4.8 GREENHOUSE GAS EMISSIONS

This section describes existing conditions pertaining to greenhouse gas (GHG) emissions, identifies associated regulatory requirements, evaluates potential project and cumulative impacts, and identifies mitigation measures for any significant or potentially significant impacts related to implementation of the Sustainability Policy and Regulatory Update of the County of Santa Cruz (County) General Plan and Local Coastal Program (LCP) and County Code (Sustainability Update or project). The analysis is based on air emissions modeling conducted for the proposed project (see Appendix I).

4.8.1 Environmental Setting

4.8.1.1 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 (U.S. Environmental Protection Agency [EPA] 2017).

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 (Intergovernmental Panel on 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.

4.8.1.2 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 (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs),

sulfur hexafluoride (SF_6), and nitrogen trifluoride (see also Cal. Code Regs. Title 14, § 15364.5).[1] Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted into the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are the predominant GHGs emitted from human activities. The following paragraphs provide a summary of the GHGs associated with the proposed project and their sources.[2]

Carbon Dioxide

CO_2 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 CO_2 include respiration of bacteria, plants, animals, and fungus; evaporation from oceans; volcanic out-gassing; and decomposition of dead organic matter. Human activities that generate CO_2 include the combustion of fuels such as coal, oil, natural gas, and wood, and changes in land use.

Methane

CH_4 is produced through both natural and human activities. CH_4 is a flammable gas and is the main component of natural gas. CH_4 is produced through anaerobic (i.e., 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

N_2O is produced through natural and human activities, mainly through agricultural activities and natural biological processes, although fuel burning and other processes also create N_2O. Sources of N_2O 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 N_2O as a propellant (such as in rockets, racecars, and aerosol sprays).

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 (O_3)-depleting substances (e.g., chlorofluorocarbons [CFCs], hydrochlorofluorocarbons [HCFCs], and halons). The most prevalent fluorinated gases include the following:

- **Hydrofluorocarbons**: HFCs are compounds containing only hydrogen, fluorine, and carbon atoms. HFCs are synthetic chemicals used as alternatives to O_3-depleting substances in serving

[1] Climate-forcing substances include GHGs and other substances such as black carbon and aerosols.
[2] The descriptions of GHGs are summarized from the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (IPCC 2007), CARB's "Glossary of Terms Used in GHG Inventories" (CARB 2018), and EPA's "Climate Change" (EPA 2017).

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, along with HFCs, as alternatives to the O_3-depleting substances. The two main sources of PFCs are primarily aluminum production and semiconductor manufacturing. Since 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**: SF_6 is a colorless gas soluble in alcohol and ether and slightly soluble in water. SF_6 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

CFCs are synthetic chemicals that have been used as cleaning solvents, refrigerants, and aerosol propellants. CFCs are chemically unreactive in the lower atmosphere (troposphere), and the production of CFCs was prohibited in 1987 due to the chemical destruction of stratospheric O_3.

Hydrochlorofluorocarbons

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

Black Carbon

Black carbon is a component of fine particulate matter ($PM_{2.5}$), 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; influences cloud formation; and darkens 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 particulate matter 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 decreased 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 O_3, which is created by photochemical reactions involving gases from both natural sources and human activities, acts as a GHG. Stratospheric O_3, 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 O_3, which occurs 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.

4.8.1.3 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[3]) (EPA 2017). The IPCC 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 CO_2; therefore, GWP-weighted emissions are measured in metric tons of CO_2 equivalent (MT CO_2e).

The current version of the California Emissions Estimator Model (CalEEMod) (Version 2020.4.0), which is used to model GHG emissions, assumes that the GWP for CH_4 is 25 (so emissions of 1 MT of CH_4 are equivalent to emissions of 25 MT of CO_2), and the GWP for N_2O is 298, based on the IPCC's Fourth Assessment Report (IPCC 2007).

[3] Albedo is the ratio of the light received by a body to the light reflected by that body.

Greenhouse Gas Inventories

Global Inventory

Anthropogenic GHG emissions worldwide in 2019 (the most recent year for which data is available) totaled approximately 52,400 million metric tons (MMT) of CO_2e, excluding land use change and forestry (PBL 2020). The top six GHG emitters include China, the United States, the Russian Federation, India, Japan, and the European Union, which accounted for approximately 62% of the total global emissions, or approximately 32,500 MMT CO_2e (PBL 2020). Table 4.8-1 presents the top GHG-emissions-producing countries.

Table 4.8-1. Six Top Greenhouse-Gas-Producer Countries and the European Union

Emitting Countries (listed in order of emissions)	Greenhouse Gas Emissions (MMT CO_2e)
China	14,000
United States	6,600
European Union	4,300
India	3,700
Russian Federation	2,500
Japan	1,400
Total	**32,500**

Source: PBL 2020.
Note: MMT CO_2e = million metric tons of carbon dioxide equivalent.

National Inventory

Per the Environmental Protection Agency (EPA) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 to 2019 (EPA 2021), total United States GHG emissions were approximately 6,558.3 MMT CO_2e in 2019 (EPA 2021).[4] The primary GHG emitted by human activities in the United States was CO_2, which represented approximately 80.1% of total GHG emissions (5,255.8 MMT CO_2e). The largest source of CO_2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 92.4% of CO_2 emissions in 2019 (4,856.7 MMT CO_2e). Relative to 1990, gross United States GHG emissions in 2019 were 1.8% higher; however, the gross emissions were down from a high of 15.6% above 1990 levels in 2007. GHG emissions decreased from 2018 to 2019 by 1.7% (113.1 MMT CO_2e) and overall, net emissions in 2019 were 13% below 2005 levels (EPA 2021).

State Inventory

According to California's 2000–2019 GHG emissions inventory (2021 edition), California emitted approximately 418 MMT CO2e in 2019, including emissions resulting from out-of-state electrical generation (CARB 2021a). The sources of GHG emissions in California include transportation, industry, electric power

[4] A carbon "sink" is something that removes (or "sequesters") CO_2 from the atmosphere, such as through the uptake and storage in forests, vegetation, and soils (also called "sequestration").

production from both in-state and out-of-state sources, residential and commercial activities, agriculture, high-GWP substances, and recycling and waste. Table 4.8-2 presents California GHG emissions source categories and their relative contributions to the emissions inventory in 2019.

Between 2000 and 2019, per-capita GHG emissions in California have dropped from a peak of 14.0 MT per person in 2001 to 10.5 MT per person in 2019, representing an approximate 25% decrease. In addition, total GHG emissions in 2019 were approximately 7 MMT CO2e lower than 2018 emissions (CARB 2021a).

Table 4.8-2. Greenhouse Gas Emissions Sources in California

Source Category	Annual GHG Emissions (MMT CO_2e)	Percent of Total[a]
Transportation	166.1	39.7%
Industrial	88.2	21.1%
Electric power	58.8	14.1%
Commercial and residential	43.8	10.5%
Agriculture	31.8	7.6%
High global-warming potential substances	20.6	4.9%
Recycling and waste	8.9	2.1%
Total	**418.2**	**100%**

Source: CARB 2021a.
Notes: GHG = greenhouse gas; MMT CO_2e = million metric tons of carbon dioxide equivalent; GWP = global warming potential.
Emissions reflect 2018 California GHG inventory.
[a] Percent of total has been rounded, and total does not sum due to rounding.

Between 2000 and 2019, per-capita GHG emissions in California have dropped from a peak of 14.0 MT per person in 2001 to 10.5 MT per person in 2019, representing an approximate 25% decrease. In addition, total GHG emissions in 2019 were approximately 7 MMT CO2e lower than 2018 emissions (CARB 2021a).

Local Inventory

The County of Santa Cruz developed GHG emissions inventories from government operations and from community activities in unincorporated areas of the county, originally prepared for 2005 and updated for 2009, the latest year in which a complete dataset for the county is available. The County emissions inventory is summarized in Table 4.8-3.

As shown in Table 4.8-3, overall county GHG emissions decreased from 2005 to 2009. In 2005, total GHG emissions for government operations were 38,901 MT CO_2e, falling 12% to 34,267 MT CO_2e in 2009. Government operations include solid waste facilities, employee commute, buildings and facilities, vehicle fleet, wastewater treatment facilities, public lighting, and water delivery. Solid waste facilities contribute the largest amount of GHG emissions, followed by employee commute and buildings and facilities, and vehicle fleet. In 2005, total GHG emissions for community activities were 1,907,037 MT CO_2e, falling 59% to 791,278 MT CO_2e in 2009. This dramatic reduction reflects the closure of the Davenport Cement Plant

(CEMEX), which accounted for about half the GHG emissions generated in the county in 2005. Community activities include the sectors of transportation, residential, commercial and industrial, and solid waste. The transportation sector contributed 61% of community emissions in 2009, with the residential sector contributing the second largest amount of GHG emissions (County of Santa Cruz 2013).

Table 4.8-3. Greenhouse Gas Emissions Sources in Santa Cruz County

Source Category	2005		2009		Percent Change, 2005-2009
	Emissions (MT CO_2e)	Percent of Total	Emissions (MT CO_2e)	Percent of Total	
Government Operations Emissions					
Solid Waste Facilities	20,261	52%	18,335	54%	−10%
Employee Commute	6,928	18%	5,370	16%	−22 %[a]
Buildings and Facilities	5,525	14%	5,847	17%	6%
Vehicle Fleet	5,253	14%	3,673	11%	−30%
Wastewater Treatment Facilities	848	2%	941	3%	11%
Public Lighting	62	0.2%	69	0.2%	11%
Water Delivery	24	0.1%	32	0.1%	33%
Total Government Operations Emissions	**38,901**	—	**34,267**	—	**−12%**
Community Emissions					
Transportation (VMT)	555,458	29%	481,787	61%	−13%
Residential	173,336	9%	189,658	24%	9%
Commercial and Industrial	1,158,119	61%	101,588	13%	−91%[b]
Solid Waste	20,124	1%	18,245	2%	−9%
Total Community Emissions	**1,907,037**	—	**791,278**	—	**−59%**

Source: County of Santa Cruz 2013.
Notes: MT CO_2e = metric tons of carbon dioxide equivalent; VMT = vehicle miles traveled.
[a] Emissions reduction is attributable to a reduction in the number of employees between 2005 and 2009.
[b] Emissions reduction reflects the cessation of manufacturing at the Davenport Cement Plant (CEMEX).

Forestry and agriculture also contribute to the county's net GHG emissions. California's forests remove approximately 5 MMT CO_2e from the atmosphere annually. This sequestration, or "carbon sink" is a valuable ecosystem service provided by forests; the 143,000 acres of redwood and redwood-Douglas fir forests and 19,900 acres of oak woodland in the county contribute to this service. Forest lands in the county currently store around 56 MMT CO_2e. The county ranks in the top third of California counties for agricultural production, and the agricultural sector (not including timberland) occupies 8.5% of the county's land area, or 24,324 acres. Rough estimates of emissions from agricultural fuel and fertilizer use were 20,456 MT CO_2e in 2005, falling 21% to 16,791 MT CO_2e in 2009. Agricultural emissions account for at most 2% of county CO_2e emissions (County of Santa Cruz 2013).

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 IPCC 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, rising sea levels, and ocean acidification (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, infrastructure, 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 (1.6°F) (likely between 0.75°C [1.4°F] and 0.99°C [1.8°F]) 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 (OEHHA) 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 followed an increasing trend overall.

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, the Fourth Assessment (2018) includes reports for nine regions of the state. Key projected climate changes for the Central Coast Region (which includes Santa Cruz County) include the following (CNRA 2018a):

- Maximum and minimum temperatures for the Central Coast will continue to increase through the next century, with greater increases in the inland region relative to the coast. Precipitation is expected to increase slightly, but precipitation variability will increase substantially.
- The future of fog is uncertain because system feedbacks and their response to climate change are not well characterized. Fog can be intercepted by coastal zone flora (which obtain up to one-third of their moisture from fog) and can also prevent low stream flows, which can keep salmonids from desiccating during dry periods.
- Periodic El Niño events dominate coastal hazards across the Central Coast while atmospheric rivers, expected to increase, are the dominant drivers of locally extreme rainfall events.
- Recently observed and projected acceleration in sea-level rise poses a significant threat to the regions' coastal communities. Future flooding is also a serious concern.
- Estuarine systems will be affected by accelerated sea-level rise, warming of water and air, ocean acidification, and changes in runoff. Some Central Coast marshes may drown or become shallow mudflats, leading to a loss of the ecosystem services that marshes provide, including carbon sequestration.
- Many beaches will narrow considerably. As many as two-thirds will be completely lost over the next century, along with the ecosystems supported by those beaches. The landward erosion of beaches will be driven by accelerating sea-level rise combined with a lack of ample sediment, effectively drowning the beaches between the rising ocean and the backing cliffs and/or urban hardscape.
- Projected future droughts are likely to be a serious challenge to the region's already stressed water supplies.
- Water supply shortages, already common during drought, will be exacerbated. Higher temperatures may result in increases in water demand for agriculture and landscaping. Reduced surface water will lead to increases in groundwater extractions that may result in increased saltwater intrusion. Lower surface flows will lead to higher pollutant concentrations and will impact aquatic species.

- Frequent and sometimes large wildfires will continue to be a major disturbance and post-fire recovery time may be lengthened.
- Central Coast native plants are a large part of the world's floristic provinces. Plant species' responses to climate change will in general depend on the climate in which a population evolved and its own unique climate tolerances. Coastal shrubland resilience depends on climate effects to physiological responses that are modified by biotic interactions and the extent of anthropogenic land use. Grasslands closer to the coast will be less affected than interior grasslands where warming is already documented.
- Climate change outcomes for forests will depend largely on multiple abiotic drivers (increased air temperatures, altered fog patterns, changes in winter precipitation), and biotic factors (invasive species and insect and pest outbreaks).
- Terrestrial wildlife is already experiencing local extinctions. Species may have robust climate refugia in the region's mountains characterized by cooler temperatures and higher levels of precipitation.
- The aquatic life of streams and rivers is threatened by projected extreme swings from drought to floods, and exacerbated by fire and erosion that buries habitat in sediments. Climate impacts can threaten the survival of already endangered steelhead and coho salmon, and further reduce the diversity and abundance of sensitive aquatic insects.
- Impacts to the region's public health include increases in heat-related illnesses for agricultural workers, harmful particulate matter from wildfires, and an increase in ground-level O_3. Infectious/vector-borne diseases such as Valley Fever and Pacific Coast tick fever are expected to increase, and an increase in harmful algal blooms will have detrimental effects on animals and people exposed to toxins released from the algae.
- Residential electricity demand is likely to be affected by more frequent heat waves due to increases in cooling requirements, and warming temperatures are likely to affect electricity supply from gas-fired plants.
- Agricultural production is highly sensitive to climate change, including amounts, forms, and distribution of precipitation, changes in temperatures, and increased frequency and intensity of climate extremes.

4.8.2 Regulatory Framework

4.8.2.1 Federal Regulations

Energy Independence and Security Act

The Energy Independence and Security Act of 2007 (Public Law 110-140), 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 in 2022.

- Set a target of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020, and directs 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 *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—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations. This is the "endangerment finding."
- The administrator further found that the combined emissions of GHGs—CO_2, CH_4, N_2O, 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 (42 U.S.C. § 7401).

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 per mile of CO_2 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 CO_2 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 CO_2 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 (EPA and NHTSA 2016).

On April 2, 2018, the EPA, under administrator Scott Pruitt, reconsidered the final determination for light-duty vehicles and withdrew its previous 2017 determination, stating that the current standards may be too stringent and therefore should be revised as appropriate (EPA 2019).

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 then in place, the 2018 proposal would increase U.S. fuel consumption by about half a million barrels per day (2% to 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 Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program (84 Fed. Reg. 51310), 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 went into effect 60 days after being published in the Federal Register. The Part Two Rule sets CO_2 emissions standards and corporate average fuel economy standards for passenger vehicles and light-duty trucks for model years 2021 through 2026. On January 20, 2021, President Joe Biden issued an EO on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, which includes review of Part One Rule by April 2021 and review of the Part Two Rule by July 2021 (The White House 2021).

4.8.2.2 State Regulations

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.

Assembly Bill 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 at 1990 levels by 2020, and initiate the transformations required to achieve the state's long-range climate objectives.

Senate Bill 32 and Assembly Bill 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, in order 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.

Executive Order 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.

Executive Order 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 CO_2e. The EO also called for state agencies to continue to develop and implement GHG emission-reduction programs in support of the reduction targets.

Executive Order 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.

California Air Resources Board'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.

In 2014, CARB approved the first update to the Scoping Plan. The *First Update to the Climate Change Scoping Plan: Building on the Framework* (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 was 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.

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%. 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.

California Air Resources Board's Regulation for the Mandatory Reporting of Greenhouse Gas Emissions

CARB's Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (Cal. Code Regs. tit. 17, § 95100–95157) incorporated by reference certain requirements that EPA promulgated in its Final Rule on Mandatory Reporting of Greenhouse Gases (40 Code of Federal Regulations section 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.

Executive Order 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.

Senate Bill 605 and Senate Bill 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 (Cal. Pub. Resources Code, § 42652-43654). SB 1383 also establishes specific targets for the reduction of SLCPs (40% below 2013 levels by 2030 for CH_4 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).

Building Energy

California Code of Regulations, Title 24, Part 6

The California Building Standards Code was established in 1978 and serves to enhance and regulate California's building standards. 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 (Cal. Pub. Resources Code, § 25402(b)(1)). The regulations receive input from members of industry, as well as the public, in order to "reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy" (Cal. Pub. Resources Code, § 25402). These regulations are carefully scrutinized and analyzed for technological and economic feasibility (Cal. Pub. Resources Code, § 25402(d)) and cost effectiveness (Cal. Pub. Resources Code, § 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.

California Code of Regulations, 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. For nonresidential projects, some of the key mandatory CALGreen 2019 standards involve requirements related to bicycle parking, designated parking for clean air

vehicles, electric vehicle (EV) charging stations, shade trees, water conserving plumbing fixtures and fittings, outdoor potable water use in landscaped areas, recycled water supply systems, construction waste management, excavated soil and land clearing debris, and commissioning (Cal. Code Regs. tit. 24, Part 11).

California Code of Regulations, 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 (Cal. Code Regs. tit. 20, § 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; dishwaters; 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.

Senate Bill 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, § 25780-25784 et seq.). 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."

Assembly Bill 1470 (Solar Water Heating)

This bill established the Solar Water Heating and Efficiency Act of 2007 (California Public Utilities Code sections 2851-2869 et seq.). 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.

Assembly Bill 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 (Cal. Pub. Resources Code, § 25402.5.4).

Renewable Energy and Energy Procurement

Senate Bill 1078

SB 1078 (2002) (California Public Utilities Code section 399.11 et seq.) established the Renewables Portfolio Standard (RPS) 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 EO S-21-09).

Senate Bill 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 et seq.). These standards must be consistent with the standards adopted by the California Public Utilities Commission (CPUC).

Executive Order 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.

Executive Order S-21-09 and Senate Bill X1-2

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 CPUC and CEC to ensure that the regulation builds upon the RPS 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 RPS 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.

Senate Bill 350

SB 350 (2015) further expanded the RPS 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 CPUC, in consultation with the CEC, to establish efficiency targets for electrical and gas corporations consistent with this goal.

Senate Bill 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 (Assembly Bill 1493 and Executive Order B-16-12)

AB 1493 (July 2002) was enacted in a response to the transportation sector accounting for more than half of California's CO_2 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, CPUC, 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, this analysis continues to utilize the best available information at this time, as set forth in CalEEMod.

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 (Cal. Code Regs. tit. 13, § 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 will require 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 (Cal. Code Regs. tit. 13, § 2485).

Executive Order 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 (Cal. Code Regs. tit. 17, § 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.

Senate Bill 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 (MPOs) to prepare a Sustainable Communities Strategy (SCS) as part of their Regional Transportation Plan that will achieve the GHG-reduction targets set by CARB. If an MPO is unable to devise an SCS to achieve the GHG-reduction target, the MPO 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 SCS 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. See Section 4.11.1.2 for information about the implementation of SB 375 in the Monterey Bay Area.

Advanced Clean Cars Program and Zero-Emissions Vehicle Program

The Advanced Clean Cars (ACC) I program (January 2012) is an 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 of regulations: the Low-Emission Vehicle (LEV) regulation for criteria air pollutant and GHG emissions and a technology forcing regulation for zero-emission vehicles (ZEV) that contributes to both types of emission reductions (CARB 2021b). The package includes elements to reduce smog-forming pollution, reduce GHG emissions, promote clean cars, and provide the fuels for clean cars. 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 in 2015. The ZEV program will act as the focused technology of the ACC I program by requiring manufacturers to produce increasing numbers of ZEVs and plug-in hybrid EVs in the 2018 to 2025 model years.

The ACC II program is currently in development to establish the next set of LEV and ZEV requirements for model years after 2025 to contribute to meeting federal ambient air quality ozone standards and California's carbon neutrality standards (CARB 2021b). The main objectives of ACC II are:

1. Maximize criteria and GHG emission reductions through increased stringency and real-world reductions.

2. Accelerate the transition to ZEVs through both increased stringency of requirements and associated actions to support wide-scale adoption and use.

An ACC II rulemaking package, which will consider technological feasibility, environmental impacts, equity, economic impacts, and consumer impacts, is anticipated to be presented to CARB for consideration in June 2022. 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 ZEV mandates in California. Since 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 SAFE Rule, the ACC II rulemaking's course may vary depending on the results of this ongoing litigation.

Executive Order N-79-20

EO N-79-20 (September 2020) requires CARB to develop regulations as follows: (1) Passenger vehicle and truck regulations requiring increasing volumes of new ZEVs sold in the State towards the target of 100% of in-state sales by 2035; (2) medium- and heavy-duty vehicle regulations requiring increasing volumes of new zero-emission trucks and buses sold and operated in the State towards the target of 100% of the fleet transitioning to zero-emission vehicles by 2045 everywhere feasible and for all drayage trucks to be zero emission by 2035; and (3) strategies, in coordination with other State agencies, the EPA and local air districts, to achieve 100% zero-emission from off-road vehicles and equipment operations in the State by 2035. EO N-79-20 called for the development of a Zero-Emissions Vehicle Market Development Strategy, which was released February 2021, to be updated every 3 years, that ensures coordination and implementation of the EO and outlines actions to support new and used ZEV

markets. In addition, the EO specifies identification of near-term actions, and investment strategies, to improve clean transportation, sustainable freight, and transit options; and calls for development of strategies, recommendations, and actions by July 15, 2021, to manage and expedite the responsible closure and remediation of former oil extraction sites as the State transitions to a carbon-neutral economy.

Advanced Clean Trucks Regulation

The Advanced Clean Trucks (ACT) Regulation was also approved by CARB in 2020. The purpose of the ACT Regulation is to accelerate the market for zero-emission vehicles in the medium- and heavy-duty truck sector and to reduce air pollutant emissions generated from on-road mobile sources (CARB 2021c). The regulation has two components including (1) a manufacturer sales requirement and (2) a reporting requirement:

1. Zero-emission truck sales: Manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines will be required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales would need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales.

2. Company and fleet reporting: Large employers including retailers, manufacturers, brokers and others will be required to report information about shipments and shuttle services. Fleet owners, with 50 or more trucks, will be required to report about their existing fleet operations. This information will help identify future strategies to ensure that fleets purchase available zero-emission trucks and place them in service where suitable to meet their needs.

Water

Senate Bill X7-7

SB X7-7, or the Water Conservation Act of 2009, required 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 was required to develop water use targets to meet this goal.

Executive Order 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 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.

Executive Order N-10-21

In response to a state of emergency due to severe drought conditions, EO N-10-21 (July 2021) called on all Californians to voluntarily reduce their water use by 15% from their 2020 levels. Actions suggested in EO N-10-21 include reducing landscape irrigation, running dishwashers and washing machines only when full, finding and fixing leaks, installing water-efficient showerheads, taking shorter showers, using a shut-off nozzle on hoses, and taking cars to commercial car washes that use recycled water.

Solid Waste

Assembly Bill 939, Assembly Bill 341, and Assembly Bill 1826

In 1989, AB 939, known as the Integrated Waste Management Act (Cal. Pub. Resources Code, § 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 (replaced in 2010 by the California Department of Resources Recycling and Recovery, or CalRecycle), 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 the year 2000.

AB 341 (2011) 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 the year 2020, and annually thereafter. In addition, AB 341 required CalRecycle to develop strategies to achieve the state's policy goal. CalRecycle has conducted multiple workshops and published documents that identify priority strategies that it believes would assist the state in reaching the 75% goal by 2020.

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 multi-family 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

Senate Bill 97

SB 97 (2007) directed the Governor's Office of Planning and Research (OPR) and the CNRA to develop guidelines under CEQA for the mitigation of GHG emissions. In 2008, the OPR 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 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 (Cal. Code Regs. tit. 14, § 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 (Cal. Code Regs. tit. 14, § 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 (Cal. Code Regs. tit. 14, § 15126.4[c]). 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 acknowledged that a lead agency could 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, CEQA Guidelines section 15064.4(a), as subsequently amended in 2018, states that lead agencies "shall 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 now note that an agency "shall have discretion to determine, in the context of a particular project, whether to: (1) [q]uantify greenhouse gas emissions resulting from a project; and/or (2) [r]ely on a qualitative analysis or performance based standards" (Cal. Code Regs. tit. 14, § 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 (Cal. Code Regs. tit. 14, § 15064.4[b]).

Executive Order 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).

4.8.2.3 Regional Regulations

Association of Monterey Bay Area Governments

The Association of Monterey Bay Area Governments (AMBAG) is the designated MPO for the Monterey Bay region. The AMBAG region includes Monterey, San Benito, and Santa Cruz counties. As of 2009, many of the cities and counties in the AMBAG jurisdiction had not quantified their baseline GHG inventories, due to lack of staff and funding. The AMBAG Energy Watch designed a program to assist member jurisdictions in a variety of climate action planning support services. Additionally, in 2008, AMBAG adopted the *Monterey Bay Regional Energy Plan* (Regional Energy Plan) (AMBAG 2008). The Regional Energy Plan provides a framework that local cities and counties can adopt or use as guidelines to reduce energy use.

Additionally, CARB set SB 375 GHG-reduction targets for the Monterey Bay Area at 0% increase from 2005 per capita emissions by 2020, and 5% below 2005 per capita emissions by 2035. In June 2014, AMBAG adopted the *Moving Forward 2035 Monterey Bay – Metropolitan Transportation Plan/Sustainable Communities Strategy* (2035 MTP/SCS) (AMBAG 2014). The 2035 MTP/SCS demonstrated that, if implemented, the region would achieve over a 3%-per-capita GHG reduction in passenger vehicle emissions by 2020, and an approximately 6% reduction in 2035. These reductions meet the GHG targets for AMBAG, as discussed above.

In June 2018, AMBAG adopted an update to the 2035 MTP/SCS, *Moving Forward Monterey Bay 2040* (2040 MTP/SCS), the implementation of which was anticipated to achieve a 4%-per-capita reduction in GHG emissions from passenger vehicles by 2020, as well as a projected reduction in GHG emissions of nearly 7%-per-capita from passenger vehicles by 2035 (AMBAG 2018). The 2040 MTP/SCS outlines the region's proposed transportation network, emphasizing multimodal system enhancements, system preservation, and improved access to high quality transit, as well as land use development that complements this transportation network (AMBAG 2018).

Monterey Bay Air Resources District

California has 35 Air Pollution Control Districts and Air Quality Management Districts, many of which are currently addressing climate change issues by developing significance thresholds, performance standards, and mitigation measures. The Monterey Bay Air Resources District (MBARD) is the regional agency responsible for the regulation and enforcement of federal, state, and local air pollution control regulations in the North Central Coast Air Basin (NCCAB), where the proposed project is located. In February 2016, the MBARD adopted the staff-recommended significance threshold of 10,000 MT of CO_2e for stationary source projects (MBARD 2016).

4.8.2.4 Local Regulations

County of Santa Cruz Climate Action Strategy

On February 26, 2013 the Board of Supervisors approved a Climate Action Strategy for the County of Santa Cruz (County of Santa Cruz 2013). The first portion of this Climate Action Strategy (CAS) reports the results of the GHG emissions inventory for Santa Cruz County, proposes targets for GHG reduction, and outlines strategies and implementing actions to achieve the targets. GHG reduction strategies are proposed for the three sectors with the highest emissions: transportation, energy, and solid waste. A plan for monitoring the implementation of emissions reduction is introduced, which includes identifying the group with responsibility for implementation, periodic reporting, and a recommendation for updating the GHG emissions inventories every 5 years. The second portion focuses on a vulnerability assessment and strategies for adapting to the types of impacts that are likely to occur in Santa Cruz County. The vulnerability assessment was prepared to identify the conditions that may occur in Santa Cruz County as a result of the various components of climate change (increasing temperature, rising sea level, and shifts in the precipitation regime) and the locations, infrastructure, and economic sectors that are particularly vulnerable to negative impacts. The assessment identifies the coastal areas that are most susceptible to increased flooding, storm surge, beach and coastal bluff erosion from winter storms. Eight climate adaptation goals were articulated as a guide for the development of more specific adaptation strategies that would further reduce vulnerability to climate change:

- Protect the unique character, scenic beauty and culture in the natural and built environment from being compromised by climate change impacts.
- Support initiatives, legislation, and actions to respond to climate change.
- Encourage and support actions that reduce risks and vulnerabilities now, while recognizing the importance of identifying, making decisions about, and preparing for impacts and risks that may develop in the future.
- Support the reduction of risks from other environmental hazards, noting the strong interrelationships and benefits between reducing risk from climate change, nonclimate change related disasters, and most other environmental hazards.
- Build resilience into all programs, policies and infrastructure.
- Encourage climate change resilience planning and actions in private companies, institutions, and systems essential to a functioning County of Santa Cruz.
- Encourage community involvement and public-private partnerships to respond to potential climate impacts, particularly for those most vulnerable.
- Ensure that the County of Santa Cruz remains a safe, healthy and attractive place with a high quality of life for its residents, businesses and visitors.

The success of this Climate Adaptation Strategy will be measured by the degree to which the goals are accomplished that yield actual risk reduction.

4.8.3 Impacts and Mitigation Measures

4.8.3.1 Thresholds of Significance

The thresholds of significance used to evaluate the impacts of the proposed project related to GHG emissions are based on Appendix G of the CEQA Guidelines and, if applicable, other agency standards, as listed below. A significant impact would occur if the project would:

GHG-1 Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

GHG-2 Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The State CEQA Guidelines do not prescribe specific methodologies for performing a GHG emissions assessment, establish specific thresholds of significance, or mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance that are consistent with the manner in which other impact areas are handled in CEQA. 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 in the NCCAB would be considered a cumulatively considerable contribution to global climate change, except the MBARD has an adopted guideline for stationary source projects in which a project would not have not a significant GHG emissions impact if the project emits less than 10,000 metric tons of CO_2e per year or complies with regulations or requirements adopted to implement a statewide, regional or local plan for the reduction or mitigation of GHG emissions (MBARD 2016).

4.8.3.2 Analytical Methods

Potential Growth Assumptions

Adoption and implementation of the proposed Sustainability Update would not directly result in impacts related to GHG emissions. However, the proposed General Plan/LCP amendments include policies that could indirectly lead to future development with potential resulting impacts related to GHGs. Amendments to the General Plan/LCP include policies that support new development, redevelopment, and potential intensified development, primarily within the Urban Services Line (USL). Amendments to the Santa Cruz County Code (SCCC) include changes to permitted/allowed uses in some zone districts. The County Design Guidelines component of the proposed project does not include guidelines related to GHGs. Amendments to General Plan land use designations and/or zone districts are proposed for 23 specified parcels as summarized in Chapter 3, Project Description.

As described in the Section 4.0, Introduction to Analyses, this Environmental Impact Report (EIR) estimates of the potential to accommodate approximately 4,500 housing units over existing conditions as shown on Table 4.0-2, with approximately 75% projected to occur within urban areas. This EIR also

estimates the potential to accommodate approximately 6,210,000 square feet of non-residential uses as shown on Table 4.0-3, with approximately 60% expected to occur within urban areas. These forecasts provide an estimate of potential growth that could occur as a result of adoption and implementation of the proposed Sustainability Update for the purpose of evaluation in this EIR. This estimate of growth may or may not occur, and this estimate does not establish a limit to development. Annual limits for residential units are set annually by the County pursuant to Measure J and SCCC provisions as explained in Section 4.13 of this EIR, Population and Housing. Additionally, some of this projected development and growth would occur under the existing General Plan/LCP without the proposed project.

GHG Emissions Modeling

This analysis used CalEEMod Version 2020.4.0, which is currently recommended by MBARD. CalEEMod is a statewide computer model developed in cooperation with air districts throughout the state to quantify criteria air pollutant and GHG emissions associated with the construction and operational activities from a variety of land use projects, such as residential, commercial, and industrial facilities. CalEEMod was used to estimate potential criterial pollutant emissions with projected buildout resulting from the proposed plan amendments under the Project (2040) scenario. No specific development projects are proposed, and no project-site specific development applications have been submitted to the County. Construction emissions cannot be determined in the absence of specific development projects with identified construction schedules and equipment. Emissions from the operational phase of future development supported by the Project (2040) scenario, as well as from the Existing (2019) scenario, were estimated using CalEEMod default emission factor values for mobile, area, and energy sources. In addition, project-specific trip generation and vehicle-miles traveled rates identified in this for the Project (2040) and Existing (2019) scenarios were incorporated into CalEEMod. Model outputs and assumptions are included in Appendix I. Notably, the GHG emissions estimation included herein represents a different methodology than the methodology used to develop the GHG inventories in the County Climate Action Strategy as summarized in Table 4.8-3 above.

EIR Notice of Preparation Comments

Public and agency comments were received during the public scoping period in response to the Notice of Preparation (NOP), which is included in Appendix A. A summary of the comments received during the scoping period for EIR, as well as written comments received, are included in Appendix B. Comments related to GHG emissions included the following:

- The EIR should establish County thresholds of significance for GHG emissions that can be used for analysis of future development projects.
- A commenter asked about requirements for new construction to include solar power and achieve zero carbon emissions.
- Questions about what new standards or incentives could be incorporated into building requirements to ensure that new developments use solar panels and exceed energy efficiency and GHG reduction standards.

To the extent that issues identified in public comments involve potentially significant effects on the environment according to CEQA and/or are raised by responsible agencies, they are identified and addressed within this EIR.

4.8.3.3 Project Impact Analysis

Impact GHG-1: Greenhouse Gas Emissions (Significance Threshold GHG-1). Adoption and implementation of the proposed Sustainability Update would not generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. ***(Less than Significant).***

The proposed project would not directly result in new development, but could indirectly lead to future development and redevelopment throughout the county, primarily in urban areas within the County's USL. Future development accommodated by the project could result in generation of GHG emissions from off-road equipment and vehicle emissions during construction. However, the scale and timing of construction of new development or redevelopment is unknown, and construction activities would be variable throughout the overall construction period. Since construction activities and associated GHG emissions are speculative, only operational emissions have been quantified and are detailed herein.

Future development and growth accommodated by the Project (2040) scenario, as well as baseline conditions under the Existing (2019) scenario, would result in GHG emissions from vehicular traffic, area sources (hearths and landscaping maintenance), electrical generation, natural gas consumption, water supply and wastewater treatment, and solid waste. No stationary source emissions (such as emergency generators) are anticipated at this time for future land uses accommodated by the project. The CalEEMod model was utilized to estimate operational emissions for the Project (2040) and Existing (2019) scenarios. CalEEMod defaults were incorporated into the emissions modeling for all sources except for on-road vehicles, which were adjusted with an average trip length to match the VMT for the Project (2040) and Existing (2019) scenarios. Table 4.8-4 summarizes the results of the emissions modeling.

As shown in Table 4.8-4, overall GHG emissions generated by the Project (2040) scenario would be approximately 195,109 MT CO_2e per year less than the Existing (2019) scenario. This reduction is due to cleaner on-road mobile sources in the future. Notably, there would be additional GHG reductions that were not accounted for in this assessment, including greater future RPS for utility electricity generation (per SB 100) and increased energy efficiency requirements for buildings in future years (per California Code of Regulations Title 24 Parts 6 and 11). The electricity demand calculation for the Project (2040) and Existing (2019) assumes compliance with the Title 24 standards for 2019, which is conservative since Project (2040) land uses will be required to comply with the then-current (i.e., higher efficiency) standards and many Existing (2019) land uses were constructed according to previous (i.e., less efficient) standards. As such, the proposed project's increase in electricity consumption would be lower than what is shown in Table 4.8-4.

Table 4.8-4. Estimated Operational Greenhouse Gas Emissions

Emission Source	CO_2	CH_4	N_2O	CO_2e
	metric tons per year			
Project (2040) Scenario				
Area	32,955.90	32.59	1.49	34,213.97
Energy[1]	183,070.46	13.95	3.45	184,447.31
Mobile	449,899.91	34.72	21.93	457,303.13
Waste	18,036.76	1,065.94	0.00	44,685.30
Water	10,396.90	339.37	8.13	21,302.64
Total	**694,359.92**	**1,486.58**	**34.99**	**741,952.35**
Existing (2019) Scenario				
Area	29,018.28	28.72	1.31	30,126.13
Energy[1]	159,454.53	12.19	3.01	160,654.80
Mobile	673,696.00	77.56	44.37	688,856.22
Waste	15,778.06	932.46	0.00	39,089.47
Water	8,970.34	291.39	6.98	18,334.37
Total	**886,917.20**	**1,342.32**	**55.66**	**937,060.98**
Net Change in Emissions				
Net Change (Project – Existing)	**(192,557.28)**	**144.26**	**(20.66)**	**(195,108.63)**

Notes: CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent.
See Appendix I for complete results.
Values in (parentheses) represent a net reduction in emissions.
[1] The GHGs associated with "Energy" are based on the default GHG intensity factors for PG&E included in CalEEMod and do not account for current or future renewables supplied by 3CE or greater renewable requirements established by the state, such as SB 100.

In addition, as identified in Table 4.8-5 on the next page, the Sustainability Update includes several amended policies in the County's General Plan/LCP that seek to increase energy efficiency and reduce VMT and GHG emissions, such as through the support of zero-emission vehicles and charging infrastructure and alternative transportation options. Based on the preceding considerations, the proposed project 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*.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

Table 4.8-5. Proposed and Retained General Plan/LCP Policies that Avoid/Minimize Greenhouse Gas Emission Impacts

Potential Impact	Policies and Implementation Strategies
Generate greenhouse gas emissions, either directly or indirectly	• Encourage building designs to conserve energy (BE-4.1.3) • Establish standards for landscaping associated with new construction and major renovation projects with consideration for water conservation. (BE-4.1.5) • Encourage development projects to conserve water with efficient fixtures indoors and sustainable site elements outdoors, such as drought-tolerant plants, rainwater catchment systems, graywater irrigation systems. (BE-4.2.6) • Development should enable passive solar heating and lighting through building location, orientation and massing wherever practicable. Passive solar should be a priority for energy conservation in building design. Further energy conservation should be achieved with energy-efficient building envelopes, lighting, heating, cooling, and ventilation systems, and renewable energy design components. (BE-4.2.7) • Reduce the volume of construction waste going to landfills through promoting retention and re-use of existing structures, efficient design and construction techniques, use of recycled-content materials, and structure deconstruction instead of demolition.(BE-4.2.9) • Encourage energy-efficient and resource protective agricultural practices. (ARC-1.5.1) • Encourage use of alternative energy sources to maximize energy efficiency. (ARC-2.1.5) • Encourage open ventilation in greenhouses and fans that maximize energy efficiency. (ARC-2.1.6) • Support electric and clean air vehicles. (AM-1.1.8) • Work with regional and local organization to fund and site new EV charging infrastructure at public facilities, parking lots and new development. (AM-1.1.1g) • Allow reduction of standard trip generation rates where demonstrated that transportation demand management (TDM) and other measures/considerations will reduce trips. (AM-6.2.3) • Require new recreation and visitor-serving development to support alternative transportation, including provision of shuttles, promotion of bicycling and walking to nearby attractions, construction of bus turnouts, bus shelters, and parking spaces for bus and shuttle service. (AM-1.2.1) • Connect neighborhoods by accommodating 15-minute walk or bike ride between residential areas and destinations. (AM-1.1.5) • Require new development to prioritize bike and ped connections to activity centers. (AM-1.1.4) • Encourage and allow developers to provide multimodal improvements that shift travelers from vehicles to alternative modes to improve level of service and reduce VMT. (AM-6.2.2)

Table 4.8-5. Proposed and Retained General Plan/LCP Policies that Avoid/Minimize Greenhouse Gas Emission Impacts

Potential Impact	Policies and Implementation Strategies
	• Implement Climate Action Strategy recommendations and TDM practices to reduce GHG emissions from County vehicle fleet and employee travel. (AM-1.1.10) • Support and implement local actions and County, state and federal plans and legislation promoting the reduced emission of carbon dioxide and other GHG gases, and actions to achieve reduction goals and standards. (Public SafetyPolicy 6.8.90)[a]

Notes: * In September 2020, the County Board of Supervisors adopted revisions to the General Plan Public Safety Element. The revisions (all except sections related to coastal bluffs and beaches) were approved by the California Coastal Commission in February 2022 subject to County acceptance of modifications.

Impact GHG-2: Conflict with Applicable Greenhouse Gas Reduction Plan (Significance Threshold GHG-2). Adoption and implementation of the proposed Sustainability Update would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases. ***(Less than Significant).***

While there are no mandatory GHG plans, policies, or regulations or finalized agency guidelines that would apply to implementation of the proposed project, an analysis of the potential for the proposed project to conflict with relevant plans that include GHG reduction strategies is provided below.

County of Santa Cruz Climate Action Strategy

The County of Santa Cruz CAS established GHG reduction targets for 2020 and 2050 in alignment with the statewide targets, as well as an interim target for the year 2035. These reduction targets are 18% by 2020, 38% by 2035, and 80% by 2050, each relative to the 2009 GHG inventory included in the CAS (County of Santa Cruz 2013). In order to achieve these reduction targets, the CAS identifies strategies for energy, transportation, and the solid waste sectors. The proposed project's consistency with these strategies is outlined in Table 4.8-6.

Table 4.8-6. Consistency with the County Climate Action Strategy

CAS Strategy	Proposed Project Consistency
Strategies for the Reduction of GHGs from Energy Use	
E-1: Develop a Community Choice Aggregation (CCA) Program, if feasible.	**No conflict.** The Central Coast Community Energy (previously Monterey Bay Community Power) was formed in March 2017.
E-2: Increase energy efficiency in new and existing buildings and facilities.	**No conflict.** Any future development accommodated by the proposed project would be required to comply with all applicable energy efficiency requirements, including Title 24 Parts 6 and 11. In addition, the County's General Plan/LCP includes multiple policies that pertain to increased energy efficiency for buildings

Table 4.8-6. Consistency with the County Climate Action Strategy

CAS Strategy	Proposed Project Consistency
Strategies for the Reduction of GHGs from Energy Use	
	and facilities (Policy BE-4.1.3, BE-4.2.7, ARC-1.5.1, ARC-2.1.5, and ARC-2.1.6)
E-3: Enhance and expand the Green Business Program.	**No conflict.** The proposed project would not inhibit the Department of Public Works from enhancing and expanding the Green Business Program.
E-4: Increase local renewable energy generation.	**No conflict.** The proposed project would not inhibit the County from increasing local renewable energy generation, such as reviewing and revising ordinances for opportunities to support renewable energy projects. Further, the County's General Plan/LCP Policies BE-4.2.7 and ARC-2.1.5 encourage renewable and alternative energy sources.
E-5: Public education about climate change and impacts of individual actions.	**No conflict.** The proposed project would not inhibit the County from increasing public education about climate change.
E-6: Continue to improve the Green Building Program by exceeding the minimum standards of the state green building code (CALGreen).	**No conflict.** The proposed project would not inhibit the County from improving the Green Building Program.
E-7: Form partnerships and cooperative agreements among local governments, educational institutions, non-governmental organizations, and private businesses as a cost-effective way to facilitate mitigation and adaptation.	**No conflict.** The proposed project would not inhibit the County from establishing partnerships and cooperative agreements to facilitate mitigation and adaptation.
E-8: Reduce energy use for water supply through water conservation strategies.	**No conflict.** The proposed project would not preclude the County from developing and implementing water conservation strategies and ordinances.
Strategies for the Reduction of GHGs from Transportation	
T-1: Reduce vehicle miles traveled (VMT) through County and regional long-range planning efforts.	**No conflict.** The proposed project would support VMT reduction strategies and alternative transportation with the County General Plan/LCP Policies AM-1.1.8, AM-1.1.1g, AM-6.2.3, AM-1.2.1, AM-1.1.5, AM-1.1.4, AM-6.2.2, and AM-1.1.10.
T-2: Increase bicycle ridership and walking through incentive programs and investment in bicycle and pedestrian infrastructure and safety programs.	**No conflict.** The proposed project would support bicycle and walking programs with the County General Plan/LCP Policies AM-1.2.1, AM-1.1.5, AM-1.1.4, and AM-6.2.2.
T-3: Provide infrastructure to support zero and low emissions vehicles (plug in, hybrid plug-in vehicles).	**No conflict.** The proposed project would support zero and low emission vehicles with the County General Plan/LCP Policies AM-1.1.8 and AM-1.1.1g.
T-4: Increase employee use of alternative commute modes: bus transit, walking, bicycling, carpooling, etc.	**No conflict.** The proposed project would support employee use of alternative commute modes with the County General Plan/LCP Policies AM-6.2.3, AM-6.2.2, and AM-1.1.10.
T-5: Reduce County fleet emissions.	**No conflict.** The proposed project would support the reduction in County fleet emissions with the County General Plan/LCP Policy AM-1.1.10.

Table 4.8-6. Consistency with the County Climate Action Strategy

CAS Strategy	Proposed Project Consistency
Strategies for the Reduction of GHGs from Energy Use	
Strategies for the Reduction of GHGs from Solid Waste	
W-1: Pursue "waste to energy" capacity at County landfill through acquiring existing capacity and investigating new technology.	**No conflict.** The proposed project would not inhibit the County from pursuing waste to energy capacity at the County landfill.
W-2: Improve existing landfill gas capture system to increase percentage capture of landfill gases.	**No conflict.** The proposed project would not inhibit the County from improving the existing landfill gas capture system.
W-3: Reduce the amount of solid waste, particularly recyclable and compostable materials, in the commercial and residential waste stream.	**No conflict.** The proposed project would not inhibit the County from continuing and expanding waste reduction programs.

Source: County of Santa Cruz 2013.
Notes: GHG = greenhouse gas; LCP = Local Coastal Program; VMT = vehicle-miles traveled.

Based on the analysis in Table 4.8-6, the proposed project would not conflict with the applicable strategies and measures in the County of Santa Cruz CAS.

AMBAG's Metropolitan Transportation Plan/Sustainable Communities Strategy

AMBAG's 2040 MTP/SCS is a regional growth-management strategy that targets per-capita GHG reduction from passenger vehicles and light-duty trucks within the Monterey Bay Area. The 2040 MTP/SCS incorporates local land use projections and circulation networks in city and county general plans. Typically, a project would be consistent with the MTP/SCS if the project does not exceed the underlying growth parameters within the MTP/SCS. The proposed project would not directly result in increased dwelling units or population. However, the proposed Sustainability update includes policies that support intensified development in the county's urban areas. For the purpose of the EIR analyses, the County estimates that approximately 4,500 new dwelling units could be constructed as a result of the proposed project, which would bring the total number of housing units in the unincorporated area of the county to 61,827 units in 2040. As detailed in Section 4.13, Population and Housing, the proposed project could generate approximately 11,385 new residents, which exceeds current AMBAG population forecasts by approximately 2,895 to 6,630 residents. The resulting population increase represents an annual average growth rate of approximately 0.4%, which is slightly higher than the AMBAG forecast annual average rate of 0.2% and an average annual rate of 0.3% based on existing 2020 population. The population projections resulting from the proposed project represent a maximum estimate between 2020 and 2040 for the purposes of analyses included in this EIR. Development within the unincorporated area is subject to annual growth rates and residential building permit limits established by the County of Santa Cruz Board of Supervisors. However, even as a maximum estimate, the average annual growth rate resulting from the proposed project (0.4%) is not substantially higher than forecast rates (0.2%) and the historical average annual growth rates of 0.3% experienced between

2010 and 2020 and 0.4% experienced between 1990 and 2000. Therefore, the proposed project would not induce substantial unplanned population growth in the unincorporated area of Santa Cruz County. Further, the regional population projections prepared by AMBAG are routinely updated to reflect population trends. AMBAG projections are subject to updates every several years at which time projected and actual growth can be compared, and forecasts adjusted if needed to reflect actual population growth trends. Finally, as described in Table 4.8-7, the proposed project would not conflict with the major goals of the 2040 MTP/SCS.

Table 4.8-7. Consistency with AMBAG's 2040 Metropolitan Transportation Plan/Sustainable Communities Strategy Goals

MTP/SCS Goal	Project Consistency
Provide convenient, accessible, and reliable travel options while maximizing productivity for all people and goods in the region.	**No conflict.** The proposed project would not inhibit AMBAG from strengthening the regional transportation network for goods movement.
Raise the region's standard of living by enhancing the performance of the transportation system.	**No conflict.** The proposed project would not inhibit AMBAG from preserving and expanding the existing regional transportation system.
Promote environmental sustainability and protect the natural environment.	**No conflict.** The proposed project would not inhibit AMBAG from promoting sustainability within the Monterey Bay Area region.
Protect the health of our residents; foster efficient development patterns that optimize travel, housing, and employment choices and encourage active transportation.	**No conflict.** The proposed project would not inhibit AMBAG from improving development patterns and encouraging active transportation.
Provide an equitable level of transportation services to all segments of the population.	**No conflict.** The proposed project would not inhibit AMBAG from strengthening the regional transportation network for all segments of the population.
Preserve and ensure a sustainable and safe regional transportation system.	**No conflict.** The proposed project would not inhibit AMBAG from providing a sustainable and safe transportation system.

Source: AMBAG 2018.
Notes: AMBAG = Association of Monterey Bay Area Governments; MTP/SCS = Metropolitan Transportation Plan/Sustainable Communities Strategy.

California Air Resources Board's Scoping Plan

The 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.[5] 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

[5] The Final Statement of Reasons for the amendments to the State 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).

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. Accordingly, the Scoping Plan measures focus on reducing long-term operational GHG emissions rather than short-term construction GHG emissions.

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. Development accommodated by the proposed project would comply with all regulations adopted in furtherance of the Scoping Plan to the extent required by law and to the extent that they are applicable.

As discussed in Section 4.8.2, EO S-3-05 established a goal to reduce statewide GHG emissions to the 1990 level by 2020, and to reduce statewide GHG emissions to 80% below the 1990 level by 2050.[6] SB 32 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, shall ensure that statewide GHG emissions are reduced to at least 40% below 1990 levels by 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).

Although the proposed project's emissions level in 2050 cannot be reliably quantified, statewide efforts are underway to facilitate the state's achievement of that goal, and similar to the comparison of the Project (2040) to Existing (2019) scenarios, it is reasonable to expect the proposed project's net emissions level to decline as the regulatory initiatives identified by CARB are implemented and other technological innovations occur. In addition, the proposed project would support achievement of the SB 32 and EO S-3-05 goals through the project's compliance with the County of Santa Cruz CAS (see Table 4.8-6 for a discussion of the project's consistency with the applicable CAS reduction measures) and consistency with the strategies identified in AMBAG's 2040 MTP/SCS to reduce per capita GHG emissions. For instance, the County's General Plan/LCP includes policies that optimize energy efficiency, encourage compact development patterns, and reduce VMT (see Table 4.8-5 for applicable policies that reduce GHGs). As such, given the reasonably anticipated decline in GHG emissions for the Project (2040) versus the Existing (2019) scenarios, which are conservative based on the models and methodology available at this time, the proposed project is anticipated to be consistent with EO S-3-05's horizon-year goal.

As discussed above, the new Scoping Plan, outlined in SB 32, involves increasing renewable energy use, imposing tighter limits on the carbon content of gasoline and diesel fuel, putting more electric cars on the road, improving energy efficiency, and curbing emissions from key industries. The proposed project's policies advance these goals by encouraging the reduction of VMT and compact urban

[6] In adopting AB 32, the legislature did not adopt the 2050 horizon-year goal from EO No. S-3-05.

development, providing facilities to increase the use of electric vehicles, and improving energy efficiency.

In addition, as described in Section 4.15, Transportation, development accommodated by the proposed project is the type of compact land use development that is encouraged by the 2040 MTP/SCS to reduce VMT, and the project also includes the expansion of multi-modal transportation options in order to achieve the GHG reductions from the land use and transportation sectors. By furthering implementation of SB 375, the project supports regional land use and transportation GHG reductions consistent with state climate targets for 2030 and beyond.

For the reasons described above, although the proposed project's emissions cannot be fully quantified with reasonable assurance, the proposed project's post-2030 emissions trajectory is expected to follow a declining trend, consistent with the 2030 and 2050 targets and EO S-3-05. Because the proposed project would be consistent with the applicable plans and regulations adopted for the purpose of reducing the emissions of GHGs, the proposed project-related GHG impacts would be less than significant.

Mitigation Measures

No mitigation measures are required as a significant impact has not been identified.

4.8.3.4 Cumulative Impact Analysis

This section provides an evaluation of cumulative GHG impacts associated with the proposed project and past, present, and reasonably foreseeable future projects as relevant to this topic. The geographic area for the analysis of cumulative impacts resulting from GHG emissions is the Earth as GHG emissions are a global phenomena.

Cumulative development throughout the NCCAB region and beyond would generate GHG emissions that could have a significant impact on the environment. Accordingly, the analysis above takes into account the potential for the proposed project to contribute to a cumulative impact of global climate change. As shown in Table 4.8-4, overall GHG emissions generated by the Project (2040) scenario would be approximately 195,109 MT CO_2e per year less than the Existing (2019) scenario. Therefore, the project's contribution to global GHG emissions would be reduced from existing emissions and, as such, would not be cumulatively considerable. In addition, as described in Impact GHG-2 above, the proposed project would not conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions. Therefore, the proposed project's contribution to significant cumulative GHG impacts would not be cumulatively considerable and would be less than significant.

4.8.4 References

AMBAG (Association of Monterey Bay Area Governments). 2008. *Monterey Bay Regional Energy Plan.*

AMBAG. 2014. *Moving Forward Monterey Bay 2035 – Metropolitan Transportation Plan/Sustainable Communities Strategy*. Adopted June 2014.

AMBAG. 2018. *Moving Forward Monterey Bay 2040 – 2040 Metropolitan Transportation Plan/ Sustainable Communities Strategy*. Adopted June 2018. Accessed October 14, 2020 at https://ambag.org/sites/default/files/2019-12/AMBAG_MTP-SCS_Final_EntireDocument_PDFA.pdf.

California Air Resources Board (CARB). 2008. *Climate Change Proposed Scoping Plan: A Framework for Change*. October 2008. Accessed October 14, 2020 at http://www.arb.ca.gov/cc/scopingplan/document/psp.pdf.

CARB. 2014. *First Update to the Climate Change Scoping Plan: Building on the Framework.* May 2014. Accessed October 14, 2020 at http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

CARB. 2017a. *The 2017 Climate Change Scoping Plan Update: The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target*. January 20, 2017. Accessed October 14, 2020 at https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf.

CARB. 2017b. *Short-Lived Climate Pollutant Reduction Strategy*. March 2017. Accessed October 14, 2020 at https://ww2.arb.ca.gov/sites/default/files/2020-07/final_SLCP_strategy.pdf.

CARB. 2018. "Glossary of Terms Used in Greenhouse Gas Inventories." June 22, 2018. Accessed October 14, 2020 at http://www.arb.ca.gov/cc/inventory/faq/ghg_inventory_glossary.htm.

CARB. 2021a. Current California GHG Emission Inventory Data: 2000-2019 GHG Inventory (2021 Edition). Accessed July 2021 at https://ww2.arb.ca.gov/ghg-inventory-data?utm_medium=email&utm_source=govdelivery.

CARB. 2021b. Advanced Clean Cars Program. Accessed December 2021 at https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/about.

CARB. 2021c. Advanced Clean Trucks Fact Sheet. August 20, 2021. Accessed at https://ww2.arb.ca.gov/sites/default/files/2021-08/200625factsheet_ADA.pdf

California Natural Resources Agency (CNRA). 2009a. *Final Statement of Reasons for Regulatory Action: Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions Pursuant to SB 97*. December 2009.

CNRA. 2009b. 2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008. Accessed October 14, 2020 at http://resources.ca.gov/docs/climate/Statewide_Adaptation_Strategy.pdf.

CNRA. 2014. *Safeguarding California: Reducing Climate Risk: An Update to the 2009 California Climate Adaptation Strategy.* July 2014. Accessed October 14, 2020 at http://resources.ca.gov/docs/climate/Final_Safeguarding_CA_Plan_July_31_2014.pdf.

CNRA. 2016. *Safeguarding California: Implementation Action Plans*. March 2016. Accessed October 14, 2020 at http://resources.ca.gov/docs/climate/safeguarding/Safeguarding%20California-Implementation%20Action%20Plans.pdf.

CNRA. 2018a. *California's Fourth Climate Change Assessment: Central Coast Region Report.* September 28, 2018. Accessed May 19, 2021 at https://www.energy.ca.gov/sites/default/files/2019-11/Reg_Report-SUM-CCCA4-2018-006_CentralCoast_ADA.pdf.

CNRA. 2018b. *Safeguarding California Plan: 2018 Update: California's Climate Adaptation Strategy.* January 2018. Accessed October 14, 2020 at http://resources.ca.gov/docs/climate/safeguarding/update2018/safeguarding-california-plan-2018-update.pdf.

County of Santa Cruz. 2013. *County of Santa Cruz Climate Action Strategy.* Approved February 26, 2013. Accessed October 14, 2020 at https://www.sccoplanning.com/Portals/2/County/Planning/policy/Climate%20Action%20Strategy/Climate%20Action%20Strategy.pdf?ver=-dse4v30qSAQ_YA7SW_Zfw%3d%3d.

Environmental Protection Agency, U.S. (EPA). 2017. "Climate Change." Last updated January 19, 2017. Accessed May 19, 2021 at https://19january2017snapshot.epa.gov/climatechange_.html.

EPA. 2019. "Mid-Term Evaluation of Light-Duty Vehicle Greenhouse Gas Emissions Standards for Model Years 2022-2025". Website last updated March 2019. Accessed October 14, 2020 at https://www.epa.gov/regulations-emissions-vehicles-and-engines/midterm-evaluation-light-duty-vehicle-greenhouse-gas.

EPA. 2021. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990–2019*. EPA 430-R-21-005. April 2021. Accessed July 2021 at https://www.epa.gov/sites/default/files/2021-04/documents/us-ghg-inventory-2021-main-text.pdf.

EPA Department of Transportation's National Highway Traffic Safety Administration (NHTSA). 2016. *EPA and NHTSA Adopt Standards to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles for Model Year 2018 and Beyond*. August 2016. Accessed October 14, 2020 at https://nepis.epa.gov/Exe/ZyPDF.cgi/P100P7NL.PDF?Dockey=P100P7NL.PDF.

EPA and NHTSA. 2018. *The Safer Affordable Fuel-Efficient 'SAFE' Vehicles Rule for Model Years 2021-2026 Passenger Vehicles and Light Trucks*. Proposed Rule August 2018. Accessed October 14, 2020 at https://www.govinfo.gov/content/pkg/FR-2018-08-24/pdf/2018-16820.pdf.

Governor's Office of Planning and Research (OPR). 2008. *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review.* Technical Advisory. Sacramento, California: OPR. June 19, 2008. Accessed October 14, 2020 at http://opr.ca.gov/docs/june08-ceqa.pdf.

Intergovernmental Panel on Climate Change (IPCC). 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp. Accessed October 14, 2020 at https://www.ipcc.ch/site/assets/uploads/2018/05/ar4_wg1_full_report-1.pdf.

IPCC. 2013. *Climate Change 2013: The Physical Science Basis*. *Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change,* edited by T.F. Stocker, D. Qin, G.K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex, and P.M. Midgley. New York, New York: Cambridge University Press. Accessed October 14, 2020 at http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf.

IPCC. 2014. *Climate Change 2014: Synthesis Report*. *Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by R.K. Pachauri and L.A. Meyer. Geneva, Switzerland: IPCC. Accessed October 14, 2020 at https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf.

IPCC. 2018. "Summary for Policymakers." In *Global Warming of 1.5 °C. An IPCC Special Report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Accessed May 19, 2021 at https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf.

Monterey Bay Air Resources District (MBARD). 2016. *Guidelines for Implementing the California Environmental Quality Act*. Adopted April 1996 and revised February 2016.

Office of Environmental Health Hazard Assessment (OEHHA). 2018. Indicators of Climate Change in California. May 9, 2018. Accessed May 19, 2021 at https://oehha.ca.gov/media/downloads/climate-change/report/2018caindicatorsreportmay2018.pdf.

Netherlands Environmental Assessment Agency (PBL). 2020. *Trends in Global CO_2 and Total Greenhouse Gas Emissions, 2019 Report*. Accessed October 14, 2020 at https://www.pbl.nl/sites/default/files/downloads/pbl-2020-trends-in-global-co2-and-total-greenhouse-gas-emissions-2019-report_4068.pdf.

The White House. 2021. Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. January 20. Accessed February 11, 2021 at https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-protecting-public-health-and-environment-and-restoring-science-to-tackle-climate-crisis/.

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