3.5 Greenhouse Gases and Energy

This section presents a summary of the existing science related to greenhouse gases (GHGs); overviews of state and local GHG emissions inventories, and of the existing regulatory context for GHGs; a summary of the methods used to estimate GHG emissions attributable to the proposed project; and an analysis of potential impacts of the proposed project related to GHG emissions.

The proposed project would not contribute significantly to climate change by itself. However, cumulative emissions from many projects and plans would all contribute to global GHG concentrations and the climate system. This section considers the proposed project's cumulative contribution to the significant cumulative impact of climate change.

Energy use (and efficiency) is an important indicator of GHG emissions and is therefore analyzed in this section in conjunction with the GHG analysis. This section considers the primary energy requirements for the proposed project; the benefit of existing regulations that require energy-efficient construction and operation; the potential for the proposed project to result in the wasteful, inefficient, and unnecessary consumption of energy; and the energy conservation measures proposed as part of the project design to reduce energy use.

3.5.1 Environmental Setting

3.5.1.1 Overview of Greenhouse Gases

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space through the atmosphere. However, infrared radiation is selectively absorbed by GHGs in the atmosphere. As a result, infrared radiation released from the earth that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the "greenhouse effect," is responsible for maintaining a habitable climate on Earth. Anthropogenic (human-caused) emissions of these GHGs lead to atmospheric levels that exceed natural ambient concentrations and have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change.

The Intergovernmental Panel on Climate Change concluded that variations in natural phenomena, such as solar radiation and volcanoes, produced most of the earth's warming from preindustrial times to 1950. Some variations in natural phenomena also had a small cooling effect. Since 1950, increasing GHG concentrations resulting from human activity, such as fossil fuel burning and deforestation, have been responsible for most of the observed temperature increase (IPCC 2013).

Global surface temperature has increased by approximately 1.53 degrees Fahrenheit over the last 140 years (IPCC 2013); however, the rate of increase in global average surface temperature has not been consistent. During the last three decades, temperatures have warmed at a much faster rate per decade (IPCC 2013).

During the same period when increased global warming has occurred, many other changes have occurred in other natural systems. Sea levels have risen; precipitation patterns throughout the world have shifted, with some areas becoming wetter and others drier; snowlines have increased in elevation, resulting in changes to the snowpack, runoff, and water storage; and numerous other conditions have been observed. Although it is difficult to prove a definitive cause-and-effect relationship between global warming and other observed changes to natural systems, there is a high level of confidence in the scientific community that these changes are a direct result of increased global temperatures caused by the increased presence of GHGs in the atmosphere (IPCC 2013).

Principal Greenhouse Gases and Sources

GHGs are present in the atmosphere naturally, are released by natural and anthropogenic sources, and are formed from secondary reactions taking place in the atmosphere. Natural sources of GHGs include the respiration of humans, animals, and plants; decomposition of organic matter; volcanic activity; and evaporation from the oceans. Anthropogenic sources include the combustion of fossil fuels by stationary and mobile sources, waste treatment, and agricultural processes. The following are the principal GHG pollutants that contribute to climate change and their primary emission sources:

- **Carbon Dioxide:** Natural sources of carbon dioxide (CO_2) include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; and evaporation from oceans. Anthropogenic sources include burning of coal, oil, natural gas, and wood.
- **Methane:** Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and from the decay of organic waste in municipal solid waste landfills.
- **Nitrous Oxide:** Nitrous oxide is produced by both natural and human-related sources. Primary human-related sources of nitrous oxide are agricultural soil management, sewage treatment, mobile and stationary combustion of fossil fuel, and production of adipic and nitric acid. Nitrous oxide is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests.
- **Fluorinated Gases:** These gases, listed below, are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as having high global warming potential (GWP).
    - *Chlorofluorocarbons* are used for refrigeration, air conditioning, packaging, insulation, solvents, or aerosol propellants.
    - *Perfluorinated chemicals* are emitted as byproducts of industrial processes and are used in manufacturing.
    - *Sulfur hexafluoride* is a strong GHG used primarily as an insulator in electrical transmission and distribution systems.
    - *Hydrochlorofluorocarbons* have been introduced as temporary replacements for chlorofluorocarbons and are also GHGs.
    - *Hydrofluorocarbons* were introduced as alternatives to ozone-depleting substances in serving many industrial, commercial, and personal needs. Hydrofluorocarbons are emitted as byproducts of industrial processes and are used in manufacturing.

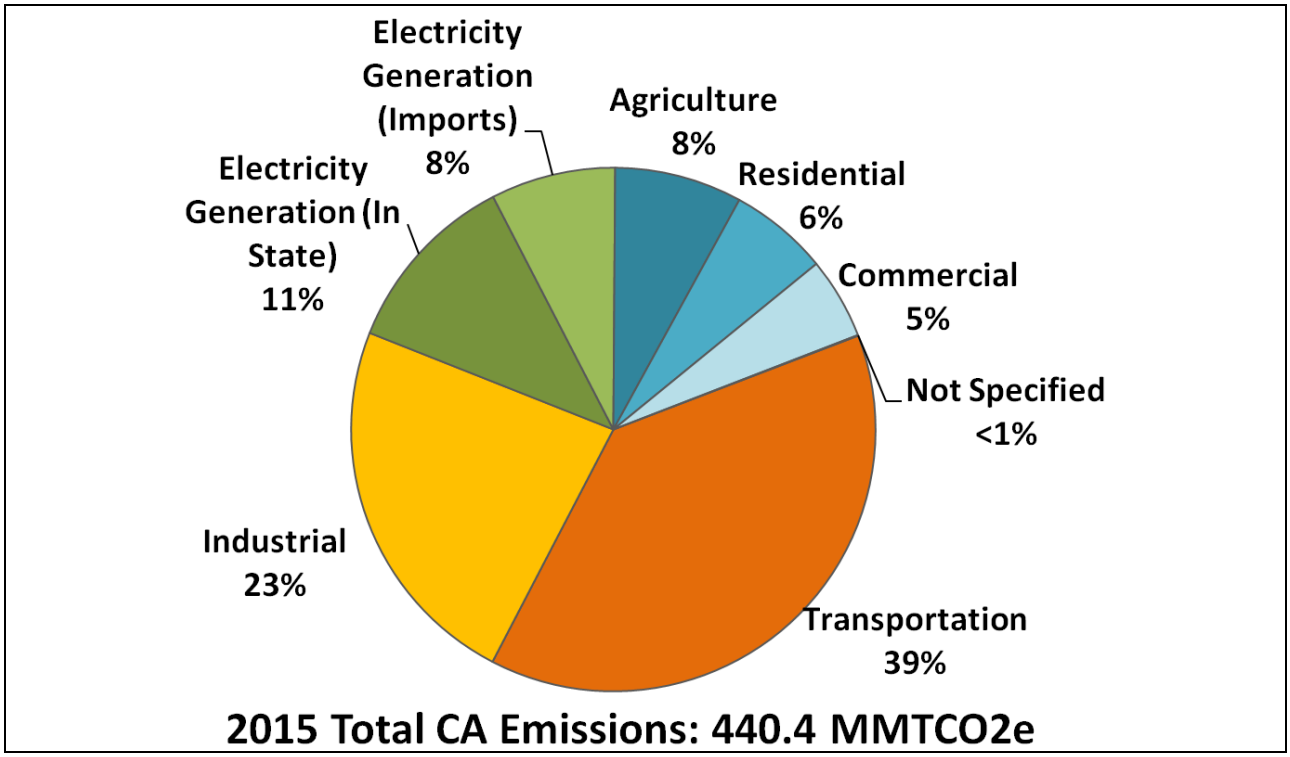
GHGs are not monitored at local air pollution monitoring stations and do not result in direct impacts on human health. Rather, GHGs generated locally contribute to global concentrations of GHGs, which result in changes to the climate and environment.

The California Air Resources Board (ARB) prepares an annual, statewide GHG emissions inventory. GHGs are typically analyzed by sector or type of activity. As shown in Figure 3.5-1, California produced 440.4 million metric tons (MT) CO_2 equivalent (CO_2e) in 2015. Combustion of fossil fuels in the transportation sector was the single largest source of California's GHG emissions in 2015, accounting for 39 percent of total GHG emissions. Transportation was followed by industry, which accounted for 23 percent, and then by the electric power category (both in-state and out-of-state sources), which accounted for 11 percent of total GHG emissions (ARB 2017a).

As described below, California has implemented several programs and regulatory measures to reduce GHG emissions. Figure 3.5-2 demonstrates California's progress in achieving statewide GHG emissions reduction targets. Since 2007, California's GHG emissions have been declining; GHG emissions have continued to decline even as population and gross domestic product have increased. Per-capita GHG emissions in 2015 were 19 percent lower than the peak per-capita GHG emissions recorded in 2001. Similarly, GHG emissions per million dollars of gross domestic product have decreased by 33 percent since the peak in 2001 (ARB 2017b).

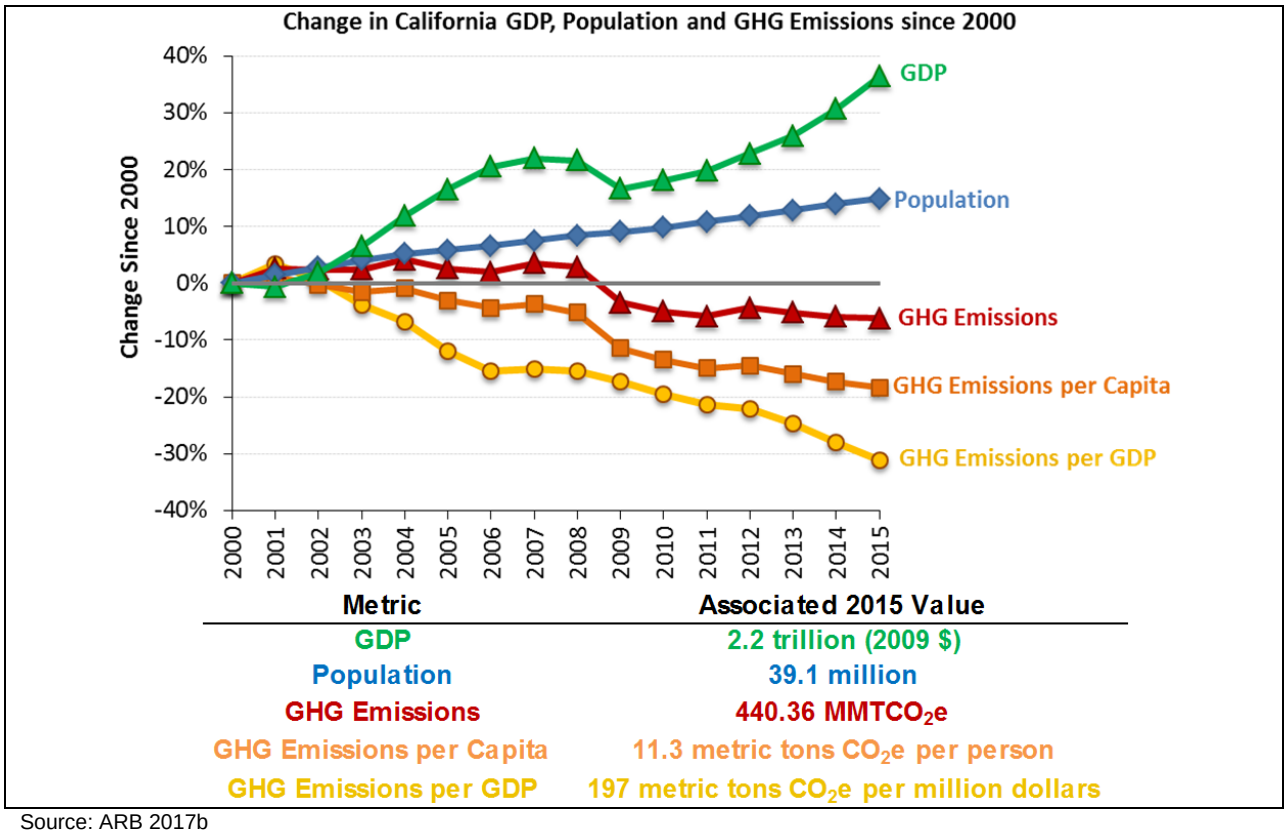
In 2012, the Sierra Business Council published a community-wide GHG emissions inventory in collaboration with the Town of Loomis. The inventory (Town of Loomis 2012) estimated emissions using the baseline year of 2005 using the International Local Government GHG Emissions Analysis Protocol.[1] The inventory, summarized in Table 3.5-1, identified GHG emissions from multiple sectors: residential, commercial, industrial, vehicle transportation, solid waste, and wastewater. According to this estimate, in 2005 the Town of Loomis produced approximately 56,000 MT CO_2e, for a per capita rate of approximately 8.8 MT CO_2e per resident. As with the state as a whole, vehicle transportation was the largest source of GHG emissions, contributing more than 61 percent of the total.

[1] A 2005 baseline year was likely used because this year was once considered an important comparison year for future emissions forecasts and reductions.



Source: ARB 2017a

Figure 3.5-1. 2015 California Greenhouse Gas Emissions Inventory by Sector



Metric	Associated 2015 Value
GDP	2.2 trillion (2009 $)
Population	39.1 million
GHG Emissions	440.36 $MMTCO_2e$
GHG Emissions per Capita	11.3 metric tons CO_2e per person
GHG Emissions per GDP	197 metric tons CO_2e per million dollars

Source: ARB 2017b

Figure 3.5-2. Trends in California Greenhouse Gas Emissions (Years 2000 to 2015)

Table 3.5-1. Town of Loomis 2005 Greenhouse Gas Emissions Inventory (Community-wide)

Sector	Emissions (MT CO_2e)	Percent of Inventory
Residential	11,619	20.7
Commercial and Industrial	8,488	15.2
Vehicle transportation	34,238	61.1
Waste and wastewater	1,696	3.0
Total Emissions in Sacramento County*	**56,041**	**100.0**

Notes:
CO_2e = carbon dioxide equivalent; MT = metric tons
* Total may not be the exact sum of emissions due to rounding.
Source: Town of Loomis 2012

Global Warming Potential

GWP is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and the length of time the gas remains in the atmosphere (its "atmospheric lifetime"). The GWP of each gas is measured relative to CO_2; therefore, CO_2 has a GWP of 1. The other main GHGs that have been attributed to human activity include methane, which has a GWP of 28, and nitrous oxide, which has a GWP of 265 (IPCC 2013). For example, 1 ton of methane has the same contribution to the greenhouse effect as approximately 28 tons of CO_2. GHGs with lower emissions rates than CO_2 may still contribute to climate change, because they are more effective than CO_2 at absorbing outgoing infrared radiation (i.e., they have a high GWP). The concept of CO_2 equivalence (CO_2e) is used to account for the different GWP potentials of GHGs to absorb infrared radiation. GHG emissions are typically measured in terms of pounds or tons of CO_2e, and are often expressed in MT CO_2e.

Climate change is a global issue because GHGs can have global effects, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern (see Section 3.3, "Air Quality"). Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years), or long enough to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule depends on multiple variables, more CO_2 is currently emitted into the atmosphere than is stored or "sequestered."

3.5.1.2 Energy Services and Demands

Electrical and Natural Gas Services

In 2016, the total system power for California was 290,567 gigawatt-hours (GWh) of electricity, of which approximately 198,227 GWh of electricity was generated in-state (CEC 2017a).

In Placer County, including the town of Loomis, electrical and natural gas services are provided by Pacific Gas and Electric Company (PG&E), one the largest combined natural gas and electrical energy companies in the United States. PG&E generates, transmits, and distributes electrical service to approximately 16 million people throughout its approximately 70,000-square-mile service area, which stretches north to south in California from Eureka to Bakersfield and west to east from the Pacific Ocean to the Sierra Nevada (PG&E 2017a).

PG&E owns approximately 106,700 circuit miles of electrical distribution lines and 18,400 circuit miles of electrical transmission lines. In 2016, PG&E delivered approximately 83,407 GWh of electricity within its service area (CEC 2017b); Placer County consumed approximately 3.5 percent (2,938 GWh) of that total (CEC 2017c).

PG&E provides natural gas service to Loomis through portions of its approximately 42,000 miles of natural gas distribution pipelines. Total natural gas throughput for PG&E is approximately 970 billion cubic feet (PG&E 2017b). In 2016, natural gas consumption in the PG&E service area totaled approximately 4,560 million therms (CEC 2017d), less than 1 percent (84 million therms) of which was consumed by users in Placer County (CEC 2017e).

Energy Sources

PG&E provides power from a variety of sources, including nuclear, hydroelectric, natural gas, and renewable energy resources such as wind, geothermal, biomass, solar, and small hydro, as detailed in Table 3.5-2 (PG&E 2017c). In

2016, 69 percent of energy delivered by PG&E was from non-GHG-generating sources. PG&E owns and operates four solar plants, and has connected more than 300,000 private rooftop solar customers to its energy grid. PG&E's hydroelectric system spans nearly 500 miles and has a generating capacity of nearly 3,900 megawatts total from 66 powerhouses.

Table 3.5-2. Pacific Gas and Electric Company Electrical Power Mix, 2016

Electrical Sources	Percent
Non-emitting Nuclear	24*
Large Hydroelectric	12*
Renewable[1]	33*
Natural Gas/Other	17
Other Unspecified[2]	14

Notes:

[1] Renewable energy sources include wind, geothermal, biomass, solar, and small hydro. These energy sources are considered eligible to meet California's renewable portfolio standard of 33 percent renewable energy generation by 2020.

[2] "Other unspecified" sources refer to electricity that is not traceable to specific generation sources by any auditable contract.

* These resources are greenhouse gas–free.

Source: PG&E 2017c

Energy Conservation and Renewable Energy Programs

The Town of Loomis approved the *Loomis Strategic Energy Resources Report* on March 17, 2015 (Town of Loomis 2015). The report presents the following goals and supporting strategies as a roadmap for expanding efforts to increase energy efficiency and use of renewable energy efforts in Loomis:

Goal 1: Increase Energy Efficiency in Existing Structures.

- **Strategy 1.1:** Expand outreach and education to increase participation in voluntary home energy-efficiency programs.
- **Strategy 1.2:** Expand outreach and education to increase participation in voluntary non-residential energy-efficiency programs.
- **Strategy 1.3:** Identify and promote programs that help finance energy efficiency and renewable energy projects.

Goal 2: Increase the Energy Performance of New Construction.

- **Strategy 2.1:** Improve compliance with Title 24 Green Building and Energy Efficiency Standards.
- **Strategy 2.2:** Provide incentives for buildings to exceed the current Title-24 Energy Efficiency Standards.
- **Strategy 2.3:** Reduce the heat island effect and related summer heat gain in residential and non-residential projects.

Goal 3: Increase Renewable Energy Use.

- **Strategy 3.1:** Evaluate the Town's residential, non-residential, and municipal solar potential and assess barriers to increased solar energy use.
- **Strategy 3.2:** Develop a comprehensive renewable energy program that provides outreach, financing, and technical assistance.
- **Strategy 3.3:** Encourage new development projects to meet 70% of their energy needs from renewable sources.

Goal 4: Increase Energy Efficiency in Municipal Structures and Operations.

- **Strategy 4.1:** Improve energy efficiency of existing municipal structures.
- **Strategy 4.2:** Evaluate feasibility of improving energy efficiency of traffic signals and public lighting.

Goal 5: Increase Community Water Conservation and Efficiency to Reduce Associated Energy Use.

- **Strategy 5.1:** Encourage residents and businesses to conserve water used indoors.
- **Strategy 5.2:** Encourage residents and businesses to conserve water used outdoors.

In addition, PG&E offers incentives, rebates, and educational resources to residents, businesses, nonprofits, and government agencies in Loomis. For nonresidential customers, PG&E offers rebates and incentives for power management software; occupancy sensors on lights; steam traps; heating, ventilation, and air conditioning (HVAC) motors and pumps; electric water heaters; process cooling; data center airflow management; boiler economizers; refrigeration; boiler heat recovery; refrigeration control; variable-frequency drive pumps; boilers; and fans.

Energy Use for Transportation

Transportation is the largest energy-consuming sector in California, accounting for approximately 39 percent of all energy use in the state (U.S. Energy Information Administration 2016). More motor vehicles are registered in California than in any other state, and commute times in California are among the longest in the country.

Types of transportation fuel have diversified in California and elsewhere. Historically gasoline and diesel fuel accounted for nearly all demand; now, however, numerous options are available, including ethanol, natural gas, electricity, and hydrogen. Despite advancements in alternative fuels and clean-vehicle technologies, gasoline and diesel remain the primary fuels used for transportation in California, with 15.1 billion gallons of gasoline and 4.2 billion gallons of diesel consumed in 2015 (CEC 2017f, 2017g).

The Sacramento Area Council of Governments (SACOG) prepared a regional analysis of vehicle miles traveled (VMT) and found average daily VMT for Placer County, excluding the Tahoe Basin, to be approximately 8,605. This travel demand is forecast to increase to 11,360 in 2020 and to 13,762 in 2036 under the Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) (SACOG 2016). Within the SACOG region (which includes Placer County), the population growth rate has been greater than the rate of increase of total VMT, resulting in a reduction in VMT per capita from 2000 through 2012. VMT forecasts project a continuation of this declining per-capita VMT trend for the region through 2036 (SACOG 2016). The SACOG 2016 MTP/SCS identifies several policies and factors as supporting this declining trend in per-capita VMT. Among these factors are the trend toward more compact development, with more residents able to find jobs, schools, shopping, and other activities closer to their place of residence, and proposed improvements in transit and walkability that promote a shift away from reliance on private vehicles for transportation.

3.5.2 Regulatory Setting

Although federal, state, regional, and local GHG-related plans, policies, and regulations do not directly apply to the proposed project, the information below is helpful for understanding the cumulative context for GHG emissions impacts and strategies to reduce GHG emissions.

3.5.2.1 Federal Plans, Policies, Regulations, and Laws

The U.S. Environmental Protection Agency (EPA) is responsible for implementing the federal Clean Air Act (CAA). On April 2, 2007, the U.S. Supreme Court held that EPA must consider regulation of GHG emissions from motor vehicles. In *Massachusetts v. Environmental Protection Agency et al.,* 12 states and cities (including California) along with several environmental organizations sued to require EPA to regulate GHGs as pollutants under the CAA (127 S. Ct. 1438 [2007]). The Supreme Court ruled that GHGs fit within the CAA's definition of a pollutant and that EPA has the authority to regulate GHGs.

U.S. Environmental Protection Agency "Endangerment" and "Cause or Contribute" Findings

On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA:

- *Endangerment Finding:* The current and projected concentrations of the six key GHGs—CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorinated chemicals, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations.
- *Cause or Contribute Finding:* The combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to GHG pollution, which threatens public health and welfare.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA released its final Greenhouse Gas Reporting Rule (Reporting Rule). The Reporting Rule is a response to the fiscal year 2008 Consolidated Appropriations Act (House of Representatives Bill 2764; Public Law 110-161), which required EPA to develop "…mandatory reporting of GHGs above appropriate thresholds in all sectors of the economy…." The Reporting Rule applies to most entities that emit 25,000 MT CO_2e or more per year. Since 2010, facility owners have been required to submit an annual GHG emissions report with detailed calculations of the facility's GHG emissions. The Reporting Rule also mandates compliance with recordkeeping and administrative requirements to enable EPA to verify annual GHG emissions reports.

Council on Environmental Quality Guidance

On December 18, 2014, the Council on Environmental Quality (CEQ) released revised draft guidance that superseded the draft GHG and climate change guidance released by CEQ in February 2010. The revised draft guidance applied to all proposed federal agency actions, including land and resource management actions. This guidance explained that agencies should consider both the potential effects of a proposed action on climate change, as indicated by its estimated GHG emissions, and the implications of climate change for the environmental effects of a proposed action (CEQ 2014). The guidance encouraged agencies to draw from their experience and expertise to determine the appropriate level (broad, programmatic, or project- or site-specific) and type (quantitative or qualitative) of analysis required to comply with the National Environmental Policy Act. The guidance recommended that agencies consider emissions of 25,000 MT CO_2e per year as a reference point below which a quantitative analysis of GHG emissions is not recommended unless it is easily accomplished based on available tools and data (CEQ 2014).

On August 1, 2016, an updated version of the CEQ guidelines was published. This document did not establish a numeric threshold for GHG emissions. Agencies were directed to consider the potential effects of a proposed action and alternatives on climate change as indicated by assessing GHG emissions (e.g., to include carbon sequestration where applicable) (CEQ 2016). However, this guidance was withdrawn on April 5, 2017 (CEQ 2017). The withdrawn guidance was not a regulation and the withdrawal does not change any law, regulation, or other legally binding requirement.

U.S. Environmental Protection Agency and National Highway Traffic Safety Administration Standards

EPA and the National Highway Traffic Safety Administration (NHTSA) implemented national GHG emission and fuel economy standards for model year 2012–2016 light-duty cars and trucks. The second phase of the standards includes GHG and fuel economy standards for model years 2017–2025. The 2017–2025 standards are anticipated to save approximately 4 billion barrels of oil and 2 billion MT of GHG emissions. In 2025, if all standards are met through fuel efficiency improvements, the average industry fleetwide fuel efficiency for light-duty cars and trucks would be approximately 54.5 miles per gallon (EPA 2012).

In addition to standards for light-duty cars and trucks, EPA and NHTSA have implemented Phase 1 of the Medium- and Heavy-Duty Vehicle GHG Emissions and Fuel Efficiency Standards, which apply to model years 2014–2018. It is anticipated that medium- and heavy-duty vehicles built to these standards from 2014–2018 will reduce CO_2 emissions by approximately 270 million MT over their lifetimes (EPA 2012). Phase 2 of these standards apply to model years 2021–2027 and would reduce GHG emissions by 1 billion MT over the lifetimes of those vehicles (EPA 2015). In addition to reducing GHG emissions and improving fuel efficiency, the standards are anticipated to generate research and development jobs focused on advanced cost-effective technologies for cleaner and more efficient commercial vehicles.

Renewable Fuel Standard Program

Created by the Energy Policy Act of 2005, which amended the CAA, the Renewable Fuel Standard program established requirements for volumes of renewable fuel used to replace petroleum-based fuels. The four renewable fuels accepted as part of the Renewable Fuel Standard program are biomass-based diesel, cellulosic biofuel, advanced biofuel, and total renewable fuel. The 2007 Energy Independence and Security Act expanded the program and its requirements to include long-term goals of using 36 billion gallons of renewable fuels and extending annual renewable-fuel volume requirements to year 2022. The four renewable fuels have specific renewable fuel-blending requirements for obligated parties such as refiners and importers of gasoline or diesel fuel. EPA implements the program in consultation with U.S. Departments of Agriculture and Energy. Gasoline and diesel refiners and importers (Obligated Parties) are required to demonstrate compliance with the Renewable Fuel Standard program.

3.5.2.2 State Plans, Policies, Regulations, and Laws

The legal framework for GHG emission reductions has come about through executive orders, legislation, and regulations. The major components of California's climate change initiatives are outlined below.

Assembly Bill 1493

Assembly Bill (AB) 1493 required that ARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state." These stricter emissions standards were designed to apply to automobiles and light trucks beginning with model year 2009. In June 2009, the EPA Administrator granted a CAA waiver of preemption to the State of California, allowing the state to implement its own GHG emissions standards for motor vehicles beginning with model year 2009. California agencies worked with federal agencies to conduct joint rulemaking to reduce GHG emissions for passenger car model years 2017–2025.

Executive Order S-3-05

Executive Order S-3-05, issued in recognition of California's vulnerability to the effects of climate change, set forth the following target dates by which statewide GHG emissions would be progressively reduced: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

Assembly Bill 32

In 2006, California enacted AB 32, the California Global Warming Solutions Act (California Health and Safety Code Section 38500 et seq.). AB 32 further details and puts into law the midterm GHG reduction target established in Executive Order S-3-05: reduce GHG emissions to 1990 levels by 2020. AB 32 also identifies ARB as the state agency responsible for designing and implementing emissions limits, regulations, and other measures to meet the target.

In December 2008, ARB adopted the Climate Change Scoping Plan (Scoping Plan), which includes California's main strategies for achieving the GHG reductions required by AB 32 (ARB 2008). The Scoping Plan also includes ARB-recommended GHG reductions for each emissions sector of California's GHG inventory. ARB acknowledges that land use planning decisions will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors.

ARB is required to update the Scoping Plan at least once every 5 years to evaluate progress and develop future inventories that may guide this process. ARB approved the *First Update to the Climate Change Scoping Plan: Building on the Framework* (2014 Scoping Plan Update) in June 2014 (ARB 2014). The 2014 Scoping Plan Update includes a status of the 2008 Scoping Plan measures and other federal, state, and local efforts to reduce GHG emissions in California, and potential actions to further reduce GHG emissions by 2020. The 2014 Scoping Plan Update determined that the state is on schedule to achieve the 2020 target (i.e., 1990 levels by 2020). However, an accelerated reduction in GHG emissions is required to achieve the Executive Order S-3-05 emissions reduction target of 80 percent below 1990 levels by 2050.

The statewide measures adopted under the direction of AB 32, and as outlined in the Scoping Plan, would reduce GHG emissions associated with existing and new development. In November 2017, ARB released *California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target* (2017 Scoping Plan Update) (ARB 2017c). The 2030 target of a 40 percent reduction in GHG emissions below 1990 statewide GHG emissions (consistent with Executive Order B-30-15, which is outlined below) guides the 2017 Scoping Plan Update (ARB 2017c). The 2017 Scoping Plan Update establishes a plan of action, consisting of a variety of strategies to be implemented rather than a single solution, for California to reduce statewide emissions by 40 percent by 2030 compared to 1990 levels (ARB 2017c).

Executive Order B-30-15

In April 2015, Governor Edmund G. Brown Jr. issued an executive order establishing a statewide GHG reduction goal of 40 percent below 1990 levels by 2030. The emission reduction target acts as an interim goal between the AB 32 goal (i.e., achieve 1990 emission levels by 2020) and the goal in Governor Brown's Executive Order S-3-05 of reducing statewide emissions 80 percent below 1990 levels by 2050. In addition, the executive order aligns California's 2030 GHG reduction goal with the European Union's reduction target (i.e., 40 percent below 1990 levels by 2030) that was adopted in October 2014.

Senate Bill 32

Approval of Senate Bill (SB) 32 in September 2016 extended the provisions of AB 32 from 2020 to 2030 with a new target of 40 percent below 1990 levels by 2030. The companion bill, AB 197, added two nonvoting members to ARB; created the Joint Legislative Committee on Climate Change Policies, consisting of at least three senators and three Assembly members; required additional annual reporting of emissions; and required that Scoping Plan updates include alternative compliance mechanisms for each statewide reduction measure, along with market-based compliance mechanisms and potential incentives.

Executive Order S-1-07

Executive Order S-1-07 acknowledges that the transportation sector is the main source of GHG emissions in California. The order established a goal of reducing the carbon intensity of fuels for mobile, stationary, and portable emissions sources sold in California by a minimum of 10 percent by 2020. It also directed ARB to determine whether this Low Carbon Fuel Standard could be adopted as a discrete, early-action measure after meeting the mandates in AB 32. ARB adopted the Low Carbon Fuel Standard on April 23, 2009.

Senate Bill 97

SB 97, signed by the Governor in August 2007, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the Governor's Office of Planning and Research to prepare, develop, and transmit to the California Natural Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The California Natural Resources Agency adopted those guidelines on December 30, 2009, and the guidelines became effective March 18, 2010.

Senate Bill 375

SB 375, signed by the Governor in September 2008, aligned regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 required metropolitan planning organizations (MPOs) to adopt a sustainable communities strategy that will prescribe land use allocation in that MPO's regional transportation plan. ARB adopted regional GHG targets for passenger vehicles and light trucks for 2020 and 2035 for the 18 MPOs in California. If the combination of measures in the SCS would not meet the regional targets, the MPO must prepare a separate "alternative planning strategy" to meet the targets.

California Air Resources Board Advanced Clean Cars Program/Zero Emission Vehicle Program

AB 1493 (Chapter 200, Statutes of 2002), also known as the Pavley regulations, required ARB to adopt regulations by January 1, 2005, that would result in the achievement of the "maximum feasible" reduction in GHG emissions from vehicles used in the state primarily for noncommercial, personal transportation.

In January 2012, ARB approved a new emissions-control program for model years 2017–2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single package of standards called Advanced Clean Cars (California Code of Regulations [CCR] Title 13, Sections 1962.1 and 1962.2 [13 CCR Sections 1962.1 and 1962.2]). The Advanced Clean Cars requirements include new GHG standards for model year 2017–2025 vehicles. ARB anticipates that the new standards will reduce motor vehicle GHG emissions by 34 percent in 2025. A midterm review of the program, released in 2017, includes ARB's technical analysis of adopted GHG and particulate matter emission standards for low-emission vehicles and regulatory requirements for zero-emission vehicles, as well as recommended next steps for each of the adopted requirements (ARB 2017d).

The Advanced Clean Cars program also includes the Low-Emission Vehicle III amendments to the low-emission vehicle regulations (13 CCR Section 1900 et seq.), the Zero-Emission Vehicle program, and the Clean Fuels Outlet regulation. The Zero-Emission Vehicle program is designed to achieve California's goals for long-term emission reductions by requiring manufacturers to offer for sale specific numbers of the very cleanest cars available. These zero-emission vehicles, which include battery electric, fuel cell, and plug-in hybrid electric vehicles, have now entered the marketplace. They are expected to be fully commercial by 2020. The Clean Fuels Outlet regulation is intended to ensure that fuels such as electricity and hydrogen are available to meet the needs of the new advanced technology vehicles as they come to market.

Executive Order B-16-12

Executive Order B-16-12 orders state entities under the direction of the Governor including ARB, the California Energy Commission, and the California Public Utilities Commission to support the rapid commercialization of zero-

emission vehicles. The order directs these entities to achieve various benchmarks related to zero-emission vehicles, including:

- infrastructure to support up to 1 million zero-emission vehicles by 2020,
- widespread use of zero-emission vehicles for public transportation and freight transport by 2020,
- more than 1.5 million zero-emission vehicles on California roads by 2025,
- annual displacement of at least 1.5 billion gallons of petroleum fuels by 2025, and
- a reduction of GHG emissions from the transportation sector equaling 80 percent below 1990 levels by 2050.

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

Executive Order S-01-07 (17 CCR Section 95480 et seq.) requires the state to achieve a 10 percent or greater reduction by 2020 in the average fuel carbon intensity for transportation fuels in California regulated by ARB. ARB identified the Low Carbon Fuel Standard as a discrete early-action item under AB 32, and issued the final resolution (No. 09-31) adopting the standard on April 23, 2009. ARB readopted the Low Carbon Fuel Standard in 2015.

Senate Bills 1078 and 107, Executive Orders S-14-08 and S-21-09, and Senate Bill 350

SB 1078 (Chapter 516, Statutes of 2002) required retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010.

Executive Order S-14-08 expanded the state's Renewable Portfolio Standard to 33 percent renewable power by 2020. Executive Order S-21-09 directs ARB under its AB 32 authority to enact regulations to help the state meet its Renewable Portfolio Standard goal of 33 percent renewable energy by 2020.

The 33 percent-by-2020 goal and requirements were codified in April 2011 with SB X1-2. This new Renewable Portfolio Standard applies to all electricity retailers in the state, including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. Consequently, PG&E, which would be the electricity provider for the proposed project, must meet the 33 percent goal by 2020. SB 350 (2015) increased the renewable-source requirement to 50 percent by 2030.

These requirements reduce the carbon content of electricity generation, and would reduce GHG emissions associated with both existing and new development, including new development on the project site.

In January 2016, the California Public Utilities Commission reported that California's three largest investor-owned utilities—PG&E, Southern California Edison, and San Diego Gas and Electric Company—collectively provided 26.6 percent of their 2014 retail electricity sales using renewable sources and are continuing progress toward meeting the future 2020 requirements (CPUC 2016).

California Green Building Standards Code

In January 2010, the State of California adopted the California Green Building Standards Code, which establishes mandatory green building standards for all buildings in California. The code covers five categories: planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and indoor environmental quality. These standards include a set of minimum requirements and more rigorous voluntary measures for new construction projects to achieve specific green building performance levels. This code went into effect as part of local jurisdictions' building codes on January 1, 2011.

The 2013 update to the California Green Building Standards Code became effective in January 2014. Another update to the energy efficiency standards became effective January 1, 2017. This update to the Building Energy Efficiency Standards will improve the energy efficiency of newly constructed buildings and of additions and alterations to existing buildings. The new standards address nonresidential development as well, and build on the energy efficiency progress made in previous iterations.

3.5.2.3 Regional and Local Plans, Policies, Regulations, and Ordinances

Sacramento Area Council of Governments

SACOG is designated by the U.S. government and the State of California as the MPO for the area and is responsible for developing a regional transportation plan (i.e., MTP) in coordination with Sacramento, Yolo, Yuba, Sutter, El Dorado, and Placer counties and the 22 cities within those counties (excluding the Tahoe Basin). This plan incorporates countywide transportation planning covering a 20-year planning horizon, which must be updated every 4 years. As a requirement of SB 375, MPOs need to develop a sustainable communities strategy as part of the MTP to identify strategies and policies to reduce GHG emissions from passenger vehicles to meet state targets established by ARB.

SACOG's MTP/SCS for 2035 was adopted on April 19, 2012. SACOG's MTP/SCS calls for meeting and exceeding ARB's GHG reduction goals for passenger vehicles and light-duty trucks of 7 percent by 2020 and 16 percent by 2035, where 2005 is the baseline year for comparison (SACOG 2012). SACOG's 2016 MTP/SCS was adopted on February 18, 2016 (SACOG 2016). The 2016 MTP/SCS demonstrates how the region can accommodate expected regional population growth and the increased demand for transportation in the region, while also showing that the region could achieve a reduction in per-capita passenger VMT.

SACOG has created a framework for describing the MTP/SCS that is made up of community types. Local land use plans (e.g., adopted and proposed general plans, specific plans, master plans, corridor plans) were divided into one of five community types based on the location of the plans. The project site is in the community type identified by the MTP/SCS as a "Developing Community" (SACOG 2016:27):

> Developing Communities are typically, though not always, situated on vacant land at the edge of existing urban or suburban development; they are the next increment of urban expansion. Developing Communities are identified in local plans as special plan areas, specific plans, or master plans and may be residential-only, employment-only, or a mix of residential and employment uses. Transportation options in Developing Communities often depend, to a great extent, on the timing of development. Bus service, for example, may be infrequent or unavailable today, but may be available every 30 minutes or less once a community builds out. Walking and bicycling environments vary widely though many Developing Communities are designed with dedicated pedestrian and bicycle trails.

The MTP/SCS includes 31 policies and multiple strategies to address the principles of smart land use; environmental quality and sustainability; financial stewardship; economic vitality; access and mobility; and equity and choice. Highlights of MTP/SCS policies include:

- Implement the Rural-Urban Connection Strategy (RUCS) which ensures good rural-urban connections and promotes the economic viability of rural lands while also protecting open space resources to expand and support the implementation of the Blueprint growth strategy and the MTP/SCS.
- Support and invest in strategies to reduce vehicle emissions that can be shown as cost effective to help achieve and maintain clean air and better public health.
- Use the best information available to implement strategies and projects that lead to reduced GHG emissions.
- Consider strategies to green the system, such as quieter pavements, cleaner vehicles, and lower energy equipment where cost effective, and consider regional funding contributions to help cover the incremental cost.
- SACOG encourages locally determined developments consistent with Blueprint principles and local circulation plans to be designed with walking, bicycling, and transit use as primary transportation consideration.

Placer County Air Pollution Control District

Placer County Air Pollution Control District (PCAPCD) regulates local air quality and air pollutant emissions sources in Placer County. In its *CEQA Air Quality Handbook*, PCAPCD includes a chapter that outlines guidance for analyzing construction emissions, including GHG emissions, and a GHG-specific chapter that discusses the recommended approach to evaluating operational GHG emissions. PCAPCD also includes a list of analysis expectations and methodologies for CEQA analyses.

On October 13, 2016, the PCAPCD Board of Directors adopted the Review of Land Use Projects under CEQA Policy, which established thresholds of significance for GHG emissions. In developing the thresholds, the district took into account health-based air quality standards and the strategies to attain air quality standards, historical CEQA project review data in Placer County, statewide regulations to achieve GHG emission reduction targets, and the geographic

and land use features of Placer County. PCAPCD's GHG thresholds of significance are discussed further in Section 3.5.3.1, "Thresholds of Significance," below.

Town of Loomis General Plan

The *Town of Loomis General Plan* (Town of Loomis 2001) contains goals, policies, and programs that address important community issues and is the basis for land use and public policy decisions. The following policies from the *Town of Loomis General Plan* are related to GHG emissions and energy:

Chapter III, "Land Use and Community Development"

- **Policy F.6:** Loomis shall require landscaping throughout off-street parking lots to mitigate the adverse visual impact of large paved areas and provide shading to assist in energy conservation within adjacent buildings.

Chapter VI, "Public Services, Facilities, and Finance"

- **Policy 8:** New construction and reconstruction/restoration shall consider energy conservation in the selection of building materials, building orientation, and landscaping.
- **Policy 9:** The Town shall identify the potential for energy conservation measures for the use of renewable energy sources and alternatives to fossil fuels.
- **Policy 10:** The Town shall actively participate in the energy conservation programs of the local, state, and federal agencies.

Loomis Municipal Code

The Loomis Municipal Code provides regulations regarding land and structures to promote the health, safety, and welfare of the public and ensure the orderly development of the town. The following provisions of the Municipal Code related to energy are applicable to the proposed project:

- Section 13.30.080(B) in Section 13.30.080, "Outdoor Lighting," begins by stating: "Lighting shall be energy efficient…"
- Section 13.34.050(A), "Landscape Design," in Section 13.34.050, "Landscape Standards," states: "The required landscape plan shall be designed to integrate all elements of the project (e.g., buildings, parking lots, and streets) to achieve their aesthetic objectives, desirable microclimates, and minimize water and energy demand."
- Section 13.38.050(F)(8) in Section 13.38.050, "General Requirements for All Signs," states: "Light sources shall utilize energy efficient fixtures to the greatest extent possible."

3.5.3 Impact Analysis

3.5.3.1 Thresholds of Significance

Based on Appendix G of the State CEQA Guidelines, the proposed project would result in a significant 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 the emissions of GHGs.

PCAPCD has developed recommendations for GHG emissions significance thresholds: a "bright line" threshold of 10,000 MT CO_2e per year for the construction and operational phases of development projects, or for stationary sources (PCAPCD 2017); and a "*de minimis*" threshold of 1,100 MT CO_2e per year for the operational phases of projects. According to PCAPCD's guidance, one of the efficiency thresholds should be used for projects where the operational phase would exceed this *de minimis* level. The efficiency thresholds reflect different expectations for urban and rural development in Placer County and for residential and nonresidential developments:

- *Residential projects:* Urban threshold, 4.5 MT CO_2e per year per capita; rural threshold, 5.5 MT CO_2e per year per capita
- *Nonresidential projects:* Urban threshold, 26.5 MT CO_2e per year per thousand square feet of building space; rural threshold, 27.3 MT CO_2e per year per thousand square feet of building space

According to PCAPCD, local lead agencies would identify whether each project is in an urban or a rural setting (PCAPCD 2016:19).

Appendix F of the State CEQA Guidelines provides guidance for assessing impacts related to energy supplies, focusing on the goal of conserving energy by ensuring that projects use energy wisely and efficiently, including a list of six environmental impacts related to use of energy in Section II(c). For the purposes of this EIR, energy impacts are considered significant if the proposed project would:

- develop land use patterns that cause wasteful, inefficient, and unnecessary consumption of energy; or
- require or result in the construction of new energy production and/or transmission facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

3.5.3.2 Methodology

GHG emissions have the potential to adversely affect the environment because such emissions contribute cumulatively to global climate change. It is unlikely that a single project will contribute significantly to climate change, but cumulative emissions from many projects could affect global GHG concentrations and the climate system. Therefore, impacts are analyzed within the context of the potential contribution to the cumulatively significant impact of climate change.

To address the first criterion for GHG impact analysis listed in Appendix G of the State CEQA Guidelines, a quantitative analysis of project-related GHG emissions was conducted:

- *Construction:* GHG emissions were estimated for off-road construction equipment, material delivery trucks, haul trucks, and construction worker vehicles. Construction emissions were modeled using California Emissions Estimator Model (CalEEMod) Version 2016.3.2 (CAPCOA 2016), as described in more detail in Section 3.3, “Air Quality.” Total annual GHG emissions from construction-related activities were compared to the bright-line threshold developed by PCAPCD.
- *Operation:* CalEEMod was used to estimate GHG emissions associated with mobile, area, and energy sources, similar to air pollutant emissions. However, CalEEMod also estimates indirect GHG emissions associated with solid waste disposal and water consumption. The proposed project’s operational GHG emissions were estimated using methods similar to those described in Section 3.3, “Air Quality.” The project would also generate GHG emissions for deliveries and staff and customer trips. VMT as listed in the project’s transportation impact analysis were used to estimate project-related GHG emissions from mobile sources. Please see Appendix B of this EIR for modeling details, assumptions, inputs, and outputs. Total annual operational GHG emissions were compared to the *de minimis* and efficiency thresholds developed by PCAPCD.

To address the second criterion for GHG impact analysis listed in Appendix G of the State CEQA Guidelines, a qualitative analysis was conducted. The quantitative thresholds established in the Review of Land Use Projects under CEQA Policy and adopted by PCAPCD Board of Directors on October 13, 2016, were developed with the intent of ensuring that new development would not interfere with state efforts to reduce GHG emissions; this was the first time that quantitative GHG thresholds had been adopted by PCAPCD. As described in PCAPCD’s Threshold Justification Report, PCAPCD staff developed the new GHG thresholds to support the state’s GHG reduction goals, specifically AB 32, SB 32, and Executive Order S-3-05, but with consideration of conditions unique to Placer County (PCAPCD 2016).

Therefore, the following analysis considers that if the proposed project would not exceed the quantitative GHG emissions thresholds adopted by PCAPCD in 2016, then the project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

The evaluation of potential energy impacts was based on a review of the following documents and regulations pertaining to the project site and surrounding area:

- *California Energy Demand 2010–2020, Adopted Forecast* (CEC 2009)
- *Town of Loomis General Plan* (Town of Loomis 2001)
- CCR Title 24, including the 2016 California Green Building Code (CCR Title 24, Part 11)

Future energy demand was calculated based on the GHG emissions modeling conducted using CalEEMod Version 2016.3.2. The primary energy demands identified are associated with construction of the proposed project, operations of the warehouse and fueling center facilities, and transportation for deliveries and staff and customer trips. Estimates of future transportation energy demand depend on a variety of factors such as fuel prices, vehicle

technologies and prices, regulatory requirements, and consumer demand and preferences. Energy-related impacts were identified by comparing existing capacity against future demand.

3.5.3.3 Environmental Impacts and Mitigation Measures

Impact 3.5-1: Generation of Greenhouse Gas Emissions. *Construction and operational activities associated with the proposed project would generate GHG emissions. Modeled GHG emission estimates for construction and operational activities are not anticipated to exceed PCAPCD's thresholds of significance when the short-term construction-related emissions are amortized over the (long-term) operational lifetime of the project. Therefore, construction and operation of the proposed project is considered to result in a* ***less than cumulatively considerable contribution*** *to the* ***significant cumulative*** *impact of climate change.*

Implementing the proposed project would generate short-term construction-related and long-term operational GHG emissions. Construction-related GHG emissions would cease after construction of the proposed project. Operational emissions are considered long term and are assumed to occur for the lifetime of the project.

During construction of the proposed project, exhaust GHG emissions would be generated from a variety of sources such as heavy-duty construction equipment, haul trucks, material delivery trucks, and construction worker vehicles. Like air pollutant emissions, daily GHG emissions would vary by type of construction activities planned for each day. For example, daily GHG emissions generated during construction equipment-intensive phases would be higher than daily emissions generated during less equipment-intensive phases. Total construction-related GHG emissions are anticipated to be generated over a 6-month period, and the maximum annual emissions are considered for purposes of the impact analysis.

Operational GHG emissions are distinguished by direct and indirect GHG emissions. Direct GHG emissions are generated at the location of consumption or use; for example, mobile-source emissions are direct emissions because GHG emissions are generated as a vehicle begins to move. Conversely, indirect emissions occur at a different time or location from the point of consumption or use. For example, electricity-related GHG emissions are indirect emissions because as consumers use electricity at their homes, the fuel combustion and emissions associated with creating that electricity likely occurred off-site or at a different time. Other indirect GHG emissions include emissions from solid waste disposal and water consumption. CalEEMod estimates direct emissions associated with the proposed project's mobile sources (e.g., delivery trucks, staff and customer vehicles), area sources (e.g., landscape maintenance equipment), and energy sources (e.g., natural gas), and indirect emissions associated with energy (electricity), water (conveyance and distribution), and solid waste (decomposition).

Table 3.5-3 lists the proposed project's maximum annual construction-related GHG emissions and annual operational emissions by source. This estimate uses a very conservative approach to mobile-source emissions, assuming this is new travel demand, while, as shown in the traffic impact analysis (Appendix E) conducted to support this EIR, the project would actually lead to a net reduction in VMT compared to existing conditions.

As shown in Table 3.5-3, the proposed project's construction-related emissions would not exceed the PCAPCD bright-line threshold of significance of 10,000 MT CO_2e per year. However, long-term (annual) operational GHG emissions would exceed PCAPCD's *de minimis* threshold of significance of 1,100 MT CO_2e per year. Therefore, in accordance with PCAPCD's *CEQA Air Quality Handbook*, the proposed project's operational GHG emissions of 17,232 MT CO_2e per year were calculated relative to project size and expressed in terms of calculated MT CO_2e per year per 1,000 square feet. For this calculation, the project square footage used was that of the proposed warehouse and fueling center, approximately 156,336 square feet, rather than the square footage of the entire 17-acre project site. Compared to PCAPCD's efficiency matrix–defined threshold of 26.5 MT CO_2e per year per 1,000 square feet, the proposed project's annual operational emissions are estimated to be 110 MT CO_2e per year per 1,000 square feet, which exceeds the PCAPCD threshold.

Table 3.5-3. Modeled Greenhouse Gas Emissions for Construction and Operations of the Proposed Project

Emissions Source	GHG Emissions (MT CO_2e/year)
Construction GHG Emissions	
Maximum Annual Construction Emissions	266
Operational GHG Emissions	
Area	0.018
Energy	666
Mobile	16,187
Waste	337
Water	42
Total Annual Operational Emissions**	**17,232**
Total Annual Operational Emissions per 1,000 Square Feet***	**110**

Notes:

CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; MT = metric tons

* The project site is 17.4 acres (approximately 740,520 square feet); the proposed warehouse and fueling center would occupy approximately 156,336 square feet of the site.

** Totals do not add due to rounding.

Source: Modeled by AECOM in 2018. See Appendix B for modeling details, assumptions, inputs, and outputs.

However, as detailed in the traffic impact study (Appendix E), although operation of the proposed project would result in approximately 12,000 daily trips to and from the project site, many of these trips would otherwise be on the roadway network for trips to the existing Costco warehouse and fueling center in nearby Roseville. In addition, because of the location of the proposed Loomis Costco, members using the existing Roseville Costco warehouse who would switch to the proposed Loomis warehouse based on location and convenience would ultimately drive an average of 5 fewer miles per trip. The VMT analysis in the traffic impact study (Appendix E) determined that this per-trip reduction would result in an overall reduction of VMT for the region. The emissions estimates presented in Table 3.5-3 present emissions only for assumed new trips and do not consider the reduction in VMT that would result from the proposed project. More than 90 percent of the estimated emissions are attributable to mobile-source operations; therefore, assuming a net decrease in VMT, and thus mobile-source emissions, the proposed project would create a net decrease in emissions compared to baseline conditions. As a result, when accounting for the net reduction in VMT for the region, net regional operational GHG emissions from mobile source associated with Costco warehouses would be reduced and would not exceed PCAPCD's *de minimis* threshold of 1,100 MT CO_2e per year. The regional reduction in VMT and GHG emissions supports SACOG's MTP/SCS goal for meeting or exceeding ARB's GHG reduction goals for passenger vehicles and light-duty trucks. The net regional GHG reduction from the proposed project is also in alignment with the framework of the MTP/SCS to accommodate expected growth in the region, while also achieving a reduction in per-capita VMT. GHG emissions generated by construction and operation of the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and the contribution of GHG emissions associated with the proposed project to climate change would be **less than cumulatively considerable**.

Impact 3.5-2: Consumption of Energy. *Implementing the proposed project would result in energy consumption in the form of electricity, natural gas, and fossil fuels (e.g., gasoline, diesel fuel) for the duration of the proposed project's construction phases. The project's operational phases would also require energy. The proposed project would not generate substantial renewable energy that would reduce reliance on fossil fuels, but it would result in a minor reduction in energy consumption by mobile sources by Costco consumers in the region, and would not result in an unnecessary, inefficient or wasteful use of energy. This impact would be* ***less than significant****.*

Construction-Related Energy Consumption

Implementing the proposed project would increase consumption of energy in the form of electricity, natural gas, and fossil fuels (e.g., gasoline, diesel fuel) for the duration of construction. Energy demands during construction would be associated primarily with construction equipment and vehicle fueling. During this period, energy (fuel and electricity) would be consumed by construction vehicles and equipment operating on-site, trucks delivering equipment and supplies to the project site, and construction workers driving to and from the site. The proposed project would not

require any demolition, and the project site is anticipated to be balanced, not requiring the import or export of materials for grading.

Table 3.5-4 presents the total fuel consumption anticipated for the proposed construction activities, shown both for the overall construction period and amortized over an assumed 20-year period of building operation. Over the anticipated 6-month construction period, the proposed project would require a total of approximately 22,569 gallons of diesel and 4,175 gallons of gasoline. When amortized over an assumed period of building operation lasting 20 years, fuel consumption would equal approximately 1,128 gallons of diesel and 209 gallons of gasoline per year. The calculations in Table 3.5-4 are based on the CalEEMod emissions calculations for proposed construction activities and application of U.S. Energy Information Administration CO_2 emissions coefficients (U.S. Energy Information Administration 2016) to estimate fuel consumption for each phase of construction activities.

Table 3.5-4. Modeled Construction Fuel Consumption, Total and Amortized over 20 Years

Phase	Source	MT CO_2e/ Year [a]	Fuel Type	Factor (MT CO_2/Gallon) [b]	Gallons/Year
Site Prep	Off-Road Equipment	38.53	Diesel	0.01016	3,793
	Hauling	0.00	Diesel	0.01016	–
	Vendors	0.00	Diesel	0.01016	–
	Workers	1.43	Gasoline	0.008887	161
Grading	Off-Road Equipment	62.80	Diesel	0.01016	6,181
	Hauling	0.00	Diesel	0.01016	–
	Vendors	0.00	Diesel	0.01016	–
	Workers	1.59	Gasoline	0.008887	179
Building Construction	Off-Road Equipment	52.63	Diesel	0.01016	5,180
	Hauling	0.00	Diesel	0.01016	–
	Vendors	49.45	Diesel	0.01016	4,868
	Workers	29.88	Gasoline	0.008887	3,362
Paving	Off-Road Equipment	23.07	Diesel	0.01016	2,271
	Hauling	0.00	Diesel	0.01016	–
	Vendors	0.00	Diesel	0.01016	–
	Workers	1.19	Gasoline	0.008887	134
Architectural Coating	Off-Road Equipment	2.82	Diesel	0.01016	277
	Hauling	0.00	Diesel	0.01016	–
	Vendors	0.00	Diesel	0.01016	–
	Workers	3.02	Gasoline	0.008887	340
			Total Gallons	**Diesel**	22,569
				Gasoline	4,175
			Amortized Demands (over 20 years)	**Diesel**	1,128
				Gasoline	209

Notes:

CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent; MT = metric tons

Assumed amortization period is 20 years, based upon timeline used in analysis of US Green Building Council's *Green Building Costs and Financial Benefits (US Green Building Council 2002)*.

Sources:

[a] Modeled by AECOM in 2018

[b] U.S. Energy Information Administration 2016

As part of the project design, the following actions are proposed for the construction phase, as detailed in Chapter 2, "Project Description."

- New and renewable building materials typically would be extracted and manufactured within the region. The materials for the masonry concrete would be purchased locally, minimizing transportation-related emissions and impacts on the local roadway system.
- Pre-manufactured building components, including structural framing and metal panels, would be used during construction, thus minimizing waste generation.

Using locally sourced materials would reduce the project's energy requirements for transporting materials to the project site. In addition, using renewable materials would reduce overall energy demand in extracting and manufacturing demands for such materials relative to new materials. Finally, using pre-manufactured materials would reduce overall waste because the manufacturing process would be streamlined to reduce generation of waste materials and would allow excess materials from one process to be used in another. Alternatively, with on-site construction, excess materials would be less likely to be reused and more likely to be diverted to recycling and landfill facilities. Although this is not quantified in Table 3.5-4, fuel savings would be achieved through the proposed use of locally sourced materials, and the amount of waste to be hauled off-site would be reduced. The proposed project does not include unusual characteristics that would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in the region. Furthermore, the proposed project would incorporate construction practices that would reduce the waste generated during construction and reduce overall VMT for material deliveries to the project site. Therefore, it is expected that construction fuel consumption associated with the proposed project would not be inefficient, wasteful, or unnecessary. This impact would be **less than significant.**

Because the proposed project would exceed thresholds for criteria air pollutants as described in Section 3.3, "Air Quality," Mitigation Measure 3.3-1a includes measures to minimize the idling time of heavy-duty construction equipment. As a part of this mitigation measure, the construction contractor shall shut off equipment when not in use and reduce idling time to 5 minutes, as required by 13 CCR Sections 2449(d) and 2485. This mitigation measure would also reduce the consumption of energy by reducing fuel consumption by construction equipment, and thus, would support the less-than-significant impact for the proposed project's construction-related energy consumption.

In addition, Mitigation Measure AQ-1c from Section 3.3, "Air Quality," requires that the construction contractor shall use new and renewable building materials extracted and manufactured within the region, and purchase materials locally for the masonry concrete requirements. While this is contained within the project description, it would be required by Mitigation Measure AQ-1c, further increasing energy efficiency during the construction phase.

Building Operational Energy Consumption

The proposed buildings would be constructed to meet all energy efficiency standards applicable at the time of construction and would be required to comply with the energy performance standards found in CCR Title 24, including the Building Energy Efficiency Standards in the California Green Building Standards Code (CCR Title 24, Part 11).

The proposed warehouse would include approximately 152,000 square feet of floor space[2] dedicated to retail goods and services. Using CalEEMod, electrical and natural gas demands were modeled to estimate energy use (Table 3.5-5). The electrical demands created by the proposed facilities would total approximately 1,937,838 kilowatt-hours per year. This would be approximately 0.07 percent of the total amount of energy consumed by Placer County in 2016 (2,938.51 GWh) (CEC 2017a). The natural gas demand generated by the proposed project would be approximately 1,858,525 thousand British thermal units (kBtu) per year, or 0.02 percent of the total amount of natural gas consumed by Placer County in 2016 (406,631,000 kBtu).

Table 3.5-5. Estimated Annual Electrical and Natural Gas Demands

Proposed Project Component	Demands	
	Electrical (kWh/year)	Natural Gas (kBtu/year)
Warehouse	1,793,270	1,779,580
Fueling Center	35,788	78,945
Parking	108,780	0
Total	**1,937,838**	**1,858,525**

Notes: kBtu = thousand British thermal units; kWh = kilowatt-hours

Source: Data compiled by AECOM in 2018

[2] Total does not include rooms housing building-serving mechanical equipment.

Energy efficiency requirements for new construction have increased over time; therefore, the proposed buildings would generally be more energy efficient than existing similar buildings in the area. Consistent with the *Town of Loomis General Plan*, which has a policy requiring new development to consider energy conservation during the selection of building materials, building orientation, and landscaping, the proposed project includes several energy-conserving features. As described previously, this includes the use of locally sourced, renewable, and pre-manufactured building components. In addition, landscaping would include a mix of drought-tolerant shrubs and grasses, and a variety of shade trees to be dispersed throughout the parking lot area and along the site perimeter; reducing water demands through these landscaping strategies also reduces off-site energy requirements for the treatment and movement of water to the site by the water utility company. Additional project design features are described in Chapter 2, "Project Description," and include the following:

- Parking lot light standards designed to distribute light evenly and use less energy than is used by a larger number of fixtures at lower heights. Light-emitting diode (LED) lamps would provide a higher level of perceived brightness with less energy than other lamps, such as the high-pressure sodium type.
- Conservation of energy required for heating and cooling the structure, through the use of pre-manufactured metal wall panels with insulation, which carry a higher energy efficiency rating (R-Value) and greater solar reflectivity than other options. These walls also have a lower thermal mass of the metal wall than a typical masonry block wall, thereby reducing building heat absorption.
- A reflective "cool roof" material to produce lower heat absorption, thereby lowering energy requirements during the summer when the HVAC system is running hard. This roofing material meets the requirements of EPA's Energy Star energy efficiency program.
- HVAC comfort systems controlled by a computerized building management system to maximize efficiency.
- The use of high-efficiency directed duct units for HVAC.
- Parking lot lights controlled by the project's energy management system.
- Energy-efficient transformers (i.e., Square D Type EE transformers).
- Use of variable-speed motors on make-up air units and booster pumps.
- Direct vent gas and water heaters that would be 94 percent efficient or greater.

The parking lot light standards and control system would reduce energy requirements by improving the distribution of lighting throughout the space, and using the more energy-efficient LED technology rather than standard lighting fixtures. Selected building materials would reduce heat absorption and increase solar reflectivity, thereby lowering energy use during the warmer months of the year. Installing a computerized building management system to control HVAC and other similar operational systems would reduce energy requirements for building operations because the systems could be adjusted automatically in response to actual requirements, rather than relying on manual adjustments. Other energy conservation systems for building operations, such as the capture of heat released by refrigeration equipment to heat water, would provide additional energy savings by using what otherwise would be wasted energy to replace a building energy requirement.

Energy consumption associated with the space heating and cooling, lighting, and other operational energy uses for the proposed project's buildings is closely tied to the design of the buildings. To ensure the buildings would meet minimally required building standards for energy efficiency, the proposed project would need to comply with the energy performance standards found in CCR Title 24, including the Building Energy Efficiency Standards in the California Green Building Standards Code (CCR Title 24, Part 11). To not overestimate energy savings, the project design features outlined in the project description are not factored into the energy demands shown in Table 3.5-5. Without compliance, the building operations could result in an unnecessary or wasteful use of energy. Thus, this impact would be **potentially significant**.

Transportation-Related Energy Consumption

The proposed project would be constructed on an undeveloped site southeast of the intersection of Sierra College Boulevard and Brace Road, and one-half mile from the nearest exit and entry point for Interstate 80. Sierra College Boulevard is a four-lane main thoroughfare for residents in the region and Interstate 80 provides the primary southwest-to-northeast route between more rural communities in the area and the more urban centers of Roseville and Sacramento. The project site was selected for the purposes of traffic control, as this location is near the main interstate to facilitate the coming and going of daily delivery trucks and consumers, and to limit the distance traveled on surface streets, where idling and increased emissions would be more likely. In addition, truck deliveries to the

warehouse would be made using a Costco-managed truck fleet; these trucks are equipped with engine idle shutoff timers, which would minimize the use of fuel and related energy consumption during deliveries.

Transportation fuel consumption during operation of the proposed warehouse and fueling center was estimated based on the CalEEMod emissions calculations for operational mobile activities, the EMFAC2014 vehicle fleet mix for Placer County, and application of U.S. Energy Information Administration CO_2 emissions coefficients (U.S. Energy Information Administration 2016) to estimate total fuel consumption. Table 3.5-6 shows the estimate of diesel and gasoline fuel consumption during project operations.

Table 3.5-6. Estimated Annual Fuel Consumption for Proposed Project Operations

	MT CO_2e/ Year [a]	% Average Fleet Mix [b]	Factor (MT CO_2/Gallon) [c]	Gallons/Year
Gross Project Fuel Consumption (16,500 daily VMT for proposed project)	16,187.47			
Diesel		8.78%	1.02E-02	139,820
Gasoline		90.48%	8.89E-03	1,648,021

Notes: CO_2 = carbon dioxide; CO_2e = carbon dioxide equivalent; MT = metric tons; VMT = vehicle miles traveled

Sources:

[a] Modeled by AECOM in 2018

[b] EMFAC2014 (v1.0.7) web database

[c] U.S. Energy Information Administration 2016

As described in detail in the traffic impact study (Appendix E), the proposed warehouse would be located approximately 5 miles from an existing Costco Wholesale warehouse in the city of Roseville. Given the proximity of the existing warehouse, the proposed Loomis warehouse is expected to capture existing trips from consumers who otherwise would shop at the Roseville Costco warehouse. Trip generation rates and distances are estimated in the traffic impact study (Appendix E). Based on this analysis, the project is estimated to result in an overall net reduction in regional VMT. Although the proposed project, independent of other regional considerations, would generate additional VMT and would have associated fuel demands for operational transportation, regionally, the proposed project is anticipated to reduce fuel consumption for transportation to and from a Costco warehouse. Thus, this impact would be **less than significant.**

Summary

Energy would be consumed through all phases of project construction and operations. Energy-requiring activities range from equipment operation, to building operations and lighting of the parking lot, to transportation during all phases of the proposed project. Table 3.5-7 summarizes total energy requirements for the proposed project. For comparison purposes, Table 3.5-7 shows conversion of all energy requirements to a common energy unit of British thermal units (Btu).

Operational transportation is a substantially greater energy-consuming factor than construction or building operations. However, when considering regional energy consumption and the reduction in overall VMT (described above under “Transportation-Related Energy Consumption”), this energy demand is actually a regional energy savings, and energy uses by the proposed project would come from construction activities and building operations. As described above, the proposed project would incorporate several processes and design elements specifically selected with the goal of reducing the proposed project’s overall energy requirements from construction through operations. In addition, implementing Mitigation Measure 3.3-1a (see Section 3.3, “Air Quality”) would further reduce fuel consumption during construction.

Building operations could result in unnecessary or wasteful use of energy without compliance with the energy performance standards found in CCR Title 24, including the Building Energy Efficiency Standards in the California Green Building Standards Code (CCR Title 24, Part 11). Thus, this impact would be **potentially significant**.

Table 3.5-7. Summary of Proposed Project Energy Requirements

Phase	Energy Requirement[a]	Unit	Annual Energy Consumption (MMBtu)[b]
Construction (amortized over 20 years)			
Diesel	1,128	gallons/year	156
Gasoline	209	gallons/year	26
		Subtotal	*182*
Building Operations			
Warehouse			
Electrical	1,793,270	KWh/year	6,120
Natural Gas	1,779,580	kBtu/year	1,780
Fueling Center			
Electrical	35,788	KWh/year	122
Natural Gas	78,945	kBtu/year	79
Parking			
Electrical	108,780	KWh/year	371
Natural Gas	–	kBtu/year	–
		Subtotal	*8,472*
Operational Transportation			
Diesel	139,820	gallons/year	19,308
Gasoline	1,648,021	gallons/year	206,003
		Subtotal	*225,003*
		Total	***233,965***

Notes:

kBtu/year = thousand British thermal units per year; KWh/year = kilowatt-hours per year; MMBtu = million British thermal units

Totals do not add due to rounding.

Sources:

[a] Modeled by AECOM in 2018

[b] U.S. Energy Information Administration 2016

Mitigation Measures

Mitigation Measure Energy-2: Comply with CCR Title 24

The applicant shall design and construct the buildings to meet all energy efficiency standards applicable at the time of construction and shall comply with the energy performance standards found in CCR Title 24, including the Building Energy Efficiency Standards in the California Green Building Standards Code (CCR Title 24, Part 11).

Significance after Mitigation

As described above, the proposed project does not include unusual characteristics that would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in the region. Furthermore, the proposed project would incorporate construction practices that would reduce the waste generated during construction and reduce overall VMT for material deliveries to the project site. Building operations are designed through various site features to be energy efficient. With implementation of Mitigation Measure Energy-2a, buildings would meet energy performance standards found in CCR Title 24, further ensuring implementation of energy efficiency measures in building design and construction. When considering mobile energy consumption and the net reduction in overall regional VMT (described above under “Transportation-Related Energy Consumption”), the energy demand from operational transportation activities results in a regional energy savings, and energy uses by the proposed project would come from construction activities and building operations. Therefore, with implementation of Mitigation Measure Energy-2a, the proposed project would not be inefficient, wasteful, or unnecessary. This impact would be **less than significant with mitigation**.

Energy efficiency is a possible indicator of environmental impacts. The actual adverse physical environmental effects associated with energy use and the efficiency of energy use are detailed throughout this EIR in the environmental

topic–specific sections. For example, the use of energy for transportation leads to air pollutant emissions, the impacts of which are addressed in Section 3.3 of this EIR. There is no physical environmental effect associated with energy use that is not addressed in the environmental topic–specific sections of this EIR.

3.5.4 Significance after Mitigation

*M*odeled GHG emission estimates for construction and operational activities are not anticipated to exceed PCAPCD's thresholds of significance when the short-term construction-related emissions are amortized over the (long-term) operational lifetime of the project. Therefore, construction and operation of the proposed project would not require mitigation.

Similarly, project construction and operation would not result in wasteful or inefficient consumption of energy due to the may project features incorporated into the design to improve energy efficiency and the reduction in vehicle miles traveled associated with placement of the project at the project site.

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