

4.6 GREENHOUSE GASES AND CLIMATE CHANGE

4.6.1 INTRODUCTION

This section addresses the potential for the Proposed Project to result in impacts associated with greenhouse gases and climate change. Following an overview of the environmental setting in **Section 4.6.2** and the relevant regulatory setting in **Section 4.6.3**, project-related impacts and recommended mitigation measures are presented in **Section 4.6.4** and **Section 4.6.5**, respectively.

4.6.2 ENVIRONMENTAL SETTING

Existing Climate Setting

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. As defined in California Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, discussed in detail below, GHGs include all of the following: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) (Health & Safety Code §38505[g]). The greenhouse effect is the process of solar radiation entering 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. The absorbed radiation is then emitted from the earth, not as high-frequency solar radiation, but lower-frequency infrared radiation. Most solar radiation passes through GHGs; however, infrared radiation is selectively absorbed by GHGs. 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. In addition to natural sources, human activities are exerting a substantial and growing influence on climate by changing the composition of the atmosphere and by modifying the land surface through deforestation and urbanization reducing carbon capture and decreasing albedo (IPCC, 2007). In particular, increased consumption of fossil fuels has substantially increased atmospheric levels of GHGs. Emissions of these gases are attributable to human activities associated with the industrial/manufacturing, utilities, transportation, residential, and agricultural sectors (CEC, 2005a).

In 2014, transportation generated 37 percent of California's GHG emissions, followed by the industrial sector (24 percent), electricity generation in state (12 percent), electricity generation imports (8 percent), commercial and residential (11 percent), agriculture and forestry (8 percent), and other sources (1 percent) (CARB, 2016d). Emissions of CO₂ and N₂O are byproducts of fossil fuel combustion, among other sources. CH₄ results from off-gassing associated with agricultural practices and landfills. Sinks of CO₂ include uptake by vegetation and dissolution into the world's ocean.

Global warming potential (GWP) is a measure of how much a given mass of GHG is estimated to contribute to global warming. It is a relative scale, which compares the gas in question to that of the same mass of CO₂ (which has a GWP of 1). Thus, for example, CH₄ has a GWP of 21 and N₂O has a GWP of 310 (ENVIRON, 2013). Consequently, using each pollutant's GWP, emissions of CO₂, CH₄, N₂O, CFCs and ozone depleting CFCs, and HFCs can be converted into CO₂ equivalents (CO₂e).

Global Implications

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and United Nations Environment Programme. IPCC's mission is to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, including the potential impacts and options for adaptation and mitigation. It is anticipated that the average global temperature could rise 1.5 degrees Celsius ($^{\circ}$ C) (2.7 degrees Fahrenheit [$^{\circ}$ F]) to 4.0 $^{\circ}$ C (7.2 $^{\circ}$ F) between the years 2000 and 2100 (IPCC, 2013a). The first installment of the Fifth Assessment Report, *Working Group I, Climate Change 2013: The Physical Science Basis* was released in September 2013; this installment was accepted and the underlying science was approved (IPCC, 2013b).

Fossil fuel combustion removes carbon stored underground (as, for example, coal, oil, or natural gas) and releases it into the active carbon cycle, thus increasing concentration of GHGs in the atmosphere. The IPCC Fifth Assessment Report concludes emissions of GHGs in excess of natural ambient concentrations are extremely likely (defined as 95 to 100 percent confidence) to be responsible for the enhancement of the greenhouse effect and contribute to what is termed "global warming," a trend of unnatural warming of the Earth's climate. Increases in these gases lead to more absorption of radiation and warm the lower atmosphere further, thereby increasing evaporation rates, and temperatures near the surface. Climate change is a global problem and GHGs are global pollutants, unlike criteria air pollutants (such as ozone, carbon monoxide, and particulate matter) and toxic air contaminants, which are pollutants of regional and local concern.

The report incorporates findings of the current effects of global climate change. These findings include increased intensity of tropical cyclones in the North Atlantic, longer and more intense droughts, declining mountain glaciers and snow cover, and rising sea levels. An enhanced greenhouse effect will generate new patterns of microclimate and will have significant impacts on economies, the environment, and transportation infrastructure and operations due to increased temperatures, intensity of storms, sea level rise, and changes in precipitation. Impacts may include flooding of tunnels, coastal highways, runways, and railways, buckling of highways and railroad tracks, submersion of dock facilities, and a shift in agriculture to areas that are now cooler. Such prospects will have strategic security as well as transportation implications.

Climate change also affects public health and the environment. Increased smog and emissions, respiratory disease, reduction in the water supply, extensive coastal damage, and changes in vegetation and crop patterns have been identified as effects of climate change. The impacts of climate change are broad-ranging and interact with other market failures and economic dynamics, giving rise to many complex policy problems.

California Implications

Climate change could impact California's natural environment in the following ways (CEC, 2012):

- Rising sea levels along the California coastline, particularly in San Francisco and the Sacramento-San Joaquin River Delta due to ocean expansion;

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- Extreme heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent;
- An increase in heat-related human deaths and infectious diseases and a higher risk of respiratory problems caused by deteriorating air quality;
- Reduced snow pack and stream flow in the Sierra Nevada mountains, affecting winter recreation and water supplies;
- Potential increase in the severity of winter storms, affecting peak stream flows and flooding;
- Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield; and
- Changes in distribution of plant and wildlife species due to changes in temperature, competition of colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate-related effects.

These changes in California's climate and ecosystems could occur at a time when California's population is expected to increase from 34 million to 59 million by the year 2040 (CEC, 2005a). Consequently, if actions are not taken to reduce GHG emissions, the anticipated increase in population would also lead to increases in the amount of anthropogenic GHG emissions and the number of people potentially affected by climate change in California. Climate changes for global warming could affect agriculture, the fishing industry, California's coastline, forests, and ecosystems, increase air pollution, and affect energy production (CAT, 2007).

Locally, impacts from climate change that have already effected the region include decreased snowpack, increase in average temperature (CEC, 2016f).

4.6.3 REGULATORY CONTEXT

Federal

The Clean Air Act (CAA)

In the past, the United States Environmental Protection Agency (USEPA) has not regulated GHGs under the Clean Air Act (CAA) because it asserted that the act did not authorize the USEPA to issue mandatory regulations to address global climate change and that such regulation would be unwise without an unequivocally established causal link between GHGs and the increase in global surface air temperatures. However, the U.S. Supreme Court held that the USEPA must consider regulation of motor vehicle GHG emissions. In *Massachusetts v. USEPA et al.*, 12 states and cities, including California, together with several environmental organizations, sued to require the USEPA 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 the USEPA did not have a valid rationale for not regulating GHGs. In response to this ruling, the USEPA has recently made an endangerment finding that GHGs pose a threat to the public health and welfare. This is the first step necessary for the establishment of federal GHG regulations under the CAA.

United States Environmental Protection Agency

The following are the most recent regulatory actions taken by the USEPA:

- On September 15, 2009, USEPA and the United States Department of Transportation's (USDOT's) National Highway Traffic Safety Administration (NHTSA) proposed a new national program that would reduce GHG emissions and improve fuel economy for all new cars and trucks sold in the United States. The USEPA proposed the first national GHG emissions standards under the CAA, and NHTSA proposed an increase in the corporate average fuel economy (CAFÉ) standards under the Energy Policy and Conservation Act. Fuel economy standards for passenger vehicles were adopted in two phases. Phase 1 was adopted in 2010 and applied to model years 2012 through 2016. Phase 2 was adopted in 2012 and applied to model years 2017-2025. The most recent standards were adopted in August 2016 and mandated increased fuel efficiency for heavy duty trucks. These standard effect model years 2021 through 2027.
- In response to the FY 2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110–161), The USEPA issued the Final Mandatory Reporting of GHG Rule. Signed by the Administrator on September 22, 2009, the rule requires that suppliers of fossil fuels and industrial GHGs, manufacturers of vehicles and engines outside of the light duty sector, and facilities that emit 25,000 metric tons (MT) or more of GHGs per year to submit annual reports to the USEPA. The rule is intended to collect accurate and timely emissions data to guide future policy decisions on climate change.
- In 2010, the EPA issued the greenhouse gas tailoring rule, which limited the numbers of facilities that would be required to obtain New Source Review and Title V permits for GHG emissions. Facilities that produce at least 100,000 MT of CO_{2e} annually or increase their emissions by 75,000 MT annually will be required to install the “best available control technology” to reduce emissions. In 2014 the Supreme Court found that, GHG emissions alone cannot trigger major source review, however, if the project's emissions of other regulated air pollutants warranted either a Title V or Prevention of Significant Deterioration permit, the USEPA may still require limitations on GHG emissions.
- In June 2014, the USEPA took steps to provided guidelines to reduce GHG emissions in existing power plants by 2030, the steps the USEPA is taking are as follows:
 - Cut carbon emission from the power sector by 30 percent nationwide below 2005 levels, which is equal to the emissions from powering more than half the homes in the United States for one year ; and
 - Cut particle pollution, nitrogen oxides, and sulfur dioxide by more than 25 percent as a co-benefit.

The Energy Policy Act of 2005

On August 8, 2005, President Bush signed the Energy Policy Act of 2005 (P.L. 109-58), with provisions directly and indirectly related to GHG emissions. Title XVI establishes a voluntary national program designed to encourage voluntary reductions in GHGs. The effort is led by an Interagency Committee,

with the United States Department of Energy (USDOE) playing a key supporting role. Title XVI attempts to support actions focused on reducing U.S. carbon intensity, but does not establish a requirement to reduce emissions. The title also establishes a program to encourage exports of carbon intensity-reducing technologies to developing countries. This program is led by the Secretary of State. In addition to Title XVI, Section 1253 repeals the mandatory purchase requirement under Section 210 of the Public Utility Regulatory Policy Act for new contracts if the Federal Energy Regulatory Commission finds that a competitive electricity market exists and if other conditions are met. The debate over the bill included proposals to increase CAFÉ standards and to establish a renewable portfolio standard (RPS), although these changes were not included in the final law.¹

The Energy Independence and Security Act (EISA)

On December 19, 2007, President Bush signed the Energy Independence and Security Act of 2007 (EISA; P.L. 110-140). EISA contains many energy provisions that could lead to reductions in GHG emissions. In addition to these indirect reductions, EISA also directly addresses climate change issues in several ways.

First, EISA expands the renewable fuel standard (RFS) established in P.L. 109-58. The RFS requires that a minimum amount of renewable fuels be blended into transportation fuels each year. The EISA amendments to the RFS significantly expand the mandated level. Further, they require that an increasing share of the RFS be met with “advanced biofuels” defined as having 50 percent lower lifecycle GHG emissions than petroleum fuels. This is the first time that Congress has enacted national policy addressing the carbon content of motor fuels.

Second, Title VII of the new law focuses on research, development, and demonstration of technologies to capture and store CO₂. USDOE research and development is expanded and will include large-scale demonstration projects. The Department of the Interior must develop a methodology to assess the national potential for geologic and ecosystem storage of CO₂, and must recommend a regulatory framework for managing geologic carbon sequestration on public lands.

In addition to the above programs, EISA also requires the establishment of an Office of Climate Change and Environment in the USDOT. This office will plan, coordinate, and implement research at USDOT on reducing transportation-related energy use, mitigating the causes of climate change, and addressing the impacts of climate change on transportation.

Energy provisions not directly addressing climate change, but that could lead to lower GHG emissions, including:

- more stringent fuel economy (CAFÉ) standards for passenger cars and light trucks;
- higher-efficiency standards for appliances and lighting;

¹ CAFÉ is the sales weighted average fuel economy, expressed in miles per gallon (mpg), of a manufacturer's fleet of passenger cars or light trucks with a gross vehicle weight rating (GVWR) of 8,500 lbs. or less, manufactured for sale in the United States, for any given model year. Fuel economy is defined as the average mileage traveled by an automobile per gallon of gasoline consumed as measured in accordance with the testing and evaluation protocol set forth by the USEPA.

- higher-efficiency requirements for government buildings; and research and development on renewable energy.

State

California has been a leader among the states in outlining and aggressively implementing a comprehensive climate change strategy that is designed to result in a substantial reduction in total statewide GHG emissions in the future. California's climate change strategy is multifaceted and involves a number of state agencies implementing a variety of state laws and policies. These laws and policies are provided below.

Assembly Bill 1493

AB 1493 of 2002 requires the California Air Resources Board (CARB) to develop and adopt the nation's first GHG emission standards for automobiles. These standards are also known as Pavley I. The new standards would cover model years 2012 to 2016 and would raise passenger vehicle fuel economy to a fleet average of 35.5 miles per gallon (mpg) by 2016.

Executive Order (EO) S-3-05

Executive Order (EO) S-3-05 was signed by the Governor on June 1, 2005. EO S-3-05 established the following statewide emission reduction targets:

- Reduce GHG emissions to 2000 levels by 2010
- Reduce GHG emissions to 1990 levels by 2020
- Reduce GHG emissions to 80 percent below 1990 levels by 2050

EO S-3-05 created a "Climate Action Team" or "CAT" headed by the California Environmental Protection Agency (CalEPA) and including several other state jurisdictional agencies. The CAT is tasked by EO S-3-05 with outlining the effects of climate change on California and recommending an adaptation plan. The CAT is also tasked with creating a strategy to meet the target emission reductions. In April 2006 the CAT published an initial report that accomplished these two tasks. Subsequent CAT reports discussed the progress and supplemental recommendations to ensure the targets of EO S-3-05. The 2010 CAT Report to the Governor and the Legislature was issued in December 2010 (CalEPA, 2010).

Senate Bill 350 (SB 350)

SB 350 codifies the GHG targets for 2030 set by EO B-30-15. To meet these goals, SB 350 also raises the RPS from 33 percent renewable generation by 2020 to 50 percent renewable generation by December 31 2030.

Executive Order S-01-07

EO S-01-07 was signed by the Governor on January 18, 2007. It mandates a statewide goal to reduce the carbon intensity of transportation fuels by at least 10 percent by 2020. This target reduction was identified by CARB as one of the AB 32 early action measures identified in their October 2007 report.

Executive Order B-30-15 (EO B-30-15)

EO B-30-15 was signed by the Governor on April 29, 2015. It sets interim GHG targets of 40 percent below 1990 by 2030, to ensure California will meet its 2050 targets set by EO S-3-05. It also directs the CARB to update the Climate Change Scoping Plan. The 2030 Target Scoping Plan Concept Paper was released on June 17th, 2016.

California Global Warming Solutions Act of 2006 (AB-32)

In adopting the California Global Warming Solutions Act of 2006 (AB 32), the California state legislature established a cap on statewide GHG emissions and set forth a regulatory framework to achieve the corresponding reduction in statewide emission levels. Under AB 32, GHGs are defined as: CO₂, CH₄, N₂O, HFC, PFC, and SF₆.

AB 32 requires that CARB:

- Adopt early action measures to reduce GHGs;
- Establish a statewide GHG emissions cap for 2020 based on 1990 emissions;
- Adopt mandatory report rules for significant GHG sources;
- Adopt a scoping plan indicating how emission reductions will be achieved via regulations, market mechanisms, and other actions; and
- Adopt regulations needed to achieve the maximum technologically feasible and cost-effective reductions in GHGs.

Senate Bill 32 (SB 32)

In 2016, the California state legislature adopted SB-32, which extends AB-32 to ensure that GHG emissions are reduced to at least 40 percent below the statewide GHG emissions limit by 2030.

Early Action Measures

CARB has adopted several early action measures to reduce GHG emissions. They include actions such as improvements to landfill CH₄ capture, a vehicle tire pressure program, improvements to heavy duty truck efficiency, and a low carbon fuels standard (LCFS). On April 23, 2009, CARB adopted a LCFS. This standard requires that all fuels sold in California must have a reduced carbon content that will lower emissions by 10 percent by 2020.

Guidance and protocols for businesses and governments to facilitate GHG emission reductions were approved as early action items by CARB at its June 2007 hearing. A Local Government Toolkit was designed to provide guidance and resources to help cities and counties reduce GHG emissions and save money. No regulations have been adopted by CARB that apply specifically to cities and counties. A variety of tools are available to assist with climate action planning, including information on:

- How to calculate and inventory current GHG emissions;
- A recommended target to reduce GHG emissions;
- Cost-saving strategies to take action now;
- Financial resources to get started; and

- Case studies to learn what other cities have been able to accomplish.

Phase II of the Toolkit will include a decision support tool to help local governments develop customized climate action plans, a peer-networking online discussion forum, and a climate leadership recognition program to recognize achievements for measured GHG emission reductions.

California's Scoping Plan and Cap and Trade Program

In the adopted Climate Change Scoping Plan, CARB lays out the GHG reductions that need to be achieved and the types of measures that will be used to reach them. The Plan predicts that under a "business as usual" (BAU) scenario, 2020 GHG emissions would equal 596 million metric tons (MMT) CO_{2e}. Consequently, compared to the 1990 GHG emissions inventory, emissions would need to be reduced by 169 MMT CO_{2e} in 2020. This represents a 30 percent GHG reduction from the 1990 levels to be achieved by 2020. In 2011, CARB updated the projected GHG emissions to reflect the effects of the economic downturn, finding that a reduction of 21 percent from the projected BAU scenario would be necessary to achieve the statewide emission targets. This 21 percent reduction from the BAU scenario does not account for the effect of additional GHG regulations that have been adopted. CARB found that if using a BAU scenario that accounts for those additional regulations, specifically the increased renewable energy standard (the RPS) and vehicle emissions reductions (under a regulation referred to as Pavley I), a reduction from that BAU scenario of 16 percent would be needed to achieve the established targets (CARB, 2008).

The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and CAT early actions and additional GHG reduction measures by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. The key elements of the Scoping Plan include:

- Expanding and strengthening existing energy efficiency programs, and building and appliance standards.
- Achieving a statewide renewables energy mix of 33 percent.
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85 percent of California's GHG emissions.
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets.
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard.
- Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the state of California's long-term commitment to AB 32 implementation.

The first update to the 2007 Climate Action Scoping Plan was released in May 2014 (CARB, 2014b). The purpose of the update is to identify the next steps for California's leadership on climate change. The

updated Plan outlines the progress California has made to date regarding near-term 2020 GHG limits, such as cleaner and more efficient energy, cleaner transportation, and the California Air Resources Board's (CARB's) Cap-and-Trade Program. The updated Plan identifies six key areas where further control strategies are needed, which are: energy, transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure), agriculture, water, waste management, and natural and working lands.

CARB Mandatory GHG Reporting Regulation

Under AB 32, California has established a unique, broad program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective GHG emission reductions. One of the specific tasks required by AB 32 was the adoption of a regulation requiring GHG emission reporting, which was carried out by CARB in December 2007 (CARB, 2014c). Under the Regulation for the Mandatory Reporting of GHG Emissions, which was last revised in 2014, facilities that have stationary sources that emit 10,000 MT of CO₂e or more must submit annual reports to CARB. Annual reports must include facility information including enumerated emissions and their sources, monitoring information, GHG calculations, and a verification report from a CARB Certified Verifier. Facilities that have stationary sources that emit 25,000 MT of CO₂e or more must have their annual reports reviewed by a CARB-accredited verification body to determine if the monitoring system in place is sufficient to meet the requirements of the Regulation for the Mandatory Reporting of GHG Emissions. The reported emissions data allows CARB to improve its data on GHG emissions for individual facilities and their emitting processes, improve emissions inventories for criteria pollutants, and provide additional data for assessing cumulative emission impacts on a community level (CARB, 2008). Additionally, mandatory GHG reporting is a central component of the Cap-and-Trade program in California as accurate measurement and reporting of all emissions is necessary to assure accountability, establish the integrity of allowances, and provide sufficient transparency to sustain confidence in the market. To ensure compliance, CARB administers penalties for entities that hold an insufficient quantity of allowances to cover their emissions or fail to report their GHG emissions. Missed compliance deadlines also result in the application of stringent administrative, civil, or criminal penalties (CARB, 2008).

California Renewable Portfolio Standards - SB 1078, Executive Order S-14-08, SB 2X, and SB X1 2

SB 1078 addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. SB 107 changed the target date of this bill's implementation to 2010. SB 1078 will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed EO S-14-08, which set the RPS target to 33 percent by 2020. It directed state government agencies and retail sellers of electricity to take all appropriate actions to implement this target. In March 2011, SB 2X established S-14-08 as law. While SB 2X contains the same targets as Governor's Order S-14-08 (33 percent of their supply from renewable sources by 2020), as an EO it did not have the force of law (a Governor's Order can be reversed by future governors).

SB X1 2 expands the RPS by establishing as a goal that 20 percent of the total electricity sold to retail customers in California per year must be from renewable sources by December 31, 2013, and 33 percent by December 31, 2020, and in subsequent years. Under the bill, a renewable electrical generation facility

is one that uses biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current, and that meets other specified requirements with respect to its location. In addition to the retail sellers covered by SB 107, SB X1 2 adds local publicly-owned electric utilities to the RPS. The California Public Utilities Commission (CPUC) has established the quantity of electricity products from eligible renewable energy resources to be procured by retail sellers in order to achieve targets of 25 percent by December 31, 2016; and 33 percent by December 31, 2020. The statute also requires that the governing boards for local publicly-owned electric utilities establish the same targets, and the governing boards are responsible for ensuring compliance with these targets. The CPUC is responsible for enforcement of the RPS for retail sellers, while the California Energy Commission (CEC) and CARB will enforce the requirements for local publicly-owned electric utilities.

Title 24 (California Energy Code and California Green Building Standards Code)

The California Energy Code (Title 24, Part 6, of the California Code of Regulations [CCR], California's Energy Efficiency Standards for Residential and Nonresidential Buildings), provides energy conservation standards for all new and renovated commercial and residential buildings constructed in California. The provisions of the California Energy Code apply to the building envelope, space-conditioning systems, and water-heating and lighting systems of buildings and appliances; they also give guidance on construction techniques to maximize energy conservation. Minimum efficiency standards are given for a variety of building elements, including appliances; water and space heating and cooling equipment; and insulation for doors, pipes, walls, and ceilings.

The California Green Building Standards Code (Title 24, Part 11 of the CCR; CalGreen) is intended to improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices in the following categories: planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. In addition, CalGreen encourages local governments to adopt more stringent voluntary provisions, known as Tier 1 and Tier 2 provisions, to further reduce air pollutant emissions, improve energy efficiency, and conserve natural resources. If a local government adopts one of the tiers, the provisions become mandates for all new construction within that jurisdiction.

The 2016 Title 24 standards will go into effect on January 1, 2017. The 2016 update of the Title 24 standards improve upon the current 2013 standards. The 2016 Standards also include changes made throughout all of its sections to improve the clarity, consistency, and readability of the regulatory language (CEC, 2015a). Compliance with Title 24 standards is verified and enforced through the local building permit process.

California Air Pollution Control Officers Association (CAPCOA) Guidance

The California Air Pollution Control Officers Association (CAPCOA) released a report in August 2010 that describes methods to estimate and quantify mitigation for GHG emissions from projects subject to California Environmental Quality Act (CEQA). The CAPCOA report evaluates several GHG thresholds that could be used to evaluate the significance of a project's GHG emissions. The CAPCOA report,

however, does not recommend any one threshold. Instead, the report is designed as a resource for public agencies as they establish agency procedures for reviewing GHG emissions from projects subject to CEQA (CAPCOA, 2010).

4.6.4 IMPACTS

Method of Analysis

GHG emissions resulting from construction and operation of the Proposed Project were quantified as described below. As discussed in **Section 4.0**, to provide a conservative analysis, this EIR evaluates impacts resulting from all modifications undertaken and proposed by CGWC to operate the proposed bottling facilities; therefore, the environmental impacts of construction activities occurring prior to the publication of the NOP in June 2016, proposed future construction activities, and operation are evaluated below. The environmental setting as it existed in 2013, when CGWC purchased the property, forms the baseline from which impacts associated with prior construction activities are measured and evaluated, and the existing environmental setting (2016) forms the baseline from which proposed construction activities and operation is measured. Under baseline conditions, the GHG emissions on the project site are conservatively considered zero. The full extent of project-related construction activities that would occur under wastewater treatment Option 4 was modeled, because this option would result in the most ground disturbance and longest duration of construction activities. The analysis of construction and operational emissions discloses the maximum potential GHG emissions that would occur under each of the options for wastewater treatment, thus no distinction between the options is drawn in the text.

The 2013 California Emissions Estimator Model (CalEEMod) air quality model, which is recommended by CARB, was used to estimate GHG emissions resulting from construction of the Proposed Project, as well as project related mobile sources, certain area sources, including landscaping equipment, and indirect emissions from electrical demands, wastewater transport and treatment, and solid waste disposal. The model estimates emissions for a variety of sources, including transportation, electricity use, natural gas use, and solid waste disposal. CalEEMod estimates GHG emissions of CO₂, CH₄, and N₂O and then converts them to carbon dioxide equivalent (CO₂e) using 100 year GWP of 1 for CO₂, 21 for CH₄, and 310 for N₂O (ENVIRON, 2013). It should be noted that the current May 2014 Scoping Plan indicates a GWP of 12 for CH₄ and 114 for N₂O. The higher GWP values in the CalEEMod model result in more conservative emission estimates.

Construction

Project-related emissions from prior construction activities occurring between 2015 and 2016 were estimated, as well as future emissions from proposed construction activities, including the installation of additional equipment, construction of the caretaker's residence, expanded leachfield, on-site wastewater treatment facilities, recycled water lines, and off-site sewer upgrades. The full extent of project-related construction activities that would occur under Wastewater Treatment Option 4 was modeled, because this option would result in the most ground disturbance and longest duration of construction activities. Although certain components of the Proposed Project would be phased (including the second production line, expansion of the leachfield, and northern recycled water irrigation area) all proposed future construction activities would occur over a twelve-month period between March 2017 and February 2018, to provide a conservative estimate of maximum year construction emissions. Construction best

management practices required in accordance with the 1998 Dannon Mitigation Agreement with Siskiyou County (County) would be implemented (**Appendix K**). Construction inputs are provided in the CalEEMod Inputs Table included as **Appendix M**.

Operations

Operational emissions from project related mobile sources, area sources, including landscaping equipment, and indirect emissions from electrical utility usage (PacifiCorp supplies), wastewater transport and treatment² and solid waste disposal were estimated using CalEEMod version 2013.2.2. Emissions results from CalEEMod are presented below, and CalEEMod input and output files are included within **Appendix M**. Although the Proposed Project would be built out in phases with the first production line beginning operation in 2018 and the second production line estimated to begin operation in 2023 as described in **Section 3.5.1**, the analysis of operational emissions estimates the first year of full production (or buildout of the Proposed Project) to occur in 2018. This approach provides a conservative estimate of project related emissions, as the mobile GHG emission estimates calculated by CalEEMod would be reduced in future years due to regulatory requirements and improvements in fuel economy.

Estimated mobile emissions include those resulting from employee trips, trips from the caretaker's residence, delivery truck trips (including transport of bottle preforms to the site and bottled water from the site), and hauling of brine produced from reverse osmosis under Wastewater Treatment Options 3 and 4, as described in more detail below:

- *Employee Trips.* Employee commutes generate 90 round trips daily (180 total daily) under full production utilizing two bottling lines. This reflects 60 employees, with half leaving the site for lunch. The average distance of employee vehicle trips was estimated by CalEEMod based on the location of the project site.
- *Caretaker's Residence.* The caretaker's residence generates approximately 3 round trips (6 total daily) based on CalEEMod default trip generation rates.
- *Delivery Trips.* Approximately 50 daily delivery truck round trips (100 total daily trips) would occur each operational day. The average one-way delivery truck trip distance would be 469 miles based on market locations and the distance to the bottle pre-form manufacturer (Weklych, 2016e).
- *Brine Disposal Haul Trips.* Approximately 12 weekly haul truck round trips (24 total weekly trips) would occur weekly to a landfill facility that accepts brine produced from reverse osmosis under Wastewater Treatment Option 4. The nearest facilities that accept brine waste are in Anderson or Bieber California; the average distance to both facilities of 73.2 miles was determined for each one-way trip.

Emissions from the boilers and generators were estimated using the fuel consumption and CO₂e emission factors provided by the respective manufacturers (**Appendix M**). Annual emissions were

² It should be noted that GHG emissions resulting from treatment on-site were estimated, as well as emissions resulting from transport of all wastewater to the City's wastewater treatment plant, to encompass the full extent of emissions that would occur under all options for wastewater treatment.

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calculated by multiplying the hours of use per year by the emissions of CO₂e per hour. Emissions resulting from the energy demands of the project were estimated taking into account the various measures described in **Section 3.5.10** that would be implemented with the goal of achieving Leadership in Energy and Environmental Design (LEED) certification. Emission estimates are based on the energy demands of facility being met through operation of all three propane generators at full capacity with supplemental power provided through PacifiCorp. Although it's possible in the future that all energy demands may be met through PacifiCorp following implementation of the Lassen Substation Project, this approach provides a conservative estimate of emissions as the proposed propane generators would result in greater GHG emissions per unit of electricity than PacifiCorp sources.

Two scenarios for operation of the boilers were estimated:

- Scenario 1 – Estimated emissions resulting from operation of all four boilers at full capacity. The purpose of this scenario is to disclose the full potential GHG emissions that could result from the requested Authority to Construct (ATC) permit from the Siskiyou County Air Pollution Control District (SCAPCD; **Appendix E**). However, as noted in the permit application, it is expected that only three boilers would be required to operate the Proposed Project, with an additional boiler proposed as back-up. Therefore, the emissions resulting under this scenario are informational only and are an overstatement of the project emissions.
- Scenario 2 – Estimated emissions resulting from expected operation three boilers, with the fourth boiler provided as back-up. This scenario represents the actual predicted GHG emissions that would result from project operation. Emissions resulting under Scenario 2 are the basis from which impacts are measured and mitigation is defined.

Additionally, GHG emissions from operation of the emergency diesel generators and HVAC equipment were estimated using propane emission factors from the USEPA's Compilation of Air Pollutant Emission Factors (AP 42) (USEPA, 2008). The emergency diesel generators were assumed to run at their permitted capacity annually, and be run equally each day. The HVAC system was assumed to run two hours a day, 160 days annually, with four heating units.

Off-Site Improvements

GHG emissions resulting from construction of the off-site sewer upgrades are combined with the construction emission estimates for the Proposed Project and are discussed below. The potential for environmental impacts from the off-site improvements described in **Section 3.7** that would serve the Proposed Project, but would occur with or without the Proposed Project, is analyzed in **Section 4.12, Utilities**. Environmental effects from the planned City of Mt. Shasta State-Mandated Wastewater Treatment and Outfall Improvement Project are discussed in **Section 4.12.1, Impact 4.12-4**. Environmental effects from the proposed Lassen Substation Project are discussed in **Section 4.12.3, Impact 4.12-7**.

Thresholds of Significance

Criteria for determining the significance of impacts due to GHG emissions have been developed based on Appendix G of the CEQA Guidelines and relevant agency thresholds. Impacts due to GHG emissions would be considered significant if the Proposed Project would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; and
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

GHG impacts are considered to be exclusively cumulative impacts because no single project makes a significant contribution to global climate change (CAPCOA, 2010); therefore, assessment of significance is based on a determination of whether the GHG emissions from a project represent a cumulatively considerable contribution to the global atmosphere.

The SCAPCD has not adopted thresholds of significance relative to GHG emissions. For this project, the County has elected to apply a widely adopted GHG emissions threshold for stationary sources of 10,000 MT of CO₂e per year. This threshold for stationary sources is recognized by the Sacramento Metropolitan Air Quality Management District (SMAQMD), Bay Area Air Quality Management District, and South Coast Air Quality Management District. This quantifiable threshold was formulated based on consistency with AB 32 and California Climate Change Scoping Plan reduction targets for 2020³, and is also the threshold for participation in California's Cap and Trade Program. Construction emissions would be considered significant if they exceed the 1,100 MT of CO₂e per year threshold adopted by SMAQMD. This quantifiable threshold was also formulated based on consistency with AB 32 and California Climate Change Scoping Plan reduction targets for 2020. In addition, the consistency of the Proposed Project with the goals of EO S-3-05, specifically to reduce GHG emissions to 80 percent below 1990 levels by 2050, is also qualitatively assessed.

³ The 10,000 MTCO₂e/year threshold is based on achieving a capture rate of at least 90 percent, using the Executive Order S-3-05 as a basis. The selected capture rate means that the thresholds are expected to capture at least 90 percent of GHG emissions from new or modified industrial/stationary-source projects within each agency's jurisdiction. A 90 percent emission capture rate sets the emission threshold low enough to capture a substantial fraction of future stationary source projects that will be constructed to accommodate future statewide population and economic growth, while setting the emission threshold high enough to exclude small projects that will in aggregate contribute a relatively small fraction of the cumulative statewide GHG emissions (SMAQMD, 2015).

Project Impacts and Cumulative Impacts

IMPACT 4.6-1	GENERATE GREENHOUSE GAS EMISSIONS, EITHER DIRECTLY OR INDIRECTLY, THAT MAY HAVE A SIGNIFICANT AND/OR CUMULATIVE IMPACT ON THE ENVIRONMENT; OR CONFLICT WITH AN APPLICABLE PLAN, POLICY, OR REGULATION ADOPTED FOR THE PURPOSE OF REDUCING THE EMISSIONS OF GREENHOUSE GASES
Significance	Significant
Mitigation Measures	MM 4.6-1: Reduce GHG Emissions below Numerical Threshold MM 4.6-2: Additional Measure to Reduce GHG Emissions
Significance After Mitigation	Significant and Unavoidable

The Proposed Project would result in short-term construction and long term operational emissions of GHGs.

Construction

Construction emissions would be associated with vehicle engine exhaust from construction equipment and employee trips. Annual emissions of GHGs from construction of the Proposed Project are shown in **Table 4.6-1**. As shown in the table, annual GHG emissions from project construction would range from a low of 3.89 MT CO_{2e} to a high of 249.90 MT CO_{2e} over an estimated 4-year period. Maximum annual GHG emissions generated by project-related construction would not exceed SCAPCD's recommended threshold of 1,100 MT CO_{2e}. In addition, annual construction emissions would be much less if amortized over a thirty year project lifetime. Therefore, the GHG emissions impacts from construction would be **less than significant**.

TABLE 4.6-1
MAXIMUM ANNUAL GHG EMISSIONS ASSOCIATED WITH PROJECT CONSTRUCTION

Year	MT CO _{2e}
2015	43.93
2016	3.89
2017	249.90
2018	13.31
Highest Year Construction Emissions	249.90
Numerical Threshold	1,100
Exceed Threshold?	No
Source: CalEEMod, 2013; Appendix M .	

Operation

Operation of the Proposed Project would result in emissions of GHGs associated with area, mobile, stationary, and indirect sources. Area-source emissions would be associated with activities such as,

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maintenance of landscaping and grounds, heating of the caretaker's residence, and other sources; mobile source emissions would result from employee trips, delivery trips, and waste haul trips; stationary-source emissions would occur through operation of propane generators and boilers; and indirect emissions would result from off-site energy generation (generated by demand for PacifiCorp electrical supplies), wastewater transport and treatment⁴ and solid waste disposal. As described under the methodology section above, emissions were analyzed under two scenarios: Scenario 1, which consists of full operation of all four boilers, and Scenario 2, which consists of expected operation of three boilers. Scenario 1 presents those emissions that could be emitted based on permit conditions; the emissions resulting under this scenario are informational only and are an overstatement of the project emissions. Because Scenario 2 represents the actual emissions predicted to occur as a result of the Proposed Project, this is the scenario from which impacts are measured and mitigation is defined. Proposed Project operational emissions are presented in **Table 4.6-2**. These emission estimates take into account the various design measures proposed by CGWC to achieve LEED certification, including but not limited to, use of energy efficient light-emitting diode (LED) light fixtures, use of sensors on exterior windows to harvest daylight and reduce lighting loads, use of low-flow water fixtures, and installation of new Heating Ventilation and Air-Conditioning (HVAC) equipment that meets current California Green Building Standards.

TABLE 4.6-2
PROPOSED PROJECT ANNUAL GHG EMISSIONS AT FULL PRODUCTION

Emissions Sources	Proposed Project Emissions MT of CO ₂ e /year	
	Scenario 1 – Full Operation of all Generators and Boilers	Scenario 2 – Projected Operation of Generators and Boilers
Energy PacifiCorp Electricity (Indirect)	6,376	6,376
Stationary Sources		
<i>Generators</i>	6,458	6,458
<i>Boilers</i>	16,603	12,452
<i>Emergency Diesel Generators</i>	56	56
Area	2	2
Mobile (Vehicle Trips)	9,594	9,954
Solid Waste Disposal	13	13
Wastewater Treatment and Transport	175	175
Total Emissions	39,277	35,486
Numerical Threshold	10,000	10,000
Exceed Threshold?	Yes	Yes
Emissions above threshold	29,277	25,486
Note: Emissions from the generators and boilers were calculated separately using the Federal Greenhouse Gas Reporting Guidelines. The calculations are provided in Appendix M . Source: CalEEMod, 2013; Appendix M ; CH2M Hill, 2015a.		

⁴ It should be noted that GHG emissions resulting from treatment on-site were estimated, as well as emissions resulting from treatment at the City's wastewater treatment plant, to encompass the full extent of emissions that would occur under all options for wastewater treatment.

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As shown in the **Table 4.6-2**, the Proposed Project's operational GHG emissions under Scenario 2 at full production were calculated to be 35,486 MT of CO₂e, which exceeds the numerical threshold of 10,000 MT of CO₂e for stationary sources by 25,486 MT. Because the Proposed Project's emissions would exceed this threshold, this is a **significant** impact.

Implementation of **Mitigation Measures 4.6-1** and **4.6-2** would reduce operational GHG emissions through the implementation of on-site measures and/or the purchase of CO₂e offset credits. **Table 4.6-3** illustrates the potential GHG reductions from the measures presented in **Mitigation Measures 4.6-1**. With **Mitigation Measure 4.6-1**, the Proposed Project's emissions would be reduced below the 10,000 MT threshold developed based on AB 32 and California Climate Change Scoping Plan reduction targets for 2020. Although mitigation would reduce the emissions of the Proposed Project, CGWC would still be required to submit annual reports regarding the emissions from the boilers and generators in compliance with the Regulation for the Mandatory Reporting of GHG Emissions. Submittal of these reports would assist CARB in its efforts to monitor statewide emission goals in compliance with AB 32 and the California Climate Change Scoping Plan.

TABLE 4.6-3
QUANTIFIED REDUCTION MEASURES

Strategy	MT CO ₂ e Reduction
Solar Array – Replace Generators	1.010 per MWh annually
Purchase Credits	1 per credit
Carpool*	1.11 per car annually
Note: carpool savings based on 250 work days a year and gas millage of 2017-2021 CAFÉ standards model years. Source: USEPA, 2014; USDOT, 2014; AES, 2016.	

In addition to the GHG reduction goals for 2020 established by AB 32, EO S-3-05 establishes a GHG reduction target of 80 percent below 1990 levels by 2050, and EO B-30-15 establishes a California GHG reduction target of 40 percent below 1990 levels by 2030 as an intermediate target to meet the ultimate 2050 goals. The CalEEMod model does not account for future programs that may be developed by the state in an effort to meet these targets, so it is not possible to accurately calculate emission estimates for these years. The 10,000 MT threshold for stationary sources is widely utilized by air quality management and pollution control districts across the state; however, this threshold is based on GHG reduction goals for 2020. CARB is currently updating the Scoping Plan to address the most recent 2030 targets and therefore the necessary measures to achieve consistency with these goals remains unclear. Due to the current disparity between the amount of existing global GHG emissions and the goals of EO B-30-15 and EO S-3-05 for target years 2030 and 2050, even with mitigation measures incorporated, the Proposed Project would contribute to cumulatively considerable global GHG emissions; therefore, this is a **significant and unavoidable** impact.

4.6.5 MITIGATION MEASURES

The following mitigation measures shall be implemented to reduce potential impacts associated with the Proposed Project:

MM 4.6-1 Reduce GHG Emissions below Numerical Threshold

CGWC shall implement a combination of the following measures to achieve a net reduction of 25,486 MT of CO₂e annually.

- a) Install solar arrays on the rooftop of the existing warehouse and/or within the disturbed areas of the project site to off-set energy demands and the use of on-site generators. Utilizing approximately 7.5 acres of disturbed land within the central portion of the project site to the south, east and north of the Plant building, approximately 3,876 solar frames could achieve a capacity of 4,048 MWh annually (which is approximately 10 percent of the annual energy demands of the project) (REC Solar, 2015). The proposed configuration and specifications of the on-site solar array shall be provided to the County for review and verification. The plans shall identify the capacity of the solar array, and the expected annual yield of MWh. This measure would provide a reduction of 0.868 MT of CO₂e per MWh of solar energy generated annually. Assuming 10 percent of the facilities energy demands would be met through on-site solar as described above, this measures would provide a reduction of 3,515 MT of CO₂e annually.
- b) Establish and administer a carpool or rideshare program. This shall include a shift scheduling program that allows interested parties to work similar work schedules to promote ride-sharing. This measure would provide a reduction of 1.11 MT of CO₂e per participant annually.
- c) Prior to the County's issuance of building permits and the operation of the Plant, CGWC shall purchase 25,486 CO₂e offset credits from a carbon registry, where reductions are real, permanent and have been quantified. The emissions reduction credits may be purchased from the Climate Action Reserve, the Verified Carbon Standard, the American Carbon Registry, or an equivalent carbon emissions reduction credit trading market, which has the same or more stringent standards for carbon sequestration projects which reduce atmospheric GHGs or direct GHG emissions reductions achieved by existing GHG emitters. The CO₂e emission reduction credits must be permanently retired through the registry. The retirement of the credit ensures that it is not re-sold and that the designated off-set project remains in operation for the lifetime of the Proposed Project; thereby reducing annual GHG emissions as enforced by the carbon registry. The amount of credits may be reduced through the implementation of on-site measures described above. The reductions achieved through these measures shall be verified by the County through a review of the implementation program.

MM 4.6-2 Additional Measures to Reduce GHG Emissions

CGWC shall implement the following best management practices to further reduce the GHG emissions of the Proposed Project:

- a) Power from the PacificCorp distribution grid shall be utilized when available. This measure would minimize the use of higher emitting on-site propane generators.
- b) Trucks and vehicles in loading or unloading queues shall have their engines turned off when not in use. Permanent signage shall be posted at loading docks informing truck drivers of CARB's commercial vehicle idling regulations. This regulation limits vehicles with a gross vehicle weight rating of 10,000 lbs. or greater to idle no more than 5 minutes. Fines are currently a minimum of \$300 and can be as much as \$1000 per day.
- c) All equipment shall be turned off when not in use. Engine idling of all equipment shall be minimized. All equipment engines shall be maintained in good operating condition and in tune per manufacturers' specifications.
- d) Participate in the USEPA's voluntary SmartWay program to assist in establishing green freight initiatives.