

3.3 Greenhouse Gas Emissions

This supplemental environmental impact report (SEIR) addresses proposed modifications to the B.F. Sisk Dam Safety of Dams Modification Project, which was previously evaluated in the B.F. Sisk Dam Safety of Dams Modification Project Environmental Impact Statement/Environmental Impact Report (2019 EIS/EIR). The project addressed in the 2019 EIS/EIR is referred to herein as the Approved Project; the Approved Project with proposed modifications identified since certification of the 2019 EIS/EIR is referred to herein as the Modified Project.

This section describes the existing conditions related to greenhouse gas (GHG) emissions, identifies associated regulatory requirements, evaluates potential impacts, and identifies any applicable mitigation measures related to implementation of the Modified Project.

3.3.1 Existing Conditions

3.3.1.1 Climate Change Overview

Climate change refers to any significant change in measures of climate—such as temperature, precipitation, or wind patterns—lasting for an extended period of time (decades or longer). The Earth’s temperature depends on the balance between energy entering and leaving the planet’s system. Many factors, both natural and human, can cause changes in Earth’s energy balance, including variations in the sun’s energy reaching Earth, changes in the reflectivity of Earth’s atmosphere and surface, and changes in the greenhouse effect, which affects the amount of heat retained by Earth’s atmosphere (EPA 2017).

The greenhouse effect is the trapping and buildup of heat in the atmosphere (troposphere) near the Earth’s surface. The greenhouse effect traps heat in the troposphere through a three-part process as follows: (1) short-wave radiation emitted by the Sun is absorbed by the Earth, (2) the Earth emits a portion of this energy in the form of long-wave radiation, and (3) GHGs in the upper atmosphere absorb this long-wave radiation and emit it both into space and back toward the Earth. The greenhouse effect is a natural process that contributes to regulating the Earth’s temperature and creates a pleasant, livable environment on the Earth. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and causing the Earth’s surface temperature to rise.

The scientific record of the Earth’s climate shows that the climate system varies naturally over a wide range of time scales and that, in general, climate changes prior to the Industrial Revolution in the 1700s can be explained by natural causes, such as changes in solar energy, volcanic eruptions, and natural changes in GHG concentrations. However, recent climate changes, in particular the warming observed over the past century, cannot be explained by natural causes alone. Rather, it is extremely likely that human activities have been the dominant cause of warming since the mid-twentieth century and are the most significant driver of observed climate change (IPCC 2013; EPA 2017). Human influence on the climate system is evident from the increasing GHG concentrations in the atmosphere, positive radiative forcing, observed warming, and improved understanding of the climate system (IPCC 2013). The atmospheric concentrations of GHGs have increased to levels unprecedented in the last 800,000 years, primarily from fossil fuel emissions and secondarily from emissions associated with land use changes (IPCC 2013). Continued emissions of GHGs will cause further warming and changes in all components of the climate system.

3.3.1.2 Greenhouse Gases

A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. As defined in California Health and Safety Code Section 38505(g), for purposes of administering many of the State’s primary GHG emissions reduction programs, GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride. (See also 14 CCR 15364.5.)¹ Some GHGs (e.g., CO₂, CH₄, and N₂O) occur naturally and are emitted into the atmosphere through natural processes and human activities. Of these gases, CO₂ and CH₄ are the predominant GHGs emitted from human activities. Manufactured GHGs, which have a much greater heat-absorption potential than CO₂, include fluorinated gases, such as HFCs, PFCs, and SF₆, which are associated with certain industrial products and processes. The following paragraphs provide a summary of the most common GHGs and their sources.²

Carbon Dioxide

CO₂ is a naturally occurring gas and a by-product of human activities; it is the principal anthropogenic GHG that affects the Earth’s radiative balance. Natural sources of CO₂ include respiration of bacteria, plants, animals, and fungi; evaporation from oceans; volcanic out-gassing; and decomposition of dead organic matter. Human activities that generate CO₂ are the combustion of fuels such as petroleum, coal, oil, natural gas, and wood, and changes in land use through loss of sequestered carbon.

Methane

CH₄ is produced through both natural and human activities. CH₄ is a flammable gas and is the main component of natural gas. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Nitrous Oxide

N₂O is produced through natural and human activities, mainly through agricultural activities and natural biological processes, although fuel burning and other processes also create N₂O. Sources of N₂O include soil cultivation practices (microbial processes in soil and water), especially the use of commercial and organic fertilizers, manure management, industrial processes (such as in nitric acid production, nylon production, and fossil-fuel-fired power plants), vehicle emissions, and using N₂O as a propellant (such as in rockets, racecars, and aerosol sprays).

¹ Climate-forcing substances include GHGs and other substances such as black carbon and aerosols. This discussion focuses on the seven GHGs identified in California Health and Safety Code, Section 38505. Impacts associated with other climate-forcing substances are not evaluated herein.

² The descriptions of GHGs are summarized from the Intergovernmental Panel on Climate Change’s Fourth Assessment Report (IPCC 2007), CARB’s Glossary of Terms Used in GHG Inventories (CARB 2020a), and EPA’s Glossary of Climate Change Terms (EPA 2016).

Fluorinated Gases

Fluorinated gases (also referred to as F-gases) are synthetic powerful GHGs emitted from many industrial processes. Fluorinated gases are commonly used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). The most prevalent fluorinated gases are discussed as follows.

- **Hydrofluorocarbons.** HFCs are compounds containing only hydrogen, fluorine, and carbon atoms. HFCs are synthetic chemicals used as alternatives to ozone-depleting substances in serving many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are used in manufacturing.
- **Perfluorocarbons.** PFCs are a group of human-made chemicals composed of carbon and fluorine only. These chemicals were introduced as alternatives, with HFCs, to the ozone-depleting substances. The two main sources of PFCs are aluminum production and semiconductor manufacturing. Because PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere, these chemicals have long lifetimes, ranging between 10,000 and 50,000 years.
- **Sulfur Hexafluoride.** SF₆ is a colorless gas soluble in alcohol and ether and slightly soluble in water. SF₆ is used for insulation in electric power transmission and distribution equipment, semiconductor manufacturing, the magnesium industry, and as a tracer gas for leak detection.
- **Nitrogen Trifluoride.** Nitrogen trifluoride is used in the manufacture of a variety of electronics, including semiconductors and flat panel displays.

Chlorofluorocarbons

Chlorofluorocarbons are synthetic chemicals that have been used as cleaning solvents, refrigerants, and aerosol propellants. Chlorofluorocarbons are chemically unreactive in the lower atmosphere (troposphere), and the production of chlorofluorocarbons was prohibited in 1987 due to the chemical destruction of stratospheric ozone.

Hydrochlorofluorocarbons

Hydrochlorofluorocarbons are a large group of compounds, whose structure is very close to that of chlorofluorocarbons—containing hydrogen, fluorine, chlorine, and carbon atoms—but including one or more hydrogen atoms. Like HFCs, hydrochlorofluorocarbons are used in refrigerants and propellants. Hydrochlorofluorocarbons were also used in place of chlorofluorocarbons for some applications; however, their use in general is being phased out.

Black Carbon

Black carbon is a component of fine particulate matter (i.e., particulate matter with an aerodynamic diameter equal to or less than 2.5 microns), which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influencing cloud formation, and darkening the surface of snow and ice, which accelerates heat absorption and melting. Black carbon is a short-lived substance that varies spatially, which makes it difficult to quantify its global warming potential (GWP). Diesel exhaust emissions are a major source of black carbon, and are toxic air contaminants that have been regulated and controlled in California for several decades to protect public health. In relation to declining diesel particulate matter as a result of the California Air Resources Board's (CARB's) regulations pertaining to diesel

engines, diesel fuels, and burning activities, CARB estimates that annual black carbon emissions in California have been reduced by 70% between 1990 and 2010, with 95% control expected by 2020 (CARB 2014).

Water Vapor

The primary source of water vapor is evaporation from the ocean, with additional vapor generated by sublimation (change from solid to gas) from ice and snow, evaporation from other water bodies, and transpiration from plant leaves. Water vapor is the most important, abundant, and variable GHG in the atmosphere, and maintains a climate necessary for life.

Ozone

Tropospheric ozone, which is created by photochemical reactions involving gases from both natural sources and human activities acts as a GHG. Stratospheric ozone, which is created by the interaction between solar ultraviolet radiation and molecular oxygen, plays a decisive role in the stratospheric radiative balance. Depletion of stratospheric ozone due to chemical reactions that may be enhanced by climate change results in an increased ground-level flux of ultraviolet-B radiation.

Aerosols

Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light.

3.3.1.3 Global Warming Potential

Gases in the atmosphere can contribute to climate change both directly and indirectly. Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the atmospheric lifetimes of other gases, and/or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo) (EPA 2017). The Intergovernmental Panel on Climate Change developed the GWP concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP of a GHG is defined as the ratio of the time-integrated radiative forcing from the instantaneous release of 1 kilogram of a trace substance relative to that of 1 kilogram of a reference gas (IPCC 2014). The reference gas used is CO₂; therefore, GWP-weighted emissions are measured in metric tons (MT) of CO₂ equivalent (CO₂e).

The current version of the California Emissions Estimator Model (CalEEMod) (Version 2016.3.2) assumes that the GWP for CH₄ is 25 (so emissions of 1 MT of CH₄ are equivalent to emissions of 25 MT of CO₂), and the GWP for N₂O is 298, based on the Intergovernmental Panel on Climate Change's Fourth Assessment Report (IPCC 2007). The GWP values identified in CalEEMod were applied to the Modified Project.

3.3.1.4 Greenhouse Gas Inventories and Climate Change Conditions

Global Inventory

Anthropogenic GHG emissions worldwide in 2018 (the most recent year for which data is available) totaled approximately 51,800 million metric tons (MMT) of CO₂e, excluding land use change and forestry (PBL 2019). Six

countries—China, the United States, the Russian Federation, India, Japan, and Brazil—and the European community accounted for approximately 65% of the total global emissions, or approximately 33,700 MMT CO_{2e} (PBL 2019). Table 3.3-1 presents the top GHG-emissions-producing countries.

Table 3.3-1. Six Top GHG-Producer Countries and the European Union

Emitting Countries (listed in order of emissions)	Greenhouse Gas Emissions (MMT CO _{2e})
China	13,600
United States	6,700
European Union	4,500
India	3,700
Russian Federation	2,500
Japan	1,400
Brazil	1,300
Total	33,700

Source: PBL 2019.

Notes: GHG = greenhouse gas; MMT CO_{2e} = million metric tons of carbon dioxide equivalent.

National and State Inventories

Per the U.S. Environmental Protection Agency (EPA) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2018 (EPA 2020), total United States GHG emissions were approximately 6,676.6 MMT CO_{2e} in 2018 (EPA 2020). The primary GHG emitted by human activities in the United States was CO₂, which represented approximately 81.3% of total GHG emissions (5,428.1 MMT CO_{2e}). The largest source of CO₂, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 92.8% of CO₂ emissions in 2018 (5,031.8 MMT CO_{2e}). Relative to 1990, gross United States GHG emissions in 2018 are higher by 3.7%, down from a high of 15.2% above 1990 levels in 2007. GHG emissions decreased from 2017 to 2018 by 2.9% (188.4 MMT CO_{2e}) and overall, net emissions in 2018 were 10.2% below 2005 levels (EPA 2020).

According to California’s 2000–2018 GHG emissions inventory (2020 edition), California emitted 425 MMT CO_{2e} in 2018, including emissions resulting from out-of-state electrical generation (CARB 2020b). The sources of GHG emissions in California include transportation, industry, electric power production from both in-state and out-of-state sources, residential and commercial activities, agriculture, high-GWP substances, and recycling and waste. The California GHG emission source categories and their relative contributions in 2018 are presented in Table 3.3-2.

Table 3.3-2. GHG Emissions Sources in California

Source Category	Annual GHG Emissions (MMT CO _{2e}) ¹	Percent of Total ¹
Transportation	169.5	40%
Industrial	89.2	21%
Electric power ²	63.1	15%
Agriculture	32.6	8%
Commercial and Residential	41.4	10%
High Global-Warming Potential Substances	20.5	5%
Recycling and Waste	9.1	2%
Totals	425.3	100%

Source: CARB 2020b.

Notes: GHG = greenhouse gas; MMT CO_{2e} = million metric tons of carbon dioxide equivalent. Emissions reflect 2017 California GHG inventory.

¹ Totals may not sum due to rounding.

² Includes emissions associated with imported electricity.

Between 2000 and 2018, per-capita GHG emissions in California dropped from a peak of 14.0 MT per person in 2001 to 10.7 MT per person in 2018, representing a 24% decrease. In addition, total GHG emissions in 2018 were approximately 1 MMT CO_{2e} higher than 2017 emissions (CARB 2020b).

Local Inventory

No official GHG inventory has been completed for Merced County. However, Merced County is currently developing a climate action plan, which will include inventories of past, current, and forecasted future GHG emissions.

Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources through uncertain impacts related to future air temperatures and precipitation patterns. The 2014 Intergovernmental Panel on Climate Change Synthesis Report (IPCC 2014) indicated that warming of the climate system is unequivocal and, since the 1950s, many of the observed changes are unprecedented over decades to millennia. Signs that global climate change has occurred include warming of the atmosphere and ocean, diminished amounts of snow and ice, and rising sea levels (IPCC 2014).

In California, climate change impacts have the potential to affect sea-level rise, agriculture, snowpack and water supply, forestry, wildfire risk, public health, frequency of severe weather events, and electricity demand and supply. The primary effect of global climate change has been a rise in average global tropospheric temperature. Reflecting the long-term warming trend since pre-industrial times, observed global mean surface temperature for the decade 2006–2015 was 0.87°C (likely between 0.75°C and 0.99°C) higher than the average over the 1850–1900 period (IPCC 2018). Scientific modeling predicts that continued emissions of GHGs at or above current rates would induce more extreme climate changes during the twenty-first century than were observed during the twentieth century. Human activities are estimated to have caused approximately 1.0°C (1.8°F) of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C (1.4°F to 2.2°F) (IPCC 2018). Global warming is likely to reach 1.5°C (2.7°F) between 2030 and 2052 if it continues to increase at the current rate (IPCC 2018).

Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. A scientific consensus confirms that climate change is already affecting California. The Office of Environmental Health Hazard Assessment identified various indicators of climate change in California, which are scientifically based measurements that track trends in various aspects of climate change. Many indicators reveal discernible evidence that climate change is occurring in California and is having significant, measurable impacts in the state. Changes in the state’s climate have been observed including an increase in annual average air temperature with record warmth from 2012 to 2016, more frequent extreme heat events, more extreme drought, a decline in winter chill, an increase in cooling degree days and a decrease in heating degree days, and an increase in variability of statewide precipitation (OEHHA 2018).

Warming temperatures and changing precipitation patterns have altered California’s physical systems—the ocean, lakes, rivers, and snowpack—upon which the state depends. Winter snowpack and spring snowmelt runoff from the Sierra Nevada and southern Cascade Mountains provide approximately one-third of the state’s annual water supply. Impacts of climate on physical systems have been observed such as high variability of snow-water content

(i.e., amount of water stored in snowpack), decrease in snowmelt runoff, glacier change (loss in area), rise in sea levels, increase in average lake water temperature and coastal ocean temperature, and a decrease in dissolved oxygen in coastal waters (OEHHA 2018).

Impacts of climate change on biological systems, including humans, wildlife, and vegetation, have also been observed including climate change impacts on terrestrial, marine, and freshwater ecosystems. As with global observations, species responses include those consistent with warming—elevational or latitudinal shifts in range, changes in the timing of key plant and animal life cycle events, and changes in the abundance of species and in community composition. Humans are better able to adapt to a changing climate than plants and animals in natural ecosystems. Nevertheless, climate change poses a threat to public health as warming temperatures and changes in precipitation can affect vector-borne pathogen transmission and disease patterns in California as well as the variability of heat-related deaths and illnesses. In addition, since 1950, the area burned by wildfires each year has been increasing.

The California Natural Resources Agency (CNRA) has released four California Climate Change Assessments (2006, 2009, 2012, and 2018), which have addressed the following: acceleration of warming across the state, more intense and frequent heat waves, greater riverine flows, accelerating sea level rise, more intense and frequent drought, more severe and frequent wildfires, more severe storms and extreme weather events, shrinking snowpack and less overall precipitation, and ocean acidification, hypoxia, and warming. To address local and regional governments need for information to support action in their communities, California’s Fourth Climate Change Assessment includes reports for nine regions of the state, including the San Joaquin Region, where the Modified Project is located. Key projected climate change issues for the San Joaquin Region include the following (CNRA 2018a):

- Agriculture is one of the most vulnerable sectors under climate change due in part of more frequent and severe drought, as well as tighter water supply.
- Ecosystems in the San Joaquin Valley are highly vulnerable to climate change given existing anthropogenic stressors and the lack of organization of landscape-scale science, funding, and mitigation of adverse impacts within the region.
- Water resources within the San Joaquin Valley region will be severely impacted by climate change.
- Infrastructure in the San Joaquin Valley—including urban, water, and transportation systems—may face increased stress from higher temperatures and extreme precipitation events, including droughts and floods.

3.3.2 Relevant Plans, Policies, and Ordinances

3.3.2.1 International

United Nations Framework Convention on Climate Change, Kyoto Protocol, and Paris Agreement

In 1992, numerous countries joined an international treaty, the United Nations Framework Convention on Climate Change, as a framework for international cooperation to combat climate change by limiting average global temperature increases and the resulting climate change, and coping with associated impacts. Currently, there are 197 Parties (196 States and 1 regional economic integration organization) in the United Nations Framework Convention on Climate Change (UNFCCC 2020).

By 1995, countries launched negotiations to strengthen the global response to climate change, and, two years later, adopted the Kyoto Protocol, which was the first international agreement to regulate GHG emissions. The Kyoto Protocol legally binds developed country Parties to emission reduction targets. The Protocol's first commitment period started in 2008 and ended in 2012. The second commitment period began on January 1, 2013 and will end in 2020. More than 160 countries signed the Kyoto Protocol (UNFCCC 2020). In 2001, President George W. Bush indicated that he would not submit the treaty to the U.S. Senate for ratification, which effectively ended the United States involvement in the Kyoto Protocol.

The 2015 Paris Agreement, adopted in Paris on December 12, 2015, marks the latest step in the evolution of the UN climate change regime and builds on the work undertaken under the Convention. The Paris Agreement charts a new course in the global effort to combat climate change. The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C (UNFCCC 2020). The Paris Agreement also aims to strengthen the ability of countries to deal with the impacts of climate change. The Paris Agreement requires all Parties to put forward their best efforts through nationally determined contributions and to strengthen these efforts in the years ahead.

The Paris Agreement entered into force on November 4, 2016, 30 days after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55% of the total global GHG emissions deposited their instruments of ratification, acceptance, approval or accession with the Depositary (UNFCCC 2020).

3.3.2.2 Federal

Massachusetts v. EPA

In *Massachusetts v. EPA* (April 2007), the U.S. Supreme Court directed the EPA administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In December 2009, the administrator signed a final rule with the following two distinct findings regarding GHGs under Section 202(a) of the federal Clean Air Act:

- The Administrator found that elevated concentrations of GHGs—CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆—in the atmosphere threaten the public health and welfare of current and future generations. This is the “endangerment finding.”
- The Administrator further found the combined emissions of GHGs—CO₂, CH₄, N₂O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is the “cause or contribute finding.”

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the Clean Air Act.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 (December 2007), among other key measures, would do the following, which would aid in the reduction of national GHG emissions:

- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel by 2022.

- Set a target of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020, and directs the National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.
- Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy-efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

Federal Vehicle Standards

In 2007, in response to the *Massachusetts v. EPA* U.S. Supreme Court ruling, the Bush Administration issued Executive Order (EO) 13432 directing the EPA, the Department of Transportation, and the Department of Energy to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the NHTSA issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, the EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012 through 2016 (75 Fed. Reg. 25324–25728).

In 2010, President Obama issued a memorandum directing the Department of Transportation, Department of Energy, EPA, and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017 through 2025 light-duty vehicles. The proposed standards projected to achieve 163 grams/mile of CO₂ in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017 through 2021 (77 Fed. Reg. 62624–63200). On January 12, 2017, the EPA finalized its decision to maintain the current GHG emissions standards for model years 2022–2025 cars and light trucks.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014 through 2018. The standards for CO₂ emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6 to 23% over the 2010 baselines (76 Fed. Reg. 57106–57513).

In August 2016, the EPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all sizes of buses and work trucks. The final standards are expected to lower CO₂ emissions by approximately 1.1 billion MT and reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program (83 FR 42986–43500).

In August 2018, EPA and NHTSA proposed to amend certain fuel economy and GHG standards for passenger cars and light trucks and establish new standards for model years 2021 through 2026. Compared to maintaining the post-2020 standards now in place, the 2018 proposal would increase U.S. fuel consumption by about half a million barrels per day (2%–3% of total daily consumption, according to the Energy Information Administration) and would impact the global climate by 3/1000th of one degree Celsius by 2100 (EPA and NHTSA 2018). California and other states have stated their intent to challenge federal actions that would delay or eliminate GHG reduction measures and have committed to cooperating with other countries to implement global climate change initiatives.

On September 27, 2019, the EPA and NHTSA published the SAFE Vehicles Rule Part One: One National Program (84 Fed. Reg. 51,310), which became effective November 26, 2019. The Part One Rule revokes California’s authority to set its own GHG emissions standards and set zero-emission vehicle mandates in California. On March 31, 2020, the EPA and NHTSA issued the Part Two Rule, which will go into effect 60 days after being published in the Federal Register. The Part Two Rule sets CO₂ emissions standards and corporate average fuel economy standards for passenger vehicles and light-duty trucks for model years 2021 through 2026. This issue is evolving as California and 22 other states, as well as the District of Columbia and four cities, filed suit against the EPA and a petition for reconsideration of the rule on November 26, 2019. It is unknown as to when this litigation will be resolved.

3.3.2.3 State

The statewide GHG emissions regulatory framework is summarized in this subsection by category: state climate change targets, building energy, renewable energy and energy procurement, mobile sources, water, solid waste, and other state actions. The following text describes EOs, Assembly Bills (ABs), Senate Bills (SBs), and other plans and policies that would directly or indirectly reduce GHG emissions and/or address climate change issues.

State Climate Change Targets

The state has taken a number of actions to address climate change. These actions are summarized below, and include EOs, legislation, and CARB plans and requirements.

EO S-3-05. EO S-3-05 (June 2005) established California’s GHG emissions-reduction targets and laid out responsibilities among the state agencies for implementing the EO and for reporting on progress toward the targets. This EO established the following targets:

- By 2010, reduce GHG emissions to 2000 levels
- By 2020, reduce GHG emissions to 1990 levels
- By 2050, reduce GHG emissions to 80% below 1990 levels

EO S-3-05 also directed the California Environmental Protection Agency to report biannually on progress made toward meeting the GHG targets and the impacts to California due to global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry.

AB 32. In furtherance of the goals established in EO S-3-05, the Legislature enacted AB 32, the California Global Warming Solutions Act of 2006 (California Health and Safety Code, Sections 38500–38599 et seq). AB 32 provided initial direction on creating a comprehensive multiyear program to limit California’s GHG emissions to 1990 levels by 2020, and initiate the transformations required to achieve the state’s long-range climate objectives.

SB 32 and AB 197. SB 32 and AB 197 (enacted in 2016) are companion bills. SB 32 codified the 2030 emissions-reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40% below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of the Senate and three members of the Assembly, to provide ongoing oversight over implementation of the state’s climate policies. AB 197 also added two members of the Legislature to the Board as nonvoting members; requires CARB to make available and update (at least annually via its website) emissions data for GHGs, criteria air pollutants, and toxic air contaminants from reporting

facilities; and requires CARB to identify specific information for GHG emissions-reduction measures when updating the scoping plan.

CARB's 2007 Statewide Limit. In 2007, CARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline (427 MMT CO_{2e}), in accordance with California Health and Safety Code, Section 38550.

CARB's Climate Change Scoping Plan. One specific requirement of AB 32 is for CARB to prepare a “scoping plan” for achieving the maximum technologically feasible and cost-effective GHG emission reductions by 2020 (California Health and Safety Code, Section 38561[a]), and to update the plan at least once every 5 years. In 2008, CARB approved the first scoping plan: The Climate Change Proposed Scoping Plan: A Framework for Change (Scoping Plan). The Scoping Plan included a mix of recommended strategies that combined direct regulations, market-based approaches, voluntary measures, policies, and other emission-reduction programs calculated to meet the 2020 statewide GHG emission limit and initiate the transformations needed to achieve the state's long-range climate objectives. The key elements of the Scoping Plan include the following (CARB 2008):

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards
- Achieving a statewide renewable energy mix of 33%
- 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% 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 (17 CCR 95480 et seq.)
- 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 California's long-term commitment to AB 32 implementation

The Scoping Plan also identified local governments as essential partners in achieving California's goals to reduce GHG emissions because they have broad influence and, in some cases, exclusive authority over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations. Specifically, the Scoping Plan encouraged local governments to adopt a reduction goal for municipal operations and for community emissions to reduce GHGs by approximately 15% from then levels (2008) by 2020. Many local governments developed community-scale local GHG-reduction plans based on this Scoping Plan recommendation.

In 2014, CARB approved the first update to the Scoping Plan, titled the First Update to the Climate Change Scoping Plan: Building on the Framework (First Update). The First Update defined the state's GHG emission reduction priorities for the next 5 years and laid the groundwork to start the transition to the post-2020 goals set forth in EOs S-3-05 and B-16-2012 (CARB 2014). The First Update concluded that California is on track to meet the 2020 target, but recommended a 2030 mid-term GHG reduction target be established to ensure a continuum of action to reduce emissions. The First Update recommended a mix of technologies in key economic sectors to reduce emissions through 2050 including energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings and industrial machinery; decarbonizing electricity and fuel supplies; and the rapid market penetration of efficient and clean energy technologies. As part of the First Update, CARB recalculated the state's 1990 emissions level, using more recent GWPs identified by the Intergovernmental Panel on Climate Change, from 427 MMT CO_{2e} to 431 MMT CO_{2e}.

In 2015, as directed by EO B-30-15, CARB began working on an update to the Scoping Plan to incorporate the 2030 target of 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing GHG emissions to 80% below 1990 levels by 2050, as set forth in S-3-05. The Governor called on California to pursue a new and ambitious set of strategies, in line with the five climate change pillars from his inaugural address, to reduce GHG emissions and prepare for the unavoidable impacts of climate change. In the summer of 2016, the Legislature affirmed the importance of addressing climate change through passage of SB 32.

In December 2017, CARB released the 2017 Climate Change Scoping Plan Update (Second Update) for public review and comment (CARB 2017a). The Second Update builds on the successful framework established in the initial Scoping Plan and First Update, while identifying new technologically feasible and cost-effective strategies that will serve as the framework to achieve the 2030 GHG target and define the state’s climate change priorities to 2030 and beyond. The strategies’ “known commitments” include implementing renewable energy and energy efficiency (including the mandates of SB 350), increased stringency of the Low Carbon Fuel Standard, measures identified in the Mobile Source and Freight Strategies, measures identified in the proposed Short-Lived Climate Pollutant Plan, and increased stringency of SB 375 targets. To fill the gap in additional reductions needed to achieve the 2030 target, the Second Update recommends continuing the Cap-and-Trade Program and a measure to reduce GHGs from refineries by 20%.

For local governments, the Second Update replaced the initial Scoping Plan’s 15% reduction goal with a recommendation to aim for a community-wide goal of no more than 6 MT CO_{2e} per capita by 2030 and no more than 2 MT CO_{2e} per capita by 2050, which are developed around the scientifically based levels necessary to limit global warming below 2°C. The Second Update recognized the benefits of local government GHG planning (e.g., through climate action plans) and provides more information regarding tools CARB is working on to support those efforts. It also recognizes the California Environmental Quality Act (CEQA) streamlining provisions for project-level review where there is a legally adequate climate action plan. The Second Update was approved by CARB’s Governing Board on December 14, 2017.

The Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32, SB 32, and the EOs; it also establishes an overall framework for the measures that will be adopted to reduce California’s GHG emissions. A project is considered consistent with the statutes and EOs if it would meet the general policies in reducing GHG emissions in order to facilitate the achievement of the state’s goals and would not impede attainment of those goals. As discussed in several cases, a given project need not be in perfect conformity with each and every planning policy or goal to be consistent. A project would be consistent if it would further the objectives and not obstruct their attainment.

CARB’s Regulations for the Mandatory Reporting of Greenhouse Gas Emissions. CARB’s Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (17 CCR 95100–95157) incorporated by reference certain requirements that EPA promulgated in its Final Rule on Mandatory Reporting of Greenhouse Gases (40 CFR 98). Specifically, section 95100(c) of the Mandatory Reporting Regulation incorporated those requirements that EPA promulgated in the Federal Register on October 30, 2009; July 12, 2010; September 22, 2010; October 28, 2010; November 30, 2010; December 17, 2010; and April 25, 2011. In general, entities subject to the Mandatory Reporting Regulation that emit over 10,000 MT CO_{2e} per year are required to report annual GHGs through the California Electronic GHG Reporting Tool. Certain sectors, such as refineries and cement plants, are required to report regardless of emission levels. Entities that emit more than the 25,000 MT CO_{2e} per year threshold are required to have their GHG emissions report verified by a CARB-accredited third-party.

EO B-18-12. EO B-18-12 (April 2012) directed state agencies, departments, and other entities under the Governor’s executive authority to take action to reduce entity-wide GHG emissions by at least 10% by 2015 and 20% by 2020, as measured against a 2010 baseline. EO B-18-12 also established goals for existing state buildings for reducing grid-based energy purchases and water use.

EO B-30-15. EO B-30-15 (April 2015) identified an interim GHG-reduction target in support of targets previously identified under S-3-05 and AB 32. EO B-30-15 set an interim target goal of reducing GHG emissions to 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing GHG emissions to 80% below 1990 levels by 2050, as set forth in S-3-05. To facilitate achieving this goal, EO B-30-15 called for CARB to update the Scoping Plan to express the 2030 target in terms of MMT CO₂e. The EO also called for state agencies to continue to develop and implement GHG emission-reduction programs in support of the reduction targets.

SB 605 and SB 1383. SB 605 (2014) requires CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants (SLCPs) in the state (California Health and Safety Code, Section 39730); and SB 1383 (2016) requires CARB to approve and implement that strategy by January 1, 2018 (California Public Resources Code, Sections 42652–43654). SB 1383 also establishes specific targets for the reduction of SLCPs (40% below 2013 levels by 2030 for CH₄ and HFCs, and 50% below 2013 levels by 2030 for anthropogenic black carbon), and provides direction for reductions from dairy and livestock operations and landfills. Accordingly, and as mentioned above, CARB adopted its Short-Lived Climate Pollutant Reduction Strategy (SLCP Reduction Strategy) in March 2017. The SLCP Reduction Strategy establishes a framework for the statewide reduction of emissions of black carbon, methane, and fluorinated gases (CARB 2017b).

EO B-55-18. EO B-55-18 (September 2018) establishes a statewide policy for the state to achieve carbon neutrality as soon as possible (no later than 2045), and achieve and maintain net negative emissions thereafter. The goal is an addition to the existing statewide targets of reducing the state’s GHG emissions. CARB will work with relevant state agencies to ensure that future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal.

Building Energy

Title 24, Part 6. The California Building Standards Code were established in 1978 and serves to enhance and regulate California’s building standards (24 CCR 6). While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically established Building Energy Efficiency Standards that are designed to ensure that new and existing buildings in California achieve energy efficiency and preserve outdoor and indoor environmental quality. These energy efficiency standards are reviewed every few years by the Building Standards Commission and the California Energy Commission (CEC), and revised if necessary (California Public Resources Code, Section 25402[b][1]). The regulations receive input from members of industry, as well as the public, to “reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy” (California Public Resources Code, Section 25402). These regulations are carefully scrutinized and analyzed for technological and economic feasibility (California Public Resources Code, Section 25402[d]) and cost effectiveness (California Public Resources Code, Section 25402[b][2–3]). As a result, these standards save energy, increase electricity supply reliability, increase indoor comfort, avoid the need to construct new power plants, and help preserve the environment. The current Title 24 standards are the 2019 Title 24 building energy efficiency standards, which became effective January 1, 2020.

Title 24, Part 11. In addition to the CEC’s efforts, in 2008, the California Building Standards Commission adopted the nation’s first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as California’s Green Building Standards (CALGreen), and establishes minimum mandatory standards and voluntary standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and interior air quality. The CALGreen standards took effect in January 2011 and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential and state-owned buildings and schools and hospitals. The 2019 CALGreen standards are the current applicable standards.

Title 20. Title 20 of the California Code of Regulations requires manufacturers of appliances to meet state and federal standards for energy and water efficiency (20 CCR 1401–1410 et seq.). The CEC certifies an appliance based on a manufacturer’s demonstration that the appliance meets the standards. New appliances regulated under Title 20 include: refrigerators, refrigerator-freezers and freezers; room air conditioners and room air-conditioning heat pumps; central air conditioners; spot air conditioners; vented gas space heaters; gas pool heaters; plumbing fittings and plumbing fixtures; fluorescent lamp ballasts; lamps; emergency lighting; traffic signal modules; dishwashers; clothes washers and dryers; cooking products; electric motors; low voltage dry-type distribution transformers; power supplies; televisions and consumer audio and video equipment; and battery charger systems. Title 20 presents protocols for testing each type of appliance covered under the regulations and appliances must meet the standards for energy performance, energy design, water performance, and water design. Title 20 contains three types of standards for appliances: federal and state standards for federally regulated appliances, state standards for federally regulated appliances, and state standards for non-federally regulated appliances.

SB 1. SB 1 (2006) established a \$3 billion rebate program to support the goal of the state to install rooftop solar energy systems with a generation capacity of 3,000 megawatts through 2016. SB 1 added sections to the Public Resources Code, including Chapter 8.8 (California Solar Initiative), that require building projects applying for ratepayer-funded incentives for photovoltaic systems to meet minimum energy efficiency levels and performance requirements (California Public Resources Code, Sections 25780–25784). Section 25780 established that it is a goal of the state to establish a self-sufficient solar industry. The goals included establishing solar energy systems as a viable mainstream option for both homes and businesses within 10 years of adoption, and placing solar energy systems on 50% of new homes within 13 years of adoption. SB 1, also termed “Go Solar California,” was previously titled “Million Solar Roofs.”

AB 1470 (Solar Water Heating). This bill established the Solar Water Heating and Efficiency Act of 2007 (California Public Resources Code, Sections 2851–2869). The bill makes findings and declarations of the Legislature relating to the promotion of solar water heating systems and other technologies that reduce natural gas demand. The bill defines several terms for purposes of the act. The bill requires the commission to evaluate the data available from a specified pilot program, and, if it makes a specified determination, to design and implement a program of incentives for the installation of 200,000 solar water heating systems in homes and businesses throughout the state by 2017.

AB 1109. Enacted in 2007, AB 1109 required the CEC to adopt minimum energy efficiency standards for general-purpose lighting to reduce electricity consumption by 50% for indoor residential lighting and by 25% for indoor commercial lighting (California Public Resources Code, Section 25402.5.4).

Renewable Energy and Energy Procurement

SB 1078. SB 1078 (2002) (California Public Resources Code, Section 399.11 et seq.) established the Renewables Portfolio Standard program, which required an annual increase in renewable generation by the utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. This goal was subsequently accelerated, requiring utilities to obtain 20% of their power from renewable sources by 2010 (see SB 107, EO S-14-08, and S-21-09).

SB 1368. SB 1368 (2006), required the CEC to develop and adopt regulations for GHG emission performance standards for the long-term procurement of electricity by local publicly owned utilities (California Public Utilities Code, Section 8340–8341). These standards must be consistent with the standards adopted by the California Public Utilities Commission.

EO S-14-08. EO S-14-08 (2008) focused on the contribution of renewable energy sources to meet the electrical needs of California while reducing the GHG emissions from the electrical sector. This EO required that all retail suppliers of electricity in California serve 33% of their load with renewable energy by 2020. Furthermore, the EO directed state agencies to take appropriate actions to facilitate reaching this target. The CNRA, through collaboration with CEC and the California Department of Fish and Wildlife, was directed to lead this effort.

EO S-21-09 and SBX1-2. EO S-21-09 (2009) directed CARB to adopt a regulation consistent with the goal of EO S-14-08 by July 31, 2010. CARB was further directed to work with California Public Utilities Commission and CEC to ensure that the regulation builds upon the Renewables Portfolio Standard program and was applicable to investor-owned utilities, publicly owned utilities, direct access providers, and community choice providers. Under this order, CARB was to give the highest priority to those renewable resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health, and those that can be developed the most quickly in support of reliable, efficient, cost-effective electricity system operations. On September 23, 2010, CARB initially approved regulations to implement a Renewable Electricity Standard; however, this regulation was not finalized because of subsequent legislation (SB X1-2) signed by Governor Brown in April 2011.

SB X1-2 expanded Renewables Portfolio Standard by establishing a renewable energy target of 20% of the total electricity sold to retail customers in California per year by December 31, 2013, and 33% 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 (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.

SB X1-2 applies to all electricity retailers in the state, including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. All of these entities must meet the renewable energy goals listed above.

SB 350. SB 350 (2015) further expanded the Renewables Portfolio Standard program by establishing a goal of 50% of the total electricity sold to retail customers in California per year by December 31, 2030. In addition, SB 350 included the goal to double the energy efficiency savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses on which an energy-efficiency program is focused) of retail customers through energy conservation and efficiency. The bill also requires the California Public Utilities

Commission, in consultation with the CEC, to establish efficiency targets for electrical and gas corporations consistent with this goal.

SB 100. SB 100 (2018) increased the standards set forth in SB 350, establishing that 44% of the total electricity sold to retail customers in California per year by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030, be secured from qualifying renewable energy sources. SB 100 states that it is the policy of the state that eligible renewable energy resources and zero-carbon resources supply 100% of the retail sales of electricity to California. This bill requires that the achievement of 100% zero-carbon electricity resources do not increase the carbon emissions elsewhere in the western grid and that the achievement not be achieved through resource shuffling.

Mobile Sources

State Vehicle Standards (AB 1493 and EO B-16-12). AB 1493 (July 2002) was enacted in a response to the transportation sector accounting for more than half of California’s CO₂ emissions. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles that are primarily used for noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. EO B-16-12 (March 2012) required that state entities under the governor’s direction and control support and facilitate the rapid commercialization of zero-emissions vehicles. It ordered CARB, CEC, California Public Utilities Commission, and other relevant agencies to work with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to help achieve benchmark goals by 2015, 2020, and 2025. On a statewide basis, EO B-16-12 established a target reduction of GHG emissions from the transportation sector equaling 80% less than 1990 levels by 2050. This directive did not apply to vehicles that have special performance requirements necessary for the protection of the public safety and welfare. As explained under the “Federal Vehicle Standards” description above, EPA and NHTSA approved the SAFE Vehicles Rule Part One and Two, which revoked California’s authority to set its own GHG emissions standards and set zero-emission vehicle mandates in California. As the EPA rule is the subject of pending legal challenges and no GHG adjustment factors have been issued for EMFAC by CARB, this analysis continues to utilize the best available information at this time, as set forth in EMFAC.

Heavy-Duty Diesel. CARB adopted the final Heavy-Duty Truck and Bus Regulation on December 31, 2014 to reduce diesel particulate matter, a major source of black carbon, and oxides of nitrogen emissions from heavy-duty diesel vehicles (13 CCR 2025). The rule requires diesel particulate matter filters be applied to newer heavier trucks and buses by January 1, 2012, with older vehicles required to comply by January 1, 2015. The rule requires nearly all diesel trucks and buses to be compliant with the 2010 model year engine requirement by January 1, 2023. CARB also adopted an Airborne Toxic Control Measure to limit idling of diesel-fueled commercial vehicles on December 12, 2013. This rule requires diesel-fueled vehicles with gross vehicle weights greater than 10,000 pounds to idle no more than 5 minutes at any location (13 CCR 2485).

EO S-1-07. EO S-1-07 (January 2007, implementing regulation adopted in April 2009) sets a declining Low Carbon Fuel Standard for GHG emissions measured in CO_{2e} grams per unit of fuel energy sold in California. The target of the Low Carbon Fuel Standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020 (17 CCR 95480 et seq.). The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel—including extraction/feedstock production, processing, transportation, and final consumption—per unit of energy delivered.

SB 375. SB 375 (California Government Code Section 65080) addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans. SB 375 requires CARB to adopt regional GHG-reduction targets for the automobile and light-truck sector for 2020 and 2035, and to update those targets every 8 years. SB 375 requires the state’s 18 regional metropolitan planning organizations to prepare a Sustainable Communities Strategy as part of their Regional Transportation Plan that will achieve the GHG-reduction targets set by CARB. If a metropolitan planning organization is unable to devise a Sustainable Communities Strategy to achieve the GHG-reduction target, it must prepare an Alternative Planning Strategy demonstrating how the GHG-reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

A Sustainable Communities Strategy does not: (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city’s or county’s land use policies and regulations, including those in a general plan, be consistent with it (California Government Code Section 65080[b][2][K]). Nonetheless, SB 375 makes regional and local planning agencies responsible for developing those strategies as part of the federally required metropolitan transportation planning process and the state-mandated housing element process.

Advanced Clean Cars Program and Zero-Emissions Vehicle Program. The Advanced Clean Cars program (January 2012) is a new emissions-control program for model years 2015 through 2025. The program combines the control of smog- and soot-causing pollutants and GHG emissions into a single coordinated package. The package includes elements to reduce smog-forming pollution, reduce GHG emissions, promote clean cars, and provide the fuels for clean cars (CARB 2012). To improve air quality, CARB has implemented new emission standards to reduce smog-forming emissions beginning with 2015 model year vehicles. It is estimated that in 2025, cars will emit 75% less smog-forming pollution than the average new car sold today. To reduce GHG emissions, CARB, in conjunction with the EPA and the NHTSA, adopted new GHG standards for model year 2017 to 2025 vehicles; the new standards are estimated to reduce GHG emissions by 34% in 2025. The zero-emission vehicle program will act as the focused technology of the Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of zero-emission vehicles and plug-in hybrid electric vehicles in the 2018 to 2025 model years. However, as detailed previously, EPA and NHTSA published the SAFE Vehicles Rule, which revokes California’s authority to set its own GHG emissions standards and set zero-emission vehicle mandates in California. The effect of the SAFE Rule on the Advanced Clean Cars program is still to be determined pending the ruling of ongoing litigation.

Water

SB X7-7. SB X7-7 or the Water Conservation Act of 2009, requires that all water suppliers increase their water use efficiency with an overall goal of reducing per capita urban water use by 20% by December 31, 2020. Each urban water supplier shall develop water use targets to meet this goal.

EO B-29-15. In response to the ongoing drought in California, EO B-29-15 (April 2015) set a goal of achieving a statewide reduction in potable urban water usage of 25% relative to water use in 2013. The term of the EO extended through February 28, 2016, although many of the directives have become permanent water-efficiency standards and requirements. The EO includes specific directives that set strict limits on water usage in the state. In response to EO B-29-15, the California Department of Water Resources (DWR) has modified and adopted a revised version of the Model Water Efficient Landscape Ordinance that, among other changes, significantly increases the requirements for landscape water use efficiency and broadens its applicability to include new development projects with smaller landscape areas.

EO B-37-16. Issued May 2016, EO B-37-16 directs the State Water Resources Control Board (SWRCB) to adjust emergency water conservation regulations through the end of January 2017 to reflect differing water supply conditions across the state. The SWRCB must also develop a proposal to achieve a mandatory reduction of potable urban water usage that builds off the mandatory 25% reduction called for in EO B-29-15. The SWRCB and DWR will develop new, permanent water use targets that build upon the existing state law requirements that the state achieve a 20% reduction in urban water usage by 2020. EO B-37-16 also specifies that the SWRCB will permanently prohibit water-wasting practices such as hosing off sidewalks, driveways, and other hardscapes; washing automobiles with hoses not equipped with a shut-off nozzle; using non-recirculated water in a fountain or other decorative water feature; watering lawns in a manner that causes runoff, or within 48 hours after measurable precipitation; and irrigating ornamental turf on public street medians.

EO B-40-17. EO B-40-17 (April 2017) lifted the drought emergency in all California counties except Fresno, Kings, Tulare, and Tuolumne. It also rescinds EO B-29-15, but expressly states that EO B-37-16 remains in effect and directs the SWRCB to continue development of permanent prohibitions on wasteful water use.

Solid Waste

AB 939, AB 341, and AB 1826. In 1989, AB 939, known as the Integrated Waste Management Act (California Public Resources Code, Sections 40000 et seq.), was passed because of the increase in waste stream and the decrease in landfill capacity. The statute established the California Integrated Waste Management Board, which oversees a disposal reporting system. AB 939 mandated a reduction of waste being disposed where jurisdictions were required to meet diversion goals of all solid waste through source reduction, recycling, and composting activities of 25% by 1995 and 50% by 2000.

AB 341 amended the California Integrated Waste Management Act of 1989 to include a provision declaring that it is the policy goal of the state that not less than 75% of solid waste generated be source-reduced, recycled, or composted by 2020, and annually thereafter. In addition, AB 341 required the California Department of Resources Recycling and Recovery to develop strategies to achieve the state's policy goal.

AB 1826 (Chapter 727, Statutes of 2014, effective 2016) requires businesses to recycle their organic waste (i.e., food waste, green waste, landscape and pruning waste, nonhazardous wood waste, and food-soiled paper waste that is mixed in with food waste) depending on the amount of waste they generate per week. This law also requires local jurisdictions across the state to implement an organic waste recycling program to divert organic waste generated by businesses, including multifamily residential dwellings that consist of five or more units. The minimum threshold of organic waste generation by businesses decreases over time, which means an increasingly greater proportion of the commercial sector will be required to comply.

Other State Actions

SB 97. SB 97 (2007) directed the Governor's Office of Planning and Research to develop guidelines under CEQA for the mitigation of GHG emissions. In 2008, the Governor's Office of Planning and Research issued a technical advisory as interim guidance regarding the analysis of GHG emissions in CEQA documents. The advisory indicated that the lead agency should identify and estimate a project's GHG emissions, including those associated with vehicular traffic, energy consumption, water usage, and construction activities (OPR 2008). The advisory further recommended that the lead agency determine significance of the impacts and impose all mitigation measures necessary to reduce GHG emissions to a level that is less than significant. The CNRA adopted the State of California CEQA Guidelines (CEQA Guidelines) amendments in December 2009, which became effective in March 2010.

Under the amended CEQA Guidelines, a lead agency has the discretion to determine whether to use a quantitative or qualitative analysis or apply performance standards to determine the significance of GHG emissions resulting from a particular project (14 CCR 15064.4[a]). The CEQA Guidelines require a lead agency to consider the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4[b]). The CEQA Guidelines also allow a lead agency to consider feasible means of mitigating the significant effects of GHG emissions, including reductions in emissions through the implementation of project features or off-site measures. The adopted amendments do not establish a GHG emission threshold, instead allowing a lead agency to develop, adopt, and apply its own thresholds of significance or those developed by other agencies or experts. The CNRA also acknowledges that a lead agency may consider compliance with regulations or requirements implementing AB 32 in determining the significance of a project’s GHG emissions (CNRA 2009a).

With respect to GHG emissions, the CEQA Guidelines Section 15064.4(a) state that lead agencies “should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate” GHG emissions. The CEQA Guidelines note that an agency may identify emissions by either selecting a “model or methodology” to quantify the emissions or by relying on “qualitative analysis or performance based standards” (14 CCR 15064.4[a]). Section 15064.4(b) states that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment: (1) the extent a project may increase or reduce GHG emissions as compared to the existing environmental setting; (2) whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14, CCR 15064.4[b]).

EO S-13-08. EO S-13-08 (November 2008) is intended to hasten California’s response to the impacts of global climate change, particularly sea-level rise. Therefore, the EO directs state agencies to take specified actions to assess and plan for such impacts. The final 2009 California Climate Adaptation Strategy report was issued in December 2009 (CNRA 2009b), and an update, Safeguarding California: Reducing Climate Risk, followed in July 2014 (CNRA 2014). To assess the state’s vulnerability, the report summarizes key climate change impacts to the state for the following areas: Agriculture, Biodiversity and Habitat, Emergency Management, Energy, Forestry, Ocean and Coastal Ecosystems and Resources, Public Health, Transportation, and Water. Issuance of the Safeguarding California: Implementation Action Plans followed in March 2016 (CNRA 2016). In January 2018, the CNRA released the Safeguarding California Plan: 2018 Update, which communicates current and needed actions that state government should take to build climate change resiliency (CNRA 2018b).

DWR Climate Action Plan Phase 1 Greenhouse Gas Emissions Reduction Plan. In July 2020, DWR adopted the Greenhouse Gas Emissions Reduction Plan (GGERP) Update 2020 (GGERP Update 2020) to update strategies for further reduction consistent with legislative changes since the original GGERP in 2012, including the GHG emissions reduction targets established in SB 32, SB 100, EO B-18-12, EO B-30-15, and EO B-55-18 (DWR 2020). DWR’s near-term goal in the original GGERP was to reduce its emissions to 50% below 1990 emissions level by 2020, which was achieved 5 years early. For the GGERP Update 2020, DWR identified the following mid-term and long-term GHG emissions reduction goals to guide decision making beyond 2020 (DWR 2020):

- Mid-Term Goal. By 2030, reduce GHG emissions to at least 60% below the 1990 level
- Long-Term Goal. By 2045, supply 100% of electricity load with zero-carbon resources and achieve carbon neutrality

Although GHG emissions will vary from year to year, DWR expects to exceed its mid-term goal by implementing GHG-reduction measures. DWR also anticipates meeting its long-term goal and will provide additional details in the next plan update to reflect evolving technologies and ongoing changes in regulatory policies and their implementation (DWR 2020).

3.3.2.4 Local

San Joaquin Air Pollution Control District

The San Joaquin Air Pollution Control District (SJVAPCD) does not regulate GHG emissions directly through its permitting responsibilities for stationary sources. Thus, there are no SJVAPCD rules or regulations related to GHGs. The SJVAPCD, however, effects reductions of GHGs from new and modified stationary sources when acting as a lead agency for CEQA. The SJVAPCD has adopted the Guidance for Valley Land-Use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA (SJVAPCD 2009a) and the policy Addressing GHG Emission Impacts for Stationary Source Projects under CEQA When Serving as the Lead Agency (SJVAPCD 2009b). The guidance and policy rely on the use of performance-based standards, otherwise known as Best Performance Standards, to assess significance of project-specific GHG emissions on global climate change during the environmental review process. However, SJVAPCD’s adopted Best Performance Standards are specifically directed at reducing GHG emissions from stationary sources; therefore, the adopted Best Performance Standards would not generally be applicable to the Modified Project.

Merced County Association of Governments

The Merced County Association of Governments (MCAG) is the regional planning agency for Merced County and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. MCAG serves as the federally designated metropolitan planning organization for Merced County. With respect to air quality planning and other regional issues, MCAG has prepared the 2018 Regional Transportation Plan and Sustainable Communities Strategy (2018 RTP/SCS) for the region (MCAG 2018). The 2018 RTP/SCS is a problem-solving guidance document that directly responds to what MCAG has learned about Merced County’s challenges through the annual State of the Region report card.

In regards to air quality, the 2018 RTP/SCS sets the policy context in which MCAG participates in and responds to the air district’s air quality plans and builds off the air district’s air quality plans and processes that are designed to meet health-based criteria pollutant standards in several ways (MCAG 2018). First, it complements air quality plans by providing guidance and incentives for public agencies to consider best practices that support the technology-based control measures in air quality plans. Second, the 2018 RTP/SCS emphasizes the need for local initiatives that can reduce the region’s GHG emissions that contribute to climate change, an issue that is largely outside the focus of local attainment plans, which is assessed in Section 8 of the 2018 RTP/SCS. Third, the 2018 RTP/SCS emphasizes the need for better coordination of land use and transportation planning, which heavily influences the emissions inventory from the transportation sectors of the economy. This also minimizes land use conflicts, such as residential development near freeways, industrial areas, or other sources of air pollution.

Merced Vision 2030 General Plan

As required by state law, Merced County has adopted a general plan to guide land use decisions within the county. The general plan provides goals, policies, standards, and implementation programs to guide the physical

development of a county. At a minimum, the general plan must address the topics of land use, transportation, housing, conservation, open space, noise, and safety. The Merced Vision 2030 General Plan (Merced County General Plan), adopted in 2013, has established the year 2030 as the plan’s time horizon. The Air Quality Element sets forth a number of policies and standards to reduce GHG emissions and adapt to climate change. The following goal and policies would apply to the Modified Project (Merced County 2013):

Air Quality Element

Goal AQ-1: Reduce air pollutants and GHG emissions and anticipate adaptation due to future consequences of global and local climate change.

- **Policy AQ-1.1: Energy Consumption Reduction.** Encourage new residential, commercial, and industrial development to reduce air quality impacts from energy consumption.
- **Policy AQ-1.6: Air Quality Improvement.** Support and implement programs to improve air quality throughout the County by reducing emissions related to vehicular travel and agricultural practices.
- **Policy AQ-1.7: Heat Island Effect Reduction.** Require increased tree canopy and reflective surface materials in order to reduce the heat island effect (i.e., increased temperatures due to heat radiation off paved surfaces and rooftops). This includes:
 - a) Preserving agricultural lands, wildlife habitat and corridors, wetlands, watersheds, groundwater recharge areas, and other open space that provide carbon sequestration benefits;
 - b) Establishing a mitigation program for development of those types of open space that provide carbon sequestration benefits;
 - c) Requiring like-kind replacement for, or impose mitigation fees on, land development that results in the loss of carbon sequestering open space; and
 - d) Using mitigation funds generated to protect existing open space.
- **Policy AQ-1.8: Climate Change Adaptation.** Prepare appropriate strategies to adapt to climate change based on peer-reviewed scientific findings of the potential impacts.

3.3.3 Thresholds of Significance

The following significance criteria from the 2019 EIS/EIR are used for the purposes of analysis in this SEIR. These criteria, which have not changed from the 2019 EIS/EIR, are identified in Chapter 8, Greenhouse Gas Emissions, of the 2019 EIS/EIR. A significant impact related to GHGs would occur if the Modified Project would:

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

Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. There are currently no established thresholds for assessing whether the GHG emissions of a project, such as the Modified Project, would be considered a cumulatively considerable contribution to global climate change; however, all reasonable efforts should be made to minimize a project’s contribution to global climate change. In addition, while GHG

impacts are recognized exclusively as cumulative impacts (CAPCOA 2008), GHG emissions impacts must also be evaluated on a project-level under CEQA.

Amendments to Section 15064.4 of the CEQA Guidelines were adopted to assist lead agencies in determining the significance of the impacts of GHG emissions. Section 15064.4 specifies that a lead agency “shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project.” Section 15064.4 also provides lead agencies with the discretion to determine whether to assess those emissions quantitatively or to rely on a qualitative analysis or performance-based standards. In addition, the CEQA Guidelines specify that “[w]hen adopting or using thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence” (14 CCR 15064.7(c)).

Construction

DWR’s GGERP Update 2020 identifies construction GHG emission thresholds that distinguish between typical construction projects and Extraordinary Construction Projects. Per DWR’s GGERP Update 2020, a project is an Extraordinary Construction Project if it (DWR 2020):

- Emits more than 25,000 MT CO₂e in total during the construction phase of the project, or
- Emits more than 12,500 MT CO₂e in any single year of construction.

These thresholds represent a level of GHG emissions that by themselves could potentially adversely affect DWR’s ability to achieve its GHG emissions reduction goals. Although these thresholds are not established by DWR as CEQA significance thresholds, they have been applied in this analysis as a contextual metric in order to evaluate the level of GHG emissions generated by the construction phase of the Modified Project, because a project exceeding either of these thresholds would represent construction activities exceeding the typical level of construction activity performed by DWR and would exceed the level of construction related emissions contemplated by the cumulative effects analysis in the GGERP Update 2020. As such, if the Modified Project exceeds either one of these thresholds, then the construction emissions must be analyzed and, if necessary, mitigated.

Operations

After the construction phase of the Modified Project, only the proposed new campground and improved San Luis Creek Day Use Area would result in long-term GHG emissions. Because these uses are under the jurisdiction of the California Department of Parks and Recreation (CDPR), analyses of these uses in the context of the DWR GGERP Update 2020 is not appropriate. As CDPR does not have a GHG-reduction plan (e.g., climate action plan), other GHG thresholds were considered to evaluate the significance of the operational GHG emissions. In the absence of an adopted numeric threshold by either CDPR or the SJVAPCD, the Modified Project was evaluated according to CEQA Guidelines Section 15064.7(c) by considering whether GHG emissions of the Modified Project meet the 900 MT CO₂e per year screening level threshold identified by the California Air Pollution Control Officers Association (CAPCOA) (CAPCOA 2008). Notably, SJVAPCD guidance supports the use of the CAPCOA threshold when other thresholds have not been adopted (SJVAPCD 2009c).

The 900 MT CO₂e per year threshold was developed based on various land use densities and future discretionary project types to determine the size of projects that would likely have a less than cumulatively considerable contribution to climate change. The CAPCOA threshold was developed to ensure capture of 90% or more of likely

future discretionary developments with the objective to set the emissions threshold low enough to capture a substantial fraction of future development while setting the emission threshold high enough to exclude small development projects that would contribute a relatively small fraction of cumulative statewide GHG emissions. CAPCOA’s 900 MT CO_{2e} per year threshold was developed to meet the target identified by AB 32 of reducing emissions to 1990 levels by year 2020. Subsequent to CAPCOA identifying the 900 MT CO_{2e} per year threshold, SB 32 was passed and set a revised statewide reduction target to reduce emissions to 40% below 1990 levels by year 2030. Though the CAPCOA threshold does not consider the reduction targets set by SB 32, the CAPCOA threshold was developed with an aggressive project-level GHG emission capture rate of 90%. Due to the aggressive GHG emission capture rate, the CAPCOA threshold has been determined to be a viable threshold to reduce project GHG emissions and meet SB 32 targets beyond 2020. Furthermore, more stringent state legislative requirements such as Building Energy Efficiency Standards and transportation-related efficiency measures will act to reduce future project GHG emissions and help in meeting State emissions reduction targets. Projects that generate emissions beyond the 900 MT CO_{2e} per year screening level threshold are required to implement feasible on-site mitigation measures to reduce their impacts on climate change. Projects that meet or fall below CAPCOA’s screening level threshold of 900 MT CO_{2e} per year of GHG emissions require no further analysis and are not required to implement mitigation measures to reduce GHG emissions. As such, the CAPCOA threshold of 900 MT CO_{2e} per year is used as a quantitative threshold for the analysis of impacts related to GHG emissions generated by long-term operations of the Modified Project.

3.3.4 Impacts Analysis

3.3.4.1 Approach and Methodology

Emissions from construction and operation of the Modified Project were estimated using the CalEEMod Version 2016.3.2.³ Specifically, emissions were estimated for the Modified Project’s proposed campground construction/day use area improvements and minor additions to contractor work areas. Detailed modeling assumptions are included in Appendix B. The Modified Project’s proposed changes in borrow area location would result in shorter haul truck trips than what was assessed in the 2019 EIS/EIR for the Approved Project, which would equate to a comparable reduction in emissions.

Construction

Construction of the Modified Project would result in GHG emissions primarily associated with use of off-road construction equipment, on-road hauling, vendor (material delivery) trucks, and worker vehicles. All details for construction criteria air pollutants discussed in Section 3.2, Air Quality, of this SEIR, are also applicable for the estimation of construction-related GHG emissions. As such, see Section 3.2 for a discussion of construction emissions calculation methodology and assumptions used in the GHG emissions analysis.

Operations

Emissions from the operational phase of the Modified Project were estimated using CalEEMod Version 2016.3.2. Specifically, emissions were only estimated for the proposed campground construction and day use area improvements, because only those would result in long-term operational emissions. Year 2024 was assumed as

³ CalEEMod is a statewide computer model developed in cooperation with air districts throughout the state to quantify criteria air pollutant emissions associated with the construction and operational activities from a variety of land use projects, such as residential, commercial, and industrial facilities. CalEEMod input parameters were based on information provided by CDPR, or default model assumptions if Modified Project specifics were unavailable.

the first full year of new campground/improved day use area operations. Potential Modified Project-generated operational GHG emissions were estimated for area sources (landscape maintenance), electricity, propane combustion, mobile sources, campfires, solid waste, and water supply and wastewater treatment. For annual emissions, it was assumed that the new campground would have an average occupancy rate of 40% based on input from CDPR (Heberling, pers. comm. 2020). Default CalEEMod values were used where detailed Modified Project information was not available from CDPR or was unknown. For additional details, see Section 3.2 of this SEIR for a discussion of operational emissions calculation methodology and assumptions, specifically for area sources, propane combustion, and mobile sources. Detailed modeling assumptions are included in Appendix B.

Area Sources

CalEEMod was used to estimate GHG emissions from operation of gasoline-powered landscape maintenance equipment, which produce minimal GHG emissions. Consumer product use and architectural coatings result in reactive organic gases emissions, which are analyzed in air quality analysis only, and generate little to no GHG emissions.

Electricity

GHG emissions associated with electricity usage was estimated based on the annual consumption of 36,600 kilowatt-hours per year (based on annual average of 40% occupancy), as provided by CDPR. Emissions are calculated by multiplying the energy use by the utility carbon intensity (pounds of GHGs per kilowatt-hour) for CO₂ and other GHGs. Emissions factors (in pounds per megawatt-hour) for CH₄ and N₂O are from CalEEMod for Pacific Gas & Electric Company. The CO₂ emissions factor is from Pacific Gas & Electric Company's reported intensity for 2017 (PG&E 2019).

Propane Combustion

A separate workbook was developed to estimate emissions associated with combustion of propane, which would be used to heat water for the campground restroom facilities. According to CDPR, it is anticipated that the new campground would require approximately 1,300 gallons of propane on an annual basis. Emissions factors for propane combustion were from the EPA's AP-42, Section 1.5, Liquefied Petroleum Gas Combustion (EPA 2008), and from A National Methodology and Emission Inventory for Residential Fuel Combustion (Haneke n.d.).

Mobile Sources

All details for criteria air pollutants discussed in Section 3.2 of this SEIR are also applicable for the estimation of operational mobile source GHG emissions. Regulatory measures related to mobile sources include AB 1493 and related federal standards. AB 1493 required that CARB establish GHG emissions standards for automobiles, light-duty trucks, and other vehicles determined by CARB to be vehicles that are primarily used for noncommercial personal transportation in the state. In addition, the NHTSA and EPA have established corporate fuel economy standards and GHG emissions standards, respectively, for automobiles and light-, medium-, and heavy-duty vehicles. Implementation of these standards and fleet turnover (replacement of older vehicles with newer ones) will gradually reduce emissions from motor vehicle operation associated with the Modified Project. The

effectiveness of fuel economy improvements was evaluated by using the CalEEMod emission factors for motor vehicles, to the extent it was captured in CalEEMod.⁴

Campfires

For campfire emissions, the Piled Fuels Biomass and Emissions Calculator (FERA et al. 2014) was used, assuming a campsite would burn a bundle of approximately 0.75 cubic feet of hardwood per night. For annual GHG emissions, it was assumed that 40% of the campsites would have a campfire, based on the anticipated annual average occupancy rate of 40% provided by CDPR.

Solid Waste

The Modified Project would generate solid waste, and therefore, result in CO₂e emissions associated with landfill off-gassing. Default values for solid waste generation were used to estimate GHG emissions associated with solid waste for the Modified Project.⁵

Water and Wastewater Treatment

Supply, conveyance, treatment, and distribution of water for the Modified Project would require the use of electricity, which would result in associated indirect GHG emissions. Similarly, wastewater generated by the Modified Project would require the use of electricity for conveyance and treatment, and would generate GHG emissions during wastewater treatment. Estimates of electricity consumption for water use and wastewater conveyance and treatment were based on an estimated use of 1,488,000 gallons per year for the proposed new campground (based on 40% average annual occupancy). In accordance with details provided by CDPR, all wastewater generated by the campground would be disposed of using on-site wastewater treatment and disposal systems (septic systems).

3.3.4.2 Impact Discussion

Threshold 1

Would the Modified Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

2019 EIS/EIR Impact Determination	Modified Project Impact Determination	New Significant Increase in Impact Severity?
Less than Significant with Mitigation Incorporated	Less than Significant with Mitigation Incorporated	No

⁴ The Low Carbon Fuel Standard calls for a 10% reduction in the “carbon intensity” of motor vehicle fuels by 2020, which would further reduce GHG emissions. However, the carbon intensity reduction associated with the Low Carbon Fuel Standard was not assumed in CalEEMod 2016.3.2.

⁵ Because CalEEMod 2016.3.2 does not include a campground land use, emissions associated with solid waste generation for the campground were modeled using default values for modular/mobile home residential uses. This was considered to generate a high or conservative estimate of potential emissions associated with campground uses.

Campground Construction and Day Use Area Improvements and Minor Additions to Contractor Work Area

Construction

Construction of the Modified Project would result in GHG emissions, which are primarily associated with use of off-road construction equipment, vendor and haul trucks, and worker vehicles. CalEEMod was used to calculate the annual GHG emissions from the Modified Project’s minor additions to contractor work areas and proposed campground construction and day use area improvements. A detailed depiction of the construction schedule—including information regarding phasing, equipment utilized during each phase, trucks, and worker vehicles—is included in Appendix B. The estimated unmitigated Modified Project-generated GHG emissions from construction activities are shown in Table 3.3-3.

Table 3.3-3. Unmitigated Annual Construction GHG Emissions

Year	CO ₂	CH ₄	N ₂ O	CO ₂ e
	Metric Tons per Year			
Minor Additions to Contractor Work Area¹				
2021	115.50	0.03	0.00	116.31
Campground Construction and Day Use Area Improvements¹				
2022	457.39	0.10	0.00	459.86
2023	511.96	0.07	0.00	513.69
Approved Project Construction²				
Annual Average	12,787.17	0.98	0.11	12,844.69
Modified Project Annual Construction GHG Emissions				13,934.55
DWR Threshold				12,500.00
Threshold Exceeded?				Yes
Total Approved Project Construction GHG Emissions				128,446.89
Total Modified Project Construction GHG Emissions				129,536.75
DWR Threshold				25,000.00
Threshold Exceeded?				Yes

Source: Appendix B.

Notes: CO₂ = carbon dioxide; CH₄ = methane; N₂O = nitrous oxide; CO₂e = carbon dioxide equivalent; DWR = California Department of Water Resources; GHG = greenhouse Gas.

- 1 These elements of the Modified Project were modeled using CalEEMod based on the assumptions outlined in Section 3.3.4.1, Approach and Methodology, under Construction.
- 2 In the 2019 EIS/EIR, all haul truck trips were assumed to be 40 miles one-way, which overestimated the associated emissions. This was adjusted herein for haul trucks in order to account for the shorter trip length between the borrow areas and worksites; 15% of total trips were still conservatively assumed to require 40-mile one-way trips, with the remainder of trips occurring on-site with a one-way trip length of 4 miles.

As shown in Table 3.3-3, emissions from construction of the Modified Project’s minor additions to the contractor work area and new campground and day use area improvements would be minimal and would not exceed the applied DWR thresholds for Extraordinary Construction Projects. However, when summed with the Approved Project emissions, the unmitigated scenario of the overall Modified Project would exceed the annual and total Modified Project GHG thresholds during construction; therefore, a significant impact would occur. Because the Modified Project would exceed the DWR thresholds during construction, it would be considered an Extraordinary Construction Project and would result in a potentially significant impact related to the generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment. With

implementation of Mitigation Measures **SEIR-GHG-1 (new mitigation measure) and SEIR-GHG-2 (replaces GHG-1 in the 2019 EIS/EIR)** (see Section 3.3.5, Mitigation Measures), GHG emissions generated by Modified Project construction would be reduced by the use of electric/alternatively fueled equipment where feasible and appropriate and through the facilitation of rideshares for workers, as well as offset below the applied threshold. As such, impacts would be **less than significant after mitigation** and would not be cumulatively considerable.

Operations

GHG emissions from the operational phase of the Modified Project were only estimated for the proposed campground and improved San Luis Creek Day Use Area, because those are the only components of the Modified Project that would result in long-term operational emissions. Operation of the new campground/improved day use area would generate GHG emissions from area sources (landscaping equipment); energy use (generation of electricity consumed by the Modified Project lighting, campground hook-ups, and amenities); propane combustion; mobile sources (vehicular traffic); wood burning in campfires; solid waste disposal; water supply, treatment, and distribution; and wastewater treatment and disposal. Table 3.3-4 presents the estimated unmitigated annual GHG emissions generated during operation of the Modified Project.

Table 3.3-4. Unmitigated Annual Operational GHG Emissions

Emission Source	CO ₂	CH ₄	N ₂ O	CO ₂ e
	Metric Tons per Year			
Campground Construction and Day Use Area Improvements				
Area Sources	0.96	<0.01	0.00	0.98
Electricity	3.49	<0.01	<0.01	3.53
Propane	7.37	<0.01	0.00	7.37
Mobile Sources	295.73	0.02	0.00	296.17
Campfires	2.85	0.01	0.00	3.10
Waste	7.38	0.44	0.00	18.28
Water And Wastewater	0.77	0.34	<0.01	9.57
Total Modified Project Operational Emissions				339.00
Screening Level Threshold				900
Threshold Exceeded?				No

Source: Appendix B.

Notes: CO₂ = carbon dioxide; CH₄ = methane; N₂O = nitrous oxide; CO₂e = carbon dioxide equivalent.

As shown in Table 3.3-4, estimated annual Modified Project-generated GHG emissions would be approximately 339 MT CO₂e per year as a result of operations of the new campground and improved San Luis Creek Day Use Area. As such, annual operational GHG emissions would be minimal and would not exceed the applied threshold of 900 MT CO₂e per year. Therefore, the Modified Project’s GHG contribution would be **less than significant** and would not be cumulatively considerable.

Changes in Borrow Area Location

As discussed in Section 3.3.4.1, Approach and Methodology, Modified Project emissions were estimated only for construction of the proposed campground, day use area improvements, and minor additions to contractor work areas. Changes in borrow area location would result in shorter haul truck trips than what was assessed in the 2019 EIS/EIR, which would equate to a comparable reduction in emissions. This element of the Modified Project

would not generate GHG emissions—either directly or indirectly—that may have a significant impact on the environment. Therefore, the impact from the change in the borrow area location would be **less than significant**.

Additional Construction Assumptions

As discussed in Chapter 2, Project Description, of this SEIR, the overall construction schedule and assumptions regarding personnel and equipment remain unchanged by the Modified Project. Although dewatering was only briefly mentioned in the 2019 EIS/EIR, this activity would be required for the Approved Project and is not a discreet addition for the Modified Project. Overall, the additional construction assumptions are described for clarification purposes in the SEIR. Based on the above considerations, these elements of the Modified Project would not generate GHG emissions—either directly or indirectly—that may have a significant impact on the environment. Therefore, the impact would be **less than significant**.

In summary, construction of the Modified Project elements would not exceed the DWR thresholds for Extraordinary Construction Projects when summed with the Approved Project emissions, after implementation of mitigation to reduce construction emissions. Operational emissions from the new campground would be minimal and would not exceed the applied screening level threshold. As such, the Modified Project overall would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. This impact would be **less than significant after mitigation**.

Comparison to 2019 EIS/EIR

The additional project components analyzed above would result in less-than-significant impacts with mitigation incorporated and therefore impacts of the Modified Project would not result in a significant increase in the severity of impacts as determined in the 2019 EIS/EIR. Impacts of the Modified Project would remain less than significant with mitigation incorporated (see Section 3.3.5).

Threshold 2

Would the Modified Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

2019 EIS/EIR Impact Determination	Modified Project Impact Determination	New Significant Increase in Impact Severity?
Less than Significant with Mitigation Incorporated	Less than Significant with Mitigation Incorporated	No

All Modified Project Components

As outlined in Section 3.3.2, Relevant Plans, Policies, and Ordinances, DWR’s GGERP Update 2020 identified the following mid-term and long-term GHG emissions reduction goals to guide decision making beyond 2020 (DWR 2020):

- Mid-Term Goal. By 2030, reduce GHG emissions to at least 60% below the 1990 level
- Long-Term Goal. By 2045, supply 100% of electricity load with zero-carbon resources and achieve carbon neutrality

DWR’s construction GHG emissions thresholds (i.e., whether the Modified Project emits more than 25,000 MT CO₂e in total during the construction phase or emits more than 12,500 MT CO₂e in any single year of construction) identified in the GGERP Update 2020 distinguish between typical construction projects and Extraordinary Construction Projects and represent a level of GHG emissions that by themselves could adversely affect DWR’s ability to achieve its GHG emissions reduction goals. As discussed in Threshold 1, GHG emissions from the Modified Project’s minor additions to the contractor work area, construction of the proposed new campground, and day use area improvements would be minimal and would not exceed the applied DWR thresholds for Extraordinary Construction Projects. However, when summed with the Approved Project emissions, the unmitigated scenario of the overall Modified Project would exceed DWR’s construction GHG emissions thresholds for both annual and total Modified Project GHG construction emissions. As such, it would be considered an Extraordinary Construction Project and would result in a potentially significant impact because Modified Project emissions could conflict with GHG reduction goals identified by the GGERP Update 2020. However, with implementation of **Mitigation Measures SEIR-GHG-1 and SEIR-GHG-2** (see Section 3.3.5), GHG emissions generated by Modified Project construction would be reduced by (1) the use of electric/alternatively fueled equipment where feasible and appropriate and through the facilitation of rideshares for workers, as well offset below the Extraordinary Construction Project thresholds. Therefore, construction of the Modified Project would be **less than significant after mitigation** and would not conflict with the DWR GGERP. Regarding long-term operations, because only the new campground/improved day use area would result in an increase in GHG emissions, and these uses are under the purview of CDPR, the DWR GGERP 2020 would not apply to operations of the Modified Project.

In regards to consistency with the MCAG 2018 RTP/SCS, the additional campground to be developed under the Modified Project within the San Luis Reservoir State Recreation Area would likely reduce the length of trips made from communities in the nearby coastal regions to access similar recreational camping and boating opportunities farther to the east; thereby resulting in some reduction in net vehicle miles traveled in the region. As such, the Modified Project would not conflict with the goals of the MCAG 2018 RTP/SCS.

Additionally, the CARB Scoping Plan, approved by CARB in 2008 and updated in 2014 and 2017, provides a framework for actions to reduce California’s GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. The Scoping Plan is not directly applicable to specific projects, nor is it intended to be used for project-level evaluations.⁶ Under the Scoping Plan, however, there are several state regulatory measures aimed at the identification and reduction of GHG emissions. CARB and other state agencies have adopted many of the measures identified in the Scoping Plan. Most of these measures focus on area source emissions (e.g., energy usage, high-GWP GHGs in consumer products) and changes to the vehicle fleet (i.e., hybrid, electric, and more fuel-efficient vehicles) and associated fuels (e.g., Low Carbon Fuel Standard), among others. The Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32 and establishes an overall framework for the measures that will be adopted to reduce California’s GHG emissions. To the extent that these regulations are applicable to the Modified Project or its uses, the Modified Project would comply with all regulations adopted in furtherance of the Scoping Plan to the extent required by law.

The Modified Project would also not impede the attainment of the GHG reduction goals for 2030 or 2050 identified in SB 32 and EO S-3-05, respectively. EO S-3-05 establishes the following goals: GHG emissions should be reduced to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050. SB 32

⁶ The Final Statement of Reasons for the amendments to the CEQA Guidelines reiterates the statement in the Initial Statement of Reasons that “[t]he Scoping Plan may not be appropriate for use in determining the significance of individual projects because it is conceptual at this stage and relies on the future development of regulations to implement the strategies identified in the Scoping Plan” (CNRA 2009a).

establishes a statewide GHG emissions reduction target whereby CARB, in adopting rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions, ensures that statewide GHG emissions are reduced to at least 40% below 1990 levels by December 31, 2030. While there are no established protocols or thresholds of significance for that future year analysis; CARB forecasts that compliance with the current Scoping Plan puts the state on a trajectory of meeting these long-term GHG goals, although the specific path to compliance is unknown (CARB 2014).

CARB has expressed optimism with regard to both the 2030 and 2050 goals. It states in the First Update to the Climate Change Scoping Plan that “California is on track to meet the near-term 2020 GHG emissions limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32” (CARB 2014). With regard to the 2050 target for reducing GHG emissions to 80% below 1990 levels, the First Update states the following (CARB 2014):

This level of reduction is achievable in California. In fact, if California realizes the expected benefits of existing policy goals (such as 12,000 megawatts of renewable distributed generation by 2020, net zero energy homes after 2020, existing building retrofits under AB 758, and others) it could reduce emissions by 2030 to levels squarely in line with those needed in the developed world and to stay on track to reduce emissions to 80% below 1990 levels by 2050. Additional measures, including locally driven measures and those necessary to meet federal air quality standards in 2032, could lead to even greater emission reductions.

In other words, CARB believes that the state is on a trajectory to meet the 2030 and 2050 GHG reduction targets set forth in AB 32, SB 32, and EO S-3-05. This is confirmed in the Second Update, which states (CARB 2017a):

This Scoping Plan builds upon the successful framework established by the Initial Scoping Plan and First Update, while also identifying new, technologically feasible, and cost-effective strategies to ensure that California meets its GHG reduction targets in a way that promotes and rewards innovation, continues to foster economic growth, and delivers improvements to the environment and public health, including in disadvantaged communities.

As discussed in Threshold 1, after implementing mitigation measures, the Modified Project would be considered to result in an increase in GHG emissions on par with typical DWR projects (i.e., would not be considered an Extraordinary Construction Project) and would not conflict with DWR’s GHG reduction goals identified in the GGERP Update 2020. Over the long-term, the new campground and day use area operations would also result in a minimal increase in emissions. Overall, the Modified Project would be consistent with the applicable strategies and measures in the Scoping Plan and is consistent with, and would not impede, the state’s trajectory toward the aforementioned statewide GHG reduction goals for 2030 or 2050. In addition, because the specific path to compliance for the state in regard to the long-term goals will likely include changes in technology and regulatory standards and controls that are unavailable or unknown at this time, Modified Project operations and users of Modified Project facilities would be subject to these changes and it can be reasonably expected that emissions from Modified Project operations would not conflict with the state’s long-term goals for reducing GHG emissions. With respect to future GHG targets under SB 32 and EO S-3-05, CARB has also made clear its legal interpretation that it has the requisite authority to adopt whatever regulations are necessary, beyond the AB 32 horizon year of 2020, to meet SB 32’s 40% reduction target by 2030 and EO S-3-05’s 80% reduction target by 2050; this legal interpretation by an expert agency provides evidence that future regulations will be adopted to continue the state on its trajectory toward meeting these future GHG targets.

Based on the above considerations, the Modified Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. This impact would be **less than significant after mitigation**.

Comparison to 2019 EIS/EIR

The additional project components analyzed above would result in less-than-significant impacts with mitigation incorporated and therefore impacts of the Modified Project would not result in a significant increase in the severity of impacts as determined in the 2019 EIS/EIR. Impacts of the Modified Project would remain less than significant with mitigation incorporated (see Section 3.3.5).

3.3.5 Mitigation Measures

The following mitigation measures are required to reduce GHG emissions from construction of the Modified Project to the extent feasible. Notably, Mitigation Measure SEIR-GHG-2 replaces Mitigation Measure GHG-1 identified in the 2019 EIS/EIR, whereas Mitigation Measure SEIR-GHG-1 has been added as new mitigation. Mitigation Measure GHG-1 was replaced with Mitigation Measure SEIR-GHG-2 to provide additional detail and specificity to guide implementation of this measure and to align the measure with guidance from recent case law pertaining to carbon offsets.

SEIR-GHG-1 (New mitigation measure): Construction GHG Emissions Reductions. To reduce greenhouse gas (GHG) emissions generated by equipment during construction, the following measures shall be incorporated into the Modified Project:

- i) The proper tuning and maintenance of all construction equipment in accordance with manufacturer’s specifications
- ii) Where feasible, employing the use of electrical or alternative fueled (i.e., non-diesel) construction equipment, including forklifts, concrete/industrial saws, pumps, aerial lifts, air compressors, and other comparable equipment types to the extent commercially available
- iii) To reduce the need for electric generators and other fuel-powered equipment, providing on-site electrical hookups for the use of hand tools such as saws, drills, and compressors used for construction where feasible and appropriate
- iv) Encouraging and providing carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes

SEIR-GHG-2 (Replaces GHG-1 in the 2019 EIS/EIR): Carbon Offsets – Construction Emissions. The California Department of Water Resources (DWR) and Bureau of Reclamation (Reclamation) shall retire carbon offsets in a quantity sufficient to offset the Modified Project’s construction greenhouse gas (GHG) emissions to below the DWR thresholds of 25,000 metric ton carbon dioxide equivalent (MT CO_{2e}) total and 12,500 MT CO_{2e} per year for Extraordinary Construction Projects, consistent with the performance standards and requirements set forth below. Based on modeling conducted to date, a minimum of 104,537 MT CO_{2e} would be required to reduce emissions below the project-level significance threshold.

Carbon Offset Standards – Eligible Registries, Acceptable Protocols, and Defined Terms

“Carbon offset” shall mean an instrument, credit, or other certification verifying the reduction of GHG emissions issued by the Climate Action Reserve, the American Carbon Registry, or Verra

(previously, the Verified Carbon Standard). This shall include, but is not limited to, an instrument, credit or other certification issued by these registries for GHG reduction activities within the Merced County region. Offsets from the Clean Development Mechanism (CDM) registry or generated under CDM protocols shall not be purchased or used to satisfy offset requirements. Qualifying carbon offsets presented for compliance with this mitigation measure may be used provided that each registry shall continue its existing practice of requiring the following for the development and approval of protocols or methodologies:

- i) Adherence to established GHG accounting principles set forth in the International Organization for Standardization (ISO) 14064, Part 2 or the World Resources Institute/World Business Council for Sustainable Development (WRI/WBCSD) Greenhouse Gas Protocol for Project Accounting
- ii) Oversight of the implementation of protocols and methodologies that define the eligibility of carbon offset projects and set forth standards for the estimation, monitoring and verification of GHG reductions achieved from such projects. The protocols and methodologies shall:
 - a. Be developed by the registries through a transparent public and expert stakeholder review process that affords an opportunity for comment and is informed by science
 - b. Incorporate standardized offset crediting parameters that define whether and how much emissions reduction credit a carbon offset project should receive, having identified conservative project baselines and the length of the crediting period and considered potential leakage and quantification uncertainties
 - c. Establish data collection and monitoring procedures, mechanisms to ensure permanency in reductions, and additionality and geographic boundary provisions
 - d. Adhere to the principles set forth in the program manuals of each of the aforementioned registries, as such manuals are updated from time to time

Further, any carbon offset used to reduce the Modified Project's GHG emissions shall be a carbon offset that represents the past or forecasted reduction or sequestration of one MT of CO_{2e} that is "not otherwise required" (California Environmental Quality Act [CEQA] Guidelines Section 15126.4(c)(3)). Each carbon offset used to reduce GHG emissions shall achieve additional, real, permanent, quantifiable, verifiable, and enforceable reductions, which are defined for purposes of this mitigation measure as follows:

- i) "Additional" means that the carbon offset is not otherwise required by law or regulation, and not any other GHG emissions reduction that otherwise would occur.
- ii) "Real" means that the GHG reduction underlying the carbon offset results from a demonstrable action or set of actions, and is quantified under the protocol or methodology using appropriate, accurate, and conservative methodologies that account for all GHG emissions sources and sinks within the boundary of the applicable carbon offset project, uncertainty, and the potential for activity-shifting leakage and market-shifting leakage.
- iii) "Verifiable" means that the GHG reduction underlying the carbon offset is well documented, transparent, and set forth in a document prepared by an independent verification body that is accredited through the American National Standards Institute (ANSI).

- iv) “Permanent” means that the GHG reduction underlying the carbon offset is not reversible; or, when GHG reduction may be reversible, that a mechanism is in place to replace any reversed GHG emission reduction.
- v) “Quantifiable” means the ability to accurately measure and calculate the GHG reduction relative to a project baseline in a reliable and replicable manner for all GHG emission sources and sinks included within the boundary of the carbon offset project, while accounting for uncertainty and leakage.
- vi) “Enforceable” means that the implementation of the GHG reduction activity must represent the legally binding commitment of the offset project developer to undertake and carry it out.

The protocols and methodologies of the Climate Action Reserve, the American Carbon Registry, and Verra establish and require carbon offset projects to comply with standards designed to achieve additional, real, permanent, quantifiable, verifiable, and enforceable reductions. The above definitions are provided as criteria and performance standards associated with the use of carbon offsets. Such criteria and performance standards are intended only to further construe the standards under CEQA for mitigation related to GHG emissions (see, e.g., State of California CEQA Guidelines Section 15126.4[a][c]), and are not intended to apply or incorporate the requirements of any other statutory or regulatory scheme not applicable to the Modified Project (e.g., the California Cap-and-Trade Program).

3.3.6 Level of Significance After Mitigation

As discussed in Section 3.3.3, Thresholds of Significance, GHG impacts are recognized exclusively as cumulative impacts (CAPCOA 2008). The Modified Project would result in a potentially significant impact with respect to generating GHG emissions during construction of the Modified Project. Mitigation Measures SEIR-GHG-1 and SEIR-GHG-2, which require strategies to reduce GHGs from construction, as well as the purchase of carbon offsets, would reduce and offset construction GHG impacts to a level below significance. Regarding long-term operations, GHG emissions associated with the Modified Project’s proposed new campground and improved San Luis Creek Day Use Area would be minimal and no mitigation would be required.

Because the Modified Project would exceed the DWR thresholds during construction, it would be considered an Extraordinary Construction Project and would result in a potentially significant impact because it could impact DWR’s ability to attain long-term GHG reduction goals identified by DWR’s GGERP Update 2020. With implementation of Mitigation Measures SEIR-GHG-1 and SEIR-GHG-2, the Modified Project would result in an increase in GHG emissions on par with typical DWR projects (i.e., would not be considered an Extraordinary Construction Project) and would not conflict with DWR’s GHG reduction goals. As noted above, regarding long-term operations, GHG emissions associated with the Modified Project’s proposed new campground and improved San Luis Creek Day Use Area would be minimal and no mitigation would be required. Overall, after mitigation, the Modified Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions, and this impact would be less than significant.

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