frame	9
Guard Structure Removal	11
Restoration	11
Install 16 kV Distribution Conductor	13
TSP Foundation	4

Project Element	CO_2e
Total Construction Emissions—SCE Improvements	*105*
30-year Amortized Total—Specific Plan plus SCE Improvements	*34*
Operations	
Mobile Sources	424
Electricity	222
Natural Gas	43
Water	50
Waste	31
Total Operations	*770*
Total Operations plus Amortized Construction	804
Significance Threshold	3,000
Exceed Significant Threshold?	No
Source: Emissions modeling by ICF 2014 (Appendix B).	

Operational Impacts

GHG Emissions

Long-term operation of the proposed project would result in GHG emissions from fuel combustion (i.e., from on-road motor vehicles associated with the increased number of student trips and auditorium visitors); natural gas, electricity, and water consumption; and wastewater and solid waste generation. As shown in Table 4.6-2, total annual GHG emissions (the sum of amortized construction and annual operational emissions) for the proposed project are not expected to exceed the 3,000 $MTCO_2e$ threshold.

As discussed in Chapter 3, *Project Description*, the FSHA Specific Plan includes various sustainability features, which would be incorporated into project design. These include a voluntary transportation demand management (TDM) program; low-flush toilets, low-flow fixtures, and water-efficient landscaping; compliance with the CalGREEN Code; a 15% improvement over existing baseline energy efficiency levels throughout; the continued storage and collection of recyclables; use of daylight in buildings and parking areas; recycling of demolition debris; and incorporation of local building materials. These design features would help reduce GHG emissions associated with short-term construction and long-term operations. For example, the TDM program would promote alternative modes of transportation, including a busing program, carpool program, and outreach to promote rideshare and alternative modes of transportation and reduce all FSHA trips, including existing trips, by at least 40% during peak hours. Additionally, the energy efficiency goal would help to reduce space and water heating requirements associated with natural gas. However, note that the construction and operational analyses herein do not include the potential reductions associated with implementation of these features, which would reduce emissions beyond the levels presented in Table 4.6-2. Also note that actions undertaken by the State will contribute to project-level GHG reductions. For example, the Pavley standard aims to improve the efficiency of automobiles and light-duty trucks by 17%, the Advanced Clean Car Standards aim to improve the fuel efficiency of light-duty vehicles by an additional 2.5% over Pavley, the LCFS aims to reduce the carbon intensity of diesel and gasoline

transportation fuels by 8.9%, and the RES and RPS aim to reduce electricity-related GHG emissions by 19.1% (CARB 2011). However, although reductions associated with statewide measures would further reduce project-related emissions, these emissions are not quantified herein.

As shown in Table 4.6-2, project-related GHG emissions during combined construction and operation are expected to remain below the 3,000 $MTCO_2e$ threshold used herein. To put this number into perspective, statewide CO_2e emissions for 2011 were estimated to be 448.11 *million* MT. Implementation of the project-related design features described in the preceding paragraph and Chapter 2 of this draft EIR, as well as statewide measures associated with AB 32, would reduce emissions even further. Consequently, the impact of construction- and operations-related emissions from the project is considered less than significant. No mitigation measures are necessary.

Applicable Plans, Policies, or Regulations

AB 32 identified 427 $MMTCO_2e$ as the acceptable level of GHG emissions for California in 2020, which is the same as the 1990 GHG emissions level and approximately 28.5% less than 2020 BAU conditions (596 $MMTCO_2e$).[4] To reach the target level, there will have to be widespread reductions in GHG emissions across California. Some reductions will need to come in the form of changes pertaining to vehicle emissions and mileage standards. Some will come from changes pertaining to sources of electricity and increased energy efficiency at existing facilities. The remainder will need to come from plans, policies, or regulations that will require new facilities to have lower carbon intensities than they have under BAU conditions.

The AB 32 Scoping Plan details specific GHG emissions-reduction measures that target specific GHG emissions sources. The scoping plan considers a range of actions, including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms (e.g., a cap-and-trade system). Also included are mobile-source emissions-reduction measures (Pavley, LCFS, vehicle efficiency measures), energy production–related emissions-reduction measures (natural gas transmission and distribution efficiency measures, natural gas extraction efficiency measures), and the RPS (electricity). As a result, project-related GHG emissions would be reduced through several of the AB 32 Scoping Plan measures.

Various lead agencies and air districts have adopted and/or drafted numeric mass emissions thresholds as a way to close the gap between emissions reductions from land use–driven sectors that occur at the state level (including Pavley, LCFS, and RPS, among others) and the necessary emissions reductions from land use development projects that have a lower carbon intensity, consistent with the goals of AB 32. Although the 3,000 MT threshold used herein has not been formally adopted by SCAQMD or any other lead agency in the state, the draft threshold does provide a reference point for assigning significance consistent with statewide goals of AB 32.

As discussed above, proposed project-related GHG emissions (construction and operational impacts combined) are expected to be below the chosen threshold of 3,000 $MTCO_2e$. Therefore, the proposed project would be consistent with the AB 32 goal of reducing statewide GHG emissions to 1990 levels

[4] CARB recently updated the AB 32 Scoping Plan and has revised the 2020 BAU downward slightly to 545 $MMTCO_2e$, which reflects reduced GHG emissions estimates based on the recent economic downturn. The updated scoping plan now defines CARB's climate change priorities for the next 5 years and lays the groundwork for reaching the post-2020 goals set forth in EO S-3-05 and EO B-16-2012.

by 2020. The project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs. Therefore, the impact is considered less than significant. No mitigation measures are necessary.

4.6.4 Mitigation Measures

No mitigation measures are required.

4.6.5 Significant Unavoidable Adverse Impacts

There would be no significant unavoidable adverse impacts resulting from project GHG emissions.

4.6.6 Cumulative Impacts

GHG emissions and climate change are exclusively cumulative impacts; there are no non-cumulative GHG emissions impacts from a climate change perspective. Climate change is the result of cumulative global emissions. No single project, when considered in isolation, can cause climate change because a single project's emissions are not enough to change the radiative balance of the atmosphere. Because climate change is the result of GHG emissions and GHGs are emitted by innumerable sources worldwide, global climate change will have a significant cumulative impact on the natural environment as well as human development and activity. As such, GHGs and climate change are cumulatively considerable, even though the contribution may be individually limited (SCAQMD 2008). SCAQMD methodology and thresholds are thus cumulative in nature. As discussed above, the project would be below the threshold of significance and consistent with the adopted plans and regulations that aim to reduce GHG emissions. Therefore, the project would not contribute to a cumulatively significant impact related to air quality and GHGs.