4.8 Greenhouse Gas Emissions

This section describes the existing conditions related to greenhouse gas (GHG) emissions, identifies associated regulatory requirements, includes project design features (PDFs), evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed project. The analysis included in this section is based on the findings of the documents listed below, as well as publicly available information referenced throughout this section. Sources used for this section include the following:

- **Appendix B-1:** Air Quality and Greenhouse Gas Emissions Modeling and Energy Estimates; prepared by Dudek; dated March 2025

4.8.1 Existing Conditions

The Greenhouse Effect

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind patterns, lasting for an extended period (i.e., decades or longer). The Earth's temperature depends on the balance of energy entering and leaving the planet's system. Many factors, both natural and human, can cause changes in Earth's energy balance, including variations in the Sun's energy reaching Earth, changes in the reflectivity of Earth's atmosphere and surface, and changes in the greenhouse effect, which affects the amount of heat retained by Earth's atmosphere (EPA 2023).

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

The scientific record of the Earth's climate shows that the climate system varies naturally over a wide range of time scales and that, in general, climate changes prior to the Industrial Revolution in the 1700s can be explained by natural causes such as changes in solar energy, volcanic eruptions, and natural changes in GHG concentrations. However, recent climate changes—in particular, the warming observed over the past century—cannot be explained by natural causes alone. Rather, it is extremely likely that human activities have been the dominant cause of that warming since the mid-twentieth century and is the most significant driver of observed climate change (IPCC 2013; EPA 2023). Human influence on the climate system is evident from the increasing GHG concentrations in the atmosphere, radiation, 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.

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 emission 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 (NF_3) (see also the California Environmental Quality Act [CEQA] Guidelines Section 15364.5). 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 emitted in the greatest quantities from human activities. Manufactured GHGs, which have a much greater heat-absorption potential than CO_2, include fluorinated gases, such as HFCs, PFCs, and SF_6, which are associated with certain industrial products and processes. The following paragraphs provide a summary of the most common GHGs and their sources.[1]

Carbon Dioxide. CO_2 is a naturally occurring gas and a by-product of human activities and is the principal anthropogenic (i.e., caused by human activity) 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 outgassing; and decomposition of dead organic matter. Human activities that generate CO_2 are those that involve 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 (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 use of N_2O as a propellant (e.g., for rockets, racecars, and aerosol sprays).

Fluorinated Gases. Fluorinated gases (also referred to as F-gases) are powerful synthetic 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 many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are used in manufacturing.
- **Perfluorocarbons:** PFCs are a group of human-made chemicals composed of carbon and fluorine only. These chemicals were introduced as alternatives, with HFCs, to the O_3-depleting substances. The two main sources of PFCs are primarily aluminum production and semiconductor manufacturing. Because PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere, these chemicals have long lifetimes, ranging between 10,000 and 50,000 years.

[1] The descriptions of GHGs are summarized from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (IPCC 1995), IPCC Fourth Assessment Report (IPCC 2007), CARB's GHG Inventory Glossary (CARB 2025a), and EPA's Glossary of Climate Change Terms (EPA 2024a).

- **Sulfur Hexafluoride:** SF_6 is a colorless gas that is 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:** NF_3 is used in the manufacture of a variety of electronics, including semiconductors and flat-panel displays.

Chlorofluorocarbons. CFCs are synthetic chemicals that were 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 hydrogen, fluorine, chlorine, and carbon atoms—but includes 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 species 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 from the CARB regulations pertaining to diesel engines, diesel fuels, and burning activities, CARB estimates that annual black carbon emissions in California were reduced by 70% between 1990 and 2010, with 95% control expected by 2020 (CARB 2014).

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

Ozone. Tropospheric 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 (O_2), plays a decisive role in the stratospheric radiative balance. Depletion of stratospheric O_3, 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.

Global Warming Potential

Gases in the atmosphere can contribute to climate change both directly and indirectly. Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the atmospheric lifetimes of other gases, and/or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo) (EPA

2025). The Intergovernmental Panel on Climate Change (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 (MT) of CO_2 equivalent (CO_2e).

The California Emissions Estimator Model (CalEEMod) (version 2022.1.1.29; CAPCOA 2022) 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 Fourth Assessment Report (IPCC 2007). The GWP values identified in CalEEMod were applied to the project.

Contributions to Greenhouse Gas Emissions

Per the 2024 EPA Inventory of U.S. GHG Emissions and Sinks: 1990–2022, total U.S. GHG emissions were approximately 6,343 million metric tons (MMT) CO_2e in 2022 (EPA 2024b). The primary GHG emitted by human activities in the United States was CO_2, which represented approximately 79.7% of total GHG emissions (5,053 MMT CO_2e). The largest source of CO_2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 93.0% of CO_2 emissions in 2022 (4,699 MMT CO_2e). Relative to the 1990 emissions level, gross U.S. GHG emissions in 2022 were 3.0% lower. GHG emissions increased from 2021 to 2022 by 0.2% (14.4 MMT CO_2e) and, overall, net emissions in 2022 were 15.4% below 2005 levels (EPA 2024b).

According to California's 2000 to 2022 GHG emissions inventory (2024 edition), California emitted 371.1 MMT CO_2e in 2022, including emissions resulting from out-of-state electrical generation (CARB 2024). The sources of GHG emissions in California include transportation, industry, electric power production from both in-state and out-of-state sources, residential and commercial activities, agriculture, high GWP substances, and recycling and waste. The California GHG emission source categories and their relative contributions in 2022 are presented in Table 4.8-1.

Table 4.8-1. GHG Emissions Sources in California

Source Category	Annual GHG Emissions (MMT CO_2e)	Percent of Total[a]
Transportation	139.9	37.7%
Industrial	72.7	19.6%
Electricity (in state)	42.2	11.4%
Electricity (imports)	17.5	4.7%
Agriculture	29.8	8.0%
Residential	24.7	6.6%
Commercial	14.8	4.0%
High global-warming potential substances	21.3	5.7%
Recycling and waste	8.2	2.2%
Total[a]	**371.1**	**100%**

Source: CARB 2024.
Notes: GHG = greenhouse gas; MMT CO_2e = million metric tons of carbon dioxide equivalent.
[a] Totals may not sum precisely due to rounding.

According to its draft GHG inventory, the City of Irvine (City), as a community, emitted over 2.25 MMT CO_2e in 2019, excluding emissions from municipal sources, which make up less than 1% of total community emissions (City of Irvine 2023). The sources of GHG emissions in the City include on-road transportation, nonresidential building energy, solid waste, off-road vehicles and equipment, water supply, and wastewater treatment. The City GHG emission source categories and their relative contributions in 2019 are presented in Table 4.8-2.

Table 4.8-2. GHG Emissions Sources in the City of Irvine

Source Category	Annual GHG Emissions (MT CO_2e)	Percent of Total[a]
On-road transportation	1,144,205	51%
Nonresidential building energy	550,138	24%
Residential building energy	291,405	13%
Solid waste	160,626	7%
Off-road vehicles and equipment	68,756	3%
Water supply	30,798	1%
Wastewater treatment	5,665	<1%
Total[a]	**2,251,593**	**100%**

Source: City of Irvine 2023.
Notes: GHG = greenhouse gas; MT CO_2e = metric tons of carbon dioxide equivalent.
[a] Totals may not sum precisely due to rounding.

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 that many of the changes observed since the 1950s 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, and electricity demand and supply. The primary effect of global climate change has been a rise in average global tropospheric temperature. Global surface temperature in the first two decades of the twenty-first century (2001–2020) was 0.99°C (0.84°C to 1.10°C) higher than surface temperatures from 1850 to 1900 (IPCC 2023). Global surface temperature has increased faster since 1970 than in any other 50-year period over at least the last 2000 years (IPCC 2023). 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, principally through emissions of GHGs, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850–1900 in 2011–2020 (IPCC 2023).

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 State of California Office of Environmental Health Hazard Assessment identified various indicators of climate change in California, which are scientifically based measurements that track trends in various aspects of climate change. Many indicators reveal discernible evidence that climate change is occurring in California and is having significant, measurable impacts in the state. Changes in the state's climate have been observed, including an increase in annual average air temperature, 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 2022).

Warming temperatures and changing precipitation patterns have altered the physical systems—the ocean, lakes, rivers and snowpack—upon which California 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 spring 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 2022).

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 because warming temperatures and changes in precipitation can affect vector-borne pathogen transmission and disease patterns in California, as well as because of the potential increase in heat-related deaths and illnesses. In addition, since 1950, the area burned by wildfires each year has been increasing.

The California Natural Resources Agency (CNRA) has released four California Climate Change Assessments (in 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, ocean acidification, hypoxia,[2] and warming. To address local and regional governments' need for information to support action in their communities, the Fourth Assessment (CNRA 2018a) includes reports for nine regions of the state, including the Los Angeles Region, which includes Orange County, where the project site is located. Key projected climate changes for the Los Angeles Region include the following (CNRA 2018a):

- Continued future warming over the Los Angeles Region. Across the region, average maximum temperatures are projected to increase around 4°F to 5°F by the mid-century, and 5°F to 8°F by the late century.
- Extreme temperatures are also expected to increase. The hottest day of the year may be up to 10°F warmer for many locations across the Los Angeles Region by the late century under certain model scenarios. The number of extremely hot days is also expected to increase across the region.
- Despite small changes in average precipitation, dry and wet extremes are both expected to increase. By the late twenty-first century, the wettest day of the year is expected to increase across most of the Los Angeles Region, with some locations experiencing 25% to 30% increases under certain model scenarios. Increased frequency and severity of atmospheric river events are also projected to occur for this region.
- Sea levels are projected to continue to rise in the future, but there is a large range based on emissions scenario and uncertainty. Roughly 1 foot to 2 feet of sea level rise is projected by the mid-century, and the most extreme projections lead to 8 feet to 10 feet of sea level rise by the end of the century.
- Projections indicate that the number of wildfires may increase over Southern California, but there remains uncertainty in quantifying future changes of burned area over the Los Angeles Region.

[2] Hypoxia is the state in which oxygen is not available in sufficient amounts at the tissue level to maintain a stable internal environment in the body.

4.8.2 Relevant Plans, Policies, and Ordinances

Federal

Massachusetts v. EPA

In *Massachusetts v. EPA* (April 2007), the U.S. Supreme Court directed the U.S. Environmental Protection Agency (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 Clean Air Act:

- The administrator found that elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF6—in the atmosphere threaten the public health and welfare of current and future generations. This is the "endangerment finding."
- The administrator further found the combined emissions of GHGs—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.

Energy Independence and Security Act

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

- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
- Set a target of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020 and direct the National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.
- Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

Federal Vehicle Standards

In response to the *Massachusetts v. EPA* ruling, the Bush administration issued Executive Order (EO) 13432 in 2007 directing 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 National Highway Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011. In 2010, EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012 through 2016 (75 FR 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, EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017 through 2025 light-duty vehicles. The proposed standards projected to achieve 163 grams/mile of 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 FR 62624–63200).

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, 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 EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6% to 23% over the 2010 baselines (76 FR 57106–57513).

In August 2016, EPA and NHTSA announced the adoption of the Phase Two Program related to fuel economy and GHG standards for medium- and heavy-duty trucks. The Phase Two Program applies 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 types of sizes of buses and work trucks. The Phase Two Program 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, 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 (83 FR 16077–16087).

In August 2018, EPA and NHTSA amended certain fuel economy and GHG standards for passenger cars and light trucks and established new standards for model years 2021 through 2026. Compared to maintaining the post-2020 standards then in place, the 2018 rulemaking 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 impact the global climate by 3/1000th of 1°C by 2100 (83 FR 42986–43500).

In 2019, EPA and NHTSA published the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program (84 FR 51310), which revoked California's authority to set its own GHG emissions standards and set zero-emission vehicle (ZEV) mandates in California. In March 2020, Part Two was issued, which set CO_2 emissions standards and Corporate Average Fuel Economy (CAFE) standards for passenger vehicles and light-duty trucks for model years 2021 through 2026.

In response to EO 13990, on December 21, 2021, NHTSA finalized the CAFE Preemption Rule to withdraw its portions of the Part One Rule. The final rule concluded that the Part One Rule overstepped the agency's legal authority and established overly broad prohibitions that did not account for a variety of important state and local interests.

In March 2022, NHTSA established new fuel economy standards that would require an industry-wide fleet average of approximately 49 miles per gallon for passenger cars and light trucks in model year 2026, by increasing fuel efficiency by 8% annually for model years 2024 and 2025, and 10% annually for model year 2026 (40 CFR Parts 85, 86, 600; 49 CFR Parts 523, 531, 533, 536, 537).

Inflation Reduction Act of 2022

The Inflation Reduction Act was signed into law by President Biden in August 2022. The act includes specific investment in energy and climate reform and is projected to reduce GHG emissions in the United States by 40% compared to 2005 levels by 2030. The act allocates funds to boost renewable energy infrastructure (e.g., solar panels and wind turbines), includes tax credits for the purchase of electric vehicles, and includes measures that will make homes more energy efficient. The Inflation Reduction Act confirms that reduction of GHGs is a core goal of the Clean Air Act and that the funding provided should allow EPA to increase the scope of its Clean Air Act rulemakings. The act also confirms applicability of the Inflation Reduction Act to GHGs in three specific areas: (1) California's ability to regulate GHG emissions from vehicles, (2) EPA's authority to regulate CH_4 emissions from oil and gas facilities, and (3) EPA's authority to regulate GHG emissions from power plants.

State

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

California Climate Change Targets

Executive Order S-3-05

EO S-3-05 (June 2005) established the following statewide goals: GHG emissions should be reduced to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050.

Assembly Bill 32

In furtherance of the goals identified in EO S-3-05, the State Legislature enacted Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006 (California Health and Safety Code Sections 38500–38599). 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.

Executive Order B-30-15

EO B-30-15 (April 2015) identified an interim GHG reduction target in support of targets previously identified under EO S-3-05 and AB 32. EO B-30-15 set an interim target goal of reducing statewide 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 statewide GHG emissions to 80% below 1990 levels by 2050, as set forth in EO S-3-05.

Senate Bill 32 and Assembly Bill 197

Senate Bill (SB) 32 and AB 197 (enacted in 2016) are companion bills that set new statewide GHG reduction targets, made changes to CARB's membership, increased legislative oversight of CARB's climate change–based activities, and expanded dissemination of GHG and other air-quality-related emissions data to enhance transparency and accountability. More specifically, SB 32 codified the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40% below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of

the senate and three members of the assembly, to provide ongoing oversight over implementation of the state's climate policies. AB 197 also added two members of the legislature to CARB as nonvoting members, required CARB to make available and update (at least annually through its website) emissions data for GHGs, criteria air pollutants, and toxic air contaminants from reporting facilities and required CARB to identify specific information for GHG emissions-reduction measures when updating the Scoping Plan.

Senate Bill 605 and Senate Bill 1383

SB 605 (2014) required CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants (SLCPs) in the state, and SB 1383 (2016) required CARB to approve and implement the SLCP Reduction Strategy. SB 1383 also established 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 provided direction for reductions from dairy and livestock operations and landfills. Accordingly, and as mentioned above, CARB adopted its SLCP Reduction Strategy in March 2017, which established a framework for the statewide reduction of emissions of black carbon, CH_4, and fluorinated gases.

Executive Order B-55-18

EO B-55-18 (September 2018) established a new statewide goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter." This executive order directed CARB to "work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal."

Assembly Bill 1279

AB 1279 (2022) establishes that it is the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045; to maintain net negative GHG emissions thereafter; and to ensure that, by 2045, statewide anthropogenic GHG emissions are reduced to at least 85% below 1990 levels.

Climate Change Scoping Plan

One specific requirement of AB 32 is for CARB to prepare a scoping plan to help achieve 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 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 adopted the First Update to the Climate Change Scoping Plan: Building on the Framework (First Update). The stated purpose of the First Update is to "highlight California's success to date in reducing its GHG emissions and lay the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80% below 1990 levels by 2050" (CARB 2014). The First Update found that California was on track to meet the 2020 emissions reduction mandate established by AB 32 and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80% below 1990 levels by 2050 if the state realizes the expected benefits of existing policy goals.

In December 2017, CARB adopted the 2017 Climate Change Scoping Plan Update (Second Update) (CARB 2017). This update identifies CARB's strategy for achieving the state's 2030 GHG target as established in SB 32 (discussed below), including continuing the cap-and-trade program through 2030. The Second Update incorporated approaches to cutting SLCPs under the SLCP Reduction Strategy (adopted by CARB in March 2017), acknowledged the need for reducing emissions in agriculture, and highlighted the work underway to ensure that California's natural and working lands increasingly sequester carbon. When discussing project-level GHG emissions-reduction actions and thresholds, the Second Update stated, "Achieving net zero increases in GHG emissions, resulting in no contribution to GHG impacts, may not be feasible or appropriate for every project, however, and the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA" (CARB 2017).

The most recent update adopted by CARB in November 2022, the 2022 Scoping Plan, outlines the state's plan to reduce emissions and achieve carbon neutrality by 2045 in alignment with AB 1279 and assesses progress toward the 2030 SB 32 target (CARB 2022). The 2022 Scoping Plan builds upon and accelerates programs currently in place, including moving to zero-emission transportation; phasing out use of fossil gas use for heating homes and buildings; reducing chemical and refrigerants with high GWP; providing communities with sustainable options for walking, biking, and public transit; and displacement of fossil-fuel-fired electrical generation through use of renewable energy alternatives (e.g., solar arrays and wind turbines) (CARB 2022). Appendix D of the 2022 Scoping Plan outlines local actions that residential and mixed-use projects can implement to address their largest sources of emissions including transportation electrification, vehicle miles traveled (VMT) reduction, and building decarbonization. CARB identifies these three sources as "Priority Areas" given that they represent those with the highest GHG reduction potential and GHG reduction opportunities for which local governments and agencies have the most authority (CARB 2022). The 2045 carbon neutrality goal required CARB to expand proposed actions in the 2022 Scoping Plan to include those that capture and store carbon in addition to those that reduce only human-caused sources of GHG emissions.

Many of the measures and programs included in the 2022 Scoping Plan would result in the reduction of project-related GHG emissions with no action required at the project level, including GHG emission reductions through increased energy efficiency and renewable energy production (SB 350), reduction in carbon intensity of transportation fuels through the Low Carbon Fuel Standard (LCFS) Program, and the accelerated efficiency and electrification of the statewide vehicle fleet (Mobile Source Strategy). Notably, the 2022 Scoping Plan emphasizes that reliance on carbon sequestration in the state's natural and working lands will not be sufficient to address residual GHG emissions, and achieving carbon neutrality will require research, development, and deployment of additional methods to capture atmospheric GHG emissions (e.g., mechanical direct air capture). The 2022 Scoping Plan details "Local Actions" in Appendix D. The Local Actions include recommendations intended to build momentum for local government actions that align with the state's climate goals, with a focus on local GHG reduction strategies (commonly referred to as "climate action planning") and approval of new land use development projects, including through environmental review under CEQA. The recommendations provided in Appendix D are non-binding and should not be interpreted as a directive to local governments, but rather as evidence-based analytical tools to assist local governments with their role as essential partners in achieving California's climate goals.[3] Appendix D recognizes consistency with a CEQA-qualified GHG reduction plan such as a Climate Action Plan as a preferred option for evaluating potential GHG emission impacts under CEQA. Absent a qualified GHG reduction plan, Appendix D provides recommendations for key attributes that residential and mixed-use projects should

[3] The threshold approaches outlined in the 2022 Scoping Plan, Appendix D, are recommendations only and are not requirements; they do not supplant lead agencies' discretion to develop their own evidence-based approaches for determining whether a project would have a potentially significant impact on GHG emissions (CARB 2022).

achieve that would align with the state's climate goals, including electric vehicle (EV) charging infrastructure, infill location, no loss or conversion of natural and working lands, transit-supportive densities or proximity to transit stops, reducing parking requirements, provision of affordable housing (20% of units), and all-electric appliances with no natural gas connection (CARB 2022). Projects that achieve all key attributes are considered clearly consistent with the state's climate and housing goals and would have a less-than-significant GHG impact under CEQA (CARB 2022). However, projects that do not achieve all attributes are not considered to result in a potentially significant GHG emission impact. Additional potential threshold options identified when a CEQA-qualified GHG reduction plan is not available included a net-zero threshold and use of air district–recommended thresholds of significance. However, per the CARB Scoping Plan, although net-zero targets can often be valuable and achievable, targets should be considered in the larger context of these goals, and any GHG targets on a local scale should take into consideration the actions and outcomes included in this Scoping Plan (CARB 2022). The CARB Scoping Plan states that jurisdictions considering "net zero" targets should carefully consider the implications such targets may have on emissions in neighboring communities and the ability of the state to meet collective targets (CARB 2022).

Building Energy

Title 24, Part 6 of the California Code of Regulations

Title 24 of the California Code of Regulations 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 establishes 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) (PRC Section 25402[b][1]). The regulations receive input from members of industry, as well as the public, with the goal of "reducing of wasteful, uneconomic, inefficient, or unnecessary consumption of energy" (PRC Section 25402). These regulations are carefully scrutinized and analyzed for technological and economic feasibility (PRC Section 25402[d]) and cost effectiveness (PRC Sections 25402[b][2] and [b][3]). These standards are updated to consider and incorporate new energy-efficient technologies and construction methods. 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 2022 standards went into effect on January 1, 2023. The 2025 standards, adopted in September 2024, will go into effect on January 1, 2026.

Title 24, Part 11 of the California Code of Regulations

In addition to CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (24 CCR 11) is commonly referred to as 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, schools, and hospitals. The CALGreen 2022 standards went into effect on January 1, 2023. The 2025 CALGreen proposed standards, adopted in September 2024, will go into effect on January 1, 2026.

Title 20 of the California Code of Regulations

Title 20 of the California Code of Regulations requires manufacturers of appliances to meet state and federal standards for energy and water efficiency. Performance of appliances must be certified through CEC to demonstrate compliance with standards. New appliances regulated under Title 20 include refrigerators, refrigerator-freezers, and freezers; room air conditioners and room air-conditioning heat pumps; central air conditioners; spot air conditioners; vented gas space heaters; gas pool heaters; plumbing fittings and plumbing fixtures; fluorescent lamp ballasts; lamps; emergency lighting; traffic signal modules; dishwashers; clothes washers and dryers; cooking products; electric motors; low voltage dry-type distribution transformers; power supplies; televisions and consumer audio and video equipment; and battery charger systems. Title 20 presents protocols for testing for 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.

Assembly Bill 1470

This bill established the Solar Water Heating and Efficiency Act of 2007 (California Public Utilities Code Sections 2851–2869). The bill makes findings and declarations of the Legislature relating to the promotion of solar water heating systems and other technologies that reduce natural gas demand.

Assembly Bill 1109

Enacted in 2007, AB 1109 required 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 (PRC Section 25402.5.4).

Renewable Energy and Energy Procurement

Senate Bills 1078, X1-2, 350, 100, and 1020

SB 1078 (Sher) (September 2002) established the state's Renewables Portfolio Standard (RPS) program and required an annual increase in renewable generation by utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. SB X1-2 expanded the 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. SB 350 (October 2015) further expanded the RPS by establishing a goal of 50% of the total electricity sold to retail customers in California per year to be sourced from eligible renewable sources by December 31, 2030. SB 100 (2018) increased, once again, 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 also 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.

SB 1020 (September 2022) revises the standards from SB 100, requiring that the following percentages of retail sales of electricity to California end-use customers come from eligible renewable energy resources and zero-carbon resources: 90% by December 31, 2035; 95% by December 31, 2040; and 100% by December 31, 2045 (California Government Code Section 7921.505; California Health and Safety Code Section 38561; California Public Utilities Code Sections 454.53, 583, 454.59, 739.13).

Mobile Sources

Low Carbon Fuel Standard

CARB's LCFS Program is designed to decrease the carbon intensity of California's transportation fuel pool and provide a range of low-carbon and renewable fuel alternatives. CARB's implementing regulations originally were adopted in 2009, with the most recent program amendments approved in 2018. As most recently amended, the LCFS Program sets carbon intensity benchmarks for transportation fuels through calendar year 2030. The original target of the LCFS Program was to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020 (17 CCR 95480 et seq.), and the updated targets include reducing the carbon intensity of California's transportation fuel pool by 30% by 2030 and 90% by 2045.

Senate Bill 375

SB 375 (2008) addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans. SB 375 required CARB to adopt regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035. Regional metropolitan planning organizations were then responsible for preparing a Sustainable Communities Strategy (SCS) within their Regional Transportation Plan (RTP). The goal of the SCS is to establish a forecasted development pattern for the region that, after considering transportation measures and policies, would achieve, if feasible, the GHG reduction targets. If an SCS is unable to achieve the GHG reduction target, a metropolitan planning organization 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.

Pursuant to California Government Code Section 65080(b)(2)(K), an 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. 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. Unlike AB 32, the California Global Warming Solutions Act of 2006, with its market mechanisms that generate cap-and-trade auction proceeds to the state for reinvestment, SB 375 does not provide any new financial resources to make the production and preservation of affordable homes near transit feasible.

Advanced Clean Cars Program and Zero-Emissions Vehicle Program

CARB's Advanced Clean Cars (ACC) I program (as adopted in 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 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 2025b). The package includes elements to reduce smog-forming pollution, reduce GHG emissions, promote clean cars, and provide fuels for clean cars. It was estimated that, in 2025, cars would emit 75% less smog-forming pollution than the average new car sold in 2015. The ZEV program acted 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.

CARB's ACC II program (August 2022) established the next set of low-emission vehicle and zero-emission vehicle requirements for model years after 2025 to contribute to meeting federal ambient air quality 0_3 standards and California's carbon neutrality standards (CARB 2025b). The main objectives of ACC II are as follows:

- Maximize criteria and GHG emission reductions through increased stringency and real-world reductions.
- Accelerate the transition to ZEVs through both increased stringency of requirements and associated actions to support wide-scale adoption and use.

The ACC II rulemaking package also considers technological feasibility, environmental impacts, equity, economic impacts, and consumer impacts.

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 toward 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 toward the target of 100% of the fleet transitioning to ZEVs by 2045 everywhere feasible, and for all drayage trucks to be zero emission by 2035; and (3) strategies, in coordination with other state agencies, EPA, and local air districts, to achieve 100% zero emissions from off-road vehicles and equipment operations in the state by 2035. EO N-79-20 called for the development of a ZEV Market Development Strategy, which was released in 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 Regulation was approved by CARB in 2020. The purpose of the Advanced Clean Trucks Regulation is to accelerate the market for ZEVs in the medium- and heavy-duty truck sector and to reduce air pollutant emissions generated from on-road mobile sources (CARB 2025c). The regulation has two components, (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.

Senate Bill 350

In 2015, SB 350—the Clean Energy and Pollution Reduction Act—was enacted into law. As one of its elements, SB 350 established a statewide policy for widespread electrification of the transportation sector, recognizing that such electrification is required for achievement of the state's 2030 and 2050 reduction targets (see California Public Utilities Code, Section 740.12).

Executive Order B-48-18

EO B-48-18 (2018) launched an 8-year initiative to accelerate the sale of EVs through a mix of rebate programs and infrastructure improvements. The order also set a new EV target of 5 million EVs in California by 2030. EO B- 48- 18 included funding for multiple state agencies, including CEC, to increase EV charging infrastructure and for CARB to provide rebates for the purchase of new EVs and purchase incentives for low-income customers.

Solid Waste

Assembly Bills 939, 341, and 1826 and Senate Bill 1383

In 1989, AB 939, known as the Integrated Waste Management Act (PRC Section 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 of where jurisdictions were required to meet diversion goals of all solid waste through source reduction, recycling, and composting activities of 25% by 1995 and 50% by 2000.

AB 341 (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 2020, and annually thereafter. In addition, AB 341 required CalRecycle to develop strategies to achieve the state's policy goal.

AB 1826 (Chapter 727, Statutes of 2014, effective 2016) requires businesses to recycle their organic waste (i.e., food waste, green waste, landscape and pruning waste, nonhazardous wood waste, and food-soiled paper waste that is mixed in with food waste) depending on the amount of waste they generate per week. This law also requires local jurisdictions across the state to implement an organic waste recycling program to divert organic waste generated by businesses, including 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.

SB 1383 (2016) required a 50% reduction in organic waste disposal from 2014 levels by 2020 and a 75% reduction by 2025—essentially requiring the diversion of up to 27 million tons of organic waste—to reduce GHG emissions. SB 1383 also required that not less than 20% of edible food that is currently disposed of be recovered for human consumption by 2025.

Water

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 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.

Other State Regulations and Goals

Senate Bill 97

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

With respect to GHG emissions, CEQA Guidelines Section 15064.4(a) states that lead agencies should "make a good faith effort, to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions. The CEQA Guidelines note that an agency may identify emissions by either selecting a "model or methodology" to quantify the emissions or by relying on "qualitative analysis or performance based standards" (14 CCR 15064.4[a], [c]). 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 project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) the extent to which a project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4[b]).

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).

Local

South Coast Air Quality Management District

Air districts typically act in an advisory capacity to local governments in establishing the framework for environmental review of air pollution impacts under CEQA. This may include recommendations regarding significance thresholds, analytical tools to estimate emissions and assess impacts, and mitigation for potentially significant impacts. Although air districts will also address some of these issues on a project-specific basis as responsible agencies, they may provide general guidance to local governments on these issues (SCAQMD 2008).

Southern California Association of Governments

The Southern California Association of Governments (SCAG) is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties, and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. SCAG serves as the federally designated metropolitan planning organization for the Southern California region and is the largest metropolitan planning organization in the United States.

On April 4, 2024, SCAG's Regional Council adopted Connect SoCal (2024–2050 Regional Transportation Plan [RTP]/Sustainable Communities Strategy [SCS]). Connect SoCal is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. Connect SoCal charts a path toward a more mobile, sustainable, and prosperous region by making connections between transportation networks, between planning strategies, and between the people whose collaboration can improve the quality of life for Southern Californians. Connect SoCal embodies a collective vision for the region's future and is developed with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses, and local interested parties within Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties (SCAG 2024). The updated growth projections from the 2024 RTP/SCS (Connect SoCal) have not yet been incorporated into an adopted Air Quality Management Plan. The South Coast Air Quality Management District (SCAQMD) adopted its latest Air Quality Management Plan, which incorporates previous regional growth projections, in 2022 (SCAG 2020; SCAQMD 2022).

Irvine 2045 General Plan

The City's General Plan (City of Irvine 2025) includes various policies related to reducing GHGs (both directly and indirectly). Applicable goals, objectives, and policies include the following:

Environmental Protection and Climate Action Element

Goal 3: Reduce greenhouse gas emissions and mitigate climate change impacts in Irvine to create a more sustainable and resilient community.

Objective EPCA-3: Achieve significant reductions in greenhouse gas emissions across all sectors within Irvine by implementing targeted policies and initiatives.

Policy (a): Promote the transition to renewable energy sources, such as solar, wind, and geothermal, for electricity generation within Irvine.

Policy (b): Encourage the adoption of energy-efficient technologies and practices in buildings, transportation, and industries to reduce reliance on fossil fuels.

Policy (d): Promote energy conservation measures, such as retrofitting buildings with energy-efficient appliances, insulation, and lighting systems.

Goal 8: Mitigate the impacts of climate change, enhance resilience, and transition to a climate-resilient community in Irvine.

Objective EPCA-8: Reduce greenhouse gas emissions, adapt to the effects of climate change, and promote climate resilience through comprehensive policies, programs, and initiatives that engage stakeholders, foster innovation, and prioritize equitable and sustainable solutions.

Policy (a): Implement strategies to achieve significant reductions in greenhouse gas emissions across all sectors, including energy, transportation, buildings, waste, and land use, in alignment with state and regional climate goals.

Goal 10: Continue to promote sustainable land use practices in Irvine.

Objective EPCA-10: Implement policies and initiatives that prioritize sustainable land management, smart growth principles, and equitable development strategies to ensure the efficient use of land while protecting environmental quality and promoting community well-being.

Policy (g): Explore the adoption of green building standards, energy-efficient design guidelines, and sustainable construction practices to reduce greenhouse gas emissions, promote energy conservation, and minimize environmental impacts associated with new development and redevelopment projects.

City of Irvine Climate Action and Adaptation Plan

The City is, at the time of writing this document, in the process of developing its first Climate Action and Adaptation Plan (CAAP). The CAAP will outline the strategies and measures to be implemented to achieve City's GHG emissions

reduction targets. The City sent out a Notice of Preparation of a PEIR for the CAAP, which has been under development since 2021, in January 2024. At the time of writing of this Draft EIR, the City has held public workshops, prepared a draft GHG Inventory Report, published a draft framework, and drafted proposed measures and actions. However, an estimated adoption date for the CAAP is currently not available.

City of Irvine Strategic Energy Plan

The City's Strategic Energy Plan is a proactive plan that analyzes the City's energy sustainability, assesses the feasibility of reductions to energy use and related emissions, and provides recommendations for the community to promote energy conservation and the use of renewable energy sources throughout the City (City of Irvine 2020a). The Strategic Energy Plan's recommendations include actions for three main categories—energy supply, buildings, and transportation and land use—and are designed to help the City align itself with the state's reduction targets. The recommendations listed in the Strategic Energy Plan are as follows:

Energy Supply

ES-1: Join a CCE Electricity Supplier

ES-2: Portfolio-wide Procurement for City Facilities

Buildings

B-1: Develop a Community-Facing Energy Upgrade Program

B-2: Reduce or Remove Administrative Obstacles to Energy Storage, Electric Vehicles, and Building Electrification

B-3: Decarbonize City Facilities

B-4: Develop Decarbonization Roadmap

Transportation and Land Use

TLU-1: Reduce emissions from City Fleet Vehicles and Employee Commute

TLU-2: Incentivize Sustainable Transportation Modes for Residents and Businesses

TLU-3: Develop a Comprehensive Electric Vehicle Action Plan

4.8.3 Thresholds of Significance

The City's CEQA Manual states that the City has adopted the significance criteria used to evaluate project impacts to greenhouse gases/climate change based on Appendix G of the CEQA Guidelines (City of Irvine 2020b; 14 CCR 15000 et seq.). A significant impact related to GHG emissions would occur if the project would:

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

The Methodology subsection, below, details the specific thresholds and methodology used for each CEQA threshold.

Methodology

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 numeric thresholds for assessing whether the GHG emissions of a project, such as the proposed project, would be considered a cumulatively considerable contribution to global climate change; however, all reasonable efforts should be made to minimize a project's contribution to global climate change. In addition, while GHG impacts are recognized exclusively as cumulative impacts (CAPCOA 2008), GHG emissions impacts must also be evaluated at a project level under CEQA.

The CEQA Guidelines do not prescribe specific methodologies for performing an assessment, do not establish specific thresholds of significance, and do not mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance consistent with the manner in which other impact areas are handled in CEQA (CNRA 2009a). The State of California has not adopted emission-based thresholds for GHG emissions under CEQA. The Governor's Office of Planning and Research's Technical Advisory titled "CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act Review" states that "public agencies are encouraged but not required to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the project contributes to a significant, cumulative climate change impact" (OPR 2008). Furthermore, the advisory document indicates that "in the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a 'significant impact,' individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice." Section 15064.7(c) of the CEQA Guidelines specifies that "when adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence."

Threshold 1

In October 2008, SCAQMD proposed recommended numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of residential and commercial development projects as presented in its Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold (SCAQMD 2008). This guidance document, which builds on the previous guidance prepared by the California Air Pollution Control Officers Association, explored various approaches for establishing a significance threshold for GHG emissions. The draft interim CEQA thresholds guidance document was not adopted or approved by the Governing Board. However, in December 2008, the SCAQMD adopted an interim 10,000 MT CO2e per-year screening level threshold for stationary source/industrial projects for which the SCAQMD is the lead agency (see SCAQMD Resolution No. 08-35, December 5, 2008).

SCAQMD formed a GHG CEQA Significance Threshold Working Group to work with SCAQMD staff on developing GHG CEQA significance thresholds until statewide significance thresholds or guidelines are established. From December 2008 to September 2010, SCAQMD hosted working group meetings and revised the draft threshold proposal several times, although it did not officially provide these proposals in a subsequent document. The most recent proposal, issued in September 2010, uses a tiered approach to evaluate potential GHG impacts from various uses (SCAQMD 2010).

The City's CEQA Manual includes the following screening criteria for evaluating GHG emissions from development projects based on the approach defined by the SCAQMD's CEQA Significance Threshold Working Group (City of Irvine 2020b):

- **Tier 1.** If a project is exempt from CEQA, project-level and cumulative GHG emissions are less than significant.
- **Tier 2.** If the project complies with a GHG emissions reduction plan or mitigation program that avoids or substantially reduces GHG emissions in the project's geographic area (i.e., City or County), project-level and cumulative GHG emissions are less than significant.
- **Tier 3.** If GHG emissions are less than the screening-level threshold, project-level and cumulative GHG emissions are less than significant.
- **Tier 4.** If emissions exceed the screening threshold, a more detailed review of the project's GHG emissions is warranted.

For projects that are not exempt under Tier 1 or where no qualifying GHG reduction plans are directly applicable under Tier 2, the Working Group recommended a quantitative assessment of project-related GHG emissions using CalEEMod to compare emissions to the SCAQMD bright-line threshold of 3,000 MT CO_2e per year for Tier 3. Per the SCAQMD guidance, construction emissions should be amortized over the operational life of the proposed project, which is assumed to be 30 years (SCAQMD 2008). This impact analysis, therefore, adds amortized construction emissions to the estimated annual operational emissions and then compares operational emissions to the proposed SCAQMD threshold of 3,000 MT CO_2e per year for the Tier 3 analysis.

Construction

CalEEMod Version 2022.1.1.29 was used to estimate potential project-generated GHG emissions during construction. Construction of the proposed project would result in GHG emissions primarily associated with use of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. All details for construction criteria air pollutants discussed in Section 4.3, Air Quality, under Approach and Methodology, are also applicable for the estimation of construction-related GHG emissions. As such, see Section 4.3, Air Quality, Approach and Methodology, for a discussion of construction emissions calculation methodology and assumptions used in the GHG emissions analysis.

Operation

Operation of the project would generate GHG emissions from mobile sources, area sources (landscape maintenance equipment), energy use, water use and wastewater generation, solid waste, and refrigerants. As with project construction, CalEEMod Version 2022.1.1.29 was used to estimate potential project-generated operational GHG emissions based on project land uses. The total project buildout scenario is expected to be fully operational in 2032. More detailed information regarding the land use breakdown is included in Section 4.3, Air Quality, Approach and Methodology.

Area Sources. The area source category calculates direct sources of GHG emissions from the project site, including hearths and landscape maintenance equipment. This source category does not include the emissions associated with natural gas usage in space heating or water heating because these are calculated in the building energy use module of CalEEMod. The project would not include any wood fireplaces in residential units, as this is prohibited by SCAQMD Rule 445. Per PDF-AQ/GHG-1 (All-Electric Residential Development; refer to Section 4.8.4, Project Design Features, for the text of all air quality and GHG PDFs) all appliances, including fireplaces, would be electric.

Landscape maintenance includes fuel combustion emissions from equipment, such as lawnmowers, rototillers, shredders/grinders, blowers, trimmers, chainsaws, and hedge trimmers, as well as air compressors, generators, and pumps. The emissions from landscape equipment use were estimated using CalEEMod defaults. For Orange County, CalEEMod assumes that landscaping equipment would operate 250 days per year.

Energy Sources. The energy use (electricity per square foot per year) from residential land uses is calculated in CalEEMod based on the Residential Appliance Saturation Study and the energy use from nonresidential land uses is calculated in CalEEMod based on the California Commercial End-Use Survey database. Per PDF-AQ/GHG-1, the residential portion of the project would be all electric and would not include the use of natural gas. For residential uses, natural gas demand was converted to electrical demand in CalEEMod. Per PDF-AQ/GHG-2 (Energy-Efficient Appliances), the appliances installed in the residential portion of the project would be Energy Star rated. These PDFs are reflected in the "mitigated" operational GHG energy estimates in Appendix B-1. Annual natural gas and electricity emissions were estimated in CalEEMod using default values for emissions factors for Southern California Gas and Southern California Edison, respectively, which would be the energy source providers for the project.

Mobile Sources. All details for criteria air pollutants discussed in Section 4.3, Air Quality, Approach and Methodology, are also applicable for the estimation of operational mobile source GHG emissions. Regulatory measures related to mobile sources include AB 1493 (Pavley) and related federal standards. AB 1493 required that CARB establish GHG emission standards for automobiles, light-duty trucks, and other vehicles determined by CARB to be vehicles that are primarily used for noncommercial personal transportation in the state. In addition, NHTSA and EPA have established corporate fuel economy standards and GHG emission standards, respectively, for automobiles and light-, medium-, and heavy-duty vehicles. Implementation of these standards and fleet turnover (replacement of older vehicles with newer ones) will gradually reduce emissions from the proposed project's motor vehicles. The effectiveness of fuel economy improvements was evaluated by using the CalEEMod emission factors for motor vehicles in the buildout operational year (2032).

Refrigerants. Refrigerants are substances used in equipment for air conditioning and refrigeration. Most of the refrigerants used today are HFCs or blends thereof, which can have high GWP values. All equipment that uses refrigerants has a charge size (i.e., quantity of refrigerant the equipment contains) and an operational refrigerant leak rate, and each refrigerant has a GWP that is specific to that refrigerant. CalEEMod default values were applied to quantify refrigerant emissions from leaks during regular operation and routine servicing over the equipment lifetime and then to derive average annual emissions from the lifetime estimate (CAPCOA 2022).

Solid Waste. The proposed project would generate solid waste and therefore would result in CO_2e emissions associated with landfill off-gassing. CalEEMod default values for solid waste generation were used to estimate GHG emissions associated with solid waste for the proposed project.

Water and Wastewater Treatment. Supply, conveyance, treatment, and distribution of water for the proposed project would require the use of electricity, which would result in associated indirect GHG emissions. Similarly, wastewater generated by the proposed project requires the use of electricity for conveyance and treatment, along with GHG emissions generated during wastewater treatment. Water consumption estimates for both indoor and outdoor water use and associated electricity consumption from water use and wastewater generation were estimated using default values in CalEEMod.

Threshold 2

For Threshold 2, the project is evaluated for its potential to conflict with state, regional, and local GHG reduction plans. According to the City's CEQA Manual, applicable plans include CARB's Scoping Plan and SCAG's RTP/SCS and the City's Strategic Energy Plan. Regarding the project's potential to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions, the analysis includes a comparison of the project's potential to conflict with the City's Strategic Energy Plan, Appendix D of the CARB Scoping Plan, and SCAG's Connect SoCal (2024–2050 RTP/SCS).

4.8.4 Project Design Features

The project would implement PDFs to reduce GHG emissions. These PDFs may also reduce other potential environmental impacts, such as criteria air pollutant emissions, and would provide energy co-benefits.

PDF-AQ/GHG-1 All-Electric Residential Development. All proposed residential development would use all-electric appliances and end uses (including heating, ventilation, and air conditioning; water heating; and induction cooking).

PDF-AQ/GHG-2 Energy-Efficient Appliances. During construction activities, the project applicant or its designee would install ENERGY STAR®-rated appliances within the residential and recreational land uses, including but not limited to refrigerators, dishwashers, clothes washers, and ceiling fans.

PDF-AQ/GHG-3 Exceedance of Title 24, Part 6 Standards. The project would exceed the requirements of the 2022 California Code of Regulations Title 24, Part 6, Building Energy Efficiency Standards by 10% at the time of building permit issuance.

4.8.5 Impacts Analysis

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

Significant and Unavoidable Impact. Project-generated GHG emissions were estimated per the methodology described in Section 4.8.3, Thresholds of Significance, and are discussed for construction and operation below. Quantification of GHG emissions is provided pursuant to CEQA Guidelines Section 15064.4(c), and the determination of significance is based on the SCAQMD's 3,000 MT CO_2e per year threshold per the City's CEQA Manual (City of Irvine 2020b).

Construction

Table 4.8-3 shows the estimated annual GHG construction emissions associated with the project. Additional information about methodology and approaches is provided in Section 4.8.3. Complete details of the construction emissions calculations are provided in Appendix B-1.

Table 4.8-3. Estimated Annual Construction Greenhouse Gas Emissions

Year	CO2	CH4	N2O	R	CO2e
	Metric Tons per Year				
2026	988.86	0.04	0.02	0.14	995.94
2027	2,512.00	0.07	0.06	1.52	2,532.89
2028	3,748.24	0.11	0.08	1.86	3,777.81
2029	3,002.10	0.09	0.07	1.42	3,026.24
2030	3,091.23	0.09	0.03	1.30	3,103.68
2031	1,582.96	0.04	0.01	0.72	1,588.93
2032	330.08	0.01	0.00	0.13	331.30
				Total for All Years of Construction	15,356.80
				Amortized Over 30 Years	*511.89*

Source: Appendix B-1.
Notes: CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; R = refrigerants; CO_2e = carbon dioxide equivalent.
Totals may not sum precisely due to rounding.

As shown in Table 4.8-3, the estimated total GHG emissions during construction would be approximately 15,357 MT CO_2e over the construction period. Estimated project-generated construction emissions amortized over 30 years would be approximately 512 MT CO_2e per year. As with project-generated construction criteria air pollutant emissions, GHG emissions generated during construction of the project would last only for the duration of the construction period.

Operation

Operation of the project would generate GHG emissions through vehicle trips by residents, employees, and visitors to and from the project site; landscape maintenance equipment operation; energy use (generation of electricity consumed by the project and natural gas use); solid waste disposal; water supply, treatment, and distribution and wastewater treatment; and refrigerants. CalEEMod was used to calculate the annual GHG emissions based on the operational assumptions described in Section 4.8.3.

As detailed in Section 4.8.3, the project would incorporate PDF-AQ/GHG-1 (All-Electric Residential Development), and PDF-AQ/GHG-2 (Energy-Efficient Appliances), which would reduce the GHG emissions from energy sources during project operations (included in Section 4.8.4). The estimated operational project-generated GHG emissions are shown in Table 4.8-4, including amortized construction emissions.

Table 4.8-4. Estimated Annual Operational GHG Emissions

Emission Source	CO_2	CH_4	N_2O	R	CO_2e
	Metric Tons per Year				
Operational Emissions					
Mobile	8,750.89	0.41	0.37	6.76	8,876.86
Area	23.53	<0.01	<0.01	N/A	23.61
Energy[a]	3,157.50	0.31	0.02	N/A	3,170.36
Water	76.12	1.69	0.04	N/A	130.45
Waste	86.61	8.66	0.0	N/A	303.01

Table 4.8-4. Estimated Annual Operational GHG Emissions

Emission Source	CO_2	CH_4	N_2O	R	CO_2e
	Metric Tons per Year				
Refrigerant	N/A	N/A	N/A	2.98	2.98
Total	**12,094.64**	**11.06**	**0.42**	**9.74**	**12,507.27**
Amortized 30-Year Mitigated Construction Emissions					*511.89*
Project Operation + Amortized Construction Total					**13,019.16**
Recommended SCAQMD Threshold (residential-only projects)					*3,000*
Threshold Exceeded?					**Yes**

Notes: CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; R = refrigerant; CO_2e = carbon dioxide equivalent; <0.01 = reported value less than 0.01; N/A = not applicable; SCAQMD = South Coast Air Quality Management District.
Totals may not sum precisely due to rounding.
See Appendix B-1 for complete results.
[a] Includes emission reductions from PDF-AQ/GHG-1 and PDF-AQ/GHG-2.

As shown in Table 4.8-4, operation of the project would result in approximately 12,507 MT CO_2e per year, and emissions would be approximately 13,019 MT CO_2e per year with amortized construction emissions. Operational emissions would be above the 3,000 MT CO_2e per year threshold recommended in the City's CEQA Guidelines, and GHG emissions associated with long-term operation of the project would be potentially significant.

As such, the project would implement Mitigation Measure (MM) GHG-1 through MM-GHG-4, which are provided in Section 4.8.6, Mitigation Measures, to reduce the GHG emissions associated with long-term operation of the project. MM-GHG-1 (Electric Vehicle Charging Infrastructure), which requires installation of EV charging infrastructure, would reduce mobile source GHG emissions by encouraging transition from fossil fuel vehicles to EVs by providing necessary infrastructure. MM-GHG-2 (Energy Conservation) involves various strategies to reduce energy consumption and associated GHG emissions by increasing energy efficiency, including installation of a solar photovoltaic electricity-generating system at the proposed on-site amenity building, light emitting diodes or other high-efficiency buildings for outdoor lighting, cool pavement. MM-GHG-3 (Water Use Efficiency and Water Conservation) requires water efficiency strategies to reduce water consumption and associated GHG emissions. MM-GHG-4 (Solid Waste Reduction) requires several strategies to reduce solid waste generation and associated GHG emissions. However, the GHG emissions reductions achieved by implementation of these mitigation measures for the project could not be reliably quantified. As such, implementation of these mitigation measures cannot demonstrate that GHG emissions would be mitigated to a less-than-significant level.

Therefore, because operational GHG emissions cannot feasibly be reduced to less than 3,000 MT CO_2e per year, the project would exceed the City's threshold for GHG emissions even with implementation of all feasible mitigation. The project would result in a significant and unavoidable impact regarding the potential to generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

2. Would the project generate conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Significant and Unavoidable Impact. The evaluation herein addresses the project's potential to conflict with the following: key attributes for residential and mixed-use projects from CARB's 2022 Scoping Plan

Updated Appendix D, and SCAG's RTP/SCS (Connect SoCal). The project's potential to conflict with the Strategic Energy Plan is addressed in Section 4.6, Energy, of this Draft EIR.

Consistency with Applicable GHG Reduction Plans

CARB Scoping Plan Appendix D

As discussed in Section 4.8.2, Relevant Plans, Policies, and Ordinances, the California State Legislature passed AB 32 to provide initial direction to limit California's GHG emissions to 1990 levels by 2020 and initiate the state's long-range climate objectives. Since the passage of AB 32, the state has adopted GHG emissions reduction targets for future years beyond the initial 2020 horizon year. CARB is required to develop the Scoping Plan, which provides the framework for actions to achieve the state's GHG emission reduction targets. The Scoping Plan is the official framework for the measures and regulations that will be implemented to reduce California's GHG emissions in alignment with the state's adopted GHG reduction targets. Therefore, a project would be found to not conflict with the state's climate goals set forth in statutes and regulations if it would meet the Scoping Plan policies and not impede attainment of the goals therein.

For the project, the relevant GHG emissions reduction targets include those established by SB 32 and AB 1279, which require GHG emissions be reduced to 40% below 1990 levels by 2030, and 85% below 1990 levels by 2045, respectively. In addition, AB 1279 requires that the state achieve net zero GHG emissions by no later than 2045 and achieve and maintain net negative GHG emissions thereafter. CARB's 2017 Scoping Plan Update was the first to address the state's strategy for achieving the 2030 GHG reduction target set forth in SB 32 (CARB 2017), and the most recent CARB 2022 Scoping Plan Update outlines the state's plan to reduce emissions and achieve carbon neutrality by 2045 in alignment with AB 1279 and assesses progress toward the 2030 SB 32 target (CARB 2022). As such, given that SB 32 and AB 1279 are the relevant GHG emission targets, the CARB 2017 and 2022 Scoping Plan Updates that outline the strategy to achieve those targets, are the most applicable to the proposed project.

The 2017 Scoping Plan Update included measures to promote renewable energy and energy efficiency (including the mandates of SB 350), increase stringency of the LCFS Program, measures identified in the Mobile Source and Freight Strategies, measures identified in the proposed SLCP Plan, and increase stringency of SB 375 targets. The 2022 Scoping Plan Update builds upon and accelerates programs currently in place, including moving to zero-emission transportation; phasing out use of fossil gas use for heating homes and buildings; reducing chemical and refrigerants with high GWP; providing communities with sustainable options for walking, biking, and public transit; and displacement of fossil-fuel-fired electrical generation through use of renewable energy alternatives (e.g., solar arrays and wind turbines) (CARB 2022).

Many of the measures and programs included in the Scoping Plan would result in the reduction of project-related GHG emissions with no action required at the project level, including GHG emission reductions through increased energy efficiency and renewable energy production (SB 350), reduction in carbon intensity of transportation fuels (LCFS Program), and the accelerated efficiency and electrification of the statewide vehicle fleet (Mobile Source Strategy).

Table 4.8-5 evaluates the project's potential to conflict with the CARB 2022 Scoping Plan Update, specifically the project attributes to reduce operational GHG emissions identified in Appendix D, Local Actions (CARB 2022). Per the Scoping Plan, empirical evidence shows that residential and mixed-use

development projects that are consistent with these attributes to reduce GHG emissions will accommodate growth in a manner that aligns with the GHG emissions and equity goals of SB 32. Additionally, compliance with the key project attributes of the 2022 Scoping Plan Update ensures that projects (1) are addressing the largest sources of their operational emissions, (2) are in alignment with the priority areas defined for Local Climate Action, and (3) are in alignment with the state's climate goals.

Table 4.8-5. Project Potential to Conflict with Key Project Attributes of CARB 2022 Scoping Plan's Appendix D

Key Project Attributes	Potential to Conflict
Transportation Electrification	
Provide EV charging infrastructure at least in accordance with CALGreen Tier 2 standards[a]	***Project would partially conflict prior to mitigation.*** The project would facilitate future installation and use of EV chargers through compliance with Title 24, Part 11, Chapter 4 requirements per the mandatory Residential Measures. However, this would not meet CALGreen's Tier 2 voluntary standard. Therefore, the project would partially conflict with this key project attribute prior to implementation of mitigation measures. ***Project would not conflict with mitigation.*** With implementation of MM-GHG-1, the project would meet the most ambitious voluntary EV charging infrastructure standards (Tier 2) of the most recent 2022 CALGreen standards. Therefore, after implementation of mitigation, the project would not conflict with this key project attribute.
VMT Reduction	
Is located on infill sites that are surrounded by existing urban uses and reuses or redevelops previously undeveloped or underutilized land presently served by existing utilities and essential public services (e.g., transit, streets, water, sewer)[b]	***Project would conflict.*** The project is not located on an infill site, as defined by the CEQA Guidelines Section 21061.3. The project site consists of active agricultural fields, which is not a qualified urban use under CEQA Guidelines Section 21061.3, and the project site's adjacent parcels are not all qualified urban uses. The project site is adjacent to parcels designated for preservation under the General Plan. Furthermore, the project has not been previously developed for urban uses. While the project site's surrounding area is semi-urbanized with residential communities located directly to the west, Hicks Canyon Wash to the north, and predominantly open space to the north and east, the project site is not an existing urban use. The project site has a zoning designation of 1.5 – Recreation and has a land use designation of Recreational, and as such, a zone change and General Plan Amendment are required to implement the project. Regarding existing utilities presently serving the project site, there are existing infrastructure and utilities located within adjacent roadways. However, the project would result in off-site improvements to extend sewer stormwater and drainage infrastructure into the project site, and as such, the project would not be entirely served by existing utilities and essential public services such as stormwater and sewer.
Do not result in the loss or conversion of the state's natural and working lands	***Project would conflict.*** The project would convert agricultural working lands to develop a residential community; the project site is land use designation of recreational in the City's General Plan. As such, the project would result in the conversion of the state's working lands into a residential use and would conflict with this key project attribute.

Table 4.8-5. Project Potential to Conflict with Key Project Attributes of CARB 2022 Scoping Plan's Appendix D

Key Project Attributes	Potential to Conflict
Consists of transit-supportive densities (minimum of 20 residential dwelling units/acre),[c] *or* in proximity to existing transit (within ½ mile),[d] *or* satisfies more detailed and stringent criteria specified in the region's Sustainable Communities Strategy (SCS)	***Project would not conflict.*** The project proposes the development of 1,360 dwelling units on 105 acres, representing a minimum overall transit-supportive density of 11.3 DU/ac. Thus, the project would not meet the minimum of 20 DU/ac discussed in this key project attribute. Regarding proximity to existing transit within 1/2 mile of the project site, there is a planned transit stop that would be within a 1/2 mile at South Park; as such, the project would not conflict with this option of the key project attribute. The project would exceed the City's VMT significance criteria, which would conflict with SCAG's SCS, as detailed below. As evaluated in detail in the project's transportation analysis, per the City's VMT significance criteria for impact determination, the project would have a significant VMT impact with full buildout of the project. The project's effect on VMT was determined to be significant. Therefore, the project would conflict with CEQA Guidelines Section 15064.3(b) related to the VMT threshold. As such, the project would conflict with Connect SoCal and with this key project attribute. Notably, the project would extend the JOST, which currently terminates at Portola Parkway just south of the project site, to serve pedestrians as an open space for transit and recreation. The project would add approximately 9.5 acres to the JOST extension. Because the project would be within 1/2 mile of a transit stop that would be in service at the time of project operation, it would not conflict with this measure.
Reduce parking requirements by:[e] ▪ Eliminating parking requirements or including maximum allowable parking ratios, *or* ▪ Providing residential parking supply at a ratio of <1 parking space per unit, *or* ▪ Unbundling residential parking costs from costs to rent or lease.	***Project would not conflict.*** The project is pursuing parking ratios under State Density Bonus law, and as such, the project is mandated to provide a certain amount of parking with the residential units and those spaces cannot be unbundled. Thus, the project has provided parking on-site to meet the minimum allowable parking ratios consistent with applicable requirements.
At least 20% of the units are affordable to lower-income residents[f,g]	***Project would not conflict.*** The project includes the development of 340 units designated to be affordable dwelling units. Therefore, of the 1,360 total units proposed, 25% would be affordable units.
Result in no net loss of existing affordable units	***Project would not conflict.*** The project site does not contain any existing residences. Project implementation would not displace any existing affordable housing units or necessitate construction of any replacement affordable housing units elsewhere. Additionally, the project would result in a net gain of 340 affordable dwelling units.
Building Decarbonization	
Use all electric appliances, without any natural gas connections, and would not use propane or other fossil	***Project would partially conflict.*** The project has incorporated PDF-AQ/GHG-1, which requires that all residential development use all-electric appliances, and PDF-AQ/GHG-2, which requires that all

Table 4.8-5. Project Potential to Conflict with Key Project Attributes of CARB 2022 Scoping Plan's Appendix D

Key Project Attributes	Potential to Conflict
fuels for space heating, water heating, or indoor cooking[h,i]	appliances installed for the residential and recreational uses be ENERGY STAR®-rated appliances. As such, the project's residential land uses, would not conflict with the building decarbonization key project attribute. However, the ancillary residential uses, including the amenity building and swimming pools and spa, would use natural gas for HVAC systems and would thus conflict with the building decarbonization attribute uses by requiring natural gas connections to the project site. Thus, MM-GHG-2, Energy Conservation, would be required. MM-GHG-2 includes installation of a solar PV electricity-generating system at the proposed on-site amenity building to reduce non-renewable energy consumption. Nevertheless, because the project would still include some natural gas connections, the project would still partially conflict with this key attribute.

Source: CARB 2022, Appendix D, Table 3 – Key Residential and Mixed-Use Project Attributes that Reduce GHGs.
Notes: CARB = California Air Resources Board; EV = electric vehicle; CALGreen = California Green Building Code, VMT = vehicle miles traveled; CEQA = California Environmental Quality Act; DU/ac = dwelling units per acre; SCAG = Southern California Association of Governments; JOST = Jeffrey Open Space Trail; GHG = greenhouse gas.
[a] Cal. Code of Regs., tit. 24, Part 11.
[b] California Government Code Section 65041.1.
[c] Federal Transit Administration. 2014.
[d] Washington Department of Transportation. 2013.
[e] CAPCOA 2021.
[f] Newmark and Haas 2015.
[g] California Housing Partnership Corporation 2015 and TransForm 2014.
[h] Energy and Environmental Economics. 2019.
[i] Energy and Environmental Economics. 2021.

As shown in Table 4.8-5, the project would not conflict with half of the key project attributes. In addition to the mitigation measures detailed in Table 4.8-5, MM-GHG-3 (Water Use Efficiency and Water Conservation) and MM-GHG-4 (Solid Waste Reduction) would also reduce GHG emissions. However, the project would not clearly satisfy the VMT reduction, natural or working lands conservation, or transit density project attributes, and although the project would include all-electric buildings in the majority of the proposed development, including all of the proposed residential units, this would only partially satisfy the building decarbonization attribute due to limitations with feasible electrical pool heating systems. Therefore, the project would continue to conflict with the previously mentioned key attributes of the 2022 CARB Scoping Plan Update, Appendix D.

SCAG 2024–2050 RTP/SCS

SCAG's 2024–2050 RTP/SCS identifies the following strategy areas to support its environmental goals: Sustainable Development, Air Quality, Clean Transportation, Natural and Agricultural Lands Preservation, and Climate Resilience. An analysis of the project's potential to conflict with the applicable strategies is presented below.

Sustainable Development. The 2024–2050 RTP/SCS identifies sustainable development, including water and energy-efficient building practices and green infrastructure, as a strategy to reduce GHG emissions. Targeted sustainable design strategies of the project, in addition to meeting the requirements of California's Building Energy Efficiency Standards and CALGreen, would include incorporating PDF-AQ/GHG-1 (All-Electric Residential Development), PDF-AQ/GHG-2 (Energy-Efficient Appliances), and PDF-AQ/GHG-3

(Exceedance of Title 24, Part 6 Standards). Furthermore, the project would implement MM-GHG-1 through MM-GHG-4, which would increase the efficiency and sustainability of the project with respect to energy, water, and waste conservation. With these strategies, the project would not conflict with the RTP/SCS goal of promoting sustainability within development.

Air Quality. The 2024–2050 RTP/SCS identifies air quality and meeting federal and state ambient air quality standards as a co-benefit of reducing GHG emissions. After mitigation, the project would exceed SCAQMD's threshold of significance for volatile organic compound (VOC) emissions; however, the project would not exceed the threshold for any other criteria air pollutants. Despite the project exceeding the threshold for a criteria air pollutant during operations, the project itself would not obstruct the goal of reducing air pollution in Southern California nor would it obstruct the SCAG's implementation of the RTP/SCS.

Clean Transportation. The 2024–2050 RTP/SCS identifies EV charging infrastructure, adoption of ZEVs, and clean transit as ways to reduce GHG emissions from mobile sources. The project would support clean transportation use by providing EV-ready requirements to all residential buildings and including EV charging infrastructure within the development per MM-GHG-1. Because the project would promote the adoption of clean transportation in the region, the project would not conflict with this strategy.

Natural and Agricultural Lands Preservation. The 2024–2050 RTP/SCS promotes the conservation and restoration of natural and agricultural lands through several policies, such as quantifying the carbon sequestration potential of natural and agricultural lands and prioritization of sensitive habitat and wildlife corridors for permanent protection. Project development would convert what is currently agricultural land into single- and multi-family residences and associated recreational uses. While not quantified, the project would replace some of the loss of sequestered carbon through the addition of 16.2 acres of park and open space. Nonetheless, because the project would convert agricultural land into residential use, the project would conflict with this strategy.

Climate Resilience: The 2024–2050 RTP/SCS promotes regional coordination and solutions for effective emergency response for climate-related hazards. Additionally, in the category of climate resilience, SCAG has established the following policies: prioritize the most vulnerable populations and communities subject to climate hazards; support local and regional climate and hazard planning; support nature-based solutions to increase regional resilience; promote sustainable water use planning; and support an integrated planning approach to help jurisdictions meet housing needs in a drier environment. While it does not directly pertain to these climate resilience efforts, the project would not conflict with these policies.

Based on the analysis above, the project would conflict with the 2024–2050 RTP/SCS.

Summary

Because the project would conflict with the key attributes of the 2022 CARB Scoping Plan Update Appendix D, as well as the environmental goals of the SCAG 2024-2050 RTP/SC, the project would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases despite implementation of the mitigation measures noted above; therefore, impacts would be significant and unavoidable.

Impact Summary

Impacts from the proposed project relating to GHG emissions would be significant and unavoidable, despite implementation of MM-GHG-1 through MM-GHG-4.

4.8.6 Mitigation Measures

To reduce project-generated GHG emissions and associated potential impacts, the following mitigation measures are identified.

MM-GHG-1 Electric Vehicle Charging Infrastructure. The project applicant or designee shall provide electric vehicle (EV) charging infrastructure that meets or exceeds 2022 California Green Building Standards Code Tier 2 standards A4.106.8.1 for single-family homes and A4.106.8.2 for multifamily dwellings to encourage use of EVs, consistent with Appendix D, Table 3, of the 2022 CARB Scoping Plan.

MM-GHG-2 Energy Conservation. Prior to the issuance of building permits, the project applicant or its designee shall provide evidence to the City that the residential and recreational building design plans include the following energy conservation measures:

a) A solar photovoltaic electricity-generating system shall be installed at the proposed on-site amenity building to the extent feasible.
b) Outdoor lighting shall be light emitting diode (LED) or other high-efficiency lightbulbs.
c) Prior to the issuance of building permits, the Project applicant or its designee shall submit building plans illustrating installation of cool pavements in place of dark pavements within walkways and patios. Walkways and patios shall use natural grey or uncolored concrete with a Solar Reflectance Index (SRI) value of 0.39.
d) Information on energy efficiency, energy-efficient lighting and lighting control systems, energy management, and existing energy incentive programs shall be provided to future residents of the project.

MM-GHG-3 Water Use Efficiency and Water Conservation. Prior to the issuance of building permits, the project applicant or its designee shall provide evidence to the City of Irvine that the residential and recreational building design plans include water use efficiency and conservation measures, including the following:

a) High-efficiency appliances/fixtures to reduce water use, and/or include water-efficient landscape design
b) Low-flow or high-efficiency water fixtures
c) Water-efficient landscapes with lower water demands than required by the California Department of Water Resources 2015 Model Water Efficient Landscape Ordinance
d) Planting of native and drought-tolerant plant species where permissible under fuel modification requirements
e) Educational materials provided to future tenants and building occupants about water saving behaviors and water-conserving landscaping

MM-GHG-4 Solid Waste Reduction. Prior to the issuance of building permits for the project, the project applicant shall provide building plans that include the following solid waste reduction measure:

a) Provide storage areas for recyclables and organic waste in new construction, and food waste storage, if a pick-up service is available.

Note: None of the above GHG mitigation measures (i.e., MM-GHG-1 through MM-GHG-4) are quantified; however, the mitigation measures are anticipated to result in direct or indirect GHG emission reductions.

4.8.7 Level of Significance After Mitigation

Regarding the project's ability to generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, emissions during project operations would exceed the SCAQMD threshold of 3,000 MT CO_2e, even after mitigation; as such, the project would result in a significant and unavoidable impact regardless of the application of feasible mitigation.

Impacts to a potential conflict an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs would be significant and unavoidable, even after implementation of all feasible mitigation measures.

4.8.8 Cumulative Impacts

This section provides an analysis of cumulative impacts from construction and operation of the project and other past, present, and reasonably foreseeable future projects, as required by Section 15130 of the CEQA Guidelines. The past, present, and reasonably foreseeable future projects (i.e., cumulative projects) used for this analysis are presented in Chapter 3, Project Description, of this Draft EIR. For purposes of GHG emissions, the geographical area of cumulative impacts is global, as further detailed below.

Where a lead agency concludes that the cumulative effects of a project, taken together with the impacts of other closely related past, present, and reasonably foreseeable future projects are significant, the lead agency then must determine whether the project's incremental contribution to such significant cumulative impact is "cumulatively considerable" (and thus significant in and of itself).

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. As previously discussed in Section 4.8.1, Existing Conditions, GHG emissions inherently contribute to cumulative impacts, and thus, any additional GHG emissions would result in a cumulative impact. As discussed in Section 4.8.5, Impacts Analysis, the project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment or conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Therefore. the project would result in a cumulatively considerable contribution to a cumulative impact with regard to the generation of GHG emissions, and the cumulative impact would be significant and unavoidable despite the implementation of MM-GHG-1 through MM-GHG-4.

As previously discussed in Section 4.8.5(2), the project would conflict with an applicable GHG reduction plan. Therefore, cumulative impacts associated with the conflict of any applicable plan, policy or regulation adopted to reduce GHG emission would be significant and unavoidable.

4.8.9 References

CAPCOA (California Air Pollution Control Officers Association). 2008. *CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act*. January 2008. https://www.contracosta.ca.gov/DocumentCenter/View/34122/CAPCOA-2008-CEQA-and-Climate-Change-PDF.

CAPCOA. 2022. *California Emissions Estimator Model User's Guide Version 2022.1.1.29*. April 2022. Accessed March 2025. https://caleemod.com/documents/user-guide/CalEEMod_User_Guide_v2022.1.pdf.

CARB (California Air Resources Board). 2008. *Climate Change Scoping Plan: A Framework for Change*. December 2008. Accessed December 9, 2009. http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm.

CARB. 2014. *First Update to the Climate Change Scoping Plan Building on the Framework Pursuant to AB 32 – The California Global Warming Solutions Act of 2006*. May 2014. Last accessed November 2022. http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

CARB. 2017. *The 2017 Climate Change Scoping Plan*. November 2017. Last accessed November 2022. https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf.

CARB. 2022. *2022 Scoping Plan Update*. December 2022. Last Accessed May 2024. https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents.

CARB. 2024. *California Greenhouse Gas Emissions from 2000 to 2022: Trends of Emissions and Other Indicators*. September 20, 2024. Last Accessed March 2025. https://ww2.arb.ca.gov/sites/default/files/2024-09/nc-2000_2022_ghg_inventory_trends.pdf.

CARB. 2025a. "GHG Inventory Glossary." https://ww2.arb.ca.gov/ghg-inventory-glossary

CARB. 2025b. "Advanced Clean Cars Program." https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program.

CARB. 2025c. "Advanced Clean Trucks." https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks.

City of Irvine. 2020a. *Draft Strategic Energy Plan*. October 2020. https://records.cityofirvine.org/OnBaseAgendaOnlineGREC/Documents/ViewDocument/STRATEGIC%20ENERGY%20PLAN.pdf?meetingId=3010&documentType=Agenda&itemId=101569&publishId=32144&isSection=false

City of Irvine. 2020b. *City of Irvine CEQA Manual, Volume II: Technical Guidelines*. April 2020. Accessed August 2025. https://legacy.cityofirvine.org/civica/filebank/blobdload.asp?BlobID=32552.

City of Irvine. 2023. *Draft Greenhouse Gas Emissions Inventory Report for the City of Irvine Climate Action and Adaptation Plan*. June 2023. https://legacy.cityofirvine.org/civica/filebank/blobdload.asp?BlobID=34472.

City of Irvine. 2025. *Irvine 2045 General Plan*. https://www.cityofirvine.org/community-development/current-general-plan.

CNRA (California Natural Resources Agency). 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. https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/Final_Statement_of_Reasons.pdf.

CNRA. 2009b. *2009 California Climate Adaptation Strategy*. December 2009. https://resources.ca.gov/CNRALegacyFiles/docs/climate/statewide_adaptation_strategy.pdf.

CNRA. 2014. Safeguarding California: Reducing Climate Risk. July 2014. https://cawaterlibrary.net/wp-content/uploads/2017/05/Final_Safeguarding_CA_Plan_July_31_2014.pdf.

CNRA. 2016. Safeguarding California: Implementation Action Plans. March 2016. https://resources.ca.gov/CNRALegacyFiles/docs/climate/safeguarding/Safeguarding%20California-Implementation%20Action%20Plans.pdf.

CNRA. 2018a. *California's Fourth Climate Change Assessment, Statewide Summary Report*. August 2018. Last Accessed June 2023. https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf.

CNRA. 2018b. Safeguarding California Plan: 2018 Update – California's Climate Adaptation Strategy. January 2018. https://resources.ca.gov/CNRALegacyFiles/docs/climate/safeguarding/update2018/safeguarding-california-plan-2018-update.pdf.

EPA (U.S. Environmental Protection Agency). 2023a. "Causes of Climate Change." Last Updated April 25, 2023. Accessed June 2023. https://www.epa.gov/climatechange-science/causes-climate-change.

EPA. 2024a. "Glossary of Climate Change Terms." Accessed February 2024. https://19january2017snapshot.epa.gov/climatechange/glossary-climate-change-terms_.html.

EPA. 2024b. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2022*. EPA 430-R-24-004. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022.

EPA. 2025. "Understanding Global Warming Potential." January 2025. Accessed March 2025. https://www.epa.gov/ghgemissions/understanding-global-warming-potentials.

EPA and NHTSA (U.S. Environmental Protection Agency and U.S. Department of Transportation's National Highway Traffic Safety Administration). 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. https://nepis.epa.gov/Exe/ZyPDF.cgi/P100P7NL.PDF?Dockey=P100P7NL.PDF.

IPCC (Intergovernmental Panel on Climate Change). 1995. *IPCC Second Assessment Synthesis of Scientific-Technical Information Relevant to Interpreting Article 2 of the U.N. Framework Convention on Climate Change*. Accessed November 2022. https://www.ipcc.ch/site/assets/uploads/2018/05/2nd-assessment-en-1.pdf.

IPCC. 2007. *IPCC Fourth Assessment Synthesis of Scientific-Technical Information Relevant to Interpreting Article 2 of the U.N. Framework Convention on Climate Change*.

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. Cambridge, United Kingdom and New York, New York: Cambridge University Press.

IPCC. 2014. *Climate Change 2014 Synthesis Report: A Report of the Intergovernmental Panel on Climate Change*. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Accessed November 2022. https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf.

IPCC. 2023. "Summary for Policymakers." In *Climate Change 2023: Synthesis Report*. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva, Switzerland: IPCC. Accessed June 2023. https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf.

OEHHA (Office of Environmental Health Hazard Assessment). 2022. *Indicators of Climate Change in California*. 4th edition. November 2022. Accessed June 2023. https://oehha.ca.gov/media/downloads/climate-change/document/2022caindicatorsreport.pdf.

OPR (Governor's Office of Planning and Research). 2008. *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review*.

SCAG (Southern California Association of Governments). 2020. *The 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy of the Southern California Association of Governments, Connect SoCal*. Adopted September 3, 2020. Last Accessed November 2022. https://scag.ca.gov/sites/main/files/file-attachments/0903fconnectsocal-plan_0.pdf?1606001176.

SCAG. 2024. *Connect SoCal—A Plan for Navigating to a Brighter Future*. Adopted April 4, 2024. Accessed May 2024. https://scag.ca.gov/sites/main/files/file-attachments/23-2987-connect-socal-2024-final-complete-040424.pdf?1714175547.

SCAQMD (South Coast Air Quality Management District). 2008. *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold*. October 2008. Last Accessed November 2022. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgattachmente.pdf.

SCAQMD. 2010. "Greenhouse Gases CEQA Significance Thresholds Working Group Meeting No. 15." September 28, 2010. Accessed November 2022. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-main-presentation.pdf?sfvrsn=2.

SCAQMD. 2022. *Air Quality Management Plan (AQMP)*. Adopted December 2, 2022. Accessed April 2023. https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan.