

3.8 GREENHOUSE GAS EMISSIONS

This section of the 2024 PEIR describes greenhouse gas (GHG) emissions in the SCAG region, set forth the regulatory framework that governs greenhouse gas emissions, and evaluates the significance of the potential impacts related to greenhouse gas emissions that could result from development of Connect SoCal 2024. In addition, this 2024 PEIR provides regional-scale mitigation measures, as well as project-level mitigation measures that can and should be considered and implemented by lead agencies for subsequent, site-specific environmental review to reduce identified impacts as appropriate and feasible. Additional discussions of ozone are provided in Section 3.3, *Air Quality*. Consideration of climate change on biodiversity and habitat is provided in Section 3.4, *Biological Resources*. Additional discussions of climate change on surface water and groundwater are provided in Section 3.10, *Hydrology and Water Quality*, as well as on wildfires in Section 3.20, *Wildfire*.

3.8.1 ENVIRONMENTAL SETTING

Gases that trap heat in the atmosphere are often called greenhouse gases, or GHGs, comparable to a greenhouse, which captures and traps radiant energy. GHGs are emitted by natural processes and human activities. The accumulation of GHGs in the atmosphere regulates the Earth's temperature. Global warming is the observed increase in average temperature of the Earth's surface and atmosphere. The primary cause of global warming is an increase of GHGs in the atmosphere. The six major GHGs are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂), sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), and perfluorocarbon (PFCs). The GHGs absorb longwave radiant energy emitted by the Earth, which warms the atmosphere. The GHGs also emit longwave radiation both upward to space and back down toward the surface of the Earth. The downward part of this longwave radiation emitted by the atmosphere is known as the "greenhouse effect." Emissions from human activities such as fossil fuel combustion for electricity production and vehicles have elevated the concentration of these gases in the atmosphere (SCAQMD 2017b).

DEFINITIONS

Definitions of terms used in the regulatory framework, characterization of baseline conditions, and impact analysis for GHG emissions follow:

- *Greenhouse gases (GHGs)*: GHGs are those compounds in the earth's atmosphere that play a critical role in determining the earth's surface temperature. Specifically, these gases allow high-frequency solar radiation to enter the earth's atmosphere but retain the low-frequency energy, which is radiated back from the earth to space, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Increased concentrations of GHGs in the earth's atmosphere are thought to be linked to global climate change, such as rising surface temperatures, melting icebergs and snowpack, rising sea levels, and the increasing frequency and magnitude of severe weather.
- *Climate change*: Climate change is the variation of earth's climate over time, whether due to natural variability or as a result of human activities. Scientists have concluded that human activities are contributing to global climate change by adding large amounts of heat-trapping gases, (i.e., GHGs), to the atmosphere.
- *Global warming potential (GWP)*: Metric used to describe how much heat a molecule of a GHG absorbs relative to a molecule of carbon dioxide (CO₂) over a given period of time (20, 100, and 500 years). CO₂ has a GWP of 1.
- *MTCO₂e*: Metric ton of CO₂e.

- *MMTCO_{2e}*: Million metric tons of CO_{2e}.
- *Carbon dioxide (CO₂)*: Enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and respiration, and as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is removed from the atmosphere (sequestered) when it is absorbed by plants as part of the biological carbon cycle.
- *Carbon dioxide-equivalent (CO_{2e})*: The standard unit to measure the amount of GHGs in terms of the amount of CO₂ that would cause the same amount of warming. CO_{2e} is based on the GWP ratios between the various GHGs relative to CO₂.
- *Methane (CH₄)*: Emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and from the decay of organic waste in municipal landfills and water treatment facilities.
- *Nitrous oxide (NO₂)*: Emitted during agricultural and industrial activities as well as during combustion of fossil fuels and solid waste.
- *Chlorofluorocarbons (CFCs)*: One of a class of fluorinated gases with a high GWP, CFCs are GHGs covered under the 1987 Montreal Protocol and used for refrigeration, air conditioning, packaging, insulation, solvents, or aerosol propellants. Since they are not destroyed in the lower atmosphere (troposphere, stratosphere), CFCs drift into the upper atmosphere where, given suitable conditions, they break down ozone.
- *Fluorinated gases*: Synthetic, strong GHGs that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances. These gases are typically emitted in smaller quantities, but they are potent GHGs, sometimes referred to as high GWP gases.
- *Hydrofluorocarbons (HFCs)*: One of a class of fluorinated gases with a high GWP, HFCs contain only hydrogen, fluorine, and carbon atoms. They were introduced as alternatives to ozone-depleting substances to serve many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are also used in manufacturing. They do not significantly deplete the stratospheric ozone layer, but they are strong GHGs.
- *Hydrochlorofluorocarbons (HCFCs)*: One of a class of fluorinated gases with a high GWP, HCFCs contain hydrogen, fluorine, chlorine, and carbon atoms. Although ozone-depleting substances, they are less potent at destroying stratospheric ozone than CFCs. They have been introduced as temporary replacements for CFCs and are GHGs.
- *Perfluorocarbons (PFCs)*: One of a class of fluorinated gases with a high GWP, PFCs, are a group of human-made chemicals composed of carbon and fluorine only. These chemicals (predominantly perfluoromethane [CF₄] and perfluoroethane [C₂F₆]) were introduced as alternatives, along with HFCs, to the ozone-depleting substances. In addition, PFCs are emitted as by-products of industrial processes and are also used in manufacturing. PFCs do not harm the stratospheric ozone layer, but they have a high global warming potential.
- *Nitrogen Trifluoride (NF₃)*: NF₃ is an inorganic, non-toxic, odorless and non-flammable gas that is used in the manufacture of semi-conductors, as an oxidizer of high energy fuels, for the preparation of tetrafluorohydrazine, as an etchant gas in the electronic industry, and as a fluorine source in high power chemical lasers.
- *Sulfur hexafluoride (SF₆)*: One of a class of fluorinated gases with a high GWP, SF₆ is a colorless gas soluble in alcohol and ether, slightly soluble in water. SF₆ is a strong GHG used primarily in electrical transmission and distribution systems as an insulator.

- *Global warming potential of various GHGs:* GHGs include CO₂, CH₄, O₃, water vapor, NO₂, HFCs, PFCs, and SF₆. Carbon dioxide is the most abundant GHG. Other GHGs are less abundant but have higher global warming potential than CO₂ (see **Table 3.8-1, Greenhouse Gases and Their Relative Warming Potential Compared to CO₂**, in the *Existing Conditions* section below).

EXISTING CONDITIONS

Global climate change refers to any significant change in climate measurements, such as temperature, precipitation, or wind, lasting for an extended period (i.e., decades or longer) (USEPA 2017). GHGs are any gas that absorbs infrared radiation in the atmosphere and are the result of both natural and human-influenced activities. Forest fires; decomposition; industrial processes; landfills; and consumption of fossil fuels for power generation, transportation, heating, and cooling are the primary sources of GHG emissions. Without human intervention, the earth maintains an approximate balance between the emission of GHGs into the atmosphere and the storage of GHGs in oceans and terrestrial ecosystems. Increased combustion of fossil fuels (e.g., gasoline, diesel, coal), have contributed to the rapid increase in atmospheric levels of GHGs over the last 150 years. By 1850, the world emitted a cumulative total of approximately 4.76 billion tons of CO₂ and by 2019, the world emitted a cumulative total of approximately 1.39 trillion tons of CO₂ (estimated from 1750 onward and includes fossil fuels and industry only). Emissions from land use change, which are emissions from conversion of land, such as from forest to agriculture, are not included since they are subject to more uncertainty than emissions for fossil fuels and industry (Our World in Data 2023). As defined above, the Global Warming Potential (GWP) is the metric used to describe how much heat a molecule of a GHG absorbs relative to a molecule of carbon dioxide (CO₂) over a given period of time (20, 100, and 500 years). CO₂ has a GWP of 1. GHGs include CO₂, CH₄, O₃, water vapor, NO₂, HFCs, PFCs, and SF₆. Carbon dioxide is the most abundant GHG. Other GHGs are less abundant but have higher global warming potential than CO₂. Table 3.8-1 displays the GWP of the GHGs listed above.

As shown in Table 3.8-1, emissions of other GHGs are frequently expressed in the equivalent mass of CO₂, denoted as CO₂e. GHGs are the result of natural and anthropogenic activities. Forest fires, decomposition, industrial processes, landfills, and consumption of fossil fuels for power generation, transportation, heating, and cooking are the primary sources of GHG emissions.

Understanding of the fundamental processes responsible for global climate change has improved over the past decade, and the predictive capabilities are advancing. However, there remain significant scientific uncertainties, for example, in estimating current and future emissions and the appropriate assumptions, predictions of local effects of climate change, occurrence of extreme weather events, effects of aerosols, changes in clouds, shifts in the intensity and distribution of precipitation, rate of sea ice melting, and changes in oceanic circulation. Due to the complexity of the earth's climate system, the uncertainty in its description and in the prediction of changes may never be completely eliminated. Because of these uncertainties, there continues to be significant debate over the extent to which increased concentrations of GHGs have caused or will cause climate change and over the appropriate actions to limit and/or respond to climate change.

TABLE 3.8-1 Greenhouse Gases and Their Relative Global Warming Potential Compared to CO2

GHG	ATMOSPHERIC LIFETIME (YEARS)	GLOBAL WARMING POTENTIAL RELATIVE TO CO2
Carbon Dioxide (CO2)	50 to 100	1
Methane (CH4)	12	25
Nitrous Oxide	114	298
Hydrofluorocarbons:		
• HFC-23	270	14,800
• HFC-32	4.9	675
• HFC-125	29	3,500
• HFC-134a	14	1,430
• HFC-143a	52	4,470
• HFC-152a	1.4	124
• HFC-227ea	34.2	3,220
• HFC-236fa	240	9,810
• HFC-43-10mee	15.9	1,640
Perfluoromethane: CF4	50,000	7,390
Perfluoroethane: C2F6	10,000	12,200
Perfluorobutane: C4F10	2,600	8,860
Perfluoro-2-methylpentane: C6F14	3,200	9,300
Nitrogen Trifluoride (NF3)	740	17,200
Sulfur hexafluoride (SF6)	3,200	22,800

Source: IPCC 2007

Table Notes:

Based on 100-Year Time Horizon of the Global Warming Potential (GWP) of the air pollutant relative to CO2.

The methane GWP includes the direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO2 is not included.

The primary effect of rising global concentrations of atmospheric GHG levels has been a rise in the average global land and ocean temperature of approximately one degree Celsius above pre-industrial levels. Warming greater than the global annual average is being experienced in many land regions, including two to three times higher in the Arctic. Estimated global warming is currently increasing at 0.2 degrees Celsius per decade due to past and ongoing emissions. The International Panel on Climate Change (IPCC) has determined that pathways limiting global warming to 1.5 degrees Celsius require emissions to decline by about 45 percent from 2010 levels by 2030, reaching net zero by 2050. Warming forecasts and related emission pathways presented by the IPCC do not account for self-reinforcing climate feedback loops. These feedback loops include, but are not limited to: loss of sea ice, which reflects heat back into the atmosphere rather than the ocean, causing further melting; the melting of permafrost, which would release new methane emissions into the atmosphere; and the cooling effects of sulfate

pollution in the atmosphere, the loss of which would lead to additional warming (IPCC 2018). Adverse impacts from global climate change worldwide and in California may include but are not limited to:

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures (USEPA 2023a).
- Since the early 1970s, glacier mass loss and ocean thermal expansion from warming together explain about 75 percent of the observed global mean sea level rise. Over the period 1993 to 2010, global mean sea level rise is consistent with the sum of the observed contributions from ocean thermal expansion due to warming from changes in glaciers, Greenland ice sheet, Antarctic ice sheet, and land water storage (IPCC 2014). Sea level in California has risen approximately 7 inches from 1900 to 2005, according to the National Climate Assessment (CARB 2015).
- Changing weather patterns, including changes to precipitation, ocean acidification and warming, and wind patterns (IPCC 2014).
- Declining Sierra snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years (CalEPA 2006).
- Increasing the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas located in the Southern California area and the San Joaquin Valley by the end of the 21st century (CalEPA 2006).
- Migrating of species to suitable habitats.
- Reducing of crop yields in the agricultural sector.
- Increasing the potential for erosion of California's coastlines and seawater intrusion into the Sacramento Delta and associated levee systems due to the rise in sea level (CalEPA 2006).
- Decreasing cold temperature extremes, increasing warm temperature extremes, increasing extreme high sea levels, and increasing number of heavy precipitation events in a number of regions (IPCC 2014).
- Increasing frequency and severity of climate-related extremes including heat waves, droughts, floods, cyclones, and wildfires (IPCC 2014).

The impacts of climate change have been documented by the Office of Environmental Health Hazard Assessment (OEHHA), which includes the following changes that are already occurring (OEHHA 2018; CARB 2017b):

- A recorded increase in annual average temperatures as well as increases in daily minimum and maximum temperatures.
- An increase in the occurrence of extreme events, including wildfire and heat waves.
- A reduction in spring runoff volumes, as a result of declining snowpack.
- A decrease in winter chill hours, necessary for the production of high-value fruit and nut crops.
- Changes in the timing and location of species sightings, including migration upslope of flora and fauna, and earlier appearance of Central Valley butterflies.

An aerial survey by the U.S. Forest Service determined that approximately 15.1 million trees died in California in 2019, which is a decrease from an estimated 18.6 million trees in 2018. The tree mortality was strongly correlated

to the effects of drought and bark beetle attacks (USDA 2020). The U.S. Forest Service National Insect and Disease Forest Assessment found that due to projected climate changes from 2013-2027, the number of acres at risk of losing forest and woodlands will increase and the number of tree deaths will likely increase from already highly destructive pests, such as the mountain pine beetle (USFS 2014). This would further exacerbate the fire hazard posed from dead trees.

In the last decade, California has experienced 5 of the state's 10 largest wildfires and 7 of its 10 most destructive fires in its history. Over the past five decades, summertime forest fires have increased in size by roughly 800 percent. Though no single wildfire can be attributed solely to climate change, evidence shows that the increase in average temperatures statewide is creating conditions more prone to wildfires (Williams et al. 2023). Southern California has warmed about three degrees Fahrenheit in the last century, and every additional increment of warming speeds up evaporation, dries out soil and vegetation, and increases the amount of fuel available for a wildfire (USEPA 2016). In 2018, wildfires in California released approximately 68 million tons of carbon dioxide, or about 15 percent of the State's annual emissions (DOI 2018). Studies suggest that GHG emissions from wildfires create a positive feedback loop, wherein the emissions warm the planet further, leading to more wildfires and more emissions.

The warming climate also causes sea level rise by warming the oceans which causes water to expand, and by melting land ice which transfers water to the ocean. Sea level rise is expected to magnify the adverse impact of any storm surge and high waves on the California coast. As temperatures warm and GHG concentrations increase, more carbon dioxide dissolves in the ocean, making it more acidic. More acidic ocean water affects a wide variety of marine species, including species that people rely on for food (CARB 2017b).

While more intense dry periods are anticipated under warmer conditions, increased extreme wet conditions are also expected to increase due to more frequent warm, wet atmospheric river events and a higher proportion of precipitation falling as rain instead of snow. In recent years, atmospheric rivers have also been recognized as the cause of the majority of major floods in rivers all along the U.S. West Coast and as the source of up to 50 percent of all precipitation in California (Scripps Institution of Oceanography 2017). These extreme precipitation events, together with the rising snowline, often cause devastating floods in major river basins (e.g., California's Russian River). Looking ahead, the frequency and severity of atmospheric rivers on the U.S. West Coast will increase due to higher atmospheric water vapor that occurs with rising temperature, leading to more frequent flooding (Hagos et al. 2016; Payne and Magnusdottir 2015).

As GHG emissions continue to accumulate and climate disruption grows, such destructive events will become more frequent. Several recent studies project increased precipitation within hurricanes over ocean regions (Easterling et al. 2016; National Academies of Sciences, Engineering, and Medicine 2016). The primary physical mechanism for this increase is higher water vapor in the warmer atmosphere, which enhances moisture convergence in a storm for a given circulation strength. Hurricanes are responsible for many of the most extreme precipitation events; such events are likely to become more extreme. Anthropogenic warming by the end of the 21st century will likely cause tropical cyclones globally to become more intense on average. This change implies an even larger increase in the destructive potential per storm, assuming no changes in storm size (Sobel et al. 2016; Kossin et al. 2016).

Extreme weather events and seasons driven by climate change can differ drastically based on region and scale. For instance, in the winter of 2023, California experienced one of the state's largest snowpacks, where on April 3, 2023, the statewide snowpack was 237 percent of average for that date (DWR 2023). The California Department of Water Resources stated this was due to the increased number of atmospheric rivers (the relatively long, narrow

regions in the atmosphere that transport water vapor outside of the tropics and that makes landfall) that winter. The atmospheric rivers generated large amounts of precipitation especially as compared to the three years prior to 2023 that were the driest in the State's history (DWR 2023). Most recently, from August 19 to 20, 2023, the region experienced tropical storm Hilary, which created a state of emergency for the region and further added to annual rainfall. In Canada, 4,241 wildfires have been recorded from January to June 2023, where the acreage burned in the first half of 2023 has surpassed the total amount of land burned in 1989, which was Canada's previous annual record (CBS News 2023). Furthermore, the global average temperature for July 2023 was the highest on record for the last 120,000 years where the month is estimated to have been around 1.5 degrees Celsius warmer than the average for 1815 to 1900, representing the average for pre-industrial times and global sea surface temperatures records were also broken in July 2023 where ocean surface temperatures were the highest ever recorded and 0.51 degrees Celsius above the 1991-2020 average (United Nations News 2023). Thus, the historical record, which once set our expectations for the traditional range of weather and other natural events, is an increasingly unreliable predictor of the conditions we will face in the future.

California is committed to further supporting new research on ways to mitigate climate change and how to understand its ongoing and projected impacts. California's Fourth Climate Change Assessment and Indicators of Change Report will further update our understanding of the many impacts from climate change in a way that directly informs State agencies' efforts to safeguard the State's people, economy, and environment (CNRA 2018a; OEHHA 2018).

The State is also taking steps to make California more resilient to ongoing and projected climate impacts as laid out by the Safeguarding California Plan (CNRA 2018b). The Safeguarding California Plan was updated in 2018 to present new policy recommendations and provide a roadmap of all the actions and next steps that state government is taking to adapt to the ongoing and inevitable effects of climate change. California's continuing efforts are vital steps toward minimizing the impact of GHG emissions and a three-pronged approach of reducing emissions, preparing for impacts, and conducting cutting-edge research can serve as a model for action (CARB 2022a).

Scientific understanding of the fundamental processes responsible for global climate change has improved over the past decade, and predictive capabilities are advancing. However, there remain significant scientific uncertainties, for example, in predictions of local effects of climate change; occurrence of extreme weather events; and effects of aerosols, changes in clouds, shifts in the intensity and distribution of precipitation, and changes in oceanic circulation. In addition, it may not be possible to link specific projects to future specific climate change impacts, though estimating project-specific emissions and contributions is possible.

SOURCES OF GHG EMISSIONS

GLOBAL

Worldwide anthropogenic GHG emissions are estimated for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I). In 2019, worldwide anthropogenic GHG emissions were estimated to be 49,900 million metric tons of CO₂ equivalents (MMTCO_{2e}) (Climatewatch 2023).

The sum of the top five GHG producing nations plus the European Union totaled approximately 28,320 MMTCO_{2e} (Climatewatch 2023).¹ The top five countries and the European Union accounted for approximately 57 percent of the total global GHG emissions according to 2019 data (see **Table 3.8-2, Top Five GHG Producer Countries and the European Union [Annual]**). The GHG emissions in more recent years may differ from the inventories presented in Table 3.8-2; however, the data is representative of the 2019 baseline year.

TABLE 3.8-2 Top Five GHG Producer Countries and the European Union in 2019 (Annual)

EMITTING COUNTRIES	GHG EMISSIONS (MMTCO _{2e})
China	12,085
United States	5,819
India	3,380
European Union (EU), 27 Member States	3,236
Russia	1,890
Indonesia	1,914

Source: Climatewatch 2019

NATIONAL

As noted in Table 3.8-2, the United States was the number two producer of global GHG emissions in 2019 (World Resources Institute, undated). The primary GHG emitted by human activities in the United States was CO₂, representing approximately 81 percent of total GHG emissions (excluding sinks).² Carbon dioxide from fossil fuel combustion, the largest source of GHG emissions, accounted for approximately 74 percent of U.S. GHG emissions (excluding sinks). In 2019, carbon dioxide emissions from the transportation sector accounted for approximately 29 percent of all GHG emissions (excluding sinks) (USEPA 2021a).

STATE OF CALIFORNIA

The California Air Resources Board (CARB) compiles GHG inventories for the State of California. Based on the 2019 GHG inventory data, California emitted 404.5 MMTCO_{2e} including emissions resulting from imported electrical power in 2019 (CARB 2022b). Based on the GHG inventories compiled by the World Resources Institute, California’s

¹ The CO₂ equivalent emissions commonly are expressed as “million metric tons of carbon dioxide equivalent (MMTCO_{2e}).” The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP, such that MMTCO_{2e} = (million metric tons of a GHG) x (GWP of the GHG). For example, the GWP for methane is 25. This means that the emission of one million metric tons of methane is equivalent to the emission of 25 million metric tons of CO₂. GWPs and associated CO_{2e} values were developed by the Intergovernmental Panel on Climate Change (IPCC), and published in its Second Assessment Report (SAR) in 1996. Historically, GHG emission inventories have been calculated using the GWPs from the IPCC’s SAR. However, CARB now uses the GWPs in the IPCC AR4 for reporting Statewide GHG emissions inventories, consistent with international reporting standards. By applying the GWP ratios, Project-related CO_{2e} emissions can be tabulated in metric tons per year. Typically, the GWP ratio corresponding to the warming potential of CO₂ over a 100-year period is used as a baseline. The IPCC has issued an updated Fifth Assessment Report (AR5) (IPCC 2013), which has revised down the majority of the GWP for key regulated pollutants. As CARB still uses AR4 values, AR4 GWP values are reported in the section and used in analyses. Generally, the changes from AR4 to AR5 are reductions in warming potential for the GHG most associated with construction and operation of typical transportation and development projects.

² Defined by the USEPA as carbon dioxide removal from the atmosphere by “sinks,” (e.g., through the uptake of carbon and storage in forests, vegetation, and soils.)

total statewide GHG emissions rank second in the U.S. (Texas is the highest emitter of GHG) (World Resources Institute 2017a).

The primary contributors to GHG emissions in California are transportation, electric power production from both in-state and out-of-state sources, industry, agriculture and forestry, commercial and residential activities (CARB 2022b). **Table 3.8-3, GHG Emissions in California (1990 and 2019)**, provides a summary of GHG emissions reported in California in 1990 and 2019 by categories. Similarly, the primary contributors to GHG emissions in the United States are transportation, electric power production from both in-state and out-of-state sources, industry, agriculture and forestry, commercial and residential activities (USEPA 2023c). **Table 3.8-4, United States Greenhouse Gas Emissions (1990 and 2019)**, provides a summary of GHG emissions reported in the United States in 1990 and 2019 by categories.

TABLE 3.8-3 GHG Emissions in California (1990 and 2019)

SOURCE CATEGORY	TOTAL 1990 EMISSIONS (MMTCO2E)	PERCENT OF TOTAL 1990 EMISSIONS	TOTAL 2019 EMISSIONS (MMTCO2E)	PERCENT OF TOTAL 2019 EMISSIONS
Transportation	150.6	35%	162.4	40%
Electric Power	110.5	26%	60.2	15%
Commercial	14.4	3%	14.5	4%
Residential	29.7	7%	25.9	6%
Industrial	105.3	24%	80.4	20%
Recycling and Waste ^a	–	–	8.8	2%
High-GWP/Non-Specified ^b	1.3	<1%	20.7	5%
Agriculture/Forestry	18.9	6%	31.4	8%
Forestry Sinks ^c	-6.7		–	–
Net Total ^d	431	100%	404.5	100%

Source: CARB 2022b.

CARB 2007ca. Included in other categories for the 1990 emissions inventory.

b. High-GWP gases are not specifically called out in the 1990 emissions inventory.

c. Revised methodology under development (not reported for 2019).

d. CARB revised the State's 1990 level GHG emissions using GWPs from the IPCC AR4 (IPCC 2007).

As demonstrated in Table 3.8-3, California's 2019 GHG emissions are lower than 1990 levels. In 2004, California statewide GHG emissions peaked at 486.2 MMT CO₂e/year; emissions fluctuated between 2004 and 2007 and since 2007 have been following a declining trend. In 2019, emissions statewide were approximately 81.7 million metric tons of CO₂e (MMTCO₂e) lower than peak GHG levels in 2004 (CARB 2022b).

TABLE 3.8-4 United States Greenhouse Gas Emissions (1990 and 2019)

SOURCE CATEGORY	TOTAL 1990 EMISSIONS (MMTCO2E)	PERCENT OF TOTAL 1990 EMISSIONS	TOTAL 2019 EMISSIONS (MMTCO2E)	PERCENT OF TOTAL 2019 EMISSIONS
Transportation	1521.4	23.5%	1874.3	28.3%
Electric power industry	1879.7	29.0%	1650.5	24.9%
Industry	1677.3	25.9%	1568.2	23.7%
Agriculture	592.9	9.1%	655.4	9.9%
Commercial	447.0	6.9%	462.0	7.0%
Residential	345.6	5.3%	382.4	5.8%
U.S. territories	23.4	0.4%	25.1	0.4%
Gross Total	6487.3	100%	6617.9	100%

Source: USEPA 2023c

SCAG REGION

The most recent GHG emissions data by sector for the SCAG region is from 2012. Similar to the 2013 U.S. and California GHG emission profiles, transportation, industrial, and electricity are the three largest contributors to GHG emissions. Total SCAG emissions in 2020 were estimated to be 216 MMTCO_{2e} (2019 was not a projection year). Transportation emissions are most prevalent relative to all other sectors in California and specifically in the SCAG region. Transportation emissions accounted for approximately 38 percent of total emissions in the SCAG region, compared to 26 percent of total emissions in the United States in 2008 (SCAG 2012).

Fossil fuel carbon dioxide emissions (FFCO₂) for 2011 were calculated across the Los Angeles metropolitan area, which includes Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties. The total FFCO₂ emissions for the Los Angeles metropolitan area, which covers the complete geographic extent of the previously mentioned five counties, were calculated to be approximately 53.4±5.9 MMT CO_{2e}/year, with transportation emissions accounting for approximately 50.4 percent of these emissions (Gurney et al. 2019). Los Angeles County contributed approximately 55 percent of the total FFCO₂ emissions, followed by San Bernardino, Orange, Riverside, and Ventura counties. These results are consistent with SCAG estimates of GHG emissions for 2019 (see **Table 3.8-7, Greenhouse Gas Emissions All On-Road and Other Transportation Sources by County (CO_{2e})**), later in this document. It should be noted that the 2011 FFCO₂ estimates does not include Imperial County, which, according to Table 3.8-7, in 2019 contributed approximately 1.7 percent of the regional total transportation GHG emissions. Therefore, these results are representative of the SCAG region (Gurney et al. 2019).

GOODS MOVEMENT

As discussed in Section 3.17, *Transportation*, goods movement includes trucking, rail freight, air cargo, marine cargo, and both domestic and international freight, the latter entering the country via the seaports, airports, and the international border with Mexico. Additionally, many cargo movements are intermodal, for example, sea to truck, sea to rail, air to truck, or truck to rail. The goods movement system includes not only highways, railroads, sea lanes, and airways, but also intermodal terminals, truck terminals, railyards, warehousing, freight consolidation/de-consolidation terminals, freight forwarding, package express, customs inspection stations, truck stops, and truck queuing areas.

SCAG's plans for goods movement are consistent with executive orders from the governor that directs MPOs to integrate climate change policies to support the State's effort to reduce per capita GHG emissions and combat the effects of climate change. As further discussed below in Section 3.8.2, *Regulatory Framework*, under the discussion of State regulations, a number of Executive Orders Including Executive Orders: S-3-05, B-16-12, B-32-15, B-30-15 and B-55-18 support reducing GHG from the goods movement sector by calling for a coordinated approach to address the detrimental air quality effects of GHGs, supporting the rapid commercialization of zero emission vehicles and setting a 2050 GHG emissions reduction goal for the transportation sector to achieve 80 percent less emissions than 1990 levels, working toward achieving GHG reduction targets with the California Sustainable Freight Action Plan that establishes clear targets to improve freight efficiency, transitioning to zero-emission technologies and increasing competitiveness of California's freight system, supporting efforts towards meeting the interim statewide GHG emission reduction target of at least 40 percent below 1990 levels by 2030 to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050, setting a framework for a new state goal to achieve carbon neutrality as soon as possible, but no later than 2045, and achieving and maintain net negative emissions thereafter, respectively.

PUBLIC HEALTH

The changing climate's effect on temperature, air quality, wildfires, and droughts will threaten the health and wellbeing of everyone in the SCAG region. Climate change threatens the water supply, air quality, and leads to more extreme heat days, drought, and sea level rise.

Extreme heat days are days in which the temperature exceeds the 98th percentile of maximum temperature for a given location. Extreme weather conditions, particularly extreme heat days, result in adverse outcomes for human health. Heat-induced illnesses include heat stroke, heat exhaustion, dehydration, and premature death from cardiovascular or respiratory disease. The effects of extreme heat days are further exacerbated by the urban heat island effects, which is caused by dense urban areas that have more buildings, pavement, and dark surfaces with less greenery and green spaces.

As a result of extreme heat days there may be longer and more severe droughts. Extreme heat can lead to excessive drying of soil and vegetation as well as melting of California's Sierra Nevada snowpack.

Climate change can also lead to sea level rise. Orange County has the greatest risk for inundation within the SCAG region, with 3.6 percent of the population in an inundation zone. Los Angeles and Ventura Counties have 1.6 percent and 0.17 percent, respectively, of their county population living within inundation zones. Sea level rise can lead to flooding in these areas and can create important health consequences such as contaminating drinking water or respiratory issues from mold in flood-damaged homes.

ONGOING GHG EMISSION REDUCTION AND ADAPTION STRATEGIES IN THE SCAG REGION

Climate change affects natural and human systems globally. Climate mitigation strategies include reducing or sequestering GHG emissions, while climate adaptation is preparing for the unavoidable impacts from climate change. Climate mitigation strategies include, but are not limited to (Energy + Environmental Economics 2020):

- Increasing energy efficiency and electricity in buildings for heating and water heating
- Increasing building electrification
- Increasing transportation electrification and deployment of battery-electric vehicles

- Increasing zero-carbon electricity and renewable energy
- Increasing carbon dioxide removal (CDR), including carbon sinks in natural and working lands
- Increasing negative emissions technologies (NETs) (e.g., biorefining with carbon capture storage and direct air capture)
- Increasing reliance on low-carbon (or zero carbon) liquid and/or gaseous fuels across all sectors of the economy (buildings, industry, transportation, and electricity)
- Increasing energy efficiency for all fuels in industrial and agriculture energy use
- Promoting active transportation
- Increasing transit options
- Improving waste management

Climate adaptation solutions would be long term and require a shift in thinking on how communities are designed. Adaptation strategies include, but are not limited to (CARB 2015):

- Using scarce water more efficiently
- Adapting building codes to future climate conditions and extreme weather events
- Building flood defenses and raising the levels of levees
- Developing drought tolerant crops
- Implementing urban tree planting and reforestation
- Setting aside land corridors for species migration
- Increasing collaboration on climate preparedness strategies among public agencies

Multiple jurisdictions in the SCAG region have taken action to address climate change. After assessing the climate vulnerabilities distinct to their community, these jurisdictions formulate a plan to move forward to minimize the impacts of these vulnerabilities. These actions take the form of climate action plans, general plan policies, GHG reduction plans, sustainability plans, and ordinances (CARB 2022c). SCAG has undertaken several planning efforts including studying adaptation strategies and assisting jurisdictions in developing Climate Action Plans.

SCAG also presents annual Sustainability Awards to recognize exemplary planning projects that support the core principles of mobility, livability, prosperity, and sustainability (SCAG 2023a). As shown in **Table 3.8-5, SCAG Sustainability Award Recipients (2021–2023)**, SCAG awarded Sustainability Awards to six planning projects. In both 2022 and 2023, SCAG awarded Sustainability Awards to seven planning projects each year (visit the SCAG Sustainability Award Recipients website for a full list of past Sustainability Awards planning projects and associated recipient organizations) (SCAG 2023a).

TABLE 3.8-5 SCAG Sustainability Award Recipients (2021–2023)

YEAR	PLANNING PROJECT	ORGANIZATION
2021	• Santa Ana Arts Collective (SAAC) Affordable Housing and Adaptive Reuse Community	• City of Santa Ana
	• San Pablo Avenue Streetscape Project	• City of Palm Desert
	• Driving the Future of Hydrogen	• Sunline Transit Agency
	• Adopt-A-Lot Program Hydrogen	• Kounkuey Design Initiative and the City of Los Angeles
	• Isla de Los Angeles development	• Clifford Beers Housing Inc.
	• The San Bernardino Valley Water Conservation District	• Upper Santa Ana River Wash Habitat Conservation Plan
2022	• Volvo Low Impact Green Heavy Transport (LIGHTS) project	• South Coast Air Quality Management District & Volvo Trucks North America
	• Riverside Pedestrian Target Safeguarding Plan, Active Transportation Plan, Complete Streets Ordinance and Trails Master Plan (PACT)	• City of Riverside
	• Metrolink Trains Run on Fossil-Free Fuel	• Southern California Regional Rail Authority (Metrolink)
	• PlanRC – City of Rancho Cucamonga General Plan Update	• City of Rancho Cucamonga
	• City Parcel/2C Ranch Habitat Restoration Project	• Orange County Transportation Authority, in Partnership with the City of San Juan Capistrano
	• Community Grants Program	• Port of Long Beach
	• Lotus Living Tiny Home Project	• City of El Centro
2023	• Agricultural Worker Housing Ordinance	• Ventura County
	• Recycled Water Collaboration	• City of Rialto and the Inland Empire Utility Agency (IEUA)
	• Envision San Jacinto	• City of San Jacinto
	• City of San Bernardino Clean Fleet Project	• City of San Bernardino
	• City of Lynwood Urban Bike Trail	• City of Lynwood
	• Pacoima Cool Community Project	• City of Pacoima
	• Legacy Square	• City of Santa Ana
	• Volvo Low Impact Green Heavy Transport (LIGHTS) project	• South Coast Air Quality Management District & Volvo Trucks North America

Source: SCAG 2023a

3.8.2 REGULATORY FRAMEWORK

INTERNATIONAL

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

The World Meteorological Organization (WMO) and United Nations Environmental Program (UNEP) established the IPCC in 1988. The goal of the IPCC is to evaluate the risk of climate change caused by human activities. Rather than performing research or monitoring climate, the IPCC relies on peer-reviewed and published scientific literature to make its assessment. While not a regulatory body, the IPCC assesses information (i.e., scientific literature) regarding human-induced climate change and the impacts of human-induced climate change and recommends options to policy makers for the adaptation and mitigation of climate change. The IPCC reports its evaluations in special reports called assessment reports. The latest assessment report (i.e., Sixth Assessment Report, consisting of three working group reports and a synthesis report based on the first three reports) was published in 2023. In its 2023 report, the IPCC stated that global surface temperature increases since 1970 have increased faster than in any other 50-year period over at least the last 2,000 years and human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming (IPCC 2023).

PARIS ACCORD

The most recent international climate change agreement was adopted at the United Nations Framework Convention on Climate Change in Paris in December 2015 (the “Paris Accord”) (United Nations 2015). In the Paris Accord, the United States set its intended nationally determined contribution to reduce its GHG emissions by 26 to 28 percent below its 2005 level in 2025 and to make best efforts to reduce its emissions by 28 percent. These targets were set with the goal of limiting global temperature rise to below 2 degrees Celsius and getting to the 80 percent emission reduction by 2050.

In June 2017, the U.S. announced its intent to withdraw from the Paris Accord and officially left the Paris Agreement on November 4, 2020 (The White House 2017b). However, on January 20, 2021, the U.S. reentered the Paris Agreement (The White House 2021).

In an effort to reach the goals set by the Paris Accord, over 10,000 cities and local governments from 138 countries across the world formed the Global Covenant of Mayors (GcoM) with the goal of collectively reducing 2.3 billion tons of CO₂ emissions per year by 2030 (GcoM 2023a). Within the United States, 182 cities have joined GcoM. Many of these cities are in the SCAG region, including Los Angeles, Lancaster, Long Beach, Manhattan Beach, Santa Monica, West Hollywood, and Palm Springs (GcoM 2023b).

FEDERAL

GLOBAL CHANGE RESEARCH ACT (1990)

In 1990, Congress passed and the President signed Public Law 101-606, the Global Change Research Act (Global Change Research Act 1990). The purpose of the legislation was: “... to require the establishment of a United States Global Change Research Program aimed at understanding and responding to global change, including the cumulative effects of human activities and natural processes on the environment, to promote discussions towards international protocols in global change research, and for other purposes.” To that end, the Global Change Research Information Office was established in 1991 to serve as a clearinghouse of information. The Act requires

a report to Congress every four years on the environmental, economic, health and safety consequences of climate change; however, the first and only one of these reports to date, the National Assessment on Climate Change, was not published until 2000. In February 2004, operational responsibility for GCRIO shifted to the U.S. Climate Change Science Program.

SUPREME COURT RULING

The U.S. Supreme Court ruled in *Massachusetts v. Environmental Protection Agency*, 127 S.Ct. 1438 (2007), that carbon dioxide and other greenhouse gases are pollutants under the federal Clean Air Act, which the U.S. Environmental Protection Agency (USEPA) must regulate if it determines they pose an endangerment to public health or welfare.

USEPA ENDANGERMENT FINDING

On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the federal Clean Air Act (42 USC Section 7521) (USEPA 2023a):

- **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) in the atmosphere threaten the public health and welfare of current and future generations.
- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

FEDERAL CLEAN AIR ACT

The USEPA is responsible for implementing federal policy to address GHGs. The U.S. Supreme Court ruled in *Massachusetts v. Environmental Protection Agency*, 127 S.Ct. 1438 (2007), that CO₂ and other GHGs are pollutants under the federal Clean Air Act, which the USEPA must regulate if it determines they pose an endangerment to public health or welfare. In December 2009, USEPA issued an endangerment finding for GHGs under the federal Clean Air Act, setting the stage for future regulation.

The Federal Government administers a wide array of public-private partnerships to reduce the GHG intensity generated in the United States. These programs focus on energy efficiency, renewable energy, CH₄ and other non-CO₂ gases, agricultural practices, and implementation of technologies to achieve GHG reductions. USEPA implements numerous voluntary programs that contribute to the reduction of GHG emissions. These programs (e.g., the ENERGY STAR labeling system for energy-efficient products) play a significant role in encouraging voluntary reductions from large corporations, consumers, industrial and commercial buildings, and many major industrial sectors.

ENERGY POLICY ACT (EPACT); ENERGY POLICY ACT; ENERGY INDEPENDENCE AND SECURITY ACT

Refer to Section 3.6, *Energy*, for a detailed discussion of these regulations.

USEPA REPORTING RULE

The USEPA adopted a mandatory GHG reporting rule in September 2009 (USEPA 2023d). The rule would require suppliers of fossil fuels or entities that emit industrial greenhouse gases, manufacturers of vehicles and engines,

and facilities that emit 25,000 metric tons or more per year of GHG emissions to submit annual reports to the USEPA beginning in 2011 (covering the 2010 calendar year emission). Vehicle and engine manufacturers were required to begin reporting GHG emissions for model year 2011.

FUEL ECONOMY STANDARDS

On September 15, 2009, the National Highway Traffic Safety Administration (NHTSA) and USEPA announced a proposed joint rule that would explicitly tie fuel economy to GHG emissions reductions requirements. The proposed new CAFÉ Standards (DOT 2009) would cover automobiles for model years 2012 through 2016 and would require passenger cars and light trucks to meet a combined, per mile, carbon dioxide emissions level. It was estimated that by 2016, this GHG emissions limit could equate to an overall light-duty vehicle fleet average fuel economy of as much as 35.5 mpg. The proposed standards would require model year 2016 vehicles to meet an estimated combined average emission level of 250 grams of carbon dioxide per mile under USEPA's GHG program.

On November 16, 2011, USEPA and NHTSA issued a joint proposal to extend the national program of harmonized GHG and fuel economy standards to model year 2017 through 2025 passenger vehicles. In August 2012, President Obama finalized standards that will increase fuel economy to the equivalent of 54.5 mpg for cars and light-duty trucks by model year 2025.

On January 12, 2017, USEPA Administrator Gina McCarthy signed her determination to maintain the GHG emissions standards for model years 2022–2025 vehicles. Her final determination found that automakers are well positioned to meet the standards at lower costs than previously estimated (USEPA 2023e).

On March 15, 2017, the new USEPA Administrator Scott Pruitt and Department of Transportation Secretary Elaine Chao announced that USEPA intended to reconsider the final determination, issued on January 12, 2017, that recommended no change to the GHG standards for light-duty vehicles for model years 2022–2025 (USEPA 2023e).

On April 2, 2018, the Administrator signed the Mid-term Evaluation Final Determination, which finds that the model year 2022–2025 greenhouse gas standards are not appropriate in light of the record before USEPA and, therefore, should be revised (USEPA 2023e).

On September 19, 2019, under the Safer, Affordable, Fuel-Efficient (SAFE) Vehicles Rule, which amended the CAFE standards and tailpipe CO₂ emissions standards for passenger cars and light trucks and establishes new standards covering model years 2021–2026 (USEPA 2020). These standards set a combined fleet wide average of 36.9 to 37 for the model years affected (NHTSA, undated).

In February 2022, the USEPA the Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards went into effect (Federal Register 2021). This final rule revises current GHG standards beginning with model year 2023–2026 vehicles, and it established the most stringent GHG standards ever set for the light-duty vehicle sector that are expected to result in average fuel economy label values of 40 mpg, while the standards they replace (the SAFE rule standards) would achieve only 32 mpg in model year 2026 vehicles (USEPA 2021b).

HEAVY-DUTY VEHICLE PROGRAM

In May 2010, former President Barack Obama issued a Presidential Memorandum Regarding Fuel Efficiency Standards requesting that USEPA and NHTSA take additional coordinated steps to produce a new generation of clean vehicles (The White House 2010). In response, USEPA and NHTSA adopted regulations governing Medium-

and Heavy-Duty Greenhouse Gas Emissions and Fuel Efficiency (Title 40, Code of Federal Regulations, Chapter I) on September 15, 2011 (most recently amended on August 16, 2013), to establish the first fuel efficiency requirements for medium- and heavy-duty vehicles beginning with the model year 2014 through model year 2018. On February 18, 2014, the President directed USEPA and NHTSA to set the next round of fuel efficiency standards for Medium- and heavy-duty vehicles (beyond model year 2018) that will build on the existing standards to further reduce fuel consumption through the application of advanced cost-effective technologies and continue to improve the efficiency of moving goods across the United States. In October 2016, USEPA and NHTSA adopted Phase 2 GHG and fuel efficiency standards for medium- and heavy-duty engines and vehicles (USEPA 2023b).

CLEAN POWER PLAN

In 2015, USEPA published the Clean Power Plan (80 Fed. Reg. 64661, October 23, 2015) (USEPA 2023f). The Clean Power Plan sets achievable standards to reduce CO₂ emissions by 32 percent from 2005 levels by 2030. This Plan establishes final emissions guidelines for states to follow in developing plans to reduce GHG emissions from existing fossil fuel-fired electric generating units (EGUs). Specifically, USEPA is establishing (1) CO₂ emission performance rates representing the best system of emission reduction (BSER) for two subcategories of existing fossil-fuel-fired EGUs, fossil-fuel-fired electric utility steam generating units and stationary combustion turbines; (2) state-specific CO₂ goals reflecting the CO₂ emission performance rates; and (3) guidelines for the development, submittal and implementation of state plans that establish emission standards or other measures to implement the CO₂ emission performance rates, which may be accomplished by meeting the state goals. This final rule would continue progress already under way in the United States to reduce CO₂ emissions from the utility power sector. On February 9, 2016, the Supreme Court (Order No. 15A773) stayed implementation of the Clean Power Plan pending judicial review. As directed by Executive Order on Energy Independence (The White House 2017a), the USEPA officially repealed the Clean Power Plan in June 2019 and issued the final Affordable Clean Energy rule in its place (USEPA 2019a).

AFFORDABLE CLEAN ENERGY RULE

The USEPA issued the Affordable Clean Energy (ACE) rule on June 19, 2019, in order to replace the Clean Power Plan. The ACE rule establishes emissions guidelines for states to use when developing plans to limit carbon dioxide at coal-fired power plants. Specifically, the ACE rule aims at improving the heat rate as the best system of emissions reductions for carbon dioxide at coal-fired power plants and these improvements can be made at individual facilities. States will have three years to submit plans. The USEPA estimates that the ACE rules will result in a reduction of CO₂ emissions from the electricity sector by as much as 35 percent below 2005 levels by 2030 (USEPA 2019a).

FEDERAL HIGHWAY ADMINISTRATION'S CLIMATE CHANGE AND EXTREME WEATHER VULNERABILITY ASSESSMENT FRAMEWORK

Published in December 2012, the Climate Change and Extreme Weather Vulnerability Assessment Framework is a guidance document for transportation agencies to assess their vulnerability to climate change and extreme weather events. Objectives for a vulnerability assessment may include siting new assets in areas less vulnerable to climate change, educating staff regarding overall climate risks to the agency's transportation system, or informing the development of adaptation strategies. Based on these objectives, an agency can then select and characterize relevant assets and identify climate variables for study. The vulnerability assessment is an iterative process; information gathered on assets may inform climate information needs and vice versa (DOT 2012).

EXECUTIVE ORDER 13990

On January 20, 2021, President Joe Biden signed Executive Order 13990, “Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis,” which calls for among other items: Immediate Review of Agency Actions Taken Between January 20, 2017, and January 20, 2021; accounting for the Benefits of Reducing Climate Pollution; and revoking Executive Order 13783 of March 28, 2017 (Promoting Energy Independence and Economic Growth).

CLIMATE POLLUTION REDUCTION GRANTS

Pursuant to Section 60114 of the Inflation Reduction Act (H.R. 5376, as amended by the Senate), the USEPA’s Climate Pollution Reduction Grants (CPRG) Program will provides funding of \$250 million for noncompetitive planning grants and \$4.6 billion for competitive implementation grants to states, local governments, tribes, and territories to develop and implement plans for reducing greenhouse gas emissions and other harmful air pollution. In August 2023, California is submitting its workplan for the CPRG planning grants outlining three proposed deliverables over four years: (1) Priority Climate Action Plan; (2) Comprehensive Climate Action Plan; (3) Status Report that reflects actions and emissions reductions statewide (CARB 2023e). With the CPRG, California sees an opportunity to not only leverage funding for the specific intended and authorized purposes of this program, but also to deliver the steep GHG reductions needed to contribute to the United States commitment under the Paris Accord (CARB 2023f).

STATE

COASTAL ACT

The California Coastal Act of 1976 directs the California Coastal Commission (Coastal Commission) to protect and enhance the State’s coastal resources (California Public Resources Code Division 20). The Coastal Commission has planning, regulatory, and permitting authority over all development within the coastal zone, whose landward boundary varies with location. The Act governs coastal hazards for new development, mandating that it minimize risks to life and property in areas of high flood. New development must be located such that it will not be subject to erosion or stability hazard over the course of its design life, and construction of protective devices (e.g., seawalls, revetment) that substantially alter natural land forms along bluffs and cliffs are not permitted (Section 30253).

The Coastal Commission’s mandate extends to climate change, including sea level rise; however, the agency is currently assessing how best to address sea level rise and other challenges resulting from climate change. The Coastal Commission partners with local governments to form Local Coastal Programs (LCPs), transferring the power to regulate development within the coastal zone to cities and counties. Within the Bay Area, all of San Mateo, San Francisco, Marin, and Sonoma counties, along with the cities of Daly City, Pacifica and Half Moon Bay have certified LCPs. Any changes in the Coastal Commission’s policies and/or regulations with respect to sea level rise may ultimately require revisions to LCPs.

The Coastal Commission bases its standard of review for Coastal Development Permits on the Chapter 3 policies of the California Coastal Act. Sections 30235, 30236, and 30253 focus on coastal hazards and shoreline development, and provide the primary basis for how the Coastal Commission considers sea level rise impacts on proposed projects. These policies requiring protection of life, property, and coastal resources are complimented by other statutes such as AB 2800, SB1 2030(e), and SB 743 directing the transportation system to mitigate, minimize, and adapt to climate change.

Furthermore, in 2021, SB 1 (Coastal resources: sea level rise) was signed into law by Governor Newsom which added several provisions to the Coastal Act which mandates a more explicit consideration of sea level rise (Sections 30270 and 30001.5 (f)) which is of direct relevance for the transportation system.

- Coastal Act Section 30270 states: The commission shall take into account the effects of sea level rise in coastal resources planning and management policies and activities in order to identify, assess, and, to the extent feasible, avoid and mitigate the adverse effects of sea level rise.
- Coastal Act Section 30001.5 (f) states: the basic goals of the state for the coastal zone are to [...] Anticipate, assess, plan for, and, to the extent feasible, avoid, minimize, and mitigate the adverse environmental and economic effects of sea level rise within the coastal zone.
- Coastal Act Section 30235 states: Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. Existing marine structures causing water stagnation contributing to pollution problems and fish kills should be phased out or upgraded where feasible.
- Coastal Act Section 30236 states: Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (1) necessary water supply projects, (2) flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) developments where the primary function is the improvement of fish and wildlife habitat.
- Coastal Act Section 30253 states: New development [defined in Section 30106] shall: (a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard; (b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs; (c) Be consistent with requirements imposed by an air pollution control district or the State Air Resources Board as to each particular development; (d) Minimize energy consumption and vehicle miles traveled; (e) Where appropriate, protect special communities and neighborhoods that, because of their unique characteristics, are popular visitor destination points for recreational uses.

SENATE BILL 1078, SENATE BILL 107, EXECUTIVE ORDER S-14-08, EXECUTIVE ORDER S-21-09, AND SENATE BILL 100

On September 12, 2002, Governor Gray Davis signed Senate Bill (SB) 1078 (Chapter 516, Statutes of 2002) requiring California to generate 20 percent of its electricity from renewable energy by 2017. SB 107 (Chapter 464, Statutes of 2006), signed by the Governor on September 26, 2006, changed the due date for this goal from 2017 to 2010. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08, which established a Renewables Portfolio Standard goal for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020 (Office of the Governor, Arnold Schwarzenegger 2008). Increased use of renewable energy sources will decrease California's reliance on fossil fuels, reducing emissions of GHGs from the energy sector. In April 2011, SB X1-2 required that all electricity retailers adopt the new RPS goals providing 20 percent renewable sources by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020.

Executive Order S-21-09 directs CARB to adopt regulations to increase California’s Renewables Portfolio Standard (RPS) to 33 percent by 2020 (California State Library 2009). The target was signed into law as SB 2 by Governor Brown in April 2011. This builds upon SB 1078 (2002), which established the California RPS program, requiring 20 percent renewable energy by 2017, and SB 107 (2006), which advanced the 20 percent deadline to 2010. SB 350 of 2015 (Chapter 547, Statutes of 2015) increased the renewable portfolio standard to 50 percent by the year 2030. In September 2018, SB 100 was approved by Governor Brown. SB 100 requires an updated goal of 60 percent renewable energy resources by the year 2030, and 100 percent zero-carbon energy by the year 2045.

ASSEMBLY BILL 1493

In September 2002, AB 1493 (Chapter 200, Statutes of 2002) (referred to as Pavley I) (Assembly Bill 1493 2002) was enacted, requiring the development and adoption of regulations to achieve “the maximum feasible reduction of greenhouse gases” emitted by noncommercial passenger vehicles, light-duty trucks, and other vehicles used primarily for personal transportation in the state by January 1, 2005. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as “LEV (Low Emission Vehicle) III GHG” will cover 2017 to 2025 (13 Cal. Code Regs. Section 1900 et seq.) (CARB 2022d). Fleet average emission standards were to reach a 22 percent reduction by 2012 and 30 percent by 2016.

On March 30, 2020, the SAFE Rule was finalized and published in the Federal Register, commencing a review period (see Section, 3.8.2, *Regulatory Framework*, under the discussion of federal fuel economy standards for additional details regarding the SAFE Rule). Subsequent legal challenges from a coalition of states, including California, and private industry groups were issued. On September 27, 2019, the USEPA withdrew the waiver it had previously provided to California for the State’s GHG and zero-emission vehicle (ZEV) programs under Section 209 of the Clean Air Act (84 FR 5130). The withdrawal of the waiver was effective November 26, 2019. In response, several states, including California, filed a lawsuit challenging the withdrawal of the USEPA waiver (United States District Court for the District Court of Columbia, *State of California vs. Chao*, Case 1:19-cv-02826, 2019). On March 14, 2022, the USEPA issued a notice of decision to reinstate California’s Clean Air Act waiver for its Advanced Clean Car regulations (Federal Register 2022).

SENATE BILL 1

SB 1 (2006) (Chapter 132, Statutes of 2006) set a goal to install 3,000 megawatts of new solar capacity by 2017, moving the state toward a cleaner energy future and helping lower the cost of solar systems for consumers. The “Million Solar Roofs” Program is a ratepayer-financed incentive program aimed at transforming the market for rooftop solar systems by driving down costs over time. It provides up to \$3.3 billion in financial incentives that decline over time.

Furthermore, as stated above in 2021, SB 1 (Coastal resources: sea level rise) was signed into law by Governor Newsom, which added several provisions to the Coastal Act which mandates a more explicit consideration of sea level rise (Sections 30270 and 30001.5(f)) which is of direct relevance for the transportation system (see Section 3.8.2, *Regulatory Framework*, under Coastal Act for additional details).

SENATE BILL 253

SB 253, also known as the Climate Corporate Data Accountability Act, was signed October 14, 2023, requires companies with greater than \$1 billion in annual revenues to file annual reports publicly disclosing their scope 1, 2 and 3 emissions (direct, indirect, and supply chain greenhouse gas emissions) to the California Air Resources

Board and verified by an independent and experienced third-party provider. SB 253 requires these companies to report on their direct and indirect emissions from energy consumption for the previous year (scope 1 and 2 GHG emissions, respectively) starting in 2026. SB 253 requires these companies to also to report on their scope 3 emissions (their supply chain greenhouse gas emissions) for the previous year in addition to their scope 1 and 2 emissions starting in 2027. Companies must conform to the Greenhouse Gas Protocol (GHG Protocol) standards and guidance to comply with SB 253.

SENATE BILL 261

SB 261, also known as the Climate-Related Financial Risk Act, signed October 14, 2023, requires companies with \$500 million in annual revenues to prepare biennial reports disclosing climate-related financial risk and measures they have adopted to reduce and adapt to that risk, with the first report due by January 1, 2026. The climate-related financial risk reports disclose climate-related financial risks consistent with recommendations from the Task Force on Climate-Related Financial Disclosure (TCFD) framework.

ASSEMBLY BILL 43

AB 43, signed October 7, 2023, requires CARB, in consultation with relevant stakeholders including, but not limited to, the California Building Standards Commission, the Department of Housing and Community Development, and the State Energy Resources Conservation and Development Commission, to develop a framework for measuring the average carbon intensity of the materials used in the construction of new buildings, including those for residential uses by December 31, 2026. CARB is also required to develop by December 31, 2028, a comprehensive strategy for the state's building sector to achieve a 40 percent net reduction in greenhouse gas emissions of building materials as soon as possible, but no later than December 31, 2035.

SENATE BILL 1368

SB 1368, signed September 29, 2006, is a companion bill to AB 32, which requires the CPUC and the CEC to establish GHG emission performance standards for the generation of electricity. These standards also generally apply to power that is generated outside of California and imported into the State. SB 1368 provides a mechanism for reducing the emissions of electricity providers, thereby assisting CARB to meet its mandate under AB 32

ASSEMBLY BILL 32

The State of California has implemented numerous laws targeting GHG emissions. Chief among these is the California Global Warming Solutions Act of 2006 (AB 32) (Health & Safety Code Section 38500 et seq.) (AB 32 2006). AB 32 represents the first enforceable statewide program to limit GHG emissions from all major sectors with penalties for noncompliance. AB 32 requires the State of California to reduce its emissions to 1990 levels by 2020 and establishes key deadlines for certain actions the state must take to achieve the reduction target. The first action under AB 32 resulted in CARB's adoption of a report listing three specific early action GHG reduction measures on June 21, 2007. On October 25, 2007, CARB approved an additional six early action GHG reduction measures under AB 32 (CARB 2007a).

As required under AB 32, on December 6, 2007, CARB approved the 1990 GHG emissions inventory, thereby establishing the emissions limit for 2020. The 2020 emissions limit was set at 427 MMTCO_{2e}, since updated to 431 MMTCO_{2e} (CARB 2017a). The inventory indicated that in 1990, transportation, with 35 percent of the state's total emissions, was the largest single sector generating carbon dioxide; followed by industrial emissions, 24

percent; imported electricity, 14 percent; in-state electricity generation, 11 percent; residential use, 7 percent; agriculture, 5 percent; and commercial uses, 3 percent (figures are based on the 1990 inventory). AB 32 does not require individual sectors to meet their individual 1990 GHG emissions inventory; the total statewide emissions are required to meet the 1990 target by 2020.

In addition to the 1990 emissions inventory, CARB also adopted regulations requiring the mandatory reporting of GHG emissions for large facilities on December 6, 2007 (17 Cal. Code Regs. Section 95100 et seq.) (CARB 2007b). The mandatory reporting regulations require annual reporting from the largest facilities in the state, which account for approximately 94 percent of GHG emissions from industrial and commercial stationary sources in California. About 800 separate sources fall under the new reporting rules and include electricity generating facilities, electricity retail providers and power marketers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and industrial sources that emit over 25,000 tons of CO₂ each year from on-site stationary combustion sources. Affected facilities began tracking their emissions in 2008, and reported them beginning in 2009, with a phase-in process to allow facilities to develop reporting systems and train personnel in data collection. Emissions for 2008 could be based on best available emission data. Beginning in 2010, however, emissions reporting requirements became more rigorous and are subject to third-party verification. Verification take place annually or every three years, depending on the type of facility.

SENATE BILL 32 AND ASSEMBLY BILL 197

On September 8, 2016, California signed into law SB 32 and AB 197 (the combined bills are herein referred to as SB 32), which adds Section 38566 to the Health and Safety Code and requires a commitment to reducing statewide GHG emissions by 2020 to 1990 levels and by 2030 to at least 40 percent less than 1990 levels. SB 32 was passed with companion legislation AB 197 Chapter 250, Statutes of 2016), which provides greater legislative oversight of CARB's GHG regulatory programs, requires CARB to account for the social costs of GHG emissions, and establishes a legislative preference for direct reductions of GHG emissions.

CLIMATE CHANGE SCOPING PLANS

AB 32 requires CARB to prepare a Climate Change Scoping Plan for achieving the maximum technologically feasible and cost-effective GHG emission reduction by 2020 and to update this plan at least every five years (HSC Sections 38561(a) and (h)). SB 32 codified the State GHG reduction target for 2030 and is included in the more recently updated Climate Change Scoping Plans.

2008 CLIMATE CHANGE SCOPING PLAN

In December 2008, CARB adopted a Climate Change Scoping Plan (initial Scoping Plan) (CARB 2008) indicating how emission reductions will be achieved from significant sources of GHGs via regulations, market mechanism, and other actions (CARB 2013b).

The 2008 Climate Change Scoping Plan proposed a "comprehensive set of actions designed to reduce overall carbon GHG emissions in California, improve our environment, reduce our dependence on oil, diversify our energy sources, save energy, create new jobs, and enhance public health" (CARB 2008). The 2008 Climate Change Scoping Plan had a range of GHG reduction actions which included direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms, such as a cap-and-trade system, and an AB 32 implementation fee to fund the program.

The 2008 Climate Change Scoping Plan called for a “coordinated set of solutions” to address all major categories of GHG emissions. Transportation emissions were addressed through a combination of higher standards for vehicle fuel economy, implementation of the Low Carbon Fuel Standard (LCFS), and greater consideration to reducing trip length and generation through land use planning and transit-oriented development. Buildings, land use, and industrial operations were encouraged and, sometimes, required to use energy more efficiently. Utility energy providers were required to include more renewable energy sources through implementation of the Renewables Portfolio Standard.³ Additionally, the 2008 Climate Change Scoping Plan emphasized opportunities for households and businesses to save energy and money through increasing energy efficiency. It indicates that substantial savings of electricity and natural gas will be accomplished through “improving energy efficiency by 25 percent.”

The 2008 Climate Change Scoping Plan identified several specific issues relevant to development projects, including:

- The potential of using the green building framework as a mechanism, which could enable GHG emissions reductions in other sectors (i.e., electricity, natural gas), noting that:

A Green Building strategy will produce greenhouse gas savings through buildings that exceed minimum energy efficiency standards, decrease consumption of potable water, reduce solid waste during construction and operation, and incorporate sustainable materials. Combined, these measures can also contribute to healthy indoor air quality, protect human health, and minimize impacts to the environment.

- The importance of supporting the Department of Water Resources’ work to implement the Governor’s objective to reduce per capita water use by 20 percent by 2020. Specific measures to achieve this goal include water use efficiency, water recycling, and reuse of urban runoff. The Climate Change Scoping Plan notes that water use requires significant amounts of energy, including approximately one-fifth of Statewide electricity.
- Encouraging local governments to set quantifiable emission reduction targets for their jurisdictions and use their influence and authority to encourage reductions in emissions caused by energy use, waste and recycling, water and wastewater systems, transportation, and community design.

As required by HSC Division 25.5, CARB approved the 1990 GHG emissions inventory, thereby establishing the emissions reduction target for 2020. The 2020 emissions reduction target was originally set at 427 MMTCO_{2e} using the GWP values from the IPCC SAR. Forecasting the emissions that would occur in 2020 if no actions are taken was necessary to assess the scope of the reductions California must make to return to the 1990 emissions level by 2020 as required by AB 32. CARB originally defined the “business-as-usual,” or BAU, scenario as emissions in the absence of any GHG emission reduction measures discussed in the 2008 Climate Change Scoping Plan, as approximately 596 MMTCO_{2e} (using GWP values from the IPCC SAR). For example, in further explaining CARB’s BAU methodology, CARB assumed that all new electricity generation would be supplied by natural gas plants, no further regulatory action would impact vehicle fuel efficiency, and building energy efficiency codes would be held at 2005 standards. Therefore, under these original projections, the State would have had to reduce its 2020 BAU emissions by 28.4 percent to meet the 1990 target of 427 MMTCO_{2e}.

³ For a discussion of Renewables Portfolio Standard, refer to subsection California Renewables Portfolio Standard.

2014 CLIMATE CHANGE SCOPING PLAN UPDATE

The First Update to the Climate Change Scoping Plan (2014 Scoping Plan) was approved by CARB in May 2014 and built upon the initial Climate Change Scoping Plan with new strategies and recommendations (CARB 2014). In 2014, CARB revised the target using the GWP values from the IPCC AR4 and determined the 1990 GHG emissions inventory and 2020 GHG emissions limit to be increased to 431 MMTCO_{2e}. CARB also updated the State's 2020 BAU emissions estimate to account for the effect of the 2007–2009 economic recession, new estimates for future fuel and energy demand, and the reductions required by regulation that had recently been adopted for motor vehicles and renewable energy. CARB's projected Statewide 2020 emissions estimate using the GWP values from the IPCC AR4 was 509.4 MMTCO_{2e}. Therefore, under the First Update to the Climate Change Scoping Plan, the emission reductions necessary to achieve the 2020 emissions target of 431 MMTCO_{2e} would have been 78.4 MMTCO_{2e}, or a reduction of GHG emissions by approximately 15.4 percent, (down from 28.4 percent).

The stated purpose of the First Update was 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 percent below 1990 levels by 2050” (CARB 2014, p. 4). 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 percent below 1990 levels by 2050 if the State realizes the expected benefits of existing policy goals (CARB 2014).

In conjunction with the First Update, CARB identified “six key focus areas comprising major components of the State's economy to evaluate and describe the larger transformative actions that will be needed to meet the State's more expansive emission reduction needs by 2050” (CARB 2014, p. 6). Those six areas are: (1) energy; (2) transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure); (3) agriculture; (4) water; (5) waste management; and (6) natural and working lands. The First Update identifies key recommended actions for each sector that will facilitate achievement of the 2050 reduction target.

Based on CARB's research efforts, it has a “strong sense of the mix of technologies needed to reduce emissions through 2050” (CARB 2014, p. 32). Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and the rapid market penetration of efficient and clean energy technologies.

The First Update discussed new residential and commercial building energy efficiency improvements, specifically identifying progress towards zero net energy buildings as an element of meeting mid-term and long-term GHG reduction goals. The First Update expressed CARB's commitment to working with the California Public Utilities Commission (CPUC) and California Energy Commission (CEC) to facilitate further achievements in building energy efficiency.

2017 CLIMATE CHANGE SCOPING PLAN UPDATE

In December 2017, CARB adopted California's 2017 Climate Change Scoping Plan (2017 Scoping Plan), which outlines the framework of action for achieving California's SB 32 2030 GHG target: a minimum of 40 percent reduction in GHG emissions by 2030 relative to 1990 levels. The 2030 target was intended to ensure that California remained on track to achieve the goal set forth by Executive Order B-30-15 to reduce statewide GHG emissions by 2050 to 80 percent below 1990 levels.

The 2017 Scoping Plan identified key sectors of the implementation strategy, which included improvements in low carbon energy, industry, transportation sustainability, natural and working lands, waste management, and water. Through a combination of data synthesis and modeling, CARB determined that the target statewide 2030 emissions limit is 260 MMTCO_{2e}, and that further commitments needed to be made to achieve an additional reduction of 50 MMTCO_{2e} beyond then-current policies and programs. Key elements of the 2017 Update included a proposed 20 percent reduction in GHG emissions from refineries and an expansion of the Cap-and-Trade program to meet the aggressive 2030 GHG emissions goal and ensure achievement of the 2050 limit set forth by E.O. B-30-15.

CARB's projected Statewide 2030 emissions took into account 2020 GHG reduction policies and programs (CARB 2017b). The 2017 Scoping Plan also addressed GHG emissions from natural and working lands of California, including the agriculture and forestry sectors. The majority of the reductions were identified to be from the continuation of the Cap-and-Trade regulation. Additional reductions were to be achieved from electricity sector standards (i.e., utility providers to supply 50 percent renewable electricity by 2030), doubling the energy efficiency savings at end uses. For the transportation sector, additional GHG reductions were to be achieved from the LCFS, implementing the short-lived GHG strategy (e.g., HCFs), and implementing the mobile source strategy and sustainable freight action plan. Implementation of mobile source strategies (cleaner technology and fuels) included the following:

- At least 1.5 million zero emission and plug-in hybrid light-duty electric vehicles by 2025
- At least 4.2 million zero emission and plug-in hybrid light-duty electric vehicles by 2030
- Further increase GHG stringency on all light-duty vehicles beyond existing Advanced Clean Cars regulations
- Medium- and heavy-duty GHG Phase 2
- Innovative Clean Transit: Transition to a suite of to-be-determined innovative clean transit options. Assumed 20 percent of new urban buses purchased beginning in 2018 will be zero emission buses with the penetration of zero-emission technology ramped up to 100 percent of new sales in 2030. Also, new natural gas buses, starting in 2018, and diesel buses, starting in 2020, meet the optional heavy-duty low-NO_x standard.
- Last Mile Delivery: New regulation that would result in the use of low NO_x or cleaner engines and the deployment of increasing numbers of zero-emission trucks primarily for Class 3–7 last mile delivery trucks in California. This measure assumes ZEVs comprise 2.5 percent of new Class 3–7 truck sales in local fleets starting in 2020, increasing to 10 percent in 2025 and remaining flat through 2030.
- Further reduce vehicle miles traveled (VMT) through continued implementation of SB 375 and regional Sustainable Communities Strategies; forthcoming Statewide implementation of SB 743; and potential additional VMT reduction strategies not specified in the Mobile Source Strategy but included in the document "Potential VMT Reduction Strategies for Discussion."

The 2017 Update indicated that stronger SB 375 GHG reduction targets will enable the State to make significant progress toward this goal, but alone will not provide all of the VMT growth reductions needed. It noted that there is a "gap" between what SB 375 can provide and what is needed to meet the State's 2030 and 2050 goals. The 2017 Update recommended that local governments consider policies to reduce VMT, including: land use and community design that reduces VMT; transit-oriented development; street design policies that prioritize transit, biking, and walking; and increasing low carbon mobility choices, including improved access to viable and affordable public transportation and active transportation opportunities.

The alternatives in the Scoping Plan were designed to consider various combinations of the recommended programs, as well as consideration of a carbon tax in the event the Cap-and-Trade regulation were not continued. However, in July 2017, the California Legislature voted to extend the Cap-and-Trade regulation to 2030. The 2017 Scoping Plan discussed the role of local governments in meeting the State's GHG reductions goals because local governments have jurisdiction and land use authority related to: community-scale planning and permitting processes, local codes and actions, outreach and education programs, and municipal operations (CARB 2017b). Furthermore, the 2017 Scoping Plan noted that local governments may have the ability to incentivize renewable energy, energy efficiency, and water efficiency measures (CARB 2017b).

2022 SCOPING PLAN FOR ACHIEVING CARBON NEUTRALITY

CARB adopted the Final 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) in December 2022 (CARB 2022a) as the third update to the initial plan adopted in 2008. The 2022 Scoping Plan is the most comprehensive Scoping Plan developed to date and supersedes the 2017 Scoping Plan.⁴ It identifies a pathway for the state across economic sectors to achieve new targets for carbon neutrality by 2045 and to reduce anthropogenic GHG emissions to at least 85 percent below 1990 levels, while also assessing the progress California is making toward reducing its GHG emissions by at least 40 percent below 1990 levels by 2030, as called for in SB 32 and laid out in the 2017 Scoping Plan (CARB 2017b). The 2022 Scoping Plan incorporates, coordinates, and leverages many existing and ongoing efforts and major climate legislation and executive orders issued since adoption of the 2017 Scoping Plan to reduce GHGs and air pollution, while identifying new clean technologies and energy. Given the focus on carbon neutrality, the 2022 Scoping Plan also includes discussion for the first time of the natural and working lands sectors as sources for both sequestration and carbon storage, and as sources of emissions as a result of wildfires. The 2022 Scoping Plan includes the Scoping Plan Scenario, which describes the types of technologies and energy needed to drastically reduce GHG emissions from the AB 32 Inventory sectors to keep California on track to achieve the SB 32 GHG reduction target for 2030 and become carbon neutral no later than 2045. The Scoping Plan Scenario achieves the AB 1279 target of 85 percent below 1990 levels by 2045, but it identifies a need to accelerate the 2030 target to 48 percent below 1990 levels (see 2022 Scoping Plan for additional details) (CARB 2022a). AB 1279 is discussed in more detail below.

CARB's 2022 Scoping Plan also concludes that a per capita reduction of at least 25 percent below 2019 levels by 2030 and 30 percent below 2019 levels by 2045 in light-duty VMT are needed to reduce overall transportation energy demand and meet the state's climate, air quality, and equity goals. However, the 2022 Scoping Plan explicitly recognizes that these targets are not regulatory requirements:

While CARB has included VMT reduction targets and strategies in the Scoping Plan and appendices, these targets are not regulatory requirements, but would inform future planning processes. CARB is not setting regulatory limits on VMT in the 2022 Scoping Plan; the authority to reduce VMT largely lies with state, regional, and local transportation, land use, and housing agencies, along with the Legislature and its budgeting choices.

Scoping Plan Appendix D (Local Actions) provides guidance for local jurisdictions, in particular for residential and mixed-use projects, to qualitatively evaluate and identify projects that are clearly consistent with the State's climate goals (see 2022 Scoping Plan for additional details) (CARB 2022a).

⁴ In litigation challenging the 2017 Scoping Plan, the Superior Court found that the issues were moot since the 2022 Scoping Plan superseded the 2017 Scoping Plan and the court could not order any appropriate remedy. See *The Two Hundred v. Cal. Air Resources Board*, Fresno Superior Court Case No. 18CECG01494, Order dated April 20, 2023.

Scoping Plan Appendix E (Sustainable and Equitable Communities) provides a Policy Framework to Advance Sustainable and Equitable Communities. Appendix E is directly relevant to SCSs and MPOs' implementation of SB 375 requirements on regional transportation planning. This policy framework looks to build more sustainable and equitable communities to help California meet the State's goal of achieving carbon neutrality no later than 2045 to prevent the most adverse impacts of climate change and building more inclusive and equitable places. Appendix E discusses opportunities for California to move away from a cars-first model and build communities and infrastructure that enable a wider range of access and mobility choices. Again, it is important to note that the per capita VMT reductions are not regulatory targets or requirements but could inform future policy and planning discussions.

Every sector of the economy in the state will need to begin to transition in this decade to meet these GHG reduction goals and achieve carbon neutrality no later than 2045 (see 2022 Scoping Plan for additional details) (CARB 2022a). The path forward is not dependent on one agency, one state, or even one country. However, the State can lead by engaging Californians and demonstrating how actions at the state, regional, and local levels of governments, as well as action at community and individual levels, can contribute to addressing the challenge.

ASSEMBLY BILL 811

AB 811 (2008) (Chapter 159, Statutes of 2008) authorizes California cities and counties to designate districts within which willing property owners may enter into contractual assessments to finance the installation of renewable energy generation and energy efficiency improvements that are permanently fixed to the property. These financing arrangements would allow property owners to finance renewable generation and energy efficiency improvements through low-interest loans that would be repaid as an item on the property owner's property tax bill.

SENATE BILL 375

SB 375 (Chapter 728, Sustainable Communities and Climate Protection Act of 2008), adopted in 2008, is a first-of-its-kind law to recognize the critical role of integrated land use planning, housing planning, and regional transportation planning to meet the State's climate goals. By coordinating these efforts, it is envisioned that vehicle congestion and travel can be reduced resulting in a corresponding reduction in emissions. SB 375 directed CARB to set regional targets to reduce GHG emissions for each of the State MPOs on a per capita basis. SB 375 requires that each MPO prepare a Sustainable Communities Strategy (SCS) that will reduce GHG emissions to achieve these regional targets.

SB 375 has three major components:

- Using the regional transportation planning process to achieve reductions in GHG emissions consistent with AB 32's goals.
- Offering California Environmental Quality Act (CEQA) incentives to encourage projects that are consistent with a regional plan that achieves emissions reductions.
- Coordinating the Regional Housing Needs Assessment (RHNA) process with the regional transportation planning process while maintaining local authority over land use decisions.

An SCS is a required component of the RTP. The SCS is a land use pattern for the region which, in combination with transportation policies and programs, strives to reduce emissions and helps meet CARB's targets for the

region. An alternative planning strategy (APS)⁵ must be prepared if the SCS is unable to reduce emissions and achieve the emissions reduction targets established by CARB. The APS to the SCS shows how the targets would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

SB 375 expressly provides that the SCS does not regulate the use of land, and further provides that local land use plans and policies (e.g., general plans) are not required to be consistent with either the RTP or SCS. CARB updated GHG emission reduction targets on March 22, 2018; CARB set reduction targets for the SCAG region at 8 percent for 2020 and 19 percent for 2035 in GHG per capita emissions from light-duty passenger vehicles as compared to 2005. This was an update to the previous 2035 GHG per capita emissions reduction target of 13 percent (CARB 2023d).

In accordance with SB 375, CARB is required to update the regional GHG emissions reduction targets every eight years for each of the State MPOs with each MPO's timeframe for updating its RTP under federal law until 2050. The next SB 375 targets for MPOs will likely consider the 2022 Scoping Plan (see detailed discussion of 2022 Scoping Plan below). Pursuant to SB 375, CARB must exchange technical information with the Department of Transportation, MPOs, local governments, and affected air districts and engage in a consultative process with public and private stakeholders prior to updating these targets.

According to CARB, the 2018 SB 375 GHG emissions reduction targets for all of the state's MPOs would result in a statewide reduction of 19 percent (compared to 18 percent expected to result from the prior 2010 targets). However, the 2017 Scoping Plan identified a 25 percent GHG emissions reduction as being needed to meet the transportation-sector (light-duty vehicles) GHG emissions reduction goals. The difference between the 19 percent reduction resulting from CARB's 2018 SB 375 targets and the 25 percent necessary reduction is referred to in other various CARB documents as the "gap." The 2022 Scoping Plan does not identify new GHG reduction targets for light-duty vehicles but indicates that further action must be implemented in the transportation sector beyond phasing out combustion technology and producing cleaner fuels, i.e., reduction in VMT. CARB explains that managing total demand for transportation energy by reducing the miles people need to drive on a daily basis is also critical as the state aims for a sustainable transportation sector in a carbon neutral economy. Although GHG emissions are declining due to cleaner vehicles and fuels, rising VMT can offset the effective benefits of adopted regulations.⁶

SENATE BILL 743

SB 743 (Steinberg) was signed into law by Governor Jerry Brown on September 27, 2013, and encourages development of mixed-use, transit-oriented infill projects by (1) establishing new CEQA exemptions for transit-oriented developments located in Transit Priority Areas (TPAs) that are consistent with an adopted Specific Plan;

⁵ Pursuant to SB 375, for purposes of CEQA, APS shall not constitute a land use plan, policy, or regulation, and the inconsistency of a project with an APS shall not be a consideration in determining whether a project may have an environmental effect.

⁶ CARB has indicated that guidance with respect to how the aggressive VMT reduction targets in the 2022 Scoping Plan are to be achieved will be forthcoming (including updated SB 375 targets in 2026); SCAG has expressed concern regarding the documentation and support for CARB's 2022 Scoping Plan VMT reduction targets and that these targets may not be wholly achievable through SCS strategies. As evidenced in CARB's SB 150 report, achieving VMT reductions in California is difficult. The 2022 Scoping Plan relies on many of the same or similar strategies already included in the SCS, it is unclear whether implementation of the suggested strategies in Appendix E of the Scoping Plan would be sufficient to reach the VMT and GHG reduction targets in the 2022 Scoping Plan. See SCAG's June 24, 2022, letter to CARB re: Draft 2022 Climate Change Scoping Plan. See <https://www.arb.ca.gov/lists/com-attach/4427-scopingplan2022-AXICZwZmVGBVDANg.pdf>.

(2) eliminating the requirement to evaluate aesthetic and parking impacts in those targeted development areas; and (3) directing the OPR to develop an alternative metric to evaluate transportation-related impacts under CEQA.⁷

SB 743 directed OPR to identify appropriate criteria for the evaluation of transportation impacts for CEQA purposes. OPR selected VMT as the preferred CEQA transportation impact analysis metric and applied their discretion to require its use statewide. Vehicle level of service (LOS) and similar measures related to delay are not identified as appropriate metrics for determining the significance of transportation impacts under CEQA although they may still be appropriate for evaluation of projects as part of the planning process. The SB 743 guidance indicates that each jurisdiction throughout the state had until July 1, 2020, to adopt VMT as the metric for evaluation of transportation impacts under CEQA.

ASSEMBLY BILL 1279

AB 1279 establishes 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 at least 85 percent below 1990 levels. The bill requires CARB to ensure that Scoping Plan updates identify and recommend measures to achieve carbon neutrality, and to identify and implement policies and strategies that enable CO₂ removal solutions and carbon capture, utilization, and storage (CCUS) technologies. This bill is reflected directly in 2022 Scoping Plan.

SENATE BILL 1383

SB 1383 (Chapter 395, Statutes of 2016) sets forth legislative direction for control of short-lived climate pollutants (SLCPs). SLCPs include black carbon (soot), methane, and fluorinated gases (F-gases). SB 1383 requires CARB, no later than January 1, 2018, to approve and begin implementing its SLCP strategy to achieve the following reductions in emissions by 2030 compared to 2013 levels: methane by 40 percent, hydrofluorocarbons by 40 percent, and black carbon (non-forest) by 50 percent. The bill specifies targets for reducing organic waste in landfills and requires CARB to adopt regulations to be implemented on or after January 1, 2024, specific to the dairy and livestock industry, requiring a 40 percent reduction in methane emissions below 2013 levels by 2030, if certain conditions are met. Lastly, the bill requires CalRecycle to adopt regulations to take effect on or after January 1, 2022, to achieve specified targets for reducing organic waste in landfills.

SENATE BILL 150

SB 150 (Allen, Chapter 646, Statutes of 2017) requires CARB to issue a report every four years analyzing the progress made toward meeting the regional SB 375 GHG emissions reduction targets. The progress report is required to include data-supported metrics for strategies utilized to meet the targets, a discussion of best practices, and challenges faced by MPOs in meeting the targets, including the effect of state policies and funding.

The 2018 Progress Report was the first report required under SB 150 and found that California was not on track to meet GHG reductions expected under SB 375 for 2020, largely due to the fact that statewide passenger vehicle travel per capita was increasing (CARB 2018a). Overall, California met its 2020 climate target ahead of schedule, and positive, on-the-ground changes had been made to improve the alignment of transportation, land use, and housing policies with state goals since SB 375 was enacted (e.g., travel patterns, funding for high-quality transit and making communities safe and convenient for walking and cycling, and building homes at all income levels

⁷ For a further discussion of SB 743, see Section 3.17, *Transportation*.

near jobs and other opportunities) (CARB 2018a). The 2018 Progress Report called for more and accelerated action to achieve public health, equity, economic, and climate success. To that effect, the Report included a discussion of 68 best practices, eight SCS implementation challenges, and CARB's suggestions on ways to overcome the challenges.

The subsequent 2022 Progress Report similarly found that California was still not reducing enough GHG emissions from personal vehicle travel as needed to meet climate commitments and as targeted under SB 375 (CARB 2022e). However, primarily as a result of stay-at-home orders and other personal choices in response to the COVID-19 pandemic, many regions met their GHG reduction targets in 2020 (CARB 2022e). The 2022 Progress Report also recognized overall growth and development in the State have been more compact since 2005. The four largest MPO regions, which include the SCAG region, have increased in compactness substantially since 2005 (CARB 2022e). While the passenger vehicle and light-duty trucks per capita VMT and GHG emissions relative to 2005 in the State continued to rise, the 2022 Progress Report showed that the regional passenger vehicle and light-duty trucks per capita VMT and GHG emissions in the SCAG region were both trending in the right directions (decreasing trends) (CARB 2022f).

ADVANCED CLEAN CARS REGULATIONS

In 2012, CARB approved the Advanced Clean Cars program, an emissions-control program for model years 2015–2025 (CARB 2023a). The components of the Advanced Clean Cars program include the Low-Emission Vehicle (LEV) regulations that reduce criteria pollutants and GHG emissions from light- and medium-duty vehicles, and the ZEV regulation, which requires manufacturers to produce an increasing number of pure ZEVs (meaning battery electric and fuel cell electric vehicles), with provisions to also produce plug-in hybrid electric vehicles (PHEV) in the 2018 through 2025 model years (CARB 2023a). During the March 2017 Midterm Review, CARB voted unanimously to continue with the vehicle GHG emission standards and the ZEV program for cars and light trucks sold in California through 2025 (CARB 2017d). Effective November 26, 2019, the federal SAFE Vehicles Rule Part One: One National Program withdrew the California waiver for the GHG and ZEV programs under Section 209 of the Clean Air Act, which revokes California's authority to implement the Advanced Clean Cars and ZEV mandates. In response, several states including California filed a lawsuit challenging the withdrawal of the USEPA waiver.⁸ On March 14, 2022, the USEPA issued a notice of decision to reinstate California's Clean Air Act waiver for its Advanced Clean Car regulations.⁹

In addition, Governor Gavin Newsom signed an executive order (Executive Order No. N-79-20) on September 23, 2020, that phases out sales of new gas-powered passenger cars by 2035 in California with an additional 10-year transition period for heavy vehicles. The Executive Order also tasked CARB to develop and propose regulations that require increasing volumes of zero-electric passenger vehicles, medium- and heavy-duty vehicles, drayage trucks, and off-road vehicles toward their corresponding targets of 100 percent zero-emission by 2035 or 2045, as listed above.

The primary mechanism for achieving the ZEV target for passenger cars and light trucks is CARB's Advanced Clean Cars II (ACC II) Program. The ACC II regulations, adopted by CARB in 2022, focus on post-2025 model year light-duty vehicles, as requirements are already in place for new vehicles through the 2025 model year (CARB 2023a).

⁸ United States District Court for the District Court of Columbia, *State of California vs. Chao*, Case 1:19-cv-02826, 2019.

⁹ California State Motor Vehicle Pollution Control Standards; Advanced Clean Car Program; Reconsideration of a Previous Withdrawal of a Waiver of Preemption; Notice of Decision, 87 Fed. Reg. 14,332 (Mar. 14, 2022).

CALIFORNIA CAP-AND-TRADE PROGRAM

Authorized by the California Global Warming Solutions Act of 2006 (AB 32), the Cap-and-Trade Program is a core strategy that California is using to meet its statewide GHG reduction targets for 2020 and 2030, and ultimately achieve an 80 percent reduction from 1990 levels by 2050. Pursuant to its authority under AB 32, CARB has designed and adopted a California Cap-and-Trade Program to reduce GHG emissions from major sources (deemed “covered entities”) by setting a firm cap on statewide GHG emissions and employing market mechanisms to achieve AB 32’s emission-reduction mandate of returning to 1990 levels of emissions by 2020 (17 CCR Sections 95800 to 96023).

In September 2012, CARB adopted a California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms, which established the cap-and-trade program to manage GHG emissions, for California (CARB 2013Aa). The cap-and-trade program is a market-based approach wherein the government determines an overall emission target, or “cap,” for a particular set of facilities. The cap is the total amount of emissions that all of the facilities can produce. Tradable emissions allowances totaling the overall emissions cap are distributed by auction or given out amongst the particular set of facilities. The emissions allowances can be traded amongst the facilities.

Under the Cap-and-Trade Program, an overall limit is established for GHG emissions from capped sectors (e.g., electricity generation, petroleum refining, cement production, and large industrial facilities that emit more than 25,000 metric tons CO₂e per year) and declines over time, and facilities subject to the cap-and-trade permits to emit GHGs. The statewide cap for GHG emissions from the capped sectors commenced in 2013 and declines over time, achieving GHG emission reductions throughout the program’s duration (see generally 17 CCR Sections 95811, 95812). On July 17, 2017, the California Legislature passed Assembly Bill 398, extending the Cap-and-Trade Program through 2030. Each covered entity with a compliance obligation is required to surrender “compliance instruments”¹⁰ for each MTCO₂e of GHG they emit. Covered entities are allocated free allowances in whole or part (if eligible), and can buy allowances at auction, purchase allowances from others, or purchase offset credits. The cap-and-trade regulation provides a firm cap, helping to ensure that the 2020 and 2030 statewide emission limits will not be exceeded. An inherent feature of the Cap-and-Trade Program is that it does not direct GHG emissions reductions in any discrete location or by any particular source. Rather, GHG emissions reductions are ensured on a state-wide basis. The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported (California Code of Regulations 17, Section 95811(b)). Accordingly, for projects that are subject to CEQA, GHG emissions from electricity consumption are covered by the Cap-and-Trade Program. The Cap-and-Trade Program also covers fuel suppliers (natural gas and propane fuel providers and transportation fuel providers) to address emissions from such fuels and from combustion of other fossil fuels not directly covered at large sources in the Program’s first compliance period (California Code of Regulations 17, Section 95811, 95812(d)).

The Program applies to emissions that cover approximately 80 percent of the State’s GHG emissions. Demonstrating the efficacy of AB 32 policies, California achieved its AB 32 2020 GHG Reduction Target four years earlier than mandated. The largest reductions were the result of increased renewable electricity in the electricity sector, which is a covered sector in the Cap-and-Trade Program.

In the FY 2014-2015 State Budget approved by former Governor Jerry Brown, the state-wide cap and trade expenditure plan allocated \$832 million dollars towards programs that will help reduce GHG emissions, with set-

¹⁰ Compliance instruments are permits to emit, the majority of which will be “allowances,” but entities also are allowed to use CARB-approved offset credits to meet up to 8% of their compliance obligations.

asides for projects benefiting disadvantaged communities. The expenditure plan funds three main investment categories: (1) sustainable communities & clean transportation; (2) energy efficiency and clean energy; and (3) natural resources and waste diversion (SCAG 2015b).

The Affordable Housing & Sustainable Communities (AHSC) Program is a statewide competitive program that provides grants and loans for affordable housing, infill development, transit-oriented development and related infrastructure that is funded by auction proceeds from California's Cap-and-Trade emissions reduction program. The Strategic Growth Council (SGC) and Department of Housing and Community Development (HCD) administer the program, including project evaluation and the approval of funding awards (California Strategic Growth Council 2023). Six projects in the SCAG region were awarded funding for the 7th Cycle of AHSC Funding (2023). The six projects totaled approximately 215 million dollars, approximately 28.5 percent of 7th cycle funding. In 2022, 14 projects were awarded funding as part of the 6th Cycle of AHSC with a total of 304 million dollars, or 38 percent of the 6th cycle funds. Between the 6th and 7th cycles of AHSC, the SCAG region was awarded nearly 520 million dollars, across 20 projects, making up 33.2 percent of total funds allocated for the two cycles.¹¹

The Fiscal Year (FY) 2023–2024 State budget assumes cap-and-trade revenues of \$2.8 billion. This includes \$2.5 billion from projected budget-year auction proceeds and \$298 million from other Greenhouse Gas Reduction Fund (GGRF) revenues (such as interest earnings, additional current-year revenues from the November 2022 auction, and utilizing the existing GGRF fund balance). Under the Governor's proposed FY 2023–2024 State budget, about \$1.6 billion would go to continuously appropriated programs, \$351 million would go toward other existing commitments, and \$861 million would be used for proposed discretionary spending (The Legislative Analyst's Office 2023). Note, the Legislative Analyst's office finds the State's 2023–24 GGRF revenue assumptions in the State budget to be conservative where the administration assumes all allowances will sell at the floor price, which is not a typical scenario as allowances have sold above the floor price over the last couple of years. The Legislative Analyst's Office estimates total GGRF revenues over 2023–24 would be \$1.3 billion more than assumed in the FY 2023–2024 State budget spending (The Legislative Analyst's Office 2023).

AB 398 was enacted in 2017 to extend and clarify the role of the State's Cap-and-Trade Program through December 31, 2030. As part of AB 398, refinements were made to the Cap-and-Trade program to establish updated protocols and allocation of proceeds to reduce GHG emissions.

CARB SMARTWAY/PHASE I AND PHASE II HEAVY-DUTY VEHICLE GREENHOUSE GAS REGULATION

In 2013, CARB approved for adoption California Phase 1 GHG regulations that were substantially identical to the federal Phase 1 regulations. This provided California the authority to certify new California certified engines and vehicles to the Phase 1 standards, as well as enforce them. This regulation applies to GHG emissions from heavy-duty trucks and engines sold in California. It establishes GHG emissions limits on truck and engine manufacturers and harmonizes with the recently adopted USEPA rule for new trucks and engines nationally. Existing heavy-duty vehicle regulations in California include engine criteria emission standards, tractor-trailer GHG requirements to implement SmartWay strategies (i.e., the Heavy-Duty Tractor-Trailer Greenhouse Gas Regulation), and in-use fleet retrofit requirements such as the Truck and Bus Regulation (CARB 2023b).

¹¹ To provide a regional and state perspective on the approximately 33.2 percent of total statewide funding from the AHSC Program, the SCAG region includes nearly 50 percent of the state's population and approximately 65 percent of the state's population in disadvantaged communities.

In 2015, Governor Brown issued Executive Order B-32-15, which led to the development of an integrated Sustainable Freight Action Plan that is intended to improve freight efficiency, transition to zero-emission technologies, and increase competitiveness of California's freight system.

In 2018, California aligned with the federal Phase 2 standards in structure, timing, and stringency, but with some minor California differences. The California Phase 2 GHG emission standards set fuel efficiency standards beginning with model year 2021 for new class 2b to 8 medium- and heavy-duty engines and tractors, and will be fully phased-in by model year 2027. The California Phase 2 GHG regulation also established CO₂ emission standards for certain trailers used in combination with tractors. The trailer standards take effect for all trailer manufacturers in 2020 through 2027. The standards are intended to make trailers more efficient and lower the greenhouse gas emissions associated with their use. Affected trailer types include box-type trailers (dry van and refrigerated van trailers of all lengths), flat bed trailers, tank trailers, and container chassis. Beginning January 1, 2020, trailer manufacturers must certify to California standards and receive an Executive Order from CARB to legally sell trailers in California (CARB 2023c).

CALIFORNIA ENVIRONMENTAL QUALITY ACT GUIDELINES AMENDMENTS

California Senate Bill (SB) 97 (Chapter 185, Statutes of 2007) required the Governor's Office of Planning and Research (OPR) to develop California Environmental Quality Act (CEQA) Guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions." The CEQA Guidelines amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The significance of GHG emissions are specifically addressed in CEQA Guidelines Section 15064.4. Section 15064.4 calls for a lead agency to make a "good-faith effort" to "describe, calculate or estimate" GHG emissions in CEQA environmental documents. Section 15064.4 further states that the analysis of GHG impacts should include consideration of (1) the extent to which the project may increase or reduce GHG emissions; (2) whether the project emissions would exceed a locally applicable threshold of significance; and (3) the extent to which the project would comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions." The guidelines also state that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program (including plans or regulations for the reduction of GHG emissions) that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located (CEQA Guidelines Section 15064(h)(3)).

2020 MOBILE SOURCE STRATEGY

On October 28, 2021, CARB released the updated 2020 Mobile Source Strategy that similar to the 2016 Mobile Source Strategy, shows the framework that identifies demonstrates how the State can simultaneously meet air quality standards, achieve greenhouse gas emission reduction targets, decrease health risk from transportation emissions, and reduce petroleum consumption over the next thirty years. The Mobile Source Strategy aims to deliver environmental and public health benefits as well as updates to transportation infrastructure, enhancements of systemwide efficiency, and clean growth in the mobile sector. The estimated benefits of the strategy in reducing emissions from mobile sources includes 75 and 82 percent reduction of NO_x emissions in 2031 and 2037, respectively below 2017 levels, and a 66 percent reduction in diesel particulate matter from 2017 levels by 2031. CARB estimates statewide, the 2020 Mobile Source Strategy would also result in a 76 percent reduction in greenhouse gas emissions by year 2045 as compared to 2020 levels, and deployment of approximately 1.4 million medium- and heavy-duty ZEVs in California by 2045 (CARB 2021).

CALTRANS GUIDANCE ON INCORPORATING SEA LEVEL RISE

Pursuant to EO S-13-08 and the California Sea Level Rise Interim Guidance Document (State of California 2010), in May 2011 Caltrans released guidance on incorporating sea level rise into planning and decision making with respect to transportation projects. Caltrans' guidance recommends first determining if sea level should be incorporated into project planning, based on the project location and level of risk. A screening process with ten criteria guides the assessment of whether to incorporate sea level rise: design life, redundancy/alternative route(s), anticipated travel delays, evacuations/emergencies, traveler safety, expenditure of public funds, scope of project, effect on non-state highways, and environmental constraints. If the screening determines that sea level rise should be incorporated into project planning, the next step is to estimate the degree of potential impact and assess alternatives for preventing, mitigating and/or absorbing the impact. Caltrans uses the statewide sea level rise estimates presented in the California Sea Level Rise Interim Guidance Document for different years (2030 through 2100) to determine target sea level rise values; Caltrans directs projects with a life that extends to 2030 or earlier not to assume impacts from sea level rise. Having identified target sea level rise values for a project, Caltrans then lays out steps for implementation, including conducting more technical studies of inundation and subsidence and determining any adverse effects on facility functions and operations (e.g., from erosion, exposure to salt water), necessary adaptation measures, and the costs of mitigation (Caltrans 2011).

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH GUIDANCE ON INTEGRATING PUBLIC HEALTH INTO CLIMATE ACTION PLANNING

In February of 2012, the California Department of Public Health released a guidance document, *Climate Action for Health: Integrating Public Health into Climate Action Planning* (California Department of Public Health 2012). This document introduces key health connections to climate change mitigation strategies, and suggestions for where these fit into a local climate action plan or general plan. The guidance document also provides a number of examples of strategies taken from actual climate action plans that integrate public health objectives, with policy efforts to improve community health and reduce GHG emissions. The information provided is advisory, voluntary, and educational. The document includes specific policy recommendations for transportation and land use planning, including incorporation of green space and tree canopy to mitigate urban heat islands, and healthy siting of housing, schools, and health care facilities to avoid major air quality impacts.

CALIFORNIA APPLIANCE EFFICIENCY REGULATIONS

The Appliance Efficiency Regulations (Title 20, Sections 1601 through 1608), adopted by the CEC, include standards for new appliances (e.g., refrigerators) and lighting, if they are sold or offered for sale in California. These standards include minimum levels of operating efficiency, and other cost-effective measures, to promote the use of energy- and water-efficient appliances.

TITLE 24, BUILDING STANDARDS CODE AND CALGREEN CODE

The CEC first adopted the Energy Efficiency Standards for Residential and Nonresidential Buildings (CCR, Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the State. Although not originally intended to reduce GHG emissions, increased energy efficiency, and reduced consumption of electricity, natural gas, and other fuels would result in fewer GHG emissions from residential and nonresidential buildings subject to the standard. The standards are updated periodically to allow for the consideration and inclusion of new energy efficiency technologies and methods.

Part 11 of the Title 24 Building Standards is referred to as the California Green Building Standards (CALGreen) Code and was developed to help the State achieve its GHG reduction goals under HSC Division 25.5 (e.g., AB 32) by codifying standards for reducing building-related energy, water, and resource demand, which in turn reduces GHG emissions from energy, water, and resource demand. The purpose of the CALGreen Code is to “improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: (1) Planning and design; (2) Energy efficiency; (3) Water efficiency and conservation; (4) Material conservation and resource efficiency; and (5) Environmental air quality” (California Building Standards Commission 2010). The CALGreen Code is not intended to substitute for or be identified as meeting the certification requirements of any green building program that is not established and adopted by the California Building Standards Commission. The CALGreen Code establishes mandatory measures for new residential and non-residential buildings. Such mandatory measures include energy efficiency, water conservation, material conservation, planning and design and overall environmental quality (California Building Standards Commission 2010).

On May 9, 2018, the CEC adopted the 2019 Title 24 Standards, which went into effect on January 1, 2020. The 2019 standards continue to improve upon the previous (2016) Title 24 standards for new construction of, and additions and alterations to, residential and non-residential buildings (CEC 2019). The 2019 Title 24 Standards ensure that builders use the most energy efficient and energy conserving technologies and construction practices. As described in the 2019 Title 24 Standards represent “challenging but achievable design and construction practices” that represent “a major step towards meeting the Zero Net Energy (ZNE) goal.” Single-family homes built with the 2019 Title 24 Standards are projected to use approximately seven percent less energy due to energy efficiency measures versus those built under the 2016 standards. Once the mandated rooftop solar electricity generation is factored in, homes built under the 2019 standards will use about 53 percent less energy than those under the 2016 standards. Nonresidential buildings are projected to use approximately 30 percent less energy due mainly to lighting upgrades (CEC 2019). Compliance with Title 24 is enforced through the building permit process.

On August 11, 2021, the CEC adopted the 2022 Title 24 Standards, which were approved by the California Building Standards Commission for inclusion into the California Building Standards Code in December 2021. The 2022 standards encourage efficient electric heat pumps, establish electric-ready requirements for new homes, expands solar photovoltaic and battery storage standards, strengthens ventilation standards, and more (California Building Standards Commission 2022). Buildings whose permit applications are applied for on or after January 1, 2023, must comply with the 2022 standards (CEC 2022).

CALTRANS 2020-2024 STRATEGIC MANAGEMENT PLAN

The 2020–2024 Caltrans Strategic Management Plan (Caltrans 2021) redefines the Caltrans vision statement from the 2015–2020 plan (Caltrans 2015). The Caltrans mission statement is that Caltrans will “*provide a safe and reliable transportation network that serves all people and respects the environment.*” The Caltrans vision is *A brighter future for all through a world-class transportation network* where, as envisioned by Caltrans, “a world-class transportation network” will be safe, equitable, reliable, efficient, sustainable, and resilient; minimize the negative impacts to the environment and enhance the environment where possible; help the economy thrive and give California residents options for their travel needs.” The document identifies six goals: (1) Safety First; (2) Cultivate Excellence; (3) Enhance and Connect the Multimodal Transportation Network; (4) Strengthen Stewardship and Drive Efficiency; (5) Lead Climate Action; and (6) Advance Equity and Livability in All Communities. The document identifies numerous strategies to achieve each goal, including the following target with respect to the Goal Lead Climate

Action: to develop and start implementing a Caltrans Climate Action Plan, Accelerate sustainable freight sector transformation, establish a robust Climate Action program of education, training, and outreach, establish VMT monitoring and engage with communities most vulnerable to climate change impacts to inform development and implementation of Climate Action activities.

EXECUTIVE ORDER (EO) S-3-05

On June 1, 2005, EO S-3-05 set the following GHG emission reduction goals: reduce GHG emissions to 2000 levels by 2010; reduce GHG emissions to 1990 levels by 2020; and reduce GHG emissions to 80 percent below 1990 levels by 2050 (Office of the Governor, Arnold Schwarzenegger 2005).¹² EO S-3-05 also calls for the Secretary of California Environmental Protection Agency (CalEPA) to be responsible for coordination of state agencies and progress reporting.

In response to the Executive Order, the Secretary of the CalEPA created the Climate Action Team (CAT) (CalEPA 2023). California's CAT originated as a coordinating council organized by the Secretary for Environmental Protection. It included the Secretaries of the Natural Resources Agency, and the Department of Food and Agriculture, and the Chairs of the Air Resources Board, Energy Commission, and Public Utilities Commission. The original council was an informal collaboration between the agencies to develop potential mechanisms for reductions in GHG emissions in the state. The council was given formal recognition in Executive Order S-3-05 and became the CAT.

The original mandate for the CAT was to develop proposed measures to meet the emission reduction targets set forth in the executive order. The CAT has since expanded and currently has members from 18 state agencies and departments.

The CAT is responsible for preparing reports that summarize the state's progress in reducing GHG emissions. The most recent CAT Report was published in December 2010 (Climate Action Team 2010). The CAT Report discusses mitigation and adaptation strategies, state research programs, policy development, and future efforts.

EXECUTIVE ORDER S-1-07, THE LOW CARBON FUEL STANDARD

On January 18, 2007, Executive Order S-1-07 was issued establishing a statewide goal to reduce at least 10 percent in the carbon intensity of California's transportation fuels by 2020 (California State Library 2007). Regulatory proceedings and implementation of the Low Carbon Fuel Standard have been directed to the CARB. The Low Carbon Fuel Standard has been identified by CARB as a discrete early action item in the Climate Change Scoping Plan (CARB 2017b). CARB expects the Low Carbon Fuel Standard to achieve the minimum 10 percent reduction goal; however, many of the early action items outlined in the Climate Change Scoping Plan work in tandem with one another. To avoid the potential for double-counting emission reductions associated with AB 1493 (see previous discussion), the Climate Change Scoping Plan has modified the aggregate reduction expected from the Low Carbon Fuel Standard to 9.1 percent. In September 2018, the standards were amended by CARB to require a 20 percent reduction in carbon intensity by 2030, aligning with California's 2030 targets set by SB 32 (CARB 2018b).

¹² While EO S-3-05 sets a goal that Statewide GHG emissions be reduced to 80 percent below 1990 levels by 2050, the EO does not constitute a "plan" for GHG reduction, and no State plan has been adopted to achieve the 2050 goal.

EXECUTIVE ORDER S-13-08

Executive Order S-13-08, signed on November 14, 2008, directs California to develop methods for adapting to climate change impacts through preparation of a statewide plan (California State Library 2008). In response to this order, the California Natural Resources Agency coordinated with 10 state agencies, multiple scientists, a consulting team, and stakeholders to develop the first statewide, multi-sector adaptation strategy in the country. The resulting report, *2009 California Climate Adaptation Strategy* (CNRA 2009a)¹³ summarizes the best-known science to assess the vulnerability of the state to climate change impacts and outlines possible solutions that can be implemented within and across state agencies to promote resiliency. This strategy is the first step in an evolving process to reduce California's vulnerability to climate change impacts.

Adaptation refers to efforts that prepare the state to respond to the impacts of climate change – adjustments in natural or human systems to actual or expected climate changes to minimize harm or take advantage of beneficial opportunities. California's ability to manage its climate risks through adaptation depends on a number of critical factors. These include its baseline and projected economic resources, technology, infrastructure, institutional support and effective governance, public awareness, access to the best available scientific information, sustainably managed natural resources, and equity in access to these resources.

EXECUTIVE ORDER B-16-2012 AND B-48-2018

On March 23, 2012, Governor Brown issued Executive Order B-16-2012 to encourage ZEVs and related infrastructure (State of California 2012). It orders CARB, CEC, CPUC, and other relevant agencies to work with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks concerning ZEVs. By 2020, the state's ZEV infrastructure should support up to one million vehicles. By 2025, Executive Order B-16-2012 aims to put over 1.5 million ZEVs on California roads and displace at least 1.5 billion gallons of petroleum. The Executive Order also directs state government to begin purchasing ZEVs. In 2015, 10 percent of state departments' light-duty fleet purchases must be ZEVs, climbing to 25 percent of light-duty fleet purchases by 2020. Executive Order B-16-2012 sets a target for 2050 to reduce GHG emissions in the transportation sector by 80 percent below 1990 levels.

In February 2013, an interagency working group developed the ZEV Action Plan which identifies specific strategies and actions that state agencies will take to meet the milestones of the Executive Order. The ZEV Action Plan states (Governor's Interagency Working Group on Zero-Emission Vehicles 2013):

- ZEVs are crucial to achieving the state's 2050 greenhouse gas goal of 80 percent emission reductions below 1990 levels, as well as meeting federal air quality standards. Achieving 1.5 million ZEVs by 2025 is essential to advance the market and put the state on a path to meet these requirements.

The ZEV Action Plan was updated in 2016, and highlights the following priorities for ZEVs:

- Raising consumer awareness and education about ZEVs
- Ensuring ZEVs are accessible to a broad range of Californians
- Making ZEV technologies commercially viable in targeted applications the medium-duty, heavy-duty and freight sectors

¹³ This report has been updated twice, once in 2014, and once in 2018 to reflect current adaptation strategies and incorporate a "Climate Justice" chapter highlighting how equity is woven throughout the entire plan.

- Aiding ZEV market growth beyond California

The 2016 ZEV Action Plan introduces new actions to meet these priorities and build California's ZEV market, remove barriers to future market growth and ensure this transition benefits the state and its residents. The intent is to clearly communicate what state government will do to advance ZEVs and serve as a "to-do" list for the Governor's Office and state agencies to enhance interagency coordination (Governor's Interagency Working Group on Zero-Emission Vehicles 2016).

In response to Executive Order B-48-2018, which set targets of 200 hydrogen fueling stations and 250,000 electric vehicle chargers to support 1.5 million ZEVs on California roads by 2025 and 5 million by 2030, the ZEV Action Plan was once again updated in 2018 to help expand private investment in zero-emission vehicle infrastructure, particularly in low income and disadvantaged communities (Governor's Interagency Working Group on Zero-Emission Vehicles, 2018). This 2018 Priorities Update serves as an addendum to the 2016 Plan, highlighting the most important actions state agencies are taking in 2018 to implement the new directives in the Executive Order. This 2018 Priorities Update focuses specifically on state agency actions and is designed to serve three fundamental purposes (Governor's Interagency Working Group 2018):

1. Provide direction to state agencies on the most important actions to be executed in 2018 to enable progress toward the 2025 targets and 2030 vision.
2. Give stakeholders transparency into the actions state agencies plan to take (or are taking) this year to further the ZEV market.
3. Create a platform for stakeholder engagement, feedback, and collaboration.

Building on the builds on the success and lessons of California's three ZEV Action Plans in 2013, 2016, and 2018, the state is developing the ZEV Market Development Strategy, which is designed to help California collectively move forward and deliver zero-emission benefits to all Californians. The ZEV Market Development Strategy outlines how state agencies and stakeholder groups can achieve the state's ZEV targets of (Governor's Office of Business and Economic Development 2023):

- 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035
- 100 percent of medium- and heavy-duty vehicles in the State will be zero-emission by 2045 and by 2035 for drayage trucks
- 100 percent of off-road vehicles and equipment will be zero-emission by 2035

EXECUTIVE ORDER B-30-15

On April 29, 2015, Governor Brown issued Executive Order B-30-15. Therein, the Governor directed the following:

- Establish a new interim Statewide reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030.
- All State agencies with jurisdiction over sources of GHG emissions to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 reduction targets.
- CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of CO₂ equivalent (MMCTO_{2e}).

EXECUTIVE ORDER B-55-18

Governor Brown signed Executive Order B-55-18 in September 2018 to establish a statewide goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter. Policies and programs undertaken to achieve this goal shall:

- Seek to improve air quality and support the health and economic resiliency of urban and rural communities, particularly low-income and disadvantaged communities.
- Be implemented in a manner that supports climate adaptation and biodiversity, including protection of the state's water supply, water quality, and native plants and animals.

This Executive Order also calls for CARB to:

- Develop a framework for implementation and accounting that tracks progress toward this goal.
- Ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal.

The 2022 Scoping Plan is designed to achieve carbon neutrality no later than 2045 and the modeling includes technology and fuel transitions to achieve that outcome.

EXECUTIVE ORDER N-19-19

Governor Newsom signed Executive Order N-19-19 in September 2019 to direct state government to redouble its efforts to reduce GHG emissions and mitigate the impacts of climate change while building a sustainable, inclusive economy (Adaptation Clearinghouse 2019). This Executive Order instructs the Department of Finance to create a Climate Investment Framework that:

- Includes a proactive strategy for the state's pension funds that reflects the increased risks to the economy and physical environment due to climate change.
- Provides a timeline and criteria to shift investments to companies and industry sectors with greater growth potential based on their focus of reducing carbon emissions and adapting to the impacts of climate change.
- Aligns with the fiduciary responsibilities of the California Public Employees' Retirement System, California State Teachers' Retirement System, and the University of California Retirement Program.

Executive Order N-19-19 directs the State Transportation Agency to leverage more than \$5 billion in annual state transportation spending to help reverse the trend of increased fuel consumption and reduce GHG emissions associated with the transportation sector. It also calls on the Department of General Services to leverage its management and ownership of the state's 19 million square feet in managed buildings, 51,000 vehicles, and other physical assets and goods to minimize state government's carbon footprint. Finally, it tasks CARB with accelerating progress toward California's goal of five million ZEV sales by 2030 by:

- Developing new criteria for clean vehicle incentive programs to encourage manufacturers to produce clean, affordable cars.
- Proposing new strategies to increase demand in the primary and secondary markets for ZEVs.
- Considering strengthening existing regulations or adopting new ones to achieve the necessary GHG reductions from within the transportation sector.

REGIONAL AND LOCAL

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD) POLICY ON GLOBAL WARMING AND STRATOSPHERIC OZONE DEPLETION

SCAQMD adopted a “Policy on Global Warming and Stratospheric Ozone Depletion” on April 6, 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the Air Quality Management Plan. In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy (SCAQMD 2023).

SCAQMD DRAFT GUIDANCE REGARDING INTERIM CEQA GHG SIGNIFICANCE THRESHOLDS

In 2008, SCAQMD released draft guidance regarding interim CEQA GHG significance thresholds (SCAQMD 2008a). A GHG Significance Threshold Working Group was formed to further evaluate potential GHG significance thresholds (SCAQMD 2019). The SCAQMD proposed the use of a percent emission reduction target to determine significance for commercial/residential projects that emit greater than 3,000 MTCO_{2e} per year. Under this proposal, commercial/residential projects that emit fewer than 3,000 MTCO_{2e} per year would be assumed to have a less than significant impact on climate change. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold of 10,000 MTCO_{2e} per year for stationary source/industrial projects where the SCAQMD is the lead agency. However, the SCAQMD has yet to adopt a GHG significance threshold for land use development projects (e.g., residential/commercial projects). The Working Group has been inactive since 2011, and SCAQMD has not formally adopted any GHG significance threshold for other jurisdictions.

The CEQA GHG Significance Threshold Working Group met several times in 2008 to provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. Members of the working group included various stakeholder groups from state agencies, OPR, CARB, Attorney’s General Office, local agencies, city and county planning departments, utilities, industry groups, and both environmental and professional organizations. The purpose of the working group was to solicit comments from the stakeholders as SCAQMD developed interim GHG significance thresholds to achieve a 90 percent GHG emission capture rate (SCAQMD 2019). The Working Group discussed methodologies for determining project significance including categorical exemptions, consistency with regional GHG budgets in approved plans, a numerical threshold, performance standards, and emissions offsets.

The draft tier thresholds recommended by the SCAQMD Working Group were designed to meet reduction requirements from AB 32. Since the development of the draft tier thresholds, California passed SB 32 in order to reduce state GHG emissions to 40 percent below 1990 levels by 2030 (see SB 32 discussion above). These recommended thresholds are over a decade old and were not designed to meet the stricter 2030 reduction requirements, as a result these thresholds are outdated and were not utilized in this analysis.

COUNTIES

IMPERIAL COUNTY

In June 2021, Imperial County published the Imperial County Regional Climate Action Plan serves as the long-range plan that outlines specific strategies to reduce greenhouse gas (GHG) emissions from Imperial County (ICTC 2021). The Imperial County Regional Climate Action Plan is intended to facilitate the reduction of GHG emissions

throughout Imperial County in a way that is practical, efficient, and beneficial to the community and enhances Imperial County's desirable characteristics and qualities. The Imperial County Regional Climate Action Plan outlines measures and actions that would facilitate meeting the State 2020 and 2030 GHG reduction goals under AB 32 and SB 32. The Imperial County Regional Climate Action Plan also makes the region eligible for State funding, streamlines the process to approve projects, as well as help achieve multiple community goals such as lowering energy costs, reducing air pollution, supporting local economic development, and improving public health and quality of life.

LOS ANGELES COUNTY

The Los Angeles County Office of Sustainability was created within the Internal Services Department by the Board of Supervisors in October 2009 to respond to legislation, regulation, and policy related to Climate Change and serve as a central hub to coordinate Energy Efficiency, Conservation and Sustainability Programs within the County, its facilities, and the region (County of Los Angeles 2023). The County Office of Sustainability develops and implements programs that impact and benefit the constituents of Los Angeles County, such as the Energy Upgrade California in Los Angeles County energy efficiency home improvement and rebate program, countywide Environmental Service Centers, the SolarMap LACounty.gov and Green.LACounty.gov websites, and the Los Angeles Regional Collaborative for Climate Action and Sustainability. In addition, the County Office of Sustainability is the lead in coordinating and implementing Energy and Environmental policy programs and activities by all County departments.

In March 2015, Los Angeles County Board of Supervisors approved the first Community Climate Action Plan (CCAP). The CCAP provided a roadmap to reduce GHGs in Los Angeles County by 11 percent by 2020. The 2020 CCAP sought to achieve this through cool roofs, solar, tree canopies, and more active transportation and public transit use (Climate Resolve 2015).

In August 2019, the Los Angeles County Board of Supervisors adopted the OurCounty regional sustainability plan. It outlines what local governments and stakeholders can do to enhance community well-being while reducing damage to the natural environment and adapting to climate change, with a particular focus on communities disproportionately burdened by environmental pollution. OurCounty is organized around 12 goals that will guide policy toward resiliency, equity, parks, renewable energy, reducing car dependency, and more. Its most ambitious goal includes reaching complete carbon neutrality by 2050 by completely phasing out fossil fuels countywide (OurCounty 2019).

In April 2022, the Public Discussion Draft County of Los Angeles 2045 Climate Action (2045 CAP) was released to the public for review. The 2045 CAP is the County's path toward meeting the goals of the Paris Agreement and achieving carbon neutrality for unincorporated Los Angeles County. The 2045 CAP builds on previous climate action work from the Unincorporated Los Angeles County Community Climate Action Plan 2020 (2020 CCAP) General Plan 2035 (General Plan). The 2045 CAP includes 10 strategies centered on five sectors including: energy supply, transportation, building energy and water, waste and agriculture, forestry and other land use, that are further supported by 25 measures and over 90 actions that, when combined, achieve all three of the GHG emissions reduction targets for 2030, 2035, and 2045 for Los Angeles County that are consistent with state goals pursuant to SB 32, AB 1279, and the 2022 Scoping Plan (County of Los Angeles, Department of Regional Planning 2023). After receiving comments from stakeholders, Los Angeles County determined substantially revised and update the public discussion draft and released the Revised Draft 2045 Climate in March 2023 that is still currently in the review process (County of Los Angeles, Department of Regional Planning 2023).

ORANGE COUNTY

In early 2010, a joint committee with equal representation from the Orange County Council of Governments (COG) and the Orange County Transportation Authority (OCTA) was formed to develop the Orange County Sustainable Communities Strategy (SCS) (OCTA/COG 2011). The Orange County COG/OCTA SCS Joint Working Committee led overall efforts to develop a subregional Orange County SCS to meet the requirements of SB 375 and the mutual agreements with SCAG with a plan that all local jurisdictions in Orange County could support. As a result of this collaborative effort, the Orange County SCS was adopted unanimously by the OCTA and Orange County COG Boards of Directors in June of 2011. Orange County SCS utilizes the transportation system along with land use and Best Management Practices strategies to help the County to achieve the state-mandated emissions reduction targets. The Orange County is moving forward with developing a county climate action plan to address ways the county could help slow climate change and mitigate the local effect (Orange County Register 2023).

RIVERSIDE COUNTY

In July 2018, Riverside County created a Climate Action Plan to establish a clear path to sustainability and GHG reduction. The 2019 Climate Action Plan Update was approved on December 17, 2019. The Plan Update establishes a 2020 reduction goal of 15 percent to 2008 emissions in order to be consistent with AB 32 (Riverside County Planning Department 2019). The 2019 CAP Update refines Riverside County's efforts to meet greenhouse gas (GHG) reduction strategies, specifically for the years 2035 and 2050 (Riverside County Planning Department 2019).

In September 2014, Western Riverside Council of Governments (WRCOG) published the Subregional Climate Action Plan. The major goals of the Climate Action Plan are to create local jobs, promote healthier communities, achieve energy self-sufficiency, enhance social equity, reduce emissions, improve air quality, protect natural systems, and save money. WRCOG aims to reduce GHG emissions to 15 percent below 2010 levels by 2020, and 49 percent below 2010 levels by 2035 (WRCOG 2014). In 2018, WRCOG grant funding from the Caltrans Sustainable Transportation Planning Grant Program to prepare an update and expansion to WRCOG's Subregional Climate Action Plan (CAP), branded as the CAP Update. The CAP Update provides local jurisdictions a process through which they can collaborate, share ideas, and develop a customized local CAP and it also aims to help jurisdictions streamline environmental review and gain access to new sources of state funding. While the CAP update has yet to be completed, it will include a comprehensive update to greenhouse gas (GHG) inventories and GHG emissions reduction strategies for all sectors and establishes GHG targets for the years 2030 and 2050 for all WRCOG member jurisdictions (WRCOG 2023).

SAN BERNARDINO COUNTY

In March 2014, San Bernardino County released the final version of the San Bernardino County Greenhouse Gas Reduction Plan and Final EIR to be certified by the SANBAG Board of Directors (San Bernardino Associated Governments 2014). In March 2021, San Bernardino County released the final version of the updated San Bernardino County Regional Greenhouse Gas Reduction Plan. Similar to the 2014 plan, the updated San Bernardino County Greenhouse Gas Reduction Plan published in 2021 initiated the compilation of an updated inventory of GHG emissions across the County as well as an evaluation of measures that could be adopted on a City-level to reduce emissions. The 2021 San Bernardino County Greenhouse Gas Reduction Plan is in accordance with AB 32, SB 375, and other regional and general plans and provides a baseline of information for jurisdictions addressing greenhouse gas emissions (San Bernardino Associated Governments 2021).

VENTURA COUNTY

In April 2010, the County of Ventura General Services Agency (GSA) released an Energy Action Plan to minimize energy intensities in GSA-maintained buildings, improve operational energy and water efficiencies, reduce energy and water use, pursue LEED and Energy Star certifications, and educate GSA employees. As of April 2012, the County of Ventura released a Climate Protection Plan to reduce GHG emissions by 15 percent by 2020. The six action areas include climate protection leadership, countywide responsibility, facilities, vehicle (fleet) operations, employee commute, and expanded sustainability goals (County of Ventura 2023c).

On September 15, 2020, the Ventura County Board of Supervisors adopted the County of Ventura 2040 General Plan and certified the Environmental Impact Report and related documents. As noted in the General Plan, the County developed an integrated approach to addressing climate change in the General Plan by incorporating related policies and programs throughout the General Plan elements, such that the General Plan will also serve as Ventura County's Climate Action Plan. (County of Ventura 2023a.) Further, the 2040 General Plan includes the Climate Change Appendix to provide further details regarding the General Plan's integrated climate action strategy, including a summary of results of key technical analyses used to develop the strategy. Section B.1 of the Appendix includes the components of the Ventura County greenhouse gas emissions reduction strategy (GHG Strategy), while Section B.2 of the Appendix documents Ventura County's vulnerability to climate change and Climate Adaptation strategy (County of Ventura 2023b).

CITIES

In 2016, the Governor's Office of Planning and Research (OPR) prepared a list of plans and initiatives adopted by California jurisdictions, including jurisdictions in the SCAG region, to address climate change (OPR 2016). The list showed that about 20 percent of the local jurisdictions had either completed local climate action plans or had efforts underway. Some cities in the SCAG region have also addressed climate change and GHG policies in their planning and permitting programs. As part of its Sustainability Program, SCAG has provided funding assistance for such local GHG emissions inventory efforts and local climate action plans. Jurisdictions within the SCAG region that have undertaken plans and initiatives addressing climate change are shown in **Table 3.8-6, Jurisdictions Addressing Climate Change in the SCAG Region (2023)**.

TABLE 3.8-6 Jurisdictions Addressing Climate Change in the SCAG Region (2023)

COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?	COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?
Imperial	Brawley	Yes	Yes	No	Orange	Aliso Viejo	No	No	No
Imperial	Calexico	Yes	Yes	No	Orange	Anaheim	No	No	No
Imperial	Calipatria	No	No	No	Orange	Brea	Yes	Yes	No
Imperial	City of Imperial	No	No	No	Orange	Buena Park	No	No	No
Imperial	County of Imperial	No	No	No	Orange	Costa Mesa	No	No	No
Imperial	El Centro	No	No	No	Orange	County of Orange	No	No	No
Imperial	Holtville	No	No	No	Orange	Cypress	No	No	No
Imperial	Westmorland	No	No	No	Orange	Dana Point	No	No	No
Los Angeles	Agoura Hills	Yes	Yes	Yes	Orange	Fountain Valley	No	No	No
Los Angeles	Alhambra	No	No	No	Orange	Fullerton	Yes	Yes	No
Los Angeles	Arcadia	No	No	No	Orange	Garden Grove	No	No	No
Los Angeles	Artesia	No	No	No	Orange	Huntington Beach	No	No	No
Los Angeles	Avalon	No	No	No	Orange	Irvine	Yes (In Process)	No	No
Los Angeles	Azusa	No	No	No	Orange	La Habra	Yes	Yes	No
Los Angeles	Baldwin Park	No	No	No	Orange	La Palma	No	No	No
Los Angeles	Bell	No	No	No	Orange	Laguna Beach	Yes	Yes	No
Los Angeles	Bell Gardens	No	No	No	Orange	Laguna Hills	No	No	No
Los Angeles	Bellflower	Yes	Yes	No	Orange	Laguna Niguel	No	No	No
Los Angeles	Beverly Hills	Yes	Yes	No	Orange	Laguna Woods	Yes	Yes	Yes

COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?	COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?
Los Angeles	Bradbury	No	Yes	No	Orange	Lake Forest	No	No	No
Los Angeles	Burbank	Yes	Yes	No	Orange	Los Alamitos	No	No	No
Los Angeles	Calabasas	No	No	No	Orange	Mission Viejo	Yes	Yes	No
Los Angeles	Carson	Yes	Yes	No	Orange	Newport Beach	No	No	No
Los Angeles	Cerritos	No	No	No	Orange	Orange	No	No	No
Los Angeles	Claremont	Yes	Yes	No	Orange	Rancho Santa Margarita	No	No	No
Los Angeles	Commerce	No	No	No	Orange	San Clemente	Yes	Yes	No
Los Angeles	Compton	No	No	No	Orange	San Juan Capistrano	No	No	No
Los Angeles	County of Los Angeles	Yes	Yes	No	Orange	Santa Ana	Yes	Yes	No
Los Angeles	Covina	No	No	No	Orange	Seal Beach	No	No	No
Los Angeles	Cudahy	No	No	No	Orange	Stanton	No	No	No
Los Angeles	Culver City	No	No	No	Orange	Tustin	No	No	No
Los Angeles	Diamond Bar	Yes	Yes	No	Orange	Villa Park	No	No	No
Los Angeles	Downey	No	No	No	Orange	Westminster	No	No	No
Los Angeles	Duarte	No	No	No	Orange	Yorba Linda	No	No	No
Los Angeles	El Monte	No	No	No	Orange	Placentia	No	No	No
Los Angeles	El Segundo	Yes	Yes	No	Riverside	Banning	Yes	Yes	Yes
Los Angeles	Gardena	Yes	Yes	Yes	Riverside	Beaumont	Yes	Yes	No
Los Angeles	Gateway COG	Yes	Yes	Yes	Riverside	Blythe	Yes	Yes	No
Los Angeles	Glendale	Yes	Yes	Yes	Riverside	Calimesa	Yes	Yes	Yes
Los Angeles	Glendora	No	No	No	Riverside	Canyon Lake	Yes	Yes	Yes

COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?	COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?
Los Angeles	Hawaiian Gardens	No	No	No	Riverside	Cathedral City	Yes	Yes	Yes
Los Angeles	Hawthorne	Yes	Yes	Yes	Riverside	Coachella	Yes	Yes	Yes
Los Angeles	Hermosa Beach	Yes	Yes	No	Riverside	Coachella Valley COG	No	No	No
Los Angeles	Hidden Hills	No	No	No	Riverside	Corona	Yes	Yes	Yes
Los Angeles	Huntington Park	No	No	No	Riverside	County of Riverside	Yes	Yes	No
Los Angeles	Industry	No	No	No	Riverside	Desert Hot Springs	No	No	No
Los Angeles	Inglewood	Yes	Yes	Yes	Riverside	Eastvale	Yes	Yes	No
Los Angeles	Irwindale	No	No	No	Riverside	Hemet	Yes	Yes	Yes
Los Angeles	La Canada Flintridge	Yes	Yes	Yes	Riverside	Indian Wells	Yes	Yes	No
Los Angeles	La Habra Heights	No	No	No	Riverside	Indio	Yes	Yes	Yes
Los Angeles	La Mirada	No	No	No	Riverside	Jurupa Valley	Yes	Yes	Yes
Los Angeles	La Puente	No	No	No	Riverside	La Quinta	No	No	No
Los Angeles	La Verne	No	No	No	Riverside	Lake Elsinore	Yes	Yes	No
Los Angeles	Lakewood	No	No	No	Riverside	Menifee	No	No	No
Los Angeles	Lancaster	Yes	Yes	No	Riverside	Moreno Valley	Yes	Yes	No
Los Angeles	Las Virgenes/Malibu COG	No	No	No	Riverside	Morongo Band of Mission Indians	Yes	Yes	No
Los Angeles	Lawndale	Yes	Yes	Yes	Riverside	Murrieta	Yes	Yes	No

COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?	COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?
Los Angeles	Lomita	Yes	Yes	No	Riverside	Pechanga Band of Luiseno Indians	Yes	Yes	Yes
Los Angeles	Long Beach	Yes (In Process – Anticipated Fall 2021)	Yes (In Process – Anticipated Fall 2021)	Yes (In Process – Anticipated Fall 2021)	Riverside	Western Riverside COG	Yes	Yes	Yes
Los Angeles	Los Angeles	Yes	Yes	Yes	Riverside	Norco	Yes	Yes	Yes
Los Angeles	Lynwood	No	No	No	Riverside	Palm Desert	Yes	No	No
Los Angeles	Malibu	No	No	No	Riverside	Palm Springs	Yes	Yes	No
Los Angeles	Manhattan Beach	Yes	Yes	No	Riverside	Perris	Yes	Yes	No
Los Angeles	Maywood	No	No	No	Riverside	Rancho Mirage	Yes	Yes	No
Los Angeles	Monrovia	No	No	No	Riverside	Riverside	Yes	Yes	No
Los Angeles	Montebello	No	No	No	Riverside	San Jacinto	Yes	Yes	Yes
Los Angeles	Monterey Park	Yes	Yes	No	Riverside	Temecula	Yes	Yes	Yes
Los Angeles	Norwalk	No	No	No	Riverside	Wildomar	Yes	Yes	Yes
Los Angeles	Palmdale	No	No	No	San Bernardino	Adelanto	No	No	No
Los Angeles	Palos Verdes Estates	Yes	Yes	No	San Bernardino	Apple Valley	Yes	Yes	No
Los Angeles	Paramount	Yes (In Process)	No	No	San Bernardino	Barstow	No	No	No
Los Angeles	Pasadena	Yes	Yes	Yes	San Bernardino	Big Bear Lake	Yes	Yes	No
Los Angeles	Pico Rivera	No	No	No	San Bernardino	Chino	Yes	Yes	Yes
Los Angeles	Pomona	No	No	No	San Bernardino	Chino Hills	No	No	No

COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?	COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?
Los Angeles	Rancho Palos Verdes	Yes	Yes	No	San Bernardino	Colton	Yes	Yes	No
Los Angeles	Redondo Beach	Yes	Yes	No	San Bernardino	County of San Bernardino	Yes	Yes	No
Los Angeles	Rolling Hills	Yes	Yes	No	San Bernardino	Fontana	No	No	No
Los Angeles	Rolling Hills Estates	Yes	Yes	No	San Bernardino	Grand Terrace	No	No	No
Los Angeles	Rosemead	No	No	No	San Bernardino	Hesperia	Yes	Yes	Yes
Los Angeles	San Dimas	No	No	No	San Bernardino	Highland	No	No	No
Los Angeles	San Fernando	No	No	No	San Bernardino	Loma Linda	No	No	No
Los Angeles	San Fernando Valley COG	No	No	No	San Bernardino	Montclair	No	No	No
Los Angeles	San Gabriel	No	No	No	San Bernardino	Needles	No	No	No
Los Angeles	San Gabriel Valley COG	No	No	No	San Bernardino	Ontario	Yes	Yes	No
Los Angeles	San Marino	No	No	No	San Bernardino	Rancho Cucamonga	Yes	Yes	No
Los Angeles	Santa Clarita	Yes	Yes	No	San Bernardino	Redlands	Yes	Yes	No
Los Angeles	Santa Fe Springs	No	No	No	San Bernardino	Rialto	No	No	No
Los Angeles	Santa Monica	Yes	Yes	Yes	San Bernardino	San Bernardino	No	No	No
Los Angeles	Sierra Madre	No	No	No	San Bernardino	Twentynine Palms	No	No	No
Los Angeles	Signal Hill	No	No	No	San Bernardino	Upland	No	No	No
Los Angeles	South Bay Cities COG	Yes	Yes	Yes	San Bernardino	Victorville	Yes	Yes	No
Los Angeles	South El Monte	No	No	No	San Bernardino	Yucaipa	Yes	Yes	No

COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?	COUNTY	MUNICIPALITY	MUNICIPALITY HAS A STANDALONE CLIMATE, SUSTAINABILITY, AND/OR RESILIENCE PLAN?	PLAN THAT INCLUDES CLIMATE ACTION (MITIGATION)? (CAP)	PLAN THAT INCLUDES CLIMATE ADAPTATION?
Los Angeles	South Gate	No	No	No	San Bernardino	Yucca Valley	No	No	No
Los Angeles	South Pasadena	Yes	Yes	Yes	Ventura	Camarillo	No	No	No
Los Angeles	Temple City	No	No	No	Ventura	Camarillo	No	No	No
Los Angeles	Torrance	Yes	Yes	No	Ventura	County of Ventura	Yes	Yes	Yes
Los Angeles	Vernon	Yes	Yes	No	Ventura	Filmore	No		
Los Angeles	Walnut	Yes (In Process)	No	No	Ventura	Moorpark	No	No	No
Los Angeles	West Covina	No	No	No	Ventura	Ojai	No	No	No
Los Angeles	West Hollywood	Yes	Yes	Yes	Ventura	Oxnard	Yes (In Process)	No	No
Los Angeles	Westlake Village	No	No	No	Ventura	Port Hueneme	No	No	No
Los Angeles	Westside Cities COG	No	No	No	Ventura	Santa Paula	No	No	No
Los Angeles	Whittier	No	No	No	Ventura	Simi Valley	Yes	Yes	No
					Ventura	Ventura	No	No	No

Source: SCAG 2023a

In October 2023, SCAG released the [Climate Equity Compendium](#), providing available federal, state, and SCAG data resources and tools that local planners in the SCAG region can use to advocate for and implement equitable and actionable climate adaptation efforts (SCAG 2023b). The Compendium also includes relevant legislation and funding resources, highlights model policies of successful climate adaptation efforts through the SCAG region, and discusses best practices for outreach to empower residents throughout the process.

LOS ANGELES GREEN NEW DEAL

In April 2019, Mayor Eric Garcetti released a refreshed version of the City's 2015 Sustainable City Plan. The Green New Deal aims to deliver environment justice through an inclusive green economy, planning to ensure every City resident has the ability to join the green economy, and a determination to lead by example within City government. The goals and targets of the Green New Deal include:

- Building a zero-carbon electricity grid – reaching an accelerated goal of 80 percent renewable energy supply by 2036 as Los Angeles leads California toward 100 percent renewable by 2045.
- Creating a Jobs Cabinet to bring city, labor, education, and business leaders together to support our effort to create 300,000 green jobs by 2035 and 400,000 by 2050.
- Mandating that all new municipally owned building and major renovations be all-electric, effective immediately, and that every building in Los Angeles – from skyscrapers to single-family homes – become emissions free by 2050.
- Achieving a zero-waste future by phasing out Styrofoam by 2021, ending the use of plastic straws and single-use takeout containers by 2028, and no longer sending any trash to landfills by 2050.
- Recycling 100 percent of our wastewater by 2035; sourcing 70 percent of our water locally – a significant increase from our existing pathway; and nearly tripling the maximum amount of stormwater captured.
- Planting and maintaining at least 90,000 trees – which will provide 61 million square feet of shade – citywide by 2021 and increasing tree canopy in low-income, severely heat impacted areas by at least 50 percent by 2028.

The Green New Deal aims to reach a 50 percent reduction in GHG emissions by 2025 and reach net neutrality by 2050. The Green New Deal builds upon the City's Sustainable City Plan, in which the City met or exceeded 90 percent of the City's long-term goals on time or early, resulting in a reduction of GHG emissions by 11 percent in a single year and creating more than 35,000 green jobs (City of Los Angeles 2019).

CITY OF RIVERSIDE GREEN ACTION PLAN

The City of Riverside's Green Action Plan aims to reduce the City's environmental impact by increasing the City's renewable energy production and reduce the City's GHG emissions, waste, and water consumption. Regarding energy, the Green Action Plan includes goals to install at least 20 megawatts (MW) of photovoltaic systems by 2020, reduce the City's peak electrical load demand by 10 percent, and meet 33 percent of electricity demand from renewable sources by 2050 (City of Riverside, undated).

3.8.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

For the purposes of this 2024 PEIR, SCAG has determined that implementation of Connect SoCal 2024 could result in significant impacts related to greenhouse gas emissions if the Plan would exceed the following significance criteria, in accordance with California Environmental Quality Act (CEQA) Guidelines Appendix G:

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

As discussed in Section 3.17, *Transportation*, CARB and OPR previously recommended project-level VMT thresholds of significance in their guidance documents for use in evaluating traffic impacts in CEQA documents. These thresholds were intended to meet statewide GHG emissions targets through VMT reductions from the transportation sector. Both CARB and OPR have acknowledged that MPOs are tasked with meeting SB 375 per capita GHG emissions reduction targets. At the project level, lead agencies may consider CARB, OPR, and other recommended thresholds of significance as well as the 2022 Scoping Plan in determining CEQA thresholds that are appropriate and feasible for an individual project. The discussion of GHG impacts below considers the potential for the region as a whole to meet the current GHG reduction targets by the year 2035 under SB 375 and GHG reduction goals by the year 2050.

METHODOLOGY

Chapter 2, *Project Description*, describes the Plan's vision, goals, forecasted regional development pattern, policies and strategies, and individual transportation projects and investments. The Plan aims to increase mobility, promote sustainability, and improve the regional economy. Although land use development is anticipated to occur within the region even without the Plan, the Plan could influence growth, including distribution patterns. To address this, the 2024 PEIR includes an analysis on the implementation of the Plan including policies and strategies as well as potential projects to evaluate how conditions in 2050 under the Plan would differ from existing conditions. As such, the CEQA significance determination for Plan's GHG impacts is based on a comparison between future (2050) with the Plan and the 2019 actual baseline (e.g., existing conditions). The comparison of GHG impacts in the future with the Plan as compared to future with no Plan is included in Chapter 4, *Alternatives*, of this PEIR.

GHG emissions and climate change were evaluated in accordance with Appendix G of the CEQA Guidelines. GHG emissions and climate change within the SCAG region were evaluated at a programmatic level of detail, in relation to the general plans of the six counties and the 191 cities within the SCAG region and a review of related literature germane to the SCAG region. The analysis of greenhouse gases considered public comments received on the NOP and feedback and discussions at the various public and stakeholder outreach meetings.

CEQA Guidelines Section 15064.4 provides:

In determining the significance of a project's greenhouse gas emissions, the lead agency should focus its analysis on the reasonably foreseeable incremental contribution of the project's emissions to the effects of climate change. A project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to statewide, national or global emissions. The agency's

analysis should consider a timeframe that is appropriate for the project. The agency's analysis also must reasonably reflect evolving scientific knowledge and state regulatory schemes.

Furthermore, when making a determination with respect to the significance of a project's GHG emissions, a lead agency shall have discretion to determine whether to: (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use; and/or (2) Rely on a qualitative analysis or performance-based standards. CEQA Guidelines Section 15064.4 also states that a lead agency should consider the following factors when assessing the significance of the impact of GHG emissions on the environment: (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting; (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

CONSTRUCTION

Implementation of Connect SoCal 2024 would result in the construction of various transportation and development projects over the Plan horizon. Construction emissions associated with each individual project will generally be short-term and are limited to the project construction phase (although some project construction phases can extend for multiple years). The sources associated with these emissions include construction equipment, employee and vendor vehicles (e.g., on-road trucks for construction material delivery), demolition, grading and other ground-disturbing activities, application of paint and other coatings, paving, among others. Since precise descriptions and locations of activities involving construction of individual projects are not reasonably foreseeable at this time, it is not possible to quantify specific project-level construction emissions. Additionally, SCAG has no land use decision-making or implementation authority over individually proposed transportation or land use projects.

OPERATIONS

The methodology for determining the significance of operational GHG emissions includes the use of SCAG's Scenario Planning Model (SPM) and transportation and air emission modeling in order to estimate GHG emissions from energy, water, and transportation. GHG emissions and transportation data were projected to 2050 using SCAG's activity-based Regional Travel Demand Model and CARB's EMFAC2021 emissions model. Estimates of energy and water use are based on current demand factors and emission rates associated with current power generation operations and water supply. Residential and commercial building electricity emissions for future year 2050 account for improved electricity energy efficiency and renewable electricity. Operational GHG impacts related to increased infrastructure improvements to support zero-emission and near-zero vehicles including charging stations are analyzed in CARB's Final Environmental Analysis for the Proposed Advanced Clean Trucks Regulation. The following GHG analysis incorporates, where appropriate, CARB's analysis of GHG impacts related to infrastructure improvements and discusses the impacts qualitatively by explaining how the GHG analysis incorporates CARB's analysis.

Analysis of the potential GHG impacts of Connect SoCal 2024 was conducted based on regional-level modeling of mobile-source emissions and gross estimates of stationary source emissions. It is anticipated that increasingly stringent regulations, changes in technology combined with future conservation (as a result of increased pressure to conserve and increased prices) will result in a reduced demand for all types of energy, including mobile and stationary sources (as well as reduced demand for water and associated energy requirements). As energy providers

and other sectors respond to SB 32 and CARB's 2022 Scoping Plan, emission rates associated with energy use are anticipated to decrease. However, to present a conservative analysis and without knowledge of future regulations, clean fuel or transportation technologies or market drivers, only modest reductions in demand are assumed. While the analysis considers regulations, programs, and policies currently in place, there is substantial uncertainty in projecting emissions for future horizon years, particularly beyond 2035. Additionally, it is important to note that GHG impacts are generally cumulative in nature, and unlike the localized air quality impacts, they have broader (i.e., statewide, national, and global) implications. See *Center for Biology Diversity v. Dept. of Fish & Wildlife*, 62 Cal.4th 204, 220 (2015) (Characterizing the state's GHG emissions as a "cumulative problem").

LIFECYCLE ANALYSIS

CEQA does not require a full lifecycle analysis of potential environmental effects. This is because the impact analysis in CEQA is subject to the rule of reasons. CEQA only requires analysis of impacts that are directly, indirectly, or cumulatively attributable to the project under consideration (CEQA Guidelines Section 15064(d)). Lifecycle analysis in general may not be consistent with CEQA because the term "lifecycle" could refer to GHG emissions beyond those that could be considered "indirect effects" or "cumulatively considerable" of a project under CEQA Guidelines Section 15358. Furthermore, the California Natural Resources Agency has indicated that a lifecycle analysis is not necessary to adequately analyze a project's energy or GHG impacts (CNRA 2009b). This was added to the CEQA Guidelines to place a reasonable limit on the analysis and signal that a full lifecycle analysis will generally not be required. Preparing a "lifecycle" analysis for the Plan would also be speculative given that there are a myriad of different transportation and land use strategies to support the Plan's vision and achieve its goals. For all of these reasons, the 2024 PEIR does not attempt to provide such a lifecycle GHG emission analysis.

SB 375 ANALYSIS

SB 375 requires passenger and light-duty vehicle per capita GHG emission reductions attributed to the SCS to meet state-established targets for the region. As described in the Regulatory Framework, SB 375 requires CARB to develop regional GHG emission reduction targets for cars and light-duty trucks for 2020 and 2035 (compared to 2005 emissions) for each of the state MPOs on a per capita basis. Each MPO is required to prepare an SCS as part of the RTP in order to meet these GHG emissions reduction targets by aligning transportation, land use, and housing strategies with respect to SB 375. For SCAG, the targets are to reduce per capita GHG emissions by 8 percent below 2005 per capita levels by 2020 and 19 percent below 2005 per capita levels by 2035. Determining the per capita GHG emissions requires modeling VMT by passenger vehicles and light trucks that emit CO₂¹⁴ and dividing the number by the total population. SB 375 consistency and per capita calculations were conducted using the on-road VMT and population from SCAG's modeling and emission factors from the then-USEPA-approved EMFAC2014 (the same model used for the target-setting process) as directed by CARB for SB 375 consistency analysis purposes (CARB and SCAG 2022). Additional analysis was done for strategies to which SCAG's model is not sensitive. These methodologies are detailed in SCAG's SCS Technical Methodology submitted to CARB and for which emission factors from CARB's latest USEPA-approved EMFAC2021 (approved in November 2022) are used to calculate GHG emission reductions. For purposes of analyzing total on-road vehicle emissions, EMFAC2021 was used to calculate GHG emission reductions.

¹⁴ SB 375 GHG emissions are reported in CO₂ from the EMFAC model.

MITIGATION MEASURES

As discussed in Chapter 2, *Project Description*, and Section 3.0, *Introduction to the Analysis*, Connect SoCal 2024 includes Regional Planning Policies and Implementation Strategies, some of which will effectively reduce impacts in the various resource areas. Furthermore, compliance with all applicable laws and regulations (as set forth in the Regulatory Framework) would be reasonably expected to reduce impacts of the Plan. See CEQA Guidelines Section 15126.4(a)(1)(B). As discussed in Section 3.0, where remaining potentially significant impacts are identified, SCAG mitigation measures are incorporated to reduce these impacts. If SCAG cannot mitigate impacts of the Plan to less than significant, project-level mitigation measures are identified which can and should be considered and implemented by lead agencies as applicable and feasible.

IMPACTS AND MITIGATION MEASURES

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

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

Significant and Unavoidable Impact (Except for Plan's Consistency with SB 375) – Mitigation Required

As discussed in Section 3.0, *Introduction to the Analysis*, due to the interrelationship of the threshold topic areas, Impacts GHG-1 and GHG-2 are addressed together.

Pursuant to Appendix G of the CEQA Guidelines, a significant GHG impact would occur if the Plan would generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. While transportation sector (specifically on-road mobile sources) GHG emissions resulting from implementation of the Plan are anticipated to decrease compared to existing conditions, they are not anticipated to be reduced sufficiently to meet the GHG emissions reduction targets established for California. Moreover, while the Plan will meet the SB 375 GHG reduction targets set by CARB for SCAG, CARB has indicated that achievement of such regional targets is insufficient for the transportation sector to meet the state's overall GHG reduction goals. As such, GHG emissions from the Plan may have a significant impact on the environment.

CONNECT SOCIAL 2024 GHG EMISSIONS – OVERVIEW

CONSTRUCTION EMISSIONS

The construction of projects requires use of vehicles and equipment that consume fuel and emit GHGs for construction activities (worker commutes and materials transport emissions are accounted for within the on-road emissions analysis above). Earth-moving equipment is often necessary to construct new transportation and development projects. Equipment includes graders, scrapers, backhoes, jackhammers, front-end loaders, generators, water trucks, and dump trucks. Construction-related GHG emissions for each individual project are temporary and last only for the duration of construction of that project, but on a regional scale construction is an on-going source of GHG emissions. Quantification of short-term construction related GHG emissions is generally based on the size of each project, the equipment used and the construction schedule. Such detailed information

is not available on a regional scale. Construction emission estimates are not reasonably foreseeable because the nature of construction activity is so variable. Generally, due to relatively short-term nature of construction activities of projects as compared to the project's overall lifetimes, the construction emissions are assumed to contribute a relatively small portion of overall lifetime project GHG emissions (SCAQMD 2008b).

Implementation of the Plan would result in the construction of various projects. Connect SoCal 2024 includes transportation projects which promote increased public transit ridership, improved connectivity to public transit lines, increased active transportation opportunities and facilities, and traffic congestion management. See the Project List Technical Report for Connect SoCal 2024 for a complete list of the Plan's transportation projects. Construction activities associated with these transportation projects and other potential development projects envisioned under the Plan would result in GHG emissions. Emissions associated with each individual project are generally short-term and are limited to the project construction phase. The sources associated with these emissions include construction equipment, employee and vendor vehicles, demolition, grading and other ground-disturbing activities, application of paint and other coatings, paving, and others. Typically, larger projects are associated with larger emissions during construction.

Plan implementation may also include electric and hydrogen vehicle charging stations, recycling facilities for batteries as combustion engines are phased out and near-zero and zero-emissions vehicles are adopted, and modification of existing facilities to accommodate alternative-fueled vehicles. In addition, roadway and transit construction materials, such as asphalt, concrete, surface treatments, steel, rail ballast, as well as building materials, could potentially emit GHG emissions, and would likely be used in projects that involve new construction or replacement of older materials. While GHG emissions would be required to complete construction for any new or modified facilities or infrastructure projects, construction would be temporary and limited in magnitude. In addition, in this case, the temporary construction GHG emissions is to, in the long-term, allow for a transition for the transportation and construction sectors to emit less GHG emissions.

OPERATIONAL EMISSIONS

Implementation of the Plan would result in the long-term operation of transportation and potential development projects. The region is anticipated to experience substantial increases in population, households, and jobs by 2050 (see Section 3.14, *Population and Housing*). Connect SoCal 2024 includes Regional Planning Policies and Implementation Strategies that seek to balance that the region's land use choices and transportation investments to accommodate the region's growth. The Plan focuses new growth and development in PDAs, which include NMAs, Livable Corridors, TPAs, and Spheres of Influence and incorporates strategies to increase walking, biking, or other forms of active transportation.

Changes in technology are anticipated to complement transportation projects and strategies in further reducing GHG emissions. The location-based land use strategies, street design policies, and pricing and system management policies would reduce GHG emissions. Integration of changing technologies with proposed strategies would enhance the effects of the strategies. For example, in order to support an increase in alternative fuel vehicles, SCAG's multi-tier approach includes encouraging electric vehicle (EV) charging at public fast charging locations, workplaces, and multi-family housing (land use strategy), encouraging curbside EV charging stations and parking (street design policy), and providing rebates for charging stations and EVs (pricing and system management policy).

Because of the anticipated increase in compact and higher density development, less energy (e.g., multi-family housing units are insulated by each other and, therefore, require less heating and cooling as compared to single

family units) and less water (e.g., multi-family units have less landscaping requiring irrigation as compared to single-family units) is expected to be used and would contribute to the reduction in GHG emissions (see Table 3.6-1, Residential Energy Use and Cost per Household, and Table 3.6-3, Building Energy Consumption – Residential and Commercial, in Section 3.6, *Energy*, of this 2024 PEIR).

GHG emissions result from direct and indirect sources. Direct emissions in the transportation sector derive from fuel combustion in vehicles (i.e., automobiles, trucks, trains, buses, planes, ships, and trains) and natural gas combustion from stationary sources. Indirect sources include off-site emissions occurring from electricity from stationary sources. Indirect sources include off-site emissions occurring from electricity, water consumption and solid waste. On-road transportation emissions include fuel consumption from passenger vehicles, heavy-duty trucks, buses, and other motor vehicles. Transportation accounts for the greatest proportion of GHG emissions on a regional and state level. Connect SoCal 2024 includes transportation network improvements and encourages more compact, infill, walkable, and mixed-use development strategies to accommodate new region's growth to accommodate increases in population, housing, employment, and travel demand. Additionally, Connect SoCal 2024 includes improvements to the active transportation network as well as passenger and rail to decrease fuel emissions.

In addition, transportation projects that could occur as a result of Plan implementation include electric and hydrogen vehicle charging stations, recycling facilities for batteries as combustion engines are phased out and near-zero and zero-emissions vehicles are adopted, and modification of existing facilities to accommodate alternative-fueled vehicles. While GHG emissions would initially be emitted due to electricity usage for any new or modified facilities or infrastructure projects, in the long-term, with the RPS regulations described above, an increasing amount of the electricity used would be renewable and not emit GHGs. In addition, this would promote a continued shift away from petroleum-based fueled vehicles toward the use of zero-emissions or near-zero-emissions vehicles and the expansion of the charging station network in the state in order for the transportation sector to emit less GHG emissions.

TRANSPORTATION EMISSIONS

In order to assess the impacts of direct emissions as a result of Connect SoCal 2024, the transportation emissions from on-road (light and medium duty vehicles, heavy duty vehicles, and buses) and other sources transportation (rail, aviation, and ocean-going vessels) were evaluated in **Table 3.8-7, Greenhouse Gas Emissions from All On-Road Vehicles in the SCAG Region**, and **Table 3.8-8, Greenhouse Gas Emissions from Other Transportation Sources in the SCAG Region**. **Table 3.8-9, Greenhouse Gas Emissions from All On-Road Vehicles and Other Transportation Sources in the SCAG Region**, provides a summary of Table 3.8-8 and Table 3.8-9 to demonstrate that the SCAG region will decrease mobile-source GHG emissions by approximately 28 percent from 2019 to 2050.

TABLE 3.8-7 Greenhouse Gas Emissions from All On-Road Vehicles in the SCAG Region
(million metric tons per year)

ON-ROAD VEHICLES	2019 (MMT/YEAR)			2030 (PLAN) (MMT/YEAR)			2045 (PLAN) (MMT/YEAR)			2050 (PLAN) (MMT/YEAR)		
	CO2	CH4	N02	CO2	CH4	N02	CO2	CH4	N02	CO2	CH4	N02
Light- and Medium-Duty Vehicles	49.30	0.0025	0.0010	37.39	0.0011	0.0004	32.91	0.0007	0.0002	32.97	0.0007	0.0002
Heavy-Duty Vehicles	12.64	0.0005	0.0014	11.90	0.0003	0.0006	9.75	0.0002	0.0005	10.82	0.0002	0.0005
Buses	1.54	0.0008	0.0001	1.22	0.0008	<0.0001	0.61	0.0001	<0.0001	0.58	0.0001	<0.0001
<i>Subtotal On-Road Vehicles in CO2</i>	<i>63.48</i>	<i>0.0039</i>	<i>0.0026</i>	<i>50.51</i>	<i>0.0023</i>	<i>0.0010</i>	<i>43.27</i>	<i>0.0010</i>	<i>0.0007</i>	<i>44.37</i>	<i>0.0009</i>	<i>0.0008</i>
<i>Subtotal On-Road Vehicles in CO2e*</i>	<i>63.48</i>	<i>0.0810</i>	<i>0.7943</i>	<i>50.51</i>	<i>0.0474</i>	<i>0.3174</i>	<i>43.27</i>	<i>0.0212</i>	<i>0.2294</i>	<i>44.37</i>	<i>0.0199</i>	<i>0.2423</i>
Total GHG Emissions from On-Road Vehicles in CO2e	64.35			50.87			43.52			44.64		

Source: SCAG Modeling (2023)

Table Note:

* CO2 was converted to CO2e based on the [Global Warming Potential \(GWP\)](#) (CARB, undated[b]).

TABLE 3.8-8 Greenhouse Gas Emissions from Other Transportation Sources in the SCAG Region
(million metric tons per year)

OFF-ROAD VEHICLES**	2019 (MMT/YEAR)			2030 (PLAN) (MMT/YEAR)			2045 (PLAN) (MMT/YEAR)			2050 (PLAN) (MMT/YEAR)		
	CO2	CH4	N02	CO2	CH4	N02	CO2	CH4	N02	CO2	CH4	N02
Rail	—	<0.0001	0.0006	—	<0.0001	0.0007	—	<0.0001	0.0004	—	<0.0001	0.0004
Aviation***	1.29	—	—	1.66	—	—	2.17	—	—	2.34	—	—
Airport Ground Support (GSE)	0.11	<0.0001	<0.0001	0.13	<0.0001	<0.0001	0.15	<0.0001	<0.0001	0.15	<0.0001	<0.0001
Ocean-Going Vessel	0.42	<0.0001	0.0002	0.43	<0.0001	0.0001	0.55	<0.0001	0.0001	0.57	<0.0001	0.0001
<i>Subtotal Other Transportation Sources</i>	<i>1.82</i>	<i><0.0001</i>	<i>0.0008</i>	<i>2.23</i>	<i><0.0001</i>	<i>0.0009</i>	<i>2.86</i>	<i><0.0001</i>	<i>0.0005</i>	<i>3.05</i>	<i><0.0001</i>	<i>0.0005</i>
<i>Subtotal Other Transportation Sources in CO2e*</i>	<i>1.82</i>	<i>0.0007</i>	<i>0.2522</i>	<i>2.23</i>	<i>0.0007</i>	<i>0.2798</i>	<i>2.86</i>	<i>0.0005</i>	<i>0.1699</i>	<i>3.05</i>	<i>0.0005</i>	<i>0.1526</i>
Total GHG Emissions from Off-Road Vehicles in CO2e*	2.07			2.51			3.03			3.21		

Source: SCAG Modeling (2023); SCAQMD 2016

Table Notes:

* CO2 was converted to CO2e based on the [Global Warming Potential \(GWP\)](#) (CARB, undated[b]).

** Rail, aviation and ocean-going vessels are regulated at the federal level. Airport Ground Support (GSE) sources are regulated at the state level. Rail CO2 emissions are not available.

*** Aviation CO2 MMT values linearly interpolated from presented years 2012 and 2040 from the SCAQMD Aircraft Emission Inventory (August 2016). This study includes Burbank, John Wayne, Long Beach, LAX, Ontario and Palm Springs which are a substantial fraction of the entire SCAG region. These airports represent 99.99% of the passenger traffic and 99.96% of cargo volume from commercial airports in the region in 2019 (see the 2024 PEIR Aviation Noise Technical Report for additional details). Note CH4 and N2O not presented. Aviation GHG emissions from other air basins unavailable.

TABLE 3.8-9 Greenhouse Gas Emissions (CO₂e) from All On-Road and Other Transportation Sources in the SCAG Region (million metric tons per year)

	2019 BASE YEAR	2030 (PLAN)	2045 (PLAN)	2050 (PLAN)
Total GHG Emissions from On-Road Vehicles in CO ₂ e	64.35	50.87	43.52	44.64
Total GHG Emissions from Other Transportation Sources in CO ₂ e*	2.07	2.51	3.03	3.21
All Transportation Sector (On-Road and Other Sources) in CO₂e	66.42	53.38	46.55	47.84
<i>2030, 2045, 205 Plan vs. 2019 Base Year</i>		-19.6%	-29.9%	-28.0%

Source: SCAG Modeling (2023)

Table Notes: CO₂ was converted to CO₂e based on the [Global Warming Potential \(GWP\)](#) (CARB, undated[b]).

* Emission sources include rail, aviation, GSE, and ocean-going vessels. Rail, aviation, and ocean-going vessels are regulated at the federal level. Airport Ground Support (GSE) sources are regulated at the state level.

Between 2019 and 2050, GHG emission from on-road mobile sources and other transportation sources, inclusive of light and medium duty vehicles and heavy-duty trucks, would decrease by approximately 28 percent (on-road also would decrease by approximately 31 percent). The largest decreases would occur in the most populous counties—Los Angeles, Orange, and Ventura Counties (**Table 3.8-10, Greenhouse Gas Emissions Light-, Medium-, and Heavy-Duty On-Road Vehicle Transportation by County and Other Transportation Sources in the SCAG Region [CO₂e]**). As shown in TABLE 3.8-8, Aviation, Airport Ground Support (GSE) and OGV GHG emissions are expected to increase between 2019 and 2050.

TABLE 3.8-10 Greenhouse Gas Emissions Light-, Medium-, and Heavy-Duty On-Road Vehicle Transportation by County and Other Transportation Sources in the SCAG Region (CO₂e) (million metric tons per year)

COUNTY	2005 BASE YEAR	2019 PEIR BASE YEAR	2030 PLAN	2045 PLAN	2050 PLAN	2019 COMPARED TO PLAN YEAR (2050)	2005 COMPARED TO PLAN YEAR (2050)
Light-, Medium-, and Heavy-Duty On-Road Vehicle Transportation							
Imperial	1.27	1.27	1.10	1.06	1.10	-12.7%	-13.0%
Los Angeles	42.47	31.07	23.85	19.97	20.10	-35.3%	-52.7%
Orange	12.77	10.17	7.73	6.47	6.51	-36.0%	-49.0%
Riverside	10.70	9.03	7.75	7.08	7.71	-14.6%	-28.0%
San Bernardino	11.84	9.66	7.96	7.33	7.64	-20.9%	-35.5%
Ventura	3.34	1.57	1.23	0.99	0.99	-37.0%	-70.4%
SCAG Subtotal	82.39	62.76	49.62	42.90	44.05	-29.8%	-46.5%
Other Transportation							
Bus (Region)	-	1.59	1.25	0.62	0.59	-63.0%	-
Rail (Region)	-	0.20	0.23	0.14	0.12	-38.1%	-
Aviation*	-	1.29	1.66	2.17	2.34	81.3%	-
Airport Ground Support (GSE)	-	0.12	0.14	0.16	0.16	32.7%	-
OGV (Region)	-	0.47	0.48	0.57	0.59	26.8%	-
Total All Sectors		66.42	53.38	46.55	47.84	-28.0%	-

Source: SCAG Modeling (2023)

Table Note: On-Road Transportation sources include light- and medium-duty vehicles and heavy-duty trucks.

No Plan emissions were not presented as they incrementally as compared to Plan emissions. For discussion of emissions related to Plan Alternatives please refer to Chapter 4, *Alternatives*, of this PEIR.

* Aviation CO₂ MMT values linearly interpolated from presented years 2012 and 2040 for the SCAQMD. Note CH₄ and N₂O not presented. Aviation GHG emissions from other jurisdictions unavailable.

Other Transportation Sources include bus rail, aviation, GSE, and ocean-going vessels. Rail, aviation, and ocean-going vessels are regulated at the federal level. Airport Ground Support (GSE) sources are regulated at the state level.

TOTAL GHG EMISSIONS IN SCAG REGION

In order to get a better estimate of total GHG emissions, emissions from other major sectors (energy and water consumption) in addition to transportation are considered in the analysis below.

As previously stated, Connect SoCal 2024 focuses growth within existing urban regions and growth opportunity areas, where transit and infrastructure are already in place. Locating new growth near bikeways, greenways, and transit would increase active transportation options and the use of other transit modes (public transit, carpooling), thereby reducing number of vehicle trips and trip lengths and associated emissions. The land use strategies included in the Plan would encourage higher density development in existing urban cores and opportunity areas which would encourage more multi-family and/or mixed-use projects, via vertical development, instead of the

traditional single-family home development. Compact development and utilization of conservation strategies (i.e., exceed Title 24 building codes, LEED certification), would reduce energy and water consumption.

GHG emissions for building energy were calculated in SCAG’s Scenario Planning Model (SPM) based on a factor of 16.10 pounds (lb) CO₂e/therm for natural gas to estimate 2019 and 2050 emissions and 0.51 lb CO₂e/kilowatt-hour (kWh) and 0.19 lb CO₂e/kWh for electricity to estimate 2019 and 2050 emissions, respectively. Indoor and outdoor water-related energy¹⁵ were based on factors of 13,587 kWh/MG and 11,593 kWh/MG, respectively for 2019 and 2050. Water related energy includes the electricity used in the transport, treatment, and distribution of water. However, the analysis below does not account for changing sources of emissions that would reduce GHG emissions per kilowatt hour, nor does it account for improved technology that would reduce consumption of energy. The below analysis also does not account for reductions in water demand as a result of conservation. The analysis presented in **Table 3.8-11, Greenhouse Gas Emissions for the SCAG Region from Three Primary Sources (CO₂e) (million metric tons per year)**, illustrates how a more compact growth pattern can reduce GHG emissions. Regulations, as well as technological and other reductions are anticipated to substantially reduce emissions compared to what is shown in Table 3.8-10.

TABLE 3.8-11 Greenhouse Gas Emissions for the SCAG Region from Three Primary Sources (CO₂e)
(million metric tons per year)

AREA	2005 BASE YEAR	2019 BASE YEAR	2030 PLAN	2045 PLAN	2050 PLAN	2019 VS 2050 PLAN	2005 VS 2050 PLAN
Transportation ^a	82.39	66.42	53.38	46.55	47.84	-28.0%	-41.9%
Building Energy ^b	44.50	64.64	57.30	47.30	43.97	-32.0%	-1.20%
Water-Related Energy ^c	3.82	2.89	2.26	1.40	1.12	-61.3%	-70.8%
Total	130.71	133.95	112.94	95.26	92.93	-30.6%	-28.9%

Source: SCAG Modeling (2023)

Table Notes:

The Scenario Planning Model provides estimates of energy and water consumption; it is a scenario planning tool used for developing scenarios for the Plan during the scenario planning process to compare relative differences among scenarios and does not account for emissions reductions from cleaner fuels and technologies in the future.

The estimates of GHG emissions in this table do not include the following sources: construction, solid waste, agriculture, wildfires, industrial process or other sources.

- a. Transportation emissions include On-Road and Other Transportation Sources. On-Road Transportation sources include light- and medium-duty vehicles and heavy-duty trucks. On-road transportation based on EMFAC and conversion from CO₂ to CO₂e. Other Transportation Sources include bus rail, aviation, GSE, and ocean-going vessels. Rail, aviation, and ocean-going vessels are regulated at the federal level. Airport Ground Support (GSE) sources are regulated at the state level. Note, transportation source emissions from the 2005 Base Year do not include emissions from Other Transportation Sources as these emissions are unavailable.
- b. Includes estimates of emissions from energy used in the region but generated outside the region. Values for 2030 and 2045 are linearly interpolated from SCAG SPM Modeling results for year 2019 and 2050. The 2005 base year value is from the 2012 RTP/SCS PEIR.
- c. Water related estimates of energy consumption includes the electricity used in the transport, treatment, and distribution of water. Values for 2030 and 2045 are linearly interpolated from SCAG SPM Modeling results for year 2019 and 2050. The 2005 base year value is from the 2012 RTP/SCS PEIR.

As shown in Table 3.8-11, the total GHG emissions from transportation, building and water-related energy are anticipated to decrease by 30.6 percent with Connect SoCal 2024 in 2050 compared to existing (2019) conditions. GHG emissions associated with building energy and water-related energy consumption are presented in Table 3.8-10. SCAG Scenario Planning Model accounts for GHG emissions associated with these sources. In addition, it is important to note that the Plan has no control over the fuels used by vehicles in the region or the

¹⁵ Water related energy includes the electricity used in the transport, treatment, and distribution of water.

types of vehicles used. As outlined in CARB's 2020 Mobile Source Strategy, changes to fuel type and types of vehicles are anticipated to result in additional substantial reductions in GHG from the transportation sector. Note that the analysis above does not include emissions from construction equipment, agricultural operations, industrial processes, wildfires, and other unique sources.

INDUSTRIAL, AGRICULTURAL, AND OTHER SOURCES

It is also important to note that the Plan is primarily a transportation plan with land use strategies. SCAG currently does not collect information regarding industrial, agricultural, and other sources, rather these sources of emissions are addressed by air quality management districts as part of the preparation of air quality management plans. For example, the SCAQMD's 2022 AQMP uses an integrated approach to reduce criteria air pollutants, toxic pollutants, and GHG emissions. A large portion of GHG and air pollutant emissions come from the transportation and energy sectors. Industrial facilities consume approximately 10 percent of energy in the SCAB region, therefore contributing to a significant portion of GHG emissions (SCAQMD 2017a). The previous SCAQMD's 2016 AQMP proposes to modernize industrial facilities, promotes equipment electrification, and incorporating newer technologies such as smart grids and solar panels to reduce the reliance on fossil fuel without generating more emissions from electricity use (SCAQMD 2017a). In the SCAQMD's 2022 AQMP, there is continued emphasis on emissions reduction and modernization in the industrial sector. The 2022 AQMP includes 31 (or 49 total) control measures that target stationary sources, including those in the industrial sector; 10 strategies focus specifically on Large Combustion Source Measures that reduce emission from industrial facilities (SCAQMD 2022).

WILDFIRES

In 2019, 7,148 fires burned 277,285 acres of California land and destroyed 732 structures (CAL FIRE 2019a). The Maria Fire in October 2019, burned approximately 9,999 acres and destroyed four structures in Ventura County, representing the largest fire of that year within the SCAG region (CAL FIRE 2019b). California's 2019 wildfires emitted approximately 4.8 MMTCO_{2e}, which represents about 1 percent of California's total GHG emissions that year as compared to the prior year where it was approximately 10 percent (39.1 MMTCO_{2e} from wildfires as compared to 411.0 MMTCO_{2e} emitted in total by the state) (CARB 2022b, Undated[a]). Estimating GHG emissions from wildfires is highly unpredictable and beyond the scope of this PEIR. However, it is likely that wildfires and their associated emissions will continue to be a substantial source of emissions in future years as climate change leads to a longer and more intense fire season (CARB 2022b).

CONNECT SOCAL 2024 CONSISTENCY WITH GHG REDUCTION PLANS AND POLICIES

COMPLIANCE WITH SB 375

Pursuant to CEQA Guidelines Appendix G, a significant GHG impact is identified if the Plan could conflict with applicable GHG reduction plans, policies, or regulations. SB 375 requires each of the State MPO to meet its per capita GHG emission reductions by 2020 and 2035 as compared to the base year of 2005. AB 32 and SB 32 are statewide reduction goals aimed at reducing emissions to 1990 levels by 2020 and reducing emissions to at least 40 percent below 1990 levels by 2030, respectively. However, as mentioned above, both CARB and OPR have acknowledged that MPOs are tasked with meeting SB 375 per capita GHG emissions reduction targets. Each MPO is required to prepare an SCS as part of the RTP in order to meet its assigned GHG emissions reduction targets by aligning transportation, land use, and housing strategies with respect to SB 375.

As described in the Regulatory Framework, SB 375 requires CARB to develop regional GHG emission reduction targets for cars and light-duty trucks for 2020 and 2035 (compared to 2005 emissions) for each of the state MPOs

on a per capita basis. Each MPO is required to prepare an SCS as part of the RTP to meet these GHG emissions reduction targets by aligning transportation, land use, and housing strategies with respect to SB 375. For SCAG, the targets are to reduce per capita GHG emissions by 8 percent below 2005 levels by 2020 and 19 percent below 2005 levels by 2035. Determining the per capita GHG emissions requires modeling VMT by passenger vehicles and light trucks that emit CO₂¹⁶ and dividing the number by the total population. Based on the Plan's GHG analysis, the Plan has achieved the 8-percent per capita GHG emissions target for 2020 as set by CARB for the SCAG region for SB 375 purposes and will meet the 19 percent per capita GHG target for 2035 as discussed in Connect SoCal 2024, Performance Monitoring Technical Report (summarized in Table 13).

Decreased travel during the COVID-19 pandemic most likely helped achieve (and exceed) the 2020 target. In fact, the total VMT for the SCAG Region in 2020 was 10.9 percent lower than in 2019. By 2035, the Plan is projected to achieve the 19 percent below the 2005 level per capita GHG emissions target. Note that the Plan's SB 375 GHG emissions analysis was based on EMFAC2014 (the same model used for the target-setting process) as directed by CARB for SB 375 consistency analysis purposes (CARB and SCAG 2022) and included SCAG's modeling and off-model adjustments for 2035. In sum, the Plan has met the State requirements for RTP/SCS under SB 375 and is considered not in conflict with SB 375.

CARB has not set per capita GHG emission reduction targets for passenger vehicles for the Plan's horizon year (2050). While the Plan is expected to meet its GHG emissions reduction targets for 2020 and 2035 pursuant to SB 375 which represent the region's share of on-road transportation emission reductions as currently identified by CARB, as discussed above, there remains a gap between what the targets achieved and the necessary reductions in GHG from the on-road transportation sector. ZEVs and other emission controls are expected to partially address this gap, and CARB encourages local jurisdictions to further reduce per capita VMT. In addition, implementation of the Plan's Regional Planning Policies and Implementation Strategies throughout the lifetime of the Plan (beyond 2035) including investments and strategies in transit improvements, traffic congestion management, emerging technology, and active transportation within the SCAG region will lead to further GHG reductions by 2050. Thus, the Plan would not be in conflict with SB 375.

SB 743 AND VMT GUIDANCE

Table 3.8-12, Population and Daily VMT (2019 and 2050), presents information related to population, daily VMT and VMT per capita for the years 2019 and 2050.¹⁷

¹⁶ SB 375 GHG emissions are reported in CO₂ from the EMFAC model.

¹⁷ Beyond the Baseline and Plan year of 2019 and 2050, the analysis years were selected in order to provide a comparison to CARB's 2022 Scoping Plan conclusion that a per capita reduction of at least 25 percent below 2019 levels by 2030 and 30 percent below 2019 levels by 2045 in light-duty VMT is needed to reduce overall transportation energy demand and meet the state's climate, air quality, and equity goals.

TABLE 3.8-12 Population and VMT (2019 and 2050)

	2019	2050	2050 VS 2019
Total Population	18,827,000	20,882,000	10.9%
Light Duty Vehicle VMT	413,969,000	407,065,000	-1.67%
Total VMT	444,240,000	450,428,000	1.39%
VMT Per Capita Light Duty Vehicles	21.99	19.49	-11.4%
VMT Per Capita All Vehicles	23.60	21.57	-8.6%

Source: SCAG modeling (2023)

As discussed in Section 3.17, *Transportation*, the region is making progress in per capita VMT reductions and is also making significant strides in the development of new initiatives, projects, policies, and strategies in the Plan to support, and align with AB 32 and SB 32 (as well as associated SB 743 guidance) GHG reduction goals. Although the Plan is not directly interfering with the statewide VMT reductions required to meet the state’s climate goals, given the “gap” between the current MPOs current emissions reductions targets and the emissions/VMT reductions necessary to meet the state’s climate action goals, additional progress from regional transportation planning by MPOs is needed.

CARB acknowledges that SCAG and other MPOs cannot meet necessary GHG reductions from the transportation sector without the collaboration and help of the state itself (i.e., through stricter regulation), as well as local partners. At the time of preparing this 2024 PEIR it is unknown how CARB and other state agencies, through statewide programs or in coordination with local and regional governments, would meet the identified higher VMT reductions. It is expected that jurisdictions will need to review their projects in light of previous CARB and OPR guidance as well as the 2022 Scoping Plan with respect to VMT reduction targets to determine the appropriate levels of reductions. Neither the agencies nor the courts have provided any clear guidance yet as to the appropriate methodology, and it is expected that there will not be a “one size fits all” approach. Each project will need to be evaluated in light of its particular components and the latest information available from CARB and other sources.

COMPLIANCE WITH AB 32 AND SB 32

As noted in Section 3.8.2, *Regulatory Framework*, AB 32 requires the state to reduce GHG emissions to 1990 levels by 2020. SB 32 was signed into law to further reduce GHG emissions and requires the state to reduce GHG emissions to at least 40 percent below 1990 levels by 2030. The Scoping Plans, particularly the most recently adopted 2022 Scoping Plan, function as roadmaps for the state to achieve near- and long-term GHG reductions. Because the Plan focuses on meeting a portion of the state’s requirements on the transportation sector (i.e., passenger vehicles and light-duty trucks) with respect to regional transportation plans and integrated land use strategies pursuant to SB 375, the Plan does not include strategies or show GHG reductions for all the AB 32 and SB 32 Scoping Plans strategies that address a broad range of economic sectors. In addition, as stated in CARB’s 2018 Progress Report, California as a whole has met its 2020 climate target ahead of schedule.

The Plan includes transportation improvements to be integrated and coordinated with land use patterns that support reduced congestion, reduced VMT, and increased transit, walking, and biking options. In 2050 under the Plan, GHG emissions for the SCAG region from the three primary sources—transportation, building energy, and water-related energy are all anticipated to decrease as compared to 2005 (see Table 3.8-11).

TRANSPORTATION SOURCES – LIGHT DUTY VEHICLES

This Plan alone is not intended to meet AB 32 and SB 32 emission reduction targets alone. By meeting the SB 375 targets, the Plan has contributed its regional share to meeting the AB 32 and SB 32 climate goals. As discussed above, the Plan has met its per capita GHG emissions reduction targets from cars and light-duty trucks of approximately 8 percent by 2020 and approximately 19 percent by 2035 per SB 375. Given that the primary statutory responsibility of Connect SoCal 2024 is to achieve SB 375 targets, which it does in both 2020 and 2035, and that the goals set forth by AB 32 and SB 32 are intended to be achieved by all the responsible sectors, the Plan has successfully contributed its regional share of GHG emission reduction. Therefore, the Plan itself is not in conflict with AB 32 or SB 32.

Note, however, as mentioned above, CARB determined that if the state's 18 MPOs' all met the SB 375 GHG cars and light-duty trucks emission reduction targets set by CARB in 2018, a 19 percent reduction in per capita VMT (from cars and light-duty trucks) would be achieved by 2035 (as compared to 2005) (CARB 2018c). In the 2018 target re-setting report, CARB indicated that to meet the statewide reduction goals set forth by SB 32 and the 2017 Scoping Plan, the state would need to reduce per capita GHG emissions from cars and light-duty trucks by 25 percent by 2035, resulting in a 6 percent gap between the 19 percent emissions reductions targets set for the regions (averaged for the 18 MPOs and compared to a baseline year of 2005). Therefore, even with meeting CARB's 2018 SB 375 GHG emissions reduction targets, a 6 percent gap compared to the state's 25 percent reduction need remains.

CARB has previously noted in setting the 2018 SB 375 emission reduction targets, "[a]n RTP/SCS that meets the applicable SB 375 targets alone will not produce the GHG emissions reductions necessary to meet state climate goals in 2030 nor in 2050" (CARB 2018c). CARB has also noted that greater reductions in VMT will be required to make up the 6 percent gap in GHG reductions. It will take collaboration among all these levels of government to identify the additional VMT reductions needed to achieve the state's climate goals because MPOs do not have the land use authority or resources to meet challenge alone.

Given the state's emphasis on VMT reduction as a key strategy to achieve additional GHG reductions needed from cars and light-duty trucks (in addition to SB 375 targets), and in recognition of the climate change benefits that occur from reduced VMT resulting in reductions in GHGs, the projected land use pattern encouraged under the Plan supports PDAs. However, SCAG lacks the land use authority to enforce specific land uses. Implementation of the projected land use pattern under the Plan is within the purview of local agencies. As described in Chapter 2, *Project Description*, in order to incentivize implementation, SCAG has established several programs that support transit-oriented development in the region. For example: promoting congestion pricing, implementing complete streets strategies, and improving connectivity between existing transit systems.

In sum, while overall, California has met its AB 32 2020 climate target four years ahead of schedule due to advances in the energy sector, the transportation sector has not seen the same gains and still constitutes approximately 40 percent of the state's emissions. Emissions from the transportation sector have continued to rise despite increases in fuel economy and decreases in the carbon content of fuel (CARB 2017c).

OTHER SOURCES

GHG emissions from sectors other than cars and light-duty trucks are anticipated to be reduced in future years due to the implementation of statewide regulations and policy directed at reducing emissions (see Table 3.8-10). For example, emissions from agriculture and the solid waste sector may be reduced through regulatory requirements of SB 1383, which requires a 75 percent reduction in the level of statewide disposal of organic waste

compared to 2014 by 2025. SB 100, the 100 Percent Clean Energy Act of 2018 also requires that the state's electricity sector achieve carbon neutrality by 2045 with benchmark targets of 50 percent renewable energy by 2026 and 60 percent by 2030. However, while these reductions are expected, implementation of statewide regulations is beyond the scope of SCAG's authority.

The 2022 Scoping Plan is the most comprehensive and far-reaching Scoping Plan developed to date. It identifies a path (though not prescribed) to achieve new targets for carbon neutrality by 2045 and to reduce anthropogenic GHG emissions to at least 85 percent below 1990 levels, while also assessing the progress California is making toward reducing its GHG emissions by at least 40 percent below 1990 levels by 2030, as called for in SB 32 and laid out in the 2017 Scoping Plan (CARB 2017b).

Implementation of development projects with the Plan would be subject to Title 24 Building Code requirements, including the California Energy Code and the mandatory requirements of the CALGreen Code. Future development would also be required to undergo environmental review that would evaluate the potential for climate change impacts to occur. It is likely that in cases where climate change impacts are identified, appropriate and feasible mitigation would be applied to reduce GHG emissions including on- and off-site GHG reduction measures (e.g., low-flow water appliance, energy-efficient home appliances, landscaping limits), investments in local or regional programs to reduce GHGs (e.g., electrified school bus programs, home refurbishment rebate programs), and the purchase of carbon offsets through programs verified by third party such as the Climate Action Reserve.

Table 3.8-11 provides a comparison of estimated emissions for three primary sources for the years 2005, 2019, 2030, 2045 and 2050. While 1990 data for the SCAG region specifically is not available, 15 percent below 2005 may be used as an estimate of 1990. Therefore estimated 1990 emissions for the three primary sources of emissions in the SCAG region is 15 percent less than 130.71 MMT or 111.10 MMT. 2050 total emissions from these sources are estimated at 92.93 MMT or about 16 percent less than estimated 1990 emissions.

SUMMARY

In summary, GHG emissions are anticipated to decrease compared to existing conditions. However, based on the analysis above they are not anticipated to be reduced sufficiently to meet the GHG emissions reduction targets established for California (see Regulatory Framework), and therefore the GHG emissions resulting directly and indirectly from the Plan may result in significant and unavoidable impacts. As noted in the discussion above, the analyses of GHG emissions sources presented herein, even for transportation, do not fully take into account changes to fuels and clean technologies that are expected to substantially reduce emissions over time as compared to what is presented here. Nonetheless, emissions are still forecasted (based on current modeling with factors) to be higher than necessary to meet the statewide GHG reduction targets (other than SB 375 where the SCAG region would meet the targets).

GHG impacts are generally cumulative in nature and have broader (i.e., statewide, national, and global) implications. At the state level, CARB has indicated in its latest 2022 Progress Report that California, as a whole, is still not reducing enough GHG emissions from personal vehicle travel pursuant to SB 375. But CARB recognizes that MPOs do not have land use authority to implement additional VMT reductions. Indeed, SCAG has no control or authority over the other key sectors whose GHG emission reductions are needed to meet the State's climate goals. At the regional level, it is expected that this Plan would meet SCAG's current per capita GHG emission reductions targets for passenger vehicles and light-duty trucks for 2020 and 2035 as set forth by CARB in 2018. By meeting its statutorily required SB 375 targets for the SCAG region, the Plan has contributed its regional share towards reducing GHG emissions set forth in AB 32 and SB 32. However, additional and accelerated per capita

light-duty vehicles VMT reductions at the regional level are still needed. As one of the largest four MPOs in the state, SCAG has a unique perspective to offer in the next round of SB 375 GHG reduction targets setting and will lead by example in working together with CARB and all other involved agencies in setting ambitious and yet appropriate, achievable, and equitable targets for SCAG's portion of transportation planning's contribution toward state climate goals. Nonetheless, there could be a possibility of conflicts with AB 32 and/or SB 32 at this time. Therefore, GHG impacts, with the exception of the Plan's compliance with SB 375, are conservatively considered significant and mitigation measures are required.

MITIGATION MEASURES

SCAG MITIGATION MEASURES

See **SMM-AQ-1**.

SMM-GHG-1 SCAG, in partnership with local air districts, shall continue to work with local jurisdictions to adopt qualified GHG reduction plans (e.g., climate action plans [CAPs]), develop GHG-reducing planning policies, and support local implementation of climate initiatives.

SMM-GHG-2 SCAG shall measure and track sustainability progress in the region and foster collaboration through the sharing of best practices across the 191 cities and six counties in the SCAG region (including across SB 535 Disadvantaged Communities) and identifies opportunities for improving sustainability practices.

PROJECT-LEVEL MITIGATION MEASURES

PMM-GHG-1 In accordance with provisions of Sections 15091(a)(2) and 15126.4(a)(1)(B) of the State CEQA Guidelines, a lead agency for a project can and should consider mitigation measures to reduce substantial adverse effects related to greenhouse gas emissions. Such measures may include the following or other comparable measures identified by the lead agency:

- a) Integrate green building measures consistent with CALGreen (California Building Code Title 24), local building codes and other applicable laws, into project design including:
 - i) Use energy efficient materials in building design, construction, rehabilitation, and retrofit.
 - ii) Install energy-efficient lighting, heating, and cooling systems (cogeneration); water heaters; appliances; equipment; and control systems.
 - iii) Reduce lighting, heating, and cooling needs by taking advantage of light-colored roofs, trees for shade, and sunlight.
 - iv) Incorporate passive environmental control systems that account for the characteristics of the natural environment.
 - v) Use high-efficiency lighting and cooking devices.
 - vi) Incorporate passive solar design.
 - vii) Use high-reflectivity building materials and multiple glazing.
 - viii) Use no gas-powered landscape maintenance equipment.
 - ix) Install electric vehicle charging stations.

- x) Reduce wood burning stoves or fireplaces.
 - xi) Provide bike lanes accessibility and parking at residential developments.
 - xii) Encourage projects to reduce natural gas infrastructure in buildings and/or reduce the use of natural gas appliances, with exceptions for limited uses.
- b) Reduce emissions resulting from projects through implementation of project features, project design, or other measures, such as those described in Appendix F of the State CEQA Guidelines.
- c) Include off-site measures to mitigate a project's emissions.
- d) Measures that consider incorporation of Best Available Control Technology (BACT) during design, construction, and operation of projects to minimize GHG emissions, including but not limited to:
- i) Use energy and fuel-efficient vehicles and equipment;
 - ii) Deployment of zero- and/or near zero emission technologies;
 - iii) Use lighting systems that are energy efficient, such as LED technology;
 - iv) Use the minimum feasible amount of GHG-emitting construction materials;
 - v) Use cement blended with the maximum feasible amount of flash or other materials that reduce GHG emissions from cement production;
 - vi) Incorporate design measures to reduce GHG emissions from solid waste management through encouraging solid waste recycling and reuse;
 - vii) Incorporate design measures to reduce energy consumption and increase use of renewable energy;
 - viii) Incorporate design measures to reduce water consumption;
 - ix) Use lighter-colored pavement where feasible;
 - x) Recycle construction debris to maximum extent feasible;
 - xi) Plant shade trees in or near construction projects where feasible; and
 - xii) Solicit bids that include concepts listed above.
- e) Measures that encourage transit use, carpooling, bike-share and car-share programs, active transportation, and parking strategies, including, but not limited to the following:
- i) Promote transit-active transportation coordinated strategies;
 - ii) Increase bicycle carrying capacity on transit and rail vehicles;
 - iii) Improve or increase access to transit;
 - iv) Increase access to common goods and services, such as groceries, schools, and day care;
 - v) Incorporate affordable housing into the project;
 - vi) Incorporate the neighborhood electric vehicle network;
 - vii) Orient the project toward transit, bicycle, and pedestrian facilities;

- viii) Improve pedestrian or bicycle networks, or transit service;
- ix) Provide traffic calming measures;
- x) Provide bicycle parking;
- xi) Limit or eliminate park supply;
- xii) Unbundle parking costs;
- xiii) Provide parking cash-out programs;
- xiv) Implement or provide access to commute reduction program;
- f) Incorporate bicycle and pedestrian facilities into project designs, maintaining these facilities, and providing amenities incentivizing their use; and planning for and building local bicycle projects that connect with the regional network;
- g) Improving transit access to rail and bus routes by incentives for construction of transit facilities within developments, and/or providing dedicated shuttle service to transit stations; and
- h) Adopting employer trip reduction measures to reduce employee trips such as vanpool and carpool programs, providing end-of-trip facilities, and telecommuting programs including but not limited to measures that:
 - i) Provide car-sharing, bike sharing, and ride-sharing programs;
 - ii) Provide transit passes;
 - iii) Shift single occupancy vehicle trips to carpooling or vanpooling, for example providing ride-matching services;
 - iv) Provide incentives or subsidies that increase that use of modes other than single-occupancy vehicle;
 - v) Provide on-site amenities at places of work, such as priority parking for carpools and vanpools, secure bike parking, and showers and locker rooms;
 - vi) Provide employee transportation coordinators at employment sites;
 - vii) Provide a guaranteed ride home service to users of non-auto modes.
- i) Designate a percentage of parking spaces for ride-sharing vehicles or high-occupancy vehicles, and provide adequate passenger loading and unloading for those vehicles;
- j) Land use siting and design measures that reduce GHG emissions, including:
 - i) Developing on infill and brownfields sites;
 - ii) Building compact and mixed-use developments near transit;
 - iii) Retaining on-site mature trees and vegetation, and planting new canopy trees;
 - iv) Measures that increase vehicle efficiency, encourage use of zero and low emissions vehicles, or reduce the carbon content of fuels, including constructing or encouraging construction of electric vehicle charging stations or neighborhood electric vehicle networks, or charging for electric bicycles; and

- v) Measures to reduce GHG emissions from solid waste management through encouraging solid waste recycling and reuse.
- vi) Establish methane recovery in Landfills and Wastewater Treatment Plants, where applicable.
- k) Consult the SCAG Environmental Justice Toolbox available on SCAG's [Environmental Justice webpage](#) for potential measures to address impacts to low-income and/or communities of color.
- l) Require at least five percent of all new vehicle parking spaces include electric vehicle charging stations, or at a minimum, install the appropriate infrastructure to facilitate sufficient electric charging for passenger vehicles and trucks to plug-in. Encourage electric vehicle capable (branch circuit and raceway) or ready (charging outlet) spaces to accommodate future growth in electric vehicles.
- M) Encourage telecommuting and alternative work schedules, such as:
 - i) Staggered starting times
 - ii) Flexible schedules
 - iii) Compressed work weeks
- n) Implement commute trip reduction marketing, such as:
 - i) New employee orientation of trip reduction and alternative mode options
 - ii) Event promotions
 - iii) Publications
- o) Implement preferential parking permit program
- p) Implement school pool and bus programs
- q) Price workplace parking, such as:
 - i) Explicitly charging for parking for its employees
 - ii) Implementing above market rate pricing
 - iii) Validating parking only for invited guests
 - iv) Not providing employee parking and transportation allowances
 - v) Educating employees about available alternatives

LEVEL OF SIGNIFICANCE AFTER MITIGATION

As previously discussed, the Plan's Regional Planning Policies and Implementation Strategies (see Chapter 2, *Project Description*, and Section 3.0, *Introduction to the Analysis*) and compliance with existing laws and regulations would reduce impacts but given the regional scale of the analysis in this 2024 PEIR and the uncertainty of GHG emissions reductions at the project-level, it is not possible or feasible to determine if the GHG emissions reductions would meet statewide standards. Therefore, this 2024 PEIR identifies SCAG and project-level mitigation measures. At the project-level, lead agencies can and should consider the identified project-level mitigation measures during subsequent review of transportation and land use projects as appropriate and feasible. While the mitigation

measures will reduce the impacts related to GHG emissions including potential conflicts with applicable plans, policies, and regulations, due to the regional nature of the analysis, unknown site conditions and project specific-details, and SCAG's lack of land use authority over individual projects, SCAG finds that the impact could be **significant and unavoidable** even with mitigation.

CUMULATIVE IMPACTS

Connect SoCal 2024 is a regional-scale Plan comprised of a regional growth forecast and land use pattern, policies and strategies, and individual projects and investments. At this regional-scale, a cumulative or related project to the Plan is another regional-scale plan (such as Air Quality Management Plans within the region) and similar regional plans for adjacent regions. Because the Plan, in and of itself, would result in significant adverse environmental impacts with respect to GHG emissions with the exception of Plan's consistency with SB 375,¹⁸ these impacts would add to the environmental impacts of other cumulative or related projects. Mitigation measures that reduce the Plan's impacts would similarly reduce the Plan's contribution to cumulative impacts.

¹⁸ The Plan meets SB 375 targets for reducing GHG emissions. This demonstrates that the Plan is able to do its share to reducing GHG emissions from passenger vehicles and light-duty trucks. Thus, the Plan's contribution to GHG emissions from passenger vehicles and light-duty trucks for purposes of SB 375 would not be cumulatively considerable. However, because of the identified "gap" in meeting the statewide GHG reduction targets from the transportation sector, emissions from light duty vehicles are considered significant and would add to cumulative impacts.

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