4.9 Greenhouse Gas Emissions and Climate Change

This section evaluates potential impacts related to greenhouse gas (GHG) emissions and climate change facilitated by the proposed 2022 RTP/SCS. Air quality impacts are discussed in Section 4.2, *Air Quality.*

4.9.1 Setting

a. Climate Change and Greenhouse Gases

Climate change is the observed increase in the average temperature of Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period. The term "climate change" is often used interchangeably with the term "global warming," but "climate change" is preferred to "global warming" because it helps convey other changes in addition to rising temperatures. The baseline against which these changes are measured originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. The global climate changes continuously, as evidenced by repeated episodes of substantial warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. However, scientists have observed substantial acceleration in the rate of warming during the past 150 years. The United Nations Intergovernmental Panel on Climate Change (IPCC) expressed that the rise and continued growth of atmospheric carbon dioxide (CO_2) concentrations is unequivocally due to human activities in the IPCC's Sixth Assessment Report (2021). Human influence has warmed the atmosphere, ocean, and land, which has led the climate to warm at an unprecedented rate in the last 2,000 years. It is estimated that between the period of 1850 through 2019, that a total of 2,390 gigatonnes of anthropogenic CO_2 was emitted. It is likely that anthropogenic activities have increased the global surface temperature by approximately 1.07 degrees Celsius between the years 2010 through 2019 (IPCC 2021). Furthermore, since the late 1700s, estimated concentrations of CO_2, methane, and nitrous oxide in the atmosphere have increased by over 43 percent, 156 percent, and 17 percent, respectively, primarily due to human activity (United States Environmental Protection Agency [U.S. EPA] 2021a). Emissions resulting from human activities are thereby contributing to an average increase in Earth's temperature.

Gases that absorb and re-emit infrared radiation in the atmosphere are called GHGs. The gases widely seen as the principal contributors to human-induced climate change include CO_2, methane (CH_4), nitrous oxides (N_2O), fluorinated gases such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Water vapor is excluded from the list of GHGs because it is short-lived in the atmosphere, and natural processes, such as oceanic evaporation, largely determine its atmospheric concentrations.

GHGs are emitted by natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are usually by-products of fossil fuel combustion, and CH_4 results from off-gassing associated with agricultural practices and landfills. Human-made GHGs, many of which have greater heat-absorption potential than CO_2, include fluorinated gases and SF_6 (U.S. EPA 2021b).

Different types of GHGs have varying global warming potentials (GWP). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common reference gas (CO_2) is used to relate the amount of heat absorbed to the amount of the gas emitted, referred to as "carbon dioxide equivalent" (CO_2e), which is the amount of GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane has a GWP of 30, meaning its global warming effect is 30 times greater than CO_2 on a molecule per molecule basis (IPCC 2021).[1]

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without the natural heat-trapping effect of GHGs, the earth's surface would be about 33 degrees Celsius (°C) cooler (World Meteorological Organization 2020). However, since 1750, estimated concentrations of CO_2, CH_4, and N_2O in the atmosphere have increased by 36 percent, 148 percent, and 18 percent, respectively, primarily due to human activity (Forster et al. 2007). GHG emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, are believed to have elevated the concentration of these gases in the atmosphere beyond the level of concentrations that occur naturally.

b. Greenhouse Gas Emissions Inventories

United States Emissions Inventory

Total U.S. GHG emissions were 6,558 MMT of CO_2e in 2019[2]. Emissions decreased by 1.7 percent from 2018 to 2019; since 1990, total U.S. emissions have increased by an average annual rate of 0.06 percent for a total increase of 1.8 percent between 1990 and 2019. The decrease from 2018 to 2019 reflects the combined influences of several long-term trends, including population changes, economic growth, energy market shifts, technological changes such as improvements in energy efficiency, and decrease carbon intensity of energy fuel choices. In 2019, the industrial and transportation end-use sectors accounted for 30 percent and 29 percent, respectively, of nationwide GHG emissions while the commercial and residential end-use sectors accounted for 16 percent and 15 percent of nationwide GHG emissions, respectively, with electricity emissions distributed among the various sectors (U.S. EPA 2021b).

California Emissions Inventory

Based on the California Air Resources Board (CARB) California GHG Inventory for 2000-2019, California produced 418.2 MMT CO_2e in 2019 (CARB 2021a). The largest single source of GHG in California is transportation, contributing 40 percent of the State's total GHG emissions. Industrial sources are the second-largest source of the state's GHG emissions, contributing 21 percent of the State's GHG emissions (CARB 2021a). The magnitude of California's total GHG emissions is due in part to its large size and large population compared to other states. However, a factor that reduces California's per capita fuel use and GHG emissions as compared to other states is its relatively mild climate. In 2016, the State of California achieved its 2020 GHG emission reduction target of reducing emissions to 1990 levels as emissions fell below 431 MMT of CO_2e (CARB 2021a). The annual 2030 statewide target emissions level is 260 MMT of CO_2e (CARB 2017).

[1] The Intergovernmental Panel on Climate Change's (2021) *Sixth Assessment Report* determined that methane has a GWP of 30. However, the 2017 Climate Change Scoping Plan published by the California Air Resources Board uses a GWP of 25 for methane, consistent with the Intergovernmental Panel on Climate Change's (2007) *Fourth Assessment Report*. Therefore, this analysis utilizes a GWP of 25.
[2] The 2020 Total U.S. GHG Emissions Inventory is available; however, it is not discussed in this analysis because 2020 emissions were substantially influenced by the COVID-19 pandemic and therefore not characteristic of "normal" conditions.

c. Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources through potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. Long-term trends have found that each of the past four decades has been warmer than all the previous decades in the instrumental record and the decade from 2011 through 2020 has been the warmest. The observed global mean surface temperature (GMST) for the decade from 2011 to 2020 was approximately 1.09°C (0.95°C to 1.20°C) higher than the average GMST over the period from 1850 to 1900. Due to past and current activities, anthropogenic GHG emissions are increasing global mean surface temperature at a rate of 0.2°C per decade. In addition to these findings, the latest IPCC report states that "human-induced climate change is already affecting many weather and climate extremes in every region across the globe" (IPCC 2021). These climate change impacts include climate change sea level rise, increased weather extremes, and substantial ice loss in the Arctic over the past three decades.

According to *California's Fourth Climate Change Assessment*, statewide temperatures from 1986 to 2016 were approximately 0.6 to 1.1°C higher than those recorded from 1901 to 1960. Potential impacts of climate change in California may include reduced water supply from snowpack, sea level rise, more extreme heat days per year, more large forest fires, and more drought years (State of California 2018). In addition to statewide projections, *California's Fourth Climate Change Assessment* includes regional reports that summarize climate impacts and adaptation solutions for nine regions of the state and regionally specific climate change case studies (State of California 2018). However, while there is growing scientific consensus about the possible effects of climate change at a global and statewide level, current scientific modeling tools are unable to predict what local impacts may occur with a similar degree of accuracy. A summary follows of some of the potential effects that could be experienced in California and the SJCOG region as a result of climate change.

Public Health

Climate change is expected to cause a number of impacts which could negatively affect public health in the SJCOG region. As temperatures increase, the Central Valley is set to experience an increased number of extreme heat days, which may lead to increases in the number of heat-related deaths and illnesses (State of California 2018). An increase in the frequency and severity of wildfires may contribute to worsening air quality and cause additional illnesses such as asthma. Higher temperatures could also lead to increased air pollution formation and potentially accelerate the spread of certain diseases and pests. These adverse impacts may also disproportionately burden vulnerable populations.

Air Quality

Scientists project that the annual average maximum daily temperatures in California could rise by 2.4 to 3.2°C in the next 50 years and by 3.1 to 4.9°C in the next century (State of California 2018). Higher temperatures are conducive to air pollution formation, and rising temperatures could therefore result in worsened air quality in California. As a result, climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. In addition, as temperatures have increased in recent years, the area burned by wildfires throughout the state has increased, and wildfires have occurred at higher elevations in

the Sierra Nevada Mountains (State of California 2018). If higher temperatures continue to be accompanied by an increase in the incidence and extent of large wildfires, air quality could worsen. Severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state.

Water Supply

Analysis of paleoclimatic data (such as tree-ring reconstructions of stream flow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California and the west, including a pattern of recurring and extended droughts. Uncertainty remains with respect to the overall impact of climate change on future precipitation trends and water supplies in California. Year-to-year variability in statewide precipitation levels has increased since 1980, meaning that wet and dry precipitation extremes have become more common (California Department of Water Resources 2018). This uncertainty regarding future precipitation trends complicates the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood. The average early spring snowpack in the western U.S., including the Sierra Nevada Mountains, decreased by about 10 percent during the last century. During the same period, sea level rose over 0.15 meter along the central and southern California coasts (State of California 2018). The Sierra snowpack provides the majority of California's water supply as snow that accumulates during wet winters is released slowly during the dry months of spring and summer. A warmer climate is predicted to reduce the fraction of precipitation that falls as snow and the amount of snowfall at lower elevations, thereby reducing the total snowpack (State of California 2018). Projections indicate that average spring snowpack in the Sierra Nevada and other mountain catchments in central and northern California will decline by approximately 66 percent from its historical average by 2050 (State of California 2018).

Agriculture

California has a roughly $49 billion annual agricultural industry that produces nearly a third of the country's vegetables and over half of the country's fruits and nuts (California Department of Food and Agriculture 2021). Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, certain regions of agricultural production could experience water shortages of up to 16 percent, which would increase water demand as hotter conditions lead to the loss of soil moisture. In addition, crop yield could be threatened by water-induced stress and extreme heat waves, and plants may be susceptible to new and changing pest and disease outbreaks (State of California 2018). Temperature increases could also change the time of year certain crops, such as wine grapes, bloom or ripen, and thereby affect their quality (California Climate Change Center 2006).

Ecosystems and Wildlife

Climate change and the potential resultant changes in weather patterns could have ecological effects at the global and local scale. Rising temperatures could have four major impacts on plants and animals: timing of ecological events; geographic distribution and range of species; species composition and the incidence of nonnative species within communities; and ecosystem processes, such as carbon cycling and storage (Parmesan 2006; State of California 2018).

4.9.2 Regulatory Setting

The following regulations address both climate change and GHG emissions.

a. Federal Laws, Regulations, and Policies

Clean Air Act

The U.S. Supreme Court determined in *Massachusetts et al. v. Environmental Protection Agency et al.* ([2007] 549 U.S. 05-1120) that the U.S. EPA has the authority to regulate motor-vehicle GHG emissions under the federal Clean Air Act. The U.S. EPA issued a Final Rule for mandatory reporting of GHG emissions in October 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and vehicle engines and requires annual reporting of emissions. In 2012, the U.S. EPA issued a Final Rule that established the GHG permitting thresholds that determine when Clean Air Act permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

In *Utility Air Regulatory Group v. Environmental Protection Agency* (134 S. Ct. 2427 [2014]), the U.S. Supreme Court held the U.S. EPA may not treat GHGs as an air pollutant for purposes of determining whether a source can be considered a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits otherwise required based on emissions of other pollutants, may continue to require limitations on GHG emissions based on the application of Best Available Control Technology.

Corporate Average Fuel Economy Standards

The Energy Policy and Conservation Act in 1975 established the Corporate Average Fuel Economy Standards (CAFE standards). The CAFE standards are Federal rules established by the National Highway Traffic Safety Administration (NHTSA) that set fuel economy standards for all new passenger cars and light trucks sold in the United States. The CAFE standards become more stringent each year, reaching an estimated 38.3 miles per gallon for the combined industry-wide fleet for model year 2020 (77 Federal Register 62624 et seq. [October 15, 2012, Table I-1).

In September 2019, U.S. EPA and the National Highway Traffic Safety Administration issued the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule. Part One, “One National Program” (84 FR 51310), revokes a waiver granted by U.S. EPA to the State of California under Section 209 of the CAA to enforce more stringent emission standards for motor vehicles than those required by U.S. EPA for the explicit purpose of GHG reduction, and indirectly, criteria air pollutants and ozone precursor emission reduction. This revocation became effective on November 26, 2019 and could have restricted the ability of CARB to enforce more stringent GHG emission standards for new vehicles and set zero emission vehicle mandates in California. However, on December 21, 2021, the National Highway NHTSA published its Corporate Average Fuel Economy (CAFE) Preemption rule, which finalizes its repeal of 2019’s SAFE Rule Part One.

Part Two addresses CAFE standards for passenger cars and light trucks for model years 2021 to 2026. This rulemaking proposes new CAFE standards for model years 2022 through 2026 and would amend existing CAFE standards for model year 2021. The proposal would retain the model year 2020 standards (specifically, the footprint target curves for passenger cars and light trucks) through model year 2026. The proposal addressing CAFE standards was jointly developed by NHTSA and U.S. EPA, with U.S. EPA simultaneously proposing tailpipe CO_2 standards for the same vehicles covered by the same model years. However, on March 31, 2022, the NHTSA finalized new CAFE Standards for model years 2024 through 2026 that would increase federal CAFE standards compared to the SAFE Rule Part Two (NHTSA 2022).

b. State Laws, Regulations, and Policies

CARB is responsible for the coordination and oversight of state and regional GHG emissions reduction programs in California. There are numerous regulations aimed at reducing the state's GHG emissions. These initiatives are summarized below.

California Advanced Clean Cars Program

Assembly Bill (AB) 1493 (2002), California's Advanced Clean Cars program (referred to as "Pavley"), requires CARB to develop and adopt regulations to achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." On June 30, 2009, U.S. EPA granted the waiver of Clean Air Act preemption to California for its GHG emission standards for motor vehicles, beginning with the 2009 model year, which allows California to implement more stringent vehicle emission standards than those promulgated by the U.S. EPA. Pavley I regulates model years from 2009 to 2016 and Pavley II, now referred to as "LEV (Low Emission Vehicle) III GHG," regulates model years from 2017 to 2025. The Advanced Clean Cars program coordinates the goals of the LEV, Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs, and would provide major reductions in GHG emissions.

Executive Order S-3-05

Executive Order (EO) S-3-05, among other things, established the following GHG emission reduction goals for California: reduction to 2000 levels by 2010; to 1990 levels by 2020; and to 80 percent below 1990 levels by 2050.

California Global Warming Solutions Act of 2006 (Assembly Bill 32 and Senate Bill 32)

The "California Global Warming Solutions Act of 2006," AB 32, outlines California's major legislative initiative for reducing GHG emissions (Chapter 488, Statutes of 2006). AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 and requires CARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. Based on this guidance, CARB approved a 1990 statewide GHG level and 2020 target of 431 MMT of CO_2e. CARB approved the Scoping Plan on December 11, 2008, and the Plan included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among others (CARB 2008). Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted since the Plan's approval.

CARB approved the 2013 Scoping Plan update in May 2014. The update defined CARB's climate change priorities for the next five years and set the groundwork to reach post-2020 statewide goals. The update highlighted California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluated how to align the State's longer term GHG reduction strategies with other State policy priorities, including those for water, waste, natural resources, clean energy, transportation, and land use (CARB 2014).

On September 8, 2016, the governor signed Senate Bill (SB) 32 into law (Chapter 429, Statutes of 2016), extending the California Global Warming Solutions Act of 2006 by requiring the State to further reduce GHG emissions to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). SB 32 became effective on January 1, 2017 and codifies the 2030 goal set in

EO B-30-15. On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, and implementation of recently adopted policies and legislation, such as SB 1383 (see below). The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with statewide per capita goals of six MT of CO_2e by 2030 and two MT of CO_2e by 2050 (CARB 2017). As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, sub-regional, or regional level), but not for specific individual projects because they include all emissions sectors in the state (CARB 2017).

Executive Order S-01-07 (Low Carbon Fuel Standard)

EO S-01-07 (17 California Code of Regulations 95480 et seq.) requires the state to achieve a 10 percent or greater reduction by 2020 in the average fuel carbon intensity for transportation fuels in California regulated by CARB. CARB identified the Low Carbon Fuel Standard (LCFS) as a discrete early action item under AB 32.

In 2018, CARB approved amendments to the LCFS regulation, which included strengthening and smoothing the carbon intensity benchmarks through 2030 in line with California's 2030 GHG emission reduction target enacted through SB 32, adding new crediting opportunities to promote zero emission vehicle adoption, alternative jet fuel, carbon capture and sequestration, and advanced technologies to achieve deep decarbonization in the transportation sector.

Senate Bill 375

SB 375, signed in August 2008, enhances the State's ability to reach AB 32 goals by directing CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles by 2020 and 2035. SB 375 aligns regional transportation planning efforts, regional GHG reduction targets, and affordable housing allocations. Metropolitan Planning Organizations (MPOs) are required to adopt a Sustainable Communities Strategy (SCS), which allocates land uses in the MPO's Regional Transportation Plan (RTP). SJCOG was assigned targets of a 12 percent reduction in GHG emissions from per capita passenger vehicles by 2020 and a 16 percent reduction in GHG emissions from per capita passenger vehicles by 2035, relative to 2005 emission levels (CARB 2020b). However, the proposed 2022 RTP/SCS cannot influence the achievement of target year 2020 GHG emissions. Therefore, SJCOG will report on meeting 2035 goals with submittal of this SCS for review by CARB.

Executive Order B-16-12

EO B-16-12 orders State entities under the direction of the Governor including CARB, the California Energy Commission, and the California Public Utilities Commission to support the rapid commercialization of zero emission vehicles (ZEVs). It directs these entities to achieve various benchmarks related to zero emission vehicles, including:

- Infrastructure to support up to one million ZEVs by 2020,
- Widespread use of ZEVs for public transportation and freight transport by 2020,
- Over 1.5 million ZEVs on California roads by 2025,
- Annual displacement of at least 1.5 billion gallons of petroleum fuels by 2025, and

- A reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels by 2050.

AB 197

AB 197 of 2016 (Chapter 250, Statutes of 2016) expands CARB membership to include two nonvoting members from the Legislature; creates a Joint Legislative Committee on Climate Change Policies to make recommendations to the Legislature concerning climate change policies; provides for annual reporting of GHG emissions from sectors covered by the AB 32 Scoping Plan as well as evaluations of regulatory requirements and other programs that may affect GHG emissions trends; and specifies that the adoption of GHG emissions reduction rules and regulations shall consider the social costs. In addition, Scoping Plan updates are required to identify the range of potential GHG emissions reductions and the cost-effectiveness for each emissions reduction measure, compliance mechanism and incentive.

Senate Bill 1383

Adopted in September 2016, SB 1383 requires CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants (Chapter 395, Statutes of 2016). SB 1383 requires the strategy to achieve the following reduction targets by 2030:

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Anthropogenic black carbon – 50 percent below 2013 levels

SB 1383 also requires the California Department of Resources Recycling and Recovery, in consultation with CARB, to adopt regulations that achieve specified targets for reducing organic waste in landfills. In addition, SB 1383 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.

Senate Bill 100

Adopted on September 10, 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the State's Renewables Portfolio Standard Program, which was last updated by SB 350 in 2015. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

Executive Order B-55-18

On September 10, 2018, the former Governor Brown issued Executive Order (EO) B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing statewide GHG reduction goals established by SB 375, SB 32, SB 1383, and SB 100. The 2022 Scoping Plan Update will assess progress towards achieving the SB 32 target and layout out a path to achieve carbon neutrality (CARB 2022).

Executive Order N-19-19

EO N-19-19 was signed on September 20, 2019 and is intended to require a redoubling of the State's efforts to reduce GHG emissions and mitigate the impacts of climate change while building a sustainable, inclusive economy. This EO includes four main directives which include investment, transportation, state buildings and operations, and zero-emissions vehicles.

Senate Bill 391

The California Transportation Plan Act requires the California Department of Transportation (Caltrans) to prepare a statewide plan that addresses how the state will achieve maximum feasible emissions reductions to attain a statewide reduction of GHG emissions to 1990 levels by 2020 and 80 percent below 1990 levels by 2050. Caltrans prepared the original California Transportation Plan in June 2016 and a released an update of the plan in February 2021 (Caltrans 2021).

As EO B-55-18 establishes a goal of achieving economy-wide carbon neutrality in California by 2045, the plan establishes policies and strategies to move toward a carbon-neutral transportation system. However, current trends to due not indicate the state will achieve carbon neutrality. The statewide strategy has not been developed to achieve carbon neutrality and regional targets do not require any Metropolitan Planning Organization's RTP to achieve carbon neutrality over the current planning horizon.

Executive Order N-79-20

EO N-79-20 established a statewide goal that 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035 and that 100 percent of medium- and heavy-duty vehicles in the state be zero-emission by 2035 for drayage trucks and by 2045 for all operations where feasible.

Executive Order N-82-20

EO N-82-20 established a goal of conserving at least 30 percent of California's lands and coastal waters by 2030 and directed state agencies to create a Natural and Working Lands Climate Smart Strategy to advance the State's carbon neutrality goal and builds climate resilience.

California Building Standards Code

The California Code of Regulations (CCR) Title 24 is referred to as the California Building Code, or CBC. It consists of a compilation of several distinct standards and codes related to building construction including plumbing, electrical, interior acoustics, energy efficiency, and handicap accessibility for persons with physical and sensory disabilities. The CBC's energy-efficiency and green building standards are outlined below. The 2019 Title 24 standards are currently in effect. However, at the time of this EIR, the 2022 Title 24 standards have been adopted and will go into effect on January 1, 2023.

Part 6 – Building Energy Efficiency Standards/Energy Code

California Code of Regulations Title 24, Part 6 is the Building Energy Efficiency Standards or California Energy Code. This code, originally enacted in 1978, establishes energy-efficiency standards for residential and non-residential buildings in order to reduce California's energy demand. The Energy Code is updated periodically to incorporate and consider new energy-efficiency technologies and methodologies as they become available. New construction and major renovations

must demonstrate their compliance with the current Energy Code through submittal and approval of a Title 24 Compliance Report to the local building permit review authority and the California Energy Commission. The 2019 Title 24 standards are the latest iteration of the statewide building energy efficiency standards because they became effective on January 1, 2020. All buildings for which an application for a building permit is submitted on or after January 1, 2020, must follow the 2019 standards. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The CEC Impact Analysis estimates that nonresidential buildings will be 30 percent more energy efficient compared to buildings built consistent with 2016 Building Energy Efficiency Standards, and single-family homes will be 7 percent more energy efficient (CEC 2018). Due to the solar requirement for all new homes, the CEC also estimates that the 2019 standards will cut energy demand from grid electricity in new homes by more than 50 percent (CEC 2018). The building efficiency standards are enforced through the local plan check and building permit process. Local government agencies may adopt and enforce additional energy standards for new buildings as reasonably necessary due to local climatologic, geologic, or topographic conditions, provided that these standards exceed those provided in Title 24.

Part 11 – California Green Building Standards/CALGreen

The California Green Building Standards Code, referred to as CALGreen, was added to Title 24 as Part 11, first in 2009 as a voluntary code, which then became mandatory effective January 1, 2011 (as part of the 2010 California Building Standards Code). The 2019 CALGreen includes mandatory minimum environmental performance standards for all ground-up new construction of residential and non-residential structures. It also includes voluntary tiers (Tiers I and II) with stricter environmental performance standards for these same categories of residential and non-residential buildings. Local jurisdictions must enforce the minimum mandatory CALGreen standards and may adopt additional amendments for stricter requirements.

The mandatory standards require:

- 20 percent reduction in indoor water use relative to specified baseline levels;[3]
- 65 percent construction/demolition waste diverted from landfills;
- Inspections of energy systems to ensure optimal working efficiency;
- Low-pollutant emitting exterior and interior finish materials such as paints, carpets, vinyl flooring, and particleboards;
- Dedicated circuitry to facilitate installation of electric vehicle charging stations for certain land uses; and
- Installation of electric vehicle charging stations for certain land uses.

The voluntary standards require:

- **Tier I:** stricter energy efficiency requirements, stricter water conservation requirements for specific fixtures, 65 percent reduction in construction waste with third-party verification, 10 percent recycled content for building materials, 20 percent permeable paving, 20 percent cement reduction, and cool/solar reflective roof; and

[3] Similar to the compliance reporting procedure for demonstrating Energy Code compliance in new buildings and major renovations, compliance with the CALGreen water-reduction requirements must be demonstrated through completion of water use reporting forms. Buildings must demonstrate a 20 percent reduction in indoor water use by either showing a 20 percent reduction in the overall baseline water use as identified in CALGreen or a reduced per-plumbing-fixture water use rate.

- **Tier II:** stricter energy efficiency requirements, stricter water conservation requirements for specific fixtures, 75 percent reduction in construction waste with third-party verification, 15 percent recycled content for building materials, 30 percent permeable paving, 25 percent cement reduction, and cool/solar reflective roof.

California State Transportation Agency (CalSTA) Climate Action Plan for Transportation Infrastructure (CAPTI)

Adopted in July 2021, the Climate Action Plan for Transportation Infrastructure (CAPTI) details how the State recommends investing billions of discretionary transportation dollars annually to aggressively combat and adapt to climate change while supporting public health, safety and equity (CalSTA 2021). CAPTI builds on EOs signed by Governor Gavin Newsom in 2019 and 2020 targeted at reducing GHG emissions in transportation, which account for more than 40 percent of all emissions, to reach the State's ambitious climate goals. The CAPTI provides investment strategies that focuses on expanding travel options in California and ensuring said investments also prioritize advancing equity and climate priorities in the State.

c. Local Laws, Regulations, and Policies

Four of SJCOG's member jurisdictions have climate action plans (CAPs) that set goals and targets for the reduction of GHG emissions and outline policies to help achieve those goals. The cities of Stockton, Tracy, Lodi, and Manteca have conducted baseline emissions inventories, which establish a reference point for GHG emissions reduction. The City of Stockton CAP (2014), City of Tracy CAP (2011), City of Lodi CAP (2014), and City of Manteca CAP (2013) also establish GHG reduction targets and reduction measures to meet those targets. To date, no other jurisdictions in the SJCOG region have adopted CAPs. Baseline and projected business-as-usual GHG emissions from the respective CAPs and jurisdictions are shown in Table 4.9-1 below. Projections beyond 2020 are only available for the City of Lodi and the City of Manteca. The inventories and projections below include emissions produced by transportation, electricity and natural gas consumptions, water supply and conveyance, wastewater treatment, agriculture, and solid waste disposal.

Table 4.9-1 GHG Emissions Inventories for SJCOG Member Jurisdictions

	Baseline		Projected Business-as-Usual	
Jurisdiction	Year	Emissions (MT of CO_2e/year)	Year	Emissions (MT of CO_2e/year)
Stockton	2005	2,360,932	2020	2,672,519
Tracy	2006	1,338,872	2020	1,735,022
Lodi	2008	486,628	2030	852,575
Manteca	2005	400,346	2035	742,186

Sources: City of Stockton 2014; City of Tracy 2011; City of Lodi 2014; City of Manteca 2013

The types and quantity of emissions produced in the SJCOG region vary among jurisdictional boundaries. However, for most jurisdictions, transportation and energy consumption are responsible for the majority of GHG emissions. To address these emissions, policies included in local CAPs in the region establish a framework for improved circulation networks and energy conservation. Transportation policies aim to reduce vehicle miles traveled (VMT) by offering more opportunities for alternative transportation modes, such as bicycling and transit use. In addition, many of the CAPs include policies to promote transit-oriented (TOD) development. In order to

reduce emissions produced by energy usage, jurisdictions have established policies that will facilitate and encourage energy efficiency for both residential and commercial land uses along with programs to improve energy efficiencies in old and new buildings and decrease the use of fossil fuels by providing incentives for use of renewable energy.

4.9.3 Impact Analysis

a. Methodology and Significance Thresholds

Significance Thresholds

Appendix G of the State CEQA Guidelines identifies the following two general criteria for determining whether a project's impacts would have a significant impact related to GHG emissions. Specific criteria under each general criterion have been developed for this EIR.

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. An increase that exceeds the following threshold would be considered a significant impact:
    a. A net increase in GHG emissions by 2046 compared to existing baseline conditions.
2. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. Any conflict with the following thresholds would be considered a significant impact:
    a. Conflict with regional SB 375 per capita passenger vehicle CO_2 emission reduction targets of 16 percent by 2035 from 2005 levels;
    b. Conflict with state's ability to achieve SB 32 GHG reduction target, which aims to reduce statewide emissions to 40 percent below 1990 levels by 2030;
    c. Conflict with state's ability to achieve EO B-55-18 carbon neutrality goal by 2045 or EO S-3-05 GHG reduction 2050 goal, which aims to reduce statewide emissions to 80 percent below 1990 levels by 2050; or
    d. Conflict with applicable local GHG emission reduction plans.

The San Joaquin Valley Air Pollution Control District (SJVCAPCD) has not adopted GHG significance thresholds that are applicable to evaluating the impacts of the proposed 2022 RTP/SCS in light of the State's post-2020 GHG emission reduction targets. In the absence of applicable SJVAPCD-adopted thresholds, this section uses the project-specific thresholds of significance listed above for each GHG impact criterion in Appendix G.

Methodology

Mobile Source Emissions Modeling

GHG emissions from on-road mobile sources were calculated using the emission factors, fleet mix, and vehicle trip and population estimates from CARB's EMFAC2021 model and Total Daily VMT from SJCOG's Regional Travel Demand Model (as further described in Section 4.14, *Transportation*), shown in Table 4.9-2. Detailed calculations are available in Appendix A.

Table 4.9-2 Proposed 2022 RTP/SCS Total Daily VMT

Year	Total Daily VMT
2005 Baseline	14,600,612
2016 Baseline	17,015,116
2030 with Proposed 2022 RTP/SCS[1]	20,686,572
2046 with Proposed 2022 RTP/SCS	23,495,442

[1] In the absence of specific VMT data for year 2030, regional VMT for year 2030 was calculated via linear interpolation of VMT for years 2029 and 2031.

Source: Appendix A

EMFAC2021 emission factors are established by CARB and incorporate mobility assumptions (e.g., vehicle fleets, speed, delay times, average trip lengths, time of day and total travel time) and socioeconomic growth projections based on data from sources including the Bureau of Automotive Repair, Caltrans, the California Household Travel Survey, the University of California Riverside College of Engineering-Center for Environmental Research and Technology, the UCLA Anderson Forecast, California Department of Finance, California Board of Equalization, California Energy Commission, and U.S. Department of Energy - Energy Information Administration. EMFAC2021 accounts for updated fleet characterization, vehicle activity profile, and socio-econometric forecasting data; new vehicle testing data for emission rates; updated assumptions on the Advanced Clean Truck regulation and Innovative Clean Transit regulation; and implementation of new regulations and policies including the SAFE Vehicles Rule. Projected emissions from all vehicle types on the SJCOG transportation network for the year 2046 under proposed 2022 RTP/SCS conditions were compared with emissions estimated for baseline year 2016. For the purposes of this analysis, a 2016 baseline is used to match the SJCOG transportation modeling base line. This allows an accurate, *apples to apples* comparison to the same baseline year. This baseline is consistent with the baseline used in SJCOG's Sustainable Communities Strategy, and as such is more reflective of the comparative analysis made within the SCS than if data from a different year was used. Pursuant to Section 15125(a)(1) of the *State CEQA Guidelines,* although the analysis baseline will normally reflect physical environmental conditions as they exist at the time the notice of preparation is published, "where necessary to provide the most accurate picture practically possible of the project's impacts, a lead agency may define existing conditions by referencing historic conditions." SJCOG has elected to do so here, for the reasons just described.

Total transportation related GHG emissions were evaluated using the Total Daily VMT (see Section 4.2, *Air Quality*) with emissions reported in terms of CO_2e. For the purposes of evaluating consistency with the SB 32 target, 2005 VMT data from SJCOG's 2018 RTP/SCS was used to back-calculate estimated 1990 emissions levels pursuant to CARB's guidance to assume 1990 emissions levels are roughly equivalent to a 15 percent reduction from baseline 2005 emissions levels (CARB 2008). In addition, for the SB 32 consistency analysis, emissions were calculated in terms of CO_2, which was used as a proxy to indicate the estimated percent change in GHG emissions levels between 1990 and 2030.

SB 375 Analysis

To determine whether the proposed 2022 RTP/SCS would allow SJCOG to meet its SB 375 reduction targets, per capita CO_2 emissions were calculated by multiplying the emission factors by the VMT from passenger vehicles and dividing by the region's population. For the purposes of this analysis, the year 2005 is used as the baseline year per the requirements of SB 375. In accordance with CARB

guidance, EMFAC2014 was utilized for SB 375 modeling for the proposed 2022 RTP/SCS to provide a consistent comparison of per capita CO_2 emissions with the SB 375 targets (CARB 2019). Furthermore, per CARB guidance, off-model adjustment factors related to the SAFE Rule were not applied in the SB375 analysis because EMFAC2014 does not account for the impact of light duty ZEV and GHG emissions standards when used in SB 375 mode (CARB 2020a).

The EMFAC model generates an output of CO_2 emissions, which were used as the overall indicator of GHG emissions associated with passenger vehicles. The CO_2 emissions associated with vehicle starts are accounted for in the EMFAC model based on the distribution of vehicle starts by vehicle classification, vehicle technology class, and operating mode. EMFAC adds these vehicle starts to the running emissions to compute total on-road mobile source emissions.

Consistency with SB 32, the 2017 Scoping Plan, EO S-3-05, and EO B-55-18

Meeting the goals of SB 375 does not guarantee consistency with SB 32 and the 2017 Scoping Plan. To determine that a project would not conflict with the State's ability to achieve the SB 32 target and its associated 2017 Scoping Plan, the proposed 2022 RTP/SCS would need to achieve substantial progress toward achieving the reduction target. Mobile source emissions were calculated to determine regionwide GHG emissions with implementation of the proposed 2022 RTP/SCS. If implementation of the proposed 2022 RTP/SCS would achieve substantial progress toward the emissions reduction targets established by SB 32, then impacts related to consistency with SB 32 would not be considered significant.

At this time, the State Legislature has codified a target of reducing emissions to 40 percent below 1990 emissions levels by 2030 (SB 32) and has developed the 2017 Scoping Plan to demonstrate how the State will achieve the 2030 target and make substantial progress toward the 2050 goal of an 80 percent reduction in 1990 GHG emission levels set by EO S-3-05. In EO B-55-18, which identifies a new goal of carbon neutrality by 2045, CARB has been tasked with including a pathway toward the EO B-55-18 carbon neutrality goal in the next Scoping Plan update. While state and regional regulators of energy and transportation systems, along with the State's Cap-and-Trade program, are designed to be set at limits to achieve most of the reductions needed to attain the State's long-term targets, local governments can do their fair share toward meeting the State's targets by siting and approving projects that accommodate planned population growth and projects that are GHG-efficient. At this time, CARB has not adopted a plan that establishes a pathway to achieving the State's long-term targets under EO S-3-05 and EO B-55-18; therefore, these targets are not used as thresholds of significance in this analysis.

Instead, the Association of Environmental Professionals (AEP) Climate Change Committee recommends that CEQA GHG analyses evaluate project emissions in light of the trajectory of state climate change legislation and assess their "substantial progress" toward achieving long-term reduction targets identified in available plans, legislation, or EOs (AEP 2016). Consistent with AEP Climate Change Committee recommendations, GHG impacts are analyzed using a threshold based on the State's 2030 target, which evaluates whether the project would impede "substantial progress" toward meeting the reduction goals identified in SB 32, EO S-3-05, and EO B-55-18. Because SB 32 is considered an interim target toward meeting the 2045 and 2050 State goals, consistency with SB 32 is considered to be contributing substantial progress toward meeting the State's long-term 2045 and 2050 goals. Avoiding interference with, and making substantial progress toward, these long-term State targets is important because these targets have been set at levels that achieve California's share of international emissions reduction targets that will stabilize global climate change effects and avoid the adverse environmental consequences of climate change (EO B-

55-18). Furthermore, these targets will depend on substantial technological innovation in GHG emission reduction measures and changes in legislation and regulations that will need to occur over the next 25 to 30 years as have occurred over the past 16 years to meet the 2020 target set by AB 32. Therefore, if the proposed 2022 RTP/SCS is consistent with the SB 32 target, the proposed 2022 RTP/SCS would also achieve substantial progress toward climate-stabilizing targets set forth by EOs S-3-05 and B-55-18 and would be consistent with these long-term goals.

b. Project Impacts and Mitigation Measures

The following section discusses impacts and mitigation measures that may be associated with transportation projects and the land use scenario contained within the proposed 2022 RTP/SCS. Section 4.9.3(c) summarizes the impacts associated with capital improvement projects in the proposed 2022 RTP/SCS. Due to the programmatic nature of the proposed 2022 RTP/SCS, a precise, project-level analysis of the specific impacts associated with individual transportation and land use projects is not possible at this time. In general, however, implementation of proposed transportation improvement projects and future projects under the land use scenario envisioned by the proposed 2022 RTP/SCS could result in the impacts as described in the following section.

Threshold 1:	Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. An increase that exceeds the following threshold would be considered a significant impact: a. A net increase in GHG emissions by 2046 compared to existing baseline conditions

Impact GHG-1 CONSTRUCTION OF THE TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD GENERATE GHG EMISSIONS THAT MAY HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Construction activities associated with transportation improvement projects and future land use projects envisioned by the proposed 2022 RTP/SCS would generate temporary short-term GHG emissions primarily due to the operation of construction equipment and truck trips. GHG emissions from construction can vary depending on the level of activity, the specific operations taking place, the equipment being operated and other factors. However, because such emissions are dependent on the characteristics of individual development projects, construction-related emissions are speculative at the RTP/SCS level. At the program-level of analysis, it is not feasible to quantify the amount of emissions expected from implementation of the proposed 2022 RTP/SCS. This is due to the variability in the extent of construction based on site conditions throughout the SJCOG region and the lack of project details needed to conduct such an analysis. Therefore, this analysis includes a qualitative analysis of potential GHG emissions from construction activity associated with projected land use development and proposed transportation projects.

Construction activity tends to be temporary in nature and would be expected to occur throughout the planning period of the proposed 2022 RTP/SCS. During construction activities, GHG emissions would be emitted from vehicular travel to and from the worksites and the operation of construction equipment such as graders, backhoes, and generators. Site preparation and grading typically generate the greatest amount of emissions due to the intensive use of grading equipment and soil hauling. The level of GHG emissions from the construction of any one project or of all projects combined would be primarily dependent on the particular type, size, quantity, engine type, fuel type, and fuel efficiency of the equipment and the duration of their operation at the construction

site or in the region. Construction activities generally result in annual GHG emissions that represent a small proportion of total annual GHG emissions from operational sources such as transportation and land use emissions. For example, the Southern California Association of Governments (SCAG) noted in their 2020-2045 RTP/SCS PEIR that total construction-related emissions typically account for less than 0.3 percent of total GHG emissions for the entire SCAG region (SCAG 2020).

Construction activities generally result in annual GHG emissions that represent a small proportion of total annual GHG emissions, and implementation of the proposed 2022 RTP/SCS would result in an overall net reduction in long-term transportation-related GHG emissions in 2046 when compared to baseline 2016 conditions (refer to Impact GHG-2). Nonetheless, construction activities would still result in GHG emissions would result in GHG emissions exceeding the 2016 baseline, which would constitute a significant impact. Therefore, this analysis identifies the following mitigation measures that should be implemented for individual construction projects to reduce impacts related to GHG emissions.

Mitigation Measures

For all transportation projects under their jurisdiction, SJCOG shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measure developed for the proposed 2022 RTP/SCS where applicable for transportation projects generating construction-related GHG emissions. Cities and the County can and should implement this measure, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust this mitigation measure as necessary to respond to site-specific conditions.

GHG-1 Construction GHG Reduction Measures

The project sponsor shall incorporate the most recent GHG emission reduction measures for off-road construction vehicles during construction. The measures shall be noted on all construction plans, and the implementing agency shall perform periodic site inspections. Current GHG-reducing measures include the following:

- Use of diesel construction equipment meeting CARB's Tier 4 certified engines wherever feasible for off-road heavy-duty diesel engines and comply with the State Off-Road Regulation. Where the use of Tier 4 engines is not feasible, Tier 3 certified engines shall be used; where the use of Tier 3 engines are not feasible, Tier 2 certified engines shall be used;
- Use of on-road heavy-duty trucks that meet CARB's 2007 or cleaner certification standard for on-road heavy-duty diesel engines, and comply with the State On-Road Regulation;
- Minimizing idling time (e.g., five-minute maximum). Signs shall be posted in the designated queuing areas and or job sites to remind drivers and operators of the five-minute idling limit;
- Use of electric-powered equipment in place of diesel-powered equipment when feasible;
- Use of alternatively fueled or catalyst-equipped diesel construction equipment when feasible, to the extent electric powered equipment is not feasible;
- Substitution of gasoline-powered in place of diesel-powered equipment, when neither electric-powered equipment or alternatively fueled or catalyst-equipped diesel equipment is feasible; and,
- Incentives for construction workers to carpool and/or use electric vehicles to commute to and from the project site.

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are SJCOG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and the County. This mitigation measure shall, or can and should, be applied during permitting and environmental review and implemented during construction where appropriate.

Significance After Mitigation

Implementation of Mitigation Measure GHG-1 would reduce short-term construction emissions from individual projects and thus reduce the severity of impacts by requiring best practices for exhaust emissions via readily available, lower-emitting diesel equipment, and/or equipment powered by alternative cleaner fuels (e.g., propane) or electricity, as well as on-road trucks using particulate exhaust filters. Implementation of Mitigation Measures AQ-2(b) and AQ-2(c) would also reduce GHG emissions from the proposed 2022 RTP/SCS. However, these mitigation measure may not be feasible or effective for all projects. Therefore, this impact would remain significant and unavoidable. No additional mitigation measures to reduce this impact to less than significant levels are feasible.

Threshold 1:	Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. An increase that exceeds the following threshold would be considered a significant impact: a. A net increase in GHG emissions by 2046 compared to existing baseline conditions

Impact GHG-2 PROPOSED TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD RESULT IN A NET INCREASE IN GHG EMISSIONS BY 2046 COMPARED TO THE EXISTING BASELINE CONDITIONS AND WOULD THEREFORE HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Transportation-Related Emissions

Table 4.9-3 compares the total transportation-related emissions from all vehicle classes for baseline (2016) conditions and with implementation of the proposed 2022 RTP/SCS. As presented in Table 4.9-3, implementation of the proposed 2022 RTP/SCS would result in a net reduction in per capita emissions of 1.28 MT of CO_2e per person per year and a net reduction in total emissions of 130,766 MT of CO_2e per year, compared to baseline (2016) conditions. The estimated reduction in total mobile source emissions is primarily due to stricter fuel efficiency and vehicle emissions standards such as the CAFE standards that will phase in over the planning period as reflected in EMFAC2021 emission factors. In addition, improved circulation networks and multimodal transportation initiatives outlined in the proposed 2022 RTP/SCS would reduce per capita VMT.

Because the proposed 2022 RTP/SCS would result in a net decrease in overall transportation-related emissions in the SJCOG region, operational activities under the plan would not generate GHG emissions that may have a significant impact on the environment, and impacts would be less than significant.

Table 4.9-3 Proposed 2022 RTP/SCS Net Change in Transportation-Related Emissions (2016-2046)

Scenario	Total Emissions (MT of CO_2e/year)	Per Capita Emissions (MT of CO_2e/person/year)[1]
2016 Baseline	3,196,610	4.37
2046 with Proposed 2022 RTP/SCS	2,837,622	2.85
Net Change from Baseline	**(358,988)**	**(1.51)**
Threshold of Significance	> 0	> 0
Threshold Exceeded?	No	No

( ) denotes a negative number.

MT = metric tons; CO_2e = carbon dioxide equivalent

[1] The baseline (2016) population of the SJCOG region is 732,185 persons, and the future (2046) population is forecast to be 994,257 persons (SJCOG 2020).

Source: Appendix A

Other Land Use Development Emissions

In addition to the transportation-related GHG emissions shown in Table 4.9-3, land use projects envisioned by the land use scenario in the proposed 2022 RTP/SCS would also result in GHG emissions due to sources such as electricity and natural gas consumption. Residential, commercial, agricultural, and other land uses would result in GHG emissions; however, data is not available to quantify impacts from such sources. For instance, agricultural machinery and processes have unique emission factors, and GHG emissions must be calculated using precise information regarding specific processes. Furthermore, emissions from land use projects cannot be feasibly quantified at this time because details about future land use projects and their timing are unknown at this time. Therefore, because future land use projects would represent new sources of GHG emissions, it can be conservatively estimated that total GHG emissions from the land use scenario envisioned by the proposed 2022 RTP/SCS would increase over the planning period. Although per capita emissions associated with electricity and natural gas consumption, water and wastewater conveyance and treatment, and solid waste disposal are anticipated to decline, primarily as a result of increasingly stringent iterations of State building code standards (specifically, the California Energy Code and the California Green Building Standards Code), total emissions may increase due to population growth and future land use projects. As a result, impacts of land use projects implementing the proposed 2022 RTP/SCS would be significant.

Mitigation Measures

Cities and the County can and should implement the following mitigation measure, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust this mitigation measure as necessary to respond to site-specific conditions.

GHG-2 Land Use Project Energy Consumption and Water Use Reduction Measures

For land use projects under their jurisdiction, cities and the County can and should implement measures to reduce energy consumption, water use, solid waste generation, and VMT, all of which contribute to GHG emissions. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions. These measures include, but are not limited to:

- Require new residential and commercial construction to install solar energy systems or be solar-ready
- Require new residential and commercial development to install low flow water fixtures
- Require new residential and commercial development to install water-efficient drought-tolerant landscaping, including the use of compost and mulch
- Require new development to exceed the applicable Title 24 energy-efficiency requirements
- Require new development to be fully electric
- Require new residential and commercial development to offer information on recycling, composting, and disposal of household hazardous waste and e-waste
- Require new development to implement circulation design elements in parking lots for no-residential uses to reduce vehicle queuing and improve the pedestrian environment

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for land use projects are cities and the County. This mitigation measure can and should be applied during project permitting and environmental review and implemented during project operation, as applicable.

Significance After Mitigation

If implementing agencies adopt and require the mitigation described above, impacts would be reduced because energy, water use, solid waste generation, and VMT-related GHG emissions from land use projects would be reduced. However, implementation of project-level GHG-reducing measures may not be feasible and cannot be guaranteed on a project-by-project basis. Therefore, this impact would remain significant and unavoidable. No additional feasible mitigation measures are available that would ensure no net increase in GHG emissions compared to existing baseline conditions.

Threshold 2:	Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. Any conflict with the following thresholds would be considered a significant impact: a. Conflict with regional SB 375 per capita passenger vehicle CO_2 emission reduction targets of 16 percent by 2035 from 2005 levels

Impact GHG-3 THE TRANSPORTATION IMPROVEMENTS AND LAND USE PROJECTS ENVISIONED BY THE PROPOSED 2022 RTP/SCS WOULD NOT CONFLICT WITH REGIONAL SB 375 PER CAPITA PASSENGER VEHICLE CO_2 EMISSION REDUCTION TARGETS OF 16 PERCENT BY 2035 FROM 2005 LEVELS. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

One of the goals of SB 375 is to reach the per capita GHG emissions reduction targets for passenger vehicles set by CARB through an integrated land use, transportation, and housing plan. Achievement of this goal is an objective of the proposed 2022 RTP/SCS. The target from CARB, analyzed in this EIR, is identified as a 16 percent reduction in per capita passenger vehicle emissions from 2005 levels by 2035.[4] Table 4.9-4 presents per capita passenger vehicle emissions for 2035 as compared to the 2005 baseline. The per capita transportation-related emissions from passenger vehicles

[4] The SB 375 target for 2020 is not utilized herein as a threshold of significance because the 2022 RTP/SCS would apply only to future transportation and land use planning from the year of adoption (anticipated to be 2022) forward.

include off-model adjustments that represent a reasonable level effect of the transportation programs included in the proposed 2022 RTP/SCS.

Table 4.9-4 Per Capita Passenger Vehicle CO_2 Emissions Comparison

	Percent Change in Per Capita CO_2 Emissions (lbs/day)		
	2005 Baseline (per SB 375)	2035	2046
Per Capita Passenger Vehicle Emissions[1]	20.4	17.1	17.0
Percent Change from in Per Capita GHG Emissions from 2005		-16.4%	-16.8%
SB 375 Target		-16%	n/a[2]
SB 375 Target Met?		Yes	n/a[2]

CO_2 = carbon dioxide; lbs = pounds; SB = Senate Bill

Source: Appendix A

[1]Per capita passenger vehicle emissions for 2035 and 2046 derived from reduction percentages provided by SJCOG.

[2]SB 375 targets have not been adopted for post-2035 years.

As shown in Table 4.9-4, implementation of the proposed 2022 RTP/SCS in the year 2035 would result in a decrease of per capita passenger vehicle CO_2 emissions by 16.4 percent compared to 2005 levels. Therefore, implementation of the proposed 2022 RTP/SCS would achieve the SB 375 GHG reduction target for SJCOG of 16 percent by 2035, and the proposed 2022 RTP/SCS would therefore be consistent with SB 375. Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Threshold 3: Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. Any conflict with the following thresholds would be considered a significant impact:

b. Conflict with state's ability to achieve SB 32 GHG reduction target, which aims to reduce statewide emissions to 40 percent below 1990 levels by 2030

c. Conflict with state's ability to achieve EO S-3-05 GHG reduction 2050 goal, which aims to reduce statewide emissions to 80 percent below 1990 levels by 2050 and EO B-55-18; or

d. Conflict with applicable local GHG reduction plans

Impact GHG-4 IMPLEMENTATION OF THE PROPOSED 2022 RTP/SCS WOULD CONFLICT WITH THE STATE'S ABILITY TO ACHIEVE SB 32, EOS S-3-05 AND B-55-18, AND APPLICABLE LOCAL GHG REDUCTION PLAN TARGETS AND GOALS. IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE.

2017 Scoping Plan

The proposed 2022 RTP/SCS would implement a suite of transportation improvement projects and facilitate a land use scenario that is consistent with the transportation sustainability goals of the 2017 Scoping Plan. The land use scenario envisioned by the proposed 2022 RTP/SCS concentrates

the forecasted growth in population and employment in established neighborhoods, job centers, urban arterials, and high quality transit areas in an effort to reduce VMT. Active transportation projects would implement design policies that prioritize transit, biking, and walking throughout the SJCOG region including but not limited to the cities of Stockton, Tracy, Escalon, Manteca, Lodi, Lathrop, and Ripon. Active Transportation projects would increase the number, safety, and connectivity, and attractiveness of biking and walking facilities by adding sidewalks, trails, bike lanes, crosswalks, intersection improvements, and signage throughout the SJCOG region. Furthermore, the proposed 2022 RTP/SCS includes transit projects designed to maintain, enhance, and expand transit services offered by agencies in the SJCOG region, including, but not limited to, the San Joaquin Regional Transit District (RTD) and municipal transit divisions. Proposed 2022 RTP/SCS projects include electric bus procurement by RTD, enhanced Dial-A-Ride operations by the City of Ripon, Compressed Natural Gas Station expansion by the City of Lodi, transit facility improvements regionwide, and new transit lines added to systems regionwide. Transit projects would increase the availability of low carbon mobility options in the region, thereby contributing to the 2017 Scoping Plan's goals of increasing the penetration of zero emission vehicles in non-light-duty sectors and electrifying the transportation sector. Therefore, the proposed 2022 RTP/SCS is consistent with the goals and strategies of the 2017 Scoping Plan.

SB 32

The SB 375 targets are a key element of CARB's 2017 Scoping Plan. However, the 2017 Scoping Plan states, "Stronger SB 375 GHG reduction targets [adopted in 2018] will enable the State to make significant progress toward this goal, but alone will not provide all of the VMT growth reductions that will be needed. There is a gap between what SB 375 can provide and what is needed to meet the State's 2030 and 2050 goals" (CARB 2017). Therefore, consistency with the SB 375 target does not necessarily equate to consistency with SB 32 and the 2017 Scoping Plan. This analysis hypothetically assumes that the proposed 2022 RTP/SCS would be required to achieve the same proportional GHG reductions as the state by the year 2030 (i.e., a 40 percent reduction in GHG emissions below 1990 levels). Although transportation related GHG emissions would decrease over the planning period, the reduction would not be sufficient to achieve the 2030 target of a 40 percent reduction below 1990 levels. As shown in Table 4.9-5, per capita transportation-related emissions would also decrease.

Table 4.9-5 Per Capita Transportation-Related Emissions (All Vehicle Classes) Compared to 1990 Levels

	Per Capita CO_2 Emissions (lbs/day)	
Scenario	Vehicle Emissions	% Change in Emissions Compared to 1990 Baseline
1990 Baseline[1, 2]	23.02	--
2005 Baseline[2]	27.16	--
2016 Baseline	25.2	-9.5%
2030 with proposed 2022 RTP/SCS[3]	19.4	-15.82%
2046 with proposed 2022 RTP/SCS	16.7	-27.64%

[1] Actual 1990 emissions are unknown but are generally assumed to be 15% below 2005 levels (CARB 2008).

Source: Appendix A

As discussed in Impact GHG-2, per capita land use emissions associated with electricity and natural gas consumption, water and wastewater conveyance and treatment, and solid waste disposal are anticipated to decline over the planning period, primarily as a result of increasingly stringent iterations of State building code standards. However, it cannot be feasibly determined that reductions in land use emissions would achieve the SB 32 target.

Therefore, although the policies, transportations projects, and land use scenario identified in the proposed 2022 RTP/SCS are designed to align transportation and land use planning to reduce transportation related GHG emissions, the proposed 2022 RTP/SCS would conflict with the State's ability to achieve the SB 32 GHG emissions reduction target, assuming that the proposed 2022 RTP/SCS is required to achieve the same proportional Statewide GHG reductions. Implementation of Mitigation Measure GHG-4 below would reduce this impact.

EOs S-3-05 and B-55-18

Because the plan would conflict with the State's ability to achieve the SB 32 GHG reduction target, it would also impede "substantial progress" toward meeting the reduction goals identified in EO S-3-05 and EO B-55-18. Implementation of Mitigation Measure GHG-4 below would reduce this impact.

Local Climate Action Plans

Four of SJCOG's member jurisdictions (the cities of Stockton, Tracy, Lodi, and Manteca) have adopted CAPs that set goals and targets for the reduction of GHG emissions, and outline policies to help achieve those goals (City of Stockton 2014; City of Tracy 2011; City of Lodi 2014; City of Manteca 2013). All of these CAPs had been adopted prior to enaction of SB 32 and thus present strategies intended to comply with the GHG emissions reduction goals recommended for local governments in the AB 32 Scoping Plan, which was aimed at reducing GHG emissions to 1990 levels by 2020 in accordance with AB 32. These CAPs are also intended to make progress toward the State's 2030 target of reducing GHG emissions by 40 percent below 1990 levels, as first set forth in EO S-3-05 in 2005 and later codified by SB 32 in 2017. In addition, the cities of Lodi and Manteca presents strategies explicitly addressing the GHG reduction goals set forth in SB 32. As discussed previously, the proposed 2022 RTP/SCS was determined to be inconsistent with the SB 32 target and EO S-3-05 and B-55-18 goals. Therefore, it would also conflict with the goals of local CAPs designed

to meet the same State goals, and impacts would be significant. The following mitigation measures would reduce this impact.

Mitigation Measures

For all transportation projects under their jurisdiction, implementing agencies shall implement, and transportation project sponsor agencies can and should implement, the following mitigation measures developed for the proposed 2022 RTP/SCS where applicable for transportation projects generating construction GHG emissions. The County of San Joaquin and cities in the SJCOG region can and should implement these measures, where relevant to land use projects implementing the proposed 2022 RTP/SCS. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions.

Implementation of Mitigation Measure GHG-2 would also reduce GHG emission from land use projects. Implementation of Mitigation Measures T-1(a) and T-1(b) in Section 4.14, *Transportation*, would further reduce GHG emissions from the proposed 2022 RTP/SCS.

GHG-4 Transportation-Related GHG Reduction Measures

The implementing agency shall incorporate the most recent GHG emission reduction measures and/or technologies for reducing VMT and associated transportation related GHG emissions. Current GHG-reducing measures include the following:

- Installation of electric vehicle charging stations beyond those required by State and local codes
- Utilization of electric vehicles and/or alternatively fueled vehicles in company fleet
- Provision of dedicated parking for carpools, vanpool, and clean air vehicles
- Provision of vanpool and/or shuttle service for employees
- Implementation of reduced parking minimum requirements
- Implementation of maximum parking limits
- Provision of bicycle parking facilities beyond those required by State and local codes
- Provision of a bicycle-share program
- Expansion of bicycle routes/lanes along the project site frontage
- Provision of new or improved transit amenities (e.g., covered turnouts, bicycle racks, covered benches, signage, lighting) if project site is located along an existing transit route
- Expansion of existing transit routes
- Provision of transit subsidies
- Expansion of sidewalk infrastructure along the project site frontage
- Provision of safe, pedestrian-friendly, and interconnected sidewalks and streetscapes
- Provision of employee lockers and showers
- Provision of on-site services that reduce the need for off-site travel (e.g., childcare facilities, automatic teller machines, postal machines, food services)
- Provision of alternative work schedule options, such as telework or reduced schedule (e.g., 9/80 or 10/40 schedules), for employees
- Implementation of transportation demand management programs to educate and incentivize residents and/or employees to use transit, smart commute, and alternative transportation options

IMPLEMENTING AGENCIES AND TIMING

Implementing agencies for transportation projects are SJCOG and transportation project sponsor agencies. Implementing agencies for land use projects are cities and counties. This mitigation measure shall, or can and should, be applied during project permitting and environmental review and implemented during project operation, as applicable.

Significance After Mitigation

If implementing agencies adopt and require the mitigation described above, impacts would be reduced because transportation related GHG emissions from transportation and land use projects would be reduced. However, implementation of project-level GHG-reducing measures may not be feasible and cannot be guaranteed on a project-by-project basis. Additionally, it is speculative at this time to forecast whether project-level GHG emission reductions would be sufficient to achieve a countywide reduction in GHG emissions of 40 percent below 1990 levels by 2030. Therefore, this impact would remain significant and unavoidable. No additional feasible mitigation measures are available that would reduce emissions to trajectories consistent with SB 32, EO S-3-05, and EO B-55-18 GHG reduction targets and goals.

c. Specific Projects that May Result in Impacts

The analysis within this section discusses the potential GHG related impacts associated with the proposed 2022 RTP/SCS. The transportation projects within the proposed 2022 RTP/SCS are evaluated herein in their entirety and are intended to improve circulation rather than cause adverse impacts. However, as described above, the proposed 2022 RTP/SCS would increase GHG emissions as a result of project construction and/or operation. These effects have been found to be significant, as described above. Any number of the proposed 2022 RTP/SCS projects that require construction equipment or include transportation improvement would presumably increase GHG emissions. Thus, no specific projects are listed in this section related to the adverse impacts on GHG emissions in the SJCOG region.

4.9.4 Cumulative Impacts

The impacts of GHG emissions are, by definition, cumulative impacts, as they add to the global accumulation of greenhouse gases in the atmosphere. The cumulative impact analysis area for GHG emissions consists of the SJCOG region, adjoining counties, and the entire State of California. The entire state is included in the analysis area because GHG emissions from the SJCOG region and adjoining counties would influence the ability for the State to achieve its GHG reduction targets. The analysis presented in Section 4.9.3, *Impact Analysis*, evaluates both plan-level impacts as well as the contribution of the proposed 2022 RTP/SCS to the existing cumulative impact related to GHG emissions, the effects of which are outlined in Section 4.9.1(c), *Potential Effects of Climate Change*.

As discussed under Impact GHG-1, construction activities associated with transportation improvement projects and future land use projects envisioned by the proposed 2022 RTP/SCS would generate temporary GHG emissions. The temporary construction GHG emissions would occur concurrent with ongoing GHG emissions in the cumulative impact analysis area, such as GHG emissions ongoing agricultural activities in surrounding Valley counties such as Stanislaus County and Merced County. As described under Impact GHG-1, construction-related GHG emissions associated with buildout under the proposed 2022 RTP/SCS would be significant even after implementation of Mitigation Measure GHG-1. Therefore, the contribution of the proposed 2022

RTP/SCS construction emissions to the cumulative impact of total GHG emissions would be cumulatively considerable, pre- and post-mitigation.

As discussed under Impacts GHG-2 through GHG-4, the transportation projects and land use scenario envisioned in the proposed 2022 RTP/SCS would also generate operational GHG emissions. Overall, implementation of the proposed 2022 RTP/SCS would reduce total regionwide mobile emissions; however, land use emissions may increase compared to existing conditions. Implementation of Mitigation Measure GHG-2 would reduce GHG emissions from land use projects, but impacts would remain significant and unavoidable. Therefore, the contribution of land use project emissions to the cumulative impact of total GHG emissions would be cumulatively considerable, pre- and post-mitigation.

The proposed 2022 RTP/SCS would not conflict with SB 375 because per capita emissions reductions would meet and exceed the regional target of a 16 percent reduction by 2035 compared to 2005 levels. However, reductions achieved by the proposed 2022 RTP/SCS would not be sufficient to achieve the 2030 target of a 40 percent reduction in overall emissions set forth by SB 32 and therefore would also be inconsistent with EO S-3-05 and B-55-18 goals. Other ongoing land uses and operation of future development in the cumulative impact analysis area would also generate GHG emissions. Implementation of Mitigation Measures GHG-2 and GHG-4 would reduce the proposed 2022 RTP/SCS impacts related to consistency with state GHG reduction targets and goals; however, emissions would remain in exceedance of applicable significance thresholds. Therefore, the proposed 2022 RTP/SCS would have a cumulatively considerable contribution to the cumulative impact of inconsistency with state GHG reduction targets and goals, both pre- and post- mitigation.

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