3.8 GREENHOUSE GASES

This section of the Program Environmental Impact Report (PEIR) describes greenhouse gas emissions in the SCAG region, identifies the regulatory framework with respect to laws and regulations that govern greenhouse gas emissions, and evaluates the significance of the potential impacts related to greenhouse gas emissions that could result from development of the Connect SoCal Plan ("Connect SoCal"; "Plan"). In addition, this PEIR provides regional-scale mitigation measures, as well as project-level mitigation measures to be considered by lead agencies for subsequent, site-specific environmental review to reduce identified impacts as appropriate and feasible.

3.8.1 ENVIRONMENTAL SETTING

Gases that trap heat in the atmosphere are often called greenhouse gases (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 (CO_2), methane (CH_4), nitrous oxide (NO_2), sulfur hexafluoride (SF_6), 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.[1]

3.8.1.1 Definitions

Terms and criteria used in the assessment of GHGs are described below.

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

1 South Coast Air Quality Management District. 2017. *Final Environmental Impact Report 2016 Air Quality Management Plan*. Available online at: http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2016/2016aqmpfpeir.pdf?sfvrsn=10, accessed March 25, 2019.

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 (CO_2) over a given period of time (20, 100, and 500 years). CO_2 has a GWP of 1.

$MTCO_{2e}$: Metric ton of CO_2e.

$MMTCO_{2e}$: Million metric tons of CO_2e.

Carbon Dioxide (CO_2): 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 CO_2 that would cause the same amount of warming. CO_{2e} is based on the GWP ratios between the various GHGs relative to CO_2.

Methane (CH_4): 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 (NO_2): 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.

Sulfur Hexafluoride (SF_6): One of a class of fluorinated gases with a high GWP, SF_6 is a colorless gas soluble in alcohol and ether, slightly soluble in water. SF_6 is a strong GHG used primarily in electrical transmission and distribution systems as an insulator.

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 [CF_4] and perfluoroethane [C_2F_6]) 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.

Global Warming Potential of Various GHGs: GHGs include CO_2, CH_4, O_3, water vapor, NO_2, HFCs, PFCs, and SF_6. Carbon dioxide is the most abundant GHG. Other GHGs are less abundant but have higher global warming potential than CO_2. (**Table 3.8-1, Greenhouse Gases and Their Relative Warming Potential Compared to CO_2**).

Table 3.8-1
Greenhouse Gases and Their Relative Global Warming Potential Compared to CO_2

GHG	Atmospheric Lifetime (years)	Global Warming Potential Relative to CO_2[a]
Carbon Dioxide (CO_2)	50 to 100	1
Methane (CH_4)[b]	12 (±3)	25
Nitrous Oxide	120	298
Hydrofluorocarbons:		
HFC-23	264	14,800
HFC-32	5.6	675
HFC-125	32.6	3,500
HFC-134a	14.6	1,100
HFC-143a	48.3	1,430
HFC-152a	1.5	124
HFC-227ea	36.5	3,220
HFC-236fa	209	9,810
HFC-43-10mee	17.1	1,640
Perfluoromethane: CF_4	50,000	7,390
Perfluoroethane: C_2F_6	10,000	12,200
Perfluorobutane: C_4F_{10}	2,600	8,860
Perfluoro-2-methylpentane: C_6F_{14}	3,200	9,300
Sulfur Hexaflouride (SF_6)	3,200	22,800

Note:
Based on 100-Year Time Horizon of the Global Warming Potential (GWP) of the air pollutant relative to CO_2.
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 CO_2 is not included.
Source:
Intergovernmental Panel on Climate Change (IPCC), Fourth Assessment Report (AR4). 4 April 2014. Emission factors for greenhouse gas inventories. Available at: http://www.epa.gov/climateleadership/documents/emission-factors.pdf

Thus, emissions of other GHGs are frequently expressed in the equivalent mass of CO_2, denoted as CO_2e. 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.

3.8.1.2 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).[2] GHGs are any gas that absorbs infrared radiation in the atmosphere[3] 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, etc.), have contributed to the rapid increase in atmospheric levels of GHGs over the last 150 years. In 1850, the world emitted approximately 4.75 billion tons of CO_2 and in 2017, the world emitted approximately 1.54 trillion tons of CO_2.[4]

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

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2 US Environmental Protection Agency, "Glossary of Climate Change Terms." Available online at: https://19january2017snapshot.epa.gov/climatechange/glossary-climate-change-terms_.html, accessed September 3, 2019.

3 Ibid.

4 Our World in Data. *Cumulative CO_2 emissions by world region*. Available online at: https://ourworldindata.org/grapher/cumulative-co2-emissions-region?stackMode=absolute, accessed October 3, 2019.

pollution in the atmosphere, the loss of which would lead to additional warming.[5] Adverse impacts from global climate change worldwide and in California may include, but not be 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.[6]

- Since the early 1970s, glacier mass loss and ocean thermal expansion from warming together explain about 75% 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.[7] Sea level in California has risen approximately 7 inches from 1900 to 2005, according to the National Climate Assessment.[8]

- Changing weather patterns, including changes to precipitation, ocean acidification and warming, and wind patterns.[9]

- 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.[10]

- 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.[11]

- 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.[12]

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5 Intergovernmental Panel on Climate Change. *2018. Summary for Policymakers, Global Warming of 1.5 C.* Available online at: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf, accessed October 1, 2019.

6 Environmental Protection Agency, Draft Endangerment Finding, 74 Fed. Reg. 18886, 18904 (April 24, 2009) ("cumulative emissions are responsible for the cumulative change in the stock of concentrations in the atmosphere"); see also 74 Fed. Reg. 66496, 66538 (same in Final Endangerment Finding).

7 Intergovernmental Panel on Climate Change. *2014. Climate Change 2014 Synthesis Report Summary for Policymakers.* Available online at: https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_SPM_FINAL.pdf, accessed March 25, 2019.

8 California Air Resources Board. 2015. *FAQ about EO B-30-15: 2030 Carbon Target and Adaptation*. Available online at: http://www.arb.ca.gov/newsrel/2030_carbon_target_adaptation_faq.pdf, accessed March 25, 2019.

9 Intergovernmental Panel on Climate Change. *2014. Climate Change 2014 Synthesis Report Summary for Policymakers.* Available online at: https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_SPM_FINAL.pdf, accessed March 25, 2019.

10 California Environmental Protection Agency, Climate Action Team. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature.*

11 Ibid.

- 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.[13]
- Increasing frequency and severity of climate-related extremes including heat waves, droughts, floods, cyclones, and wildfires.[14]

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:[15,16]

- 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.

A recent aerial survey by the U.S. Forest Service determined that 18 million trees died in California in 2018, which brings the total of dead trees across California from 2010 to 147 million trees over 9.7 million acres. Since 2016, federal, state, and local bodies have removed approximately 1.5 million dead trees that posed the highest hazards to life and property, however, the amount of dead trees across the state presents an increasing wildfire risk.[17] 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

12 Ibid.

13 Intergovernmental Panel on Climate Change. *2014. Climate Change 2014 Synthesis Report Summary for Policymakers.* Available online at: https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_SPM_FINAL.pdf, accessed March 25, 2019.

14 Ibid.

15 OEHHA. 2018 *Indicators of Climate Change in California.* August. Available online at: https://oehha.ca.gov/climate-change/document/indicators-climate-change-california, accessed March 25, 2019.

16 California Air Resources Board. 2017. *California's 2017 Climate Change Scoping Plan.* November.

17 U.S. Department of Agriculture. 2019. *News Release, Survey Finds 18 Million Trees Died in California in 2018.* February. Available online at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/FSEPRD609321.pdf, accessed October 2, 2019.

highly destructive pests, such as the mountain pine beetle.[18] This would further exacerbate the fire hazard posed from dead trees.

In the last decade, California has experienced five of the state's 10 largest wildfires and seven 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.[19] 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.[20] In 2018, wildfires in California released approximately 68 million tons of carbon dioxide, or about 15 percent of the State's annual emissions.[21] Studies suggest that greenhouse gas 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.[22]

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 large majority of major floods in rivers all along the U.S. West

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18 U.S. Forest Service. 2014. *2013-2027 National Insect and Disease Forest Risk Assessment.* January. Available online at: https://www.fs.fed.us/foresthealth/technology/pdfs/2012_RiskMap_Exec_summary.pdf, accessed October 3, 2019.

19 Williams, A. P., Abatzoglou, J. T., Gershunov, A., Guzman-Morales, J., Bishop, D. A., Balch, J. K., & Lettenmaier, D. P. (2019). Observed impacts of anthropogenic climate change on wildfire in California. Earth's Future, 7, 892–910. Available online at: https://doi.org/10.1029/2019EF001210, accessed September 16, 2019.

20 US Environmental Protection Agency, *What Climate Change Means for California.* Available online at: https://www.epa.gov/sites/production/files/2016-09/documents/climate-change-ca.pdf, accessed September 16, 2019.

21 US Department of Interior, *Press Release, November 30, 2018.* Available online at: https://www.doi.gov/pressreleases/new-analysis-shows-2018-california-wildfires-emitted-much-carbon-dioxide-entire-years, accessed September 17, 2019.

22 California Air Resources Board. 2017. *California's 2017 Climate Change Scoping Plan.* November.

Coast and as the source of up to 50 percent of all precipitation in California.[23] 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.[24,25]

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.[26,27] 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.[28,29] 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. Consequently, the best available science must drive effective climate policy.[30]

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

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23 Scripps Institution of Oceanography. 2017. *California's Climate Future Suggests More Volatility and a Key Role for Atmospheric Rivers.* September. Available online at: https://scripps.ucsd.edu/news/californias-climate-future-suggests-more-volatility-and-key-role-atmospheric-rivers, accessed October 1, 2019.

24 Hagos, S., Leung, L.R., Yoon, JH., Lu, J., and Gao, Y., 2016. *A Projection of Changes in Landfalling Atmospheric River Frequency and Extreme Precipitation over Western North America from the Large Ensemble CESM Simulations.* January.

25 Payne, Ashley and Magnusdottir, Gudrun. 2015. *An Evaluation of Atmospheric Rivers over the North Pacific in CMIP5 and their response to warming under RCP 8.5.* November.

26 Easterling, D.R., Kunkel, K.E., Wehner, M.F., and Sun, L. 2016. *Detection and Attribution of Climate Extremes in the Observed Record*. March.

27 National Academies of Sciences, Engineering, and Medicine. 2016. *Attribution of Extreme Weather Events in the Context of Climate Change.*

28 Sobel, A.H., Camargo, S.J., Hall, T.M., Lee, C-Y., Tippett, M.K., and Wing, A.A., 2016. *Human Influence on Tropical Cyclone Intensity*.

29 Kossin, James P., NOAA/National Centers for Environmental Information. 2016. *Past and Projected Changes in Western North Pacific Tropical Cyclone Exposure*. July.

30 California Air Resources Board. 2017. *California's 2017 Climate Change Scoping Plan.* November.

change in a way that directly informs State agencies' efforts to safeguard the State's people, economy, and environment.[31,32]

The State is also taking steps to make the State more resilient to ongoing and projected climate impacts as laid out by the Safeguarding California Plan.[33] 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.[34]

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 development 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 for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I) are tracked through the year 2014. The sum of the top five GHG producing nations (plus the European Union) totaled approximately 29,600 million metric tons of CO_2 equivalents ($MMTCO_2e$).[35,36] It should be noted that global emissions inventory data are not all

31 California Natural Resources Agency. *California's Fourth Climate Change Assessment*. Available online at: http://resources.ca.gov/climate/safeguarding/research/, accessed March 25, 2019.

32 OEHHA. 2018 *Indicators of Climate Change in California.* August. Available online at: https://oehha.ca.gov/climate-change/document/indicators-climate-change-california, accessed March 25, 2019.

33 California Natural Resources Agency. 2018. *Safeguarding California and Climate Change Adaption Policy*. Available online at: http://resources.ca.gov/climate/safeguarding/, accessed March 25, 2019.

34 California Air Resources Board. 2017. *California's 2017 Climate Change Scoping Plan.* November.

35 World Resources Institute. *Climate Analysis Indicators Tool (CAIT).* Available online at: https://www.climatewatchdata.org/ghg-emissions?breakBy=location&source=31&version=1, accessed March 25, 2019.

from the same year and may vary depending on the source of the emissions inventory data.[37] The top five countries and the European Union accounted for approximately 55 percent of the total global GHG emissions according to the most recently available 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 currently available global inventory data.

Table 3.8-2
Top Five GHG Producer Countries and the European Union (Annual)

Emitting Countries	2014 GHG Emissions ($MMTCO_2e$)
China	12,000
United States	6,300
European Union (EU), 27 Member States	3,600
India	3,200
Indonesia	2,500
Russia	2,000

Source: World Resources Institute. 2018. "Climate Analysis Indicators Tool (CAIT)," https://www.climatewatchdata.org/ghg-emissions?breakBy=location&source=31&version=1.

National

As noted in **Table 3.8-2**, the US was the number two producer of global GHG emissions in 2014. The primary GHG emitted by human activities in the US was CO_2, representing approximately 82 percent of total GHG emissions. Carbon dioxide from fossil fuel combustion, the largest source of GHG emissions, accounted for approximately 76 percent of US GHG emissions. In 2016, carbon dioxide emissions from

36 The CO_2 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 21. This means that the emission of one million metric tons of methane is equivalent to the emission of 21 million metric tons of CO_2.

37 The global emissions are the sum of Annex I and non-Annex I countries, without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries without 2005 data, the United Nations Framework Convention on Climate Change (UNFCCC) data for the most recent year were used. United Nations Framework Convention on Climate Change. *Annex I Parties – GHG total without LULUCF.* and *Flexible GHG Data Queries* with selections for total GHG emissions excluding LULUCF/LUCF, all years, and Annex I and non-Annex I countries. Available online at: https://unfccc.int/process-and-meetings/transparency-and-reporting/greenhouse-gas-data/ghg-data-unfccc/ghg-data-from-unfccc . n.d., accessed March 25, 2019.

the transportation sector accounted for approximately 64% of all GHG emissions from fossil fuel combustion.[38,]

State of California

The California Air Resources Board (CARB) compiles GHG inventories for the State of California. Based on the 2017 GHG inventory data (i.e., the latest year for which data are available), California emitted 424.1 $MMTCO_2e$ including emissions resulting from imported electrical power in 2017.[39] Based on the GHG inventories compiled by the World Resources Institute, California's total statewide GHG emissions rank second in the U.S. (Texas is the highest emitter of GHG). [40]

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, and other sources, which include commercial and residential activities.[41] **Table 3.8-3, GHG Emissions in California (2000 and 2017)**, provides a summary of GHG emissions reported in California in 2000 and 2017 by categories defined by the United Nations Intergovernmental Panel on Climate Change (IPCC).

Table 3.8-3
GHG Emissions in California (2000 and 2017)

Source Category	2000 ($MMTCO_2e$)	Percent of Total	2017 ($MMTCO_2e$)	Percent of Total
ENERGY	413.7	87.7%	348.9	82.3%
Energy Industries	159.12	33.7%	109.66	25.9%
Manufacturing Industries & Construction	22.75	4.8%	19.88	4.7%
Transport	179.78	38.1%	168.93	39.8%
Other Sectors (Residential/Commercial/Institutional)	44.67	9.5%	41.24	9.7%
Solid Fuels	0.04	0.0%	0.02	0.0%
Fugitive Emissions from Oil & Natural Gas	6.12	1.3%	8.2	1.9%
Fugitive Emissions from Geothermal Energy Production	1.13	0.2%	0.93	0.2%

38 US Environmental Protection Agency. 2016. *Inventory of U.S. Greenhouse Gas Emissions and Sinks.* April. Available online at: https://www.epa.gov/sites/production/files/2018-01/documents/2018_complete_report.pdf, accessed March 25, 2019.

39 California Air Resources Board. 2019. *California Greenhouse Gas 2000-2017 Inventory by IPCC Category – Summary.* June. Available online at: https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_ipcc_sum_2000-17.pdf, accessed August 13, 2019.

40 World Resources Institute. 2017. *6 Charts to Understand U.S. State Greenhouse Gas Emissions*. Available online at: https://www.wri.org/blog/2017/08/6-charts-understand-us-state-greenhouse-gas-emissions, accessed October 3, 2019.

41 California Air Resources Board. 2019. *California Greenhouse Gas 2000-2017 Inventory by IPCC Category – Summary.* June. Available online at: https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_ipcc_sum_2000-17.pdf, accessed August 13, 2019.

Source Category	2000 ($MMTCO_2e$)	Percent of Total	2017 ($MMTCO_2e$)	Percent of Total
Pollution Control Devices	0.11	0.0%	0.05	0.0%
INDUSTRIAL PROCESSES & PRODUCT USE	19.7	4.2%	33.6	7.9%
Mineral Industry	5.60	1.2%	4.93	1.2%
Chemical Industry	0.06	0.0%	0.00	0.0%
Metal Industry	0.07	0.0%	0.00	0.0%
Non-Energy Products from Fuels & Solvent Use	3.30	0.7%	1.88	0.4%
Electronics Industry	0.20	0.0%	0.17	0.0%
Substitutes for Ozone Depleting Substances	5.62	1.2%	19.64	4.6%
Other Product Manufacture and Use	1.52	0.3%	1.18	0.3%
Other	3.31	0.7%	5.81	1.4%
AGRICULTURE, FORESTRY, & OTHER LAND USE	29.0	6.1%	30.7	7.2%
Livestock	19.62	4.2%	22.68	5.3%
Aggregate Sources & Non-CO_2 Sources on Land	9.40	2.0%	8.07	1.9%
WASTE	9.3	2.0%	10.8	2.5%
Solid Waste Disposal and Biological Treatment	7.22	1.5%	8.54	2.0%
Biological Treatment of Solid Waste	0.13	0.0%	0.35	0.1%
Wastewater Treatment & Discharge	1.93	0.4%	1.94	0.5%
EMISSIONS SUMMARY				
Gross California Emissions	**471.7**		**424.1**	

Source:
[1] *California Air Resources Board, "California Greenhouse Gas 2000-2017 Inventory by IPCC Category - Summary," https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_ipcc_sum_2000-17.pdf.*

As demonstrated in **Table 3.8-3**, California's 2017 GHG emissions are lower than 2000 levels. In 2007, California statewide GHG emissions peaked at 490.9 MMT CO_2e/year, since that time emissions have been following a declining trend. In 2017, emissions from routine emitting activities statewide were 66.8 million metric tons of CO_2e ($MMTCO_2e$) lower than peak GHG levels in 2007.[42]

Cap and Trade Program

The state-wide cap and trade expenditure plan allocated $832 million dollars towards programs that will help reduce GHG emissions, with set-asides for projects benefiting disadvantaged communities. The expenditure plan funds three main investment categories: (1) sustainable communities & clean transportation; (2) energy efficiency & clean energy; and (3) natural resources & waste diversion.[43]

42 California Air Resources Board. 2019. *California Greenhouse Gas 2000-2017 Inventory by IPCC Category – Summary.* June. Available online at: https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_ipcc_sum_2000-17.pdf, accessed August 13, 2019.

43 Southern California Association of Governments. 2015. *The Greenhouse Gas Reduction Fund.* Available online at: http://www.scag.ca.gov/programs/Pages/GGRFExpenditurePlan.aspx?opentab=2, accessed March 25, 2019.

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. 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.[44] 19 projects in the SCAG region were awarded funding for Round Three of the AHSC Program. The 19 projects totaled approximately $258 million, exhausting the available budget for Round Three projects. The Fiscal Year (FY) 2019–2020 Cap and Trade Expenditure Plan proposes $1.4 billion to support programs that sequester GHG emissions, enhance the state' resiliency to climate change, benefit disadvantaged communities most impacted by climate change, and expand the state's workforce skill base in industries and occupations that anchor the carbon-neutral economy.[45] The Greenhouse Gas Reduction Fund (GGRF) is expected to be $2.1 billion in FY 2019–2020.[46] The program is in its fourth round with a current Notice of Funding Available of approximately $395 million.[47]

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 $MMTCO_{2e}$. 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.[48]

Fossil fuel carbon dioxide emissions ($FFCO_2$) for 2011 were calculated across the Los Angeles megacity, which includes Los Angeles, Orange, Riverside, Santa Barbara, and Ventura Counties. The total $FFCO_2$ emissions were calculated to be approximately 48.06±5.3 megatons of carbon dioxide per year

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44 California Strategic Growth Council. 2019. *Affordable Housing and Sustainable Communities Program: Round 4 FY 2017-2018 Program Guidelines*. Available online at: http://sgc.ca.gov/programs/ahsc/docs/20190221-AHSC_17-18_Guidelines-Updated.pdf, accessed August 21, 2019.

45 State of California. 2019. *California State Budget 2019-2020*. Available online at: http://www.ebudget.ca.gov/2019-20/pdf/Enacted/BudgetSummary/FullBudgetSummary.pdf, accessed October 2, 2019.

46 Near Zero. 2019. *California' Cap and Trade Proceeds will Likely Exceed Governor's Estimates*. Available online at: http://www.nearzero.org/wp/2019/01/30/californias-cap-and-trade-proceeds-will-likely-exceed-governors-estimate/, accessed October 2, 2019.

47 State of California.. *Notice of Funding Availability Affordable Housing and Sustainable Communities Program*. Available online at: http://www.hcd.ca.gov/grants-funding/active-funding/ahsc/docs/AHSC-NOFA-Round-4-FINAL.pdf, accessed October 2, 2019.

48 Final Southern California Association of Governments. 2012. *Regional Greenhouse Gas Inventory and Reference Case Projections, 1990-2035*. Available online at: http://sustain.scag.ca.gov/Sustainability%20Portal%20Document%20Library/05-30-12_SCAG_Revised_IF%20Report_Final.pdf, accessed October 2, 2019.

($MtCO_2$/yr), or 53.4±5.9 MMT CO_2e/year, with transportation emissions accounting for approximately 50.4% of these emissions [49]. Los Angeles County contributed approximately 55% of the total $FFCO_2$ emissions, followed by San Bernardino, Orange, Riverside, and Ventura Counties. These results are consistent with SCAG estimates of GHG emissions for 2016 (see **Table 3.8-4, Greenhouse Gas Emissions from Transportation by County,** in **Section 3.8.3.3, Impacts and Mitigation Measures**). It should be noted that the 2011 $FFCO_2$ estimates does not include Imperial County, however, according to **Table 3.8-7**, in 2016 Imperial County only contributed approximately 1.7% of the regional total transportation GHG emissions. Therefore, these results are representative of the SCAG region.[50]

Goods Movement

As discussed in **Section 3.17, Transportation Traffic and Safety**, 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 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. California Executive Order S-3-05 (June 1, 2005 - Schwarzenegger) called for a coordinated approach to address the detrimental air quality effects of greenhouse gases (GHGs).[51] More recently, California Executive Order B-16-12 supports the rapid commercialization of zero emission vehicles sets a 2050 GHG emissions reduction goal for the transportation sector to achieve 80 percent less emissions than 1990 levels. Executive Order B-32-15 works toward achieving GHG reduction targets with the California Sustainable Freight Action Plan, an integrated plan that establishes clear targets to improve freight efficiency, transition to zero-emission technologies and increase competitiveness of California's freight system. In addition, Executive Order B-30-15 established an interim statewide GHG emission reduction target to reduce GHG emissions to 40

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49 Gurney, Kevin R., et al. *The Hesta fossil fuel CO_2 emissions data product for the Los Angeles megacity (Hestia-LA)*. Earth System Science Data. August 2019. Available online at: https://www.earth-syst-sci-data.net/11/1309/2019/essd-11-1309-2019.pdf, accessed September 4, 2019.

50 Ibid.

51 State of California. *California Climate Change Executive Orders*. Available online at: https://www.climatechange.ca.gov/state/executive_orders.html, accessed September 16, 2019.

percent below 1990 levels by 2030 to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050.

Public Health

The changing climate's effect on temperature, air quality, wildfires, droughts, and the spread of diseases will threaten the health and wellbeing of everyone in the SCAG region. Climate change threatens the water supply, food security, air quality and shelter 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 results 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 is 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% and 0.17%, 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:[52]

- Promoting energy efficiency in buildings
- Using low carbon electricity
- Transitioning to high efficiency heating and cooling systems

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52 Energy + Environmental Economics. 2015. *Summary of the California State Agencies' PATHWAYS Project: Long-Term Greenhouse Gas Reduction Scenarios*. Available online at: https://ww3.arb.ca.gov/html/fact_sheets/e3_2030scenarios.pdf , accessed March 25, 2019.

- Using low carbon and alternative fuels
- Incorporating zero emission or hybrid vehicles
- Incorporating healthy community planning (active transportation)
- Increasing urban density
- Reducing automobile dependence
- Increasing transit options
- Integrating renewable energy
- 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:[53]

- 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.[54] SCAG has undertaken several planning efforts including studying adaptation strategies and assisting jurisdictions in developing Climate Action Plans.

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53 California Air Resources Board. 2015. *FAQ about EO B-30-15: 2030 Carbon Target and Adaptation.* Available online at: http://www.arb.ca.gov/newsrel/2030_carbon_target_adaptation_faq.pdf, accessed March 25, 2019.

54 California Governor's Office of Planning and Research. 2014. *California Jurisdictions Addressing Climate Change*. Available online at: http://www.ca-ilg.org/sites/main/files/file-attachments/california_jurisdictions_addressing_climate_change_pdf_0.pdf , accessed March 25, 2019.

SCAG presents annual Sustainability Awards to recognize exemplary planning projects that support the core principles of mobility, livability, prosperity, and sustainability.

Past Sustainability Award winners include:

2018:

- City of Long Beach – 2017 Bicycle Master Plan, Communities of Excellence in Nutrition, Physical Activity and Obesity Prevention (CX3) & Willow Springs Wetland Restoration Project
- City of Cathedral City & SCRAP Gallery – Cycle Cathedral City Bicycle Outreach and Education Program
- City of San Fernando – Corridors Specific Plan
- Cities of Arcadia, Azusa, Duarte, Irwindale, Monrovia, San Marino, South Pasadena and LA Metro – 626 Golden Streets
- City of Rancho Cucamonga – Rancho Cucamonga Sustainable Community Action Plan
- City of Perris – Live Well Perris
- City of Hermosa Beach – PLAN Hermosa

2017:

- Transportation Corridor Agencies (TCA) – Foothill South Settlement Agreement
- UCLA Department of Transportation – UCLA BruinBikeSmart
- City of San Bernardino – Waterman + Baseline Neighborhood Specific Plan
- Imperial County Transportation Commission (ICTC) – Pedestrian and Bicycle Transportation Access Study for the California/Baja California Land Ports of Entry
- Los Angeles County Department of Parks and Recreation – Los Angeles County Master Plan for Sustainable Parks and Recreation: Phase 1
- City of Lynwood – Lynwood Safe and Healthy Communities Element
- City of Long Beach – Midtown Specific Plan

3.8.2 REGULATORY FRAMEWORK

3.8.2.1 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., Fifth Assessment Report, consisting of three working group reports and a synthesis report based on the first three reports) was published in 2013. In its 2013 report, the IPCC stated that global temperature increases since 1951 were extremely likely attributable to man-made activities (greater than 95 percent certainty).[55] The IPCC anticipates the release of the Sixth Assessment Report in 2022.[56]

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").[57] 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.

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55 IPCC. 2013. *Climate Change 2013 The Physical Science Basis.*

56 IPCC. *AR6 Synthesis Report: Climate Change 2022.* Available online at: https://www.ipcc.ch/report/sixth-assessment-report-cycle/, accessed August 13, 2019.

57 United Nations, Paris Agreement. 2015. *Paris Agreement.* Available online at: http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf, accessed April 17, 2018

However, in June 2017, the U.S. announced its intent to withdraw from the Paris Accord.[58] The earliest effective date of a withdrawal by the U.S. is November 2020.

In an effort to reach the goals set by the Paris Accord, over 9,000 cities and local governments from 132 countries across the world formed the Global Covenant of Mayors (GCoM) with the goal of collectively reducing 1.3 billion tons of CO_2 emissions per year by 2030.[59] 158 cities within the United States have joined GCoM despite the federal government announcing its intent to withdraw from the Paris Accord. Many of these cities are in the SCAG region, including Los Angeles, Lancaster, Long Beach, Manhattan Beach, Santa Monica, West Hollywood, and Palm Springs.[60]

3.8.2.2 Federal

Global Change Research Act (1990)

In 1990, Congress passed and the President signed Public Law 101-606, the Global Change Research Act.[61] 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 US 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 (CCA),

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58 The White House. *Statement by President Trump on the Paris Climate Accord.* Available online at: https://www.whitehouse.gov/briefings-statements/statement-president-trump-paris-climate-accord/, accessed April 17, 2018.

59 Global Covenant of Mayors for Climate & Energy Change. *About Us*. Available online at: https://www.globalcovenantofmayors.org/about/, accessed September 3, 2019.

60 Global Covenant of Mayors for Climate & Energy. *USA*. Available online at: https://www.globalcovenantofmayors.org/region/usa/, accessed September 3, 2019.

61 Global Change Research Act (Public Law 101-606, 104 Stat. 3096-3104). 1990. Available online at: https://www.govinfo.gov/content/pkg/STATUTE-104/pdf/STATUTE-104-Pg3096.pdf, accessed August 13, 2019.

which the US Environmental Protection Agency (USEPA) must regulate if it determines they pose an endangerment to public health or welfare.

US EPA Endangerment Finding

On December 7, 2009, the US EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act (42 USC Section 7521):[62]

- 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.

Energy Policy Act of 1992 (EPAct)

The Energy Policy Act of 1992 (EPAct)[63] was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are also included in EPAct. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.

Energy Policy Act of 2005

The Energy Policy Act of 2005[64] provides renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan

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62 U.S. Environmental Protection Agency. *Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Clean Air Act*. Available online at: https://www.epa.gov/ghgemissions/endangerment-and-cause-or-contribute-findings-greenhouse-gases-under-clean-air-act, accessed August 13, 2019.

63 H.R. 776 – Energy Policy Act of 1992. Available online at: https://www.congress.gov/bill/102nd-congress/house-bill/776/text/enr, accessed August 13, 2019.

64 Energy Policy Act of 2005. Available online at: https://www.energy.gov/sites/prod/files/edg/media/HR6PP%281%29.pdf, accessed August 13, 2019.

guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Energy Independence and Security Act

The Energy Independence and Security Act of 2007[65] includes several key provisions that will increase energy efficiency and the availability of renewable energy, which will reduce greenhouse gas emissions as a result. First, the Act sets a Renewable Fuel Standard that requires fuel producers to use at least 36 billion gallons of biofuel by 2022. Second, it increased Corporate Average Fuel Economy (CAFE) Standards to require a minimum average fuel economy of 35 miles per gallon for the combined fleet of cars and light trucks by 2020. Third, the adopted bill includes a variety of new standards for lighting and for residential and commercial appliance equipment. The equipment includes residential refrigerators, freezers, refrigerator-freezers, metal halide lamps, and commercial walk-in coolers and freezers.

EPA Reporting Rule

The US Environmental Protection Agency (USEPA) adopted a mandatory GHG reporting rule in September 2009.[66] 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 EPA announced a proposed joint rule that would explicitly tie fuel economy to GHG emissions reductions requirements. The proposed new Corporate Average Fuel Economy (CAFE) Standards[67] 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

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65 U.S. Environmental Protection Agency. *Summary of the Energy Independence and Security Act*. Available online at: https://www.epa.gov/laws-regulations/summary-energy-independence-and-security-act, accessed August 13, 2019.

66 U.S. Environmental Protection Agency. *Greenhouse Gas Reporting Program (GHGRP)*. Available online at: https://www.epa.gov/ghgreporting/history-proposed-rules, accessed August 13, 2019.

67 U.S. Department of Transportation, Corporate Average Fuel Economy (CAFÉ) Standards. Available online at: https://www.transportation.gov/mission/sustainability/corporate-average-fuel-economy-cafe-standards, accessed August 9, 2019.

emissions limit could equate to an overall light-duty vehicle fleet average fuel economy of as much as 35.5 miles per gallon. 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 EPA's GHG program.

On November 16, 2011, EPA and NHTSA issued a joint proposal to extend the national program of harmonized GHG and fuel economy standards to model year (MY) 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 MY 2025.

On January 12, 2017, EPA Administrator Gina McCarthy signed her determination to maintain the GHG emissions standards for model year MY 2022-2025 vehicles. Her final determination found that automakers are well positioned to meet the standards at lower costs than previously estimated.[68]

On March 15, 2017, the new EPA Administrator Scott Pruitt and Department of Transportation Secretary Elaine Chao announced that EPA intended to reconsider the final determination, issued on January 12, 2017, that recommended no change to the greenhouse gas standards for light duty vehicles for model years 2022- 2025.[69]

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 EPA and, therefore, should be revised.[70]

On September 19, 2019, under the Safer, Affordable, Fuel-Efficient (SAFE) Vehicles Rule, the U.S. Department of Transportation's National Highway Traffic Safety Administration (NHSTA) and the U.S. EPA issued the final "One National Program Rule." The rule states that federal law preempts state and local laws regarding tailpipe GHG emissions standards, zero emissions vehicle mandates, and fuel economy for automobiles and light duty trucks. The rule revokes California's Clean Air Act waiver and

68 U.S. Environmental Protection Agency. *Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emissions Standards for Model Years 2022-2025.* Available online at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/midterm-evaluation-light-duty-vehicle-greenhouse-gas, accessed August 13, 2019.

69 Ibid.

70 Ibid.

preempts California's Advanced Clean Car Regulations and may potentially impact SCAG's Connect SoCal and transportation projects in the SCAG region.[71, 72]

On September 20, 2019, a lawsuit was filed by California and a coalition of 22 other states, and the cities of Los Angeles, New York and Washington, D.C., in the United States District Court for the District of Columbia (Case 1:19-cv-02826) challenging the SAFE Rule and arguing that EPA lacks the legal authority to withdraw the California waiver. As such, at the time of this PEIR, it is unclear whether the SAFE Rule will remain in place.[73]

Heavy-Duty Vehicle Program

In May 2010, President Barack Obama issued a Presidential Memorandum Regarding Fuel Efficiency Standards requesting that USEPA and National Highway Traffic Safety Administration (NHTSA) take additional coordinated steps to produce a new generation of clean vehicles.[74] 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 EPA 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, US EPA and NHTSA adopted Phase 2 GHG and fuel efficiency standards for medium- and heavy-duty engines and vehicles.[75]

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71 U.S. Department of Transportation and U.S. EPA. 2019. *One National Program Rule on Federal Preemption of State Fuel Economy Standards*. Available online at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100XI4W.pdf, accessed October 29, 2019.

72 Southern California Association of Governments. 2019. *Final Federal Safer, Affordable, Fuel-Efficient Vehicles Rule Part I (Supplemental Report).* Available online at: http://www.scag.ca.gov/committees/CommitteeDocLibrary/EEC_Item8_RC_Item10%20Supplemental%20Report.pdf, accessed October 29, 2019.

73 If the SAFE Rule remains in place, the State and region would have to develop other means of achieving the NAAQS.

74 The White House, President Barack Obama. 2010. *Presidential Memorandum Regarding Fuel Efficiency Standards*. Available online at: https://obamawhitehouse.archives.gov/the-press-office/presidential-memorandum-regarding-fuel-efficiency-standards, accessed August 13, 2019.

75 U.S. Environmental Protection Agency. *Final Rule for Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2*. Available online at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-greenhouse-gas-emissions-and-fuel-efficiency#rule-history, accessed March 1, 2018.

Clean Power Plan

In 2015, US EPA published the Clean Power Plan (80 Fed. Reg. 64661, October 23, 2015).[76] The Clean Power Plan sets achievable standards to reduce CO_2 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, US EPA is establishing: (1) CO_2 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 CO_2 goals reflecting the CO_2 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 CO_2 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 CO_2 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,[77] the U.S. EPA officially repealed the Clean Power Plan in June 2019 and issued the final Affordable Clean Energy rule in its place.[78]

Affordable Clean Energy Rule

The U.S. EPA 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 EPA estimates that the ACE rules will result in a reduction of CO_2 emissions from the electricity sector by as much as 35% below 2005 levels by 2030.[79]

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76 US Environmental Protection Agency. *Carbon Pollution Standards for New, Modified and Reconstructed Power Plants: Regulatory Actions.* Available online at: https://archive.epa.gov/epa/cleanpowerplan/carbon-pollution-standards-new-modified-and-reconstructed-power-plants-regulatory.html, accessed August 13, 2019.

77 The White House. 2017. *Presidential Executive Order on Promoting Energy Independence and Economic Growth*. Available online at: https://www.whitehouse.gov/presidential-actions/presidential-executive-order-promoting-energy-independence-economic-growth/, accessed August 13, 2019.

78 U.S. Environmental Protection Agency. 2019. *EPA Finalizes Affordable Clean Energy Rule, Ensuring Reliable, Diversified Energy Resources while Protecting the Environment*. Available online at: https://www.epa.gov/newsreleases/epa-finalizes-affordable-clean-energy-rule-ensuring-reliable-diversified-energy, accessed August 22, 2019.

79 Ibid.

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 adaption 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.[80]

Executive Order on Energy Independence

On March 28, 2017, President Donald Trump signed Executive Order 13783, "Promoting Energy Independence and Economic Growth," which calls for:[81]

- Review of the Clean Power Plan
- Review of the 2016 Oil and Gas New Source Performance Standards for New, Reconstructed, and Modified Sources
- Review of the Standards of Performance for GHG Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Generating Units
- Withdrawal of Proposed Rules: Federal Plan Requirements for GHG Emissions From Electric Utility Generating Units Constructed on or Before January 8, 2014; Model Trading Rules; Amendments to Framework Regulations; and Clean Energy Incentive Program Design Details

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80 U.S. Department of Transportation. 2012. *The Federal Highway Administration's Climate Change & Extreme Weather Vulnerability Assessment Framework*. Available online at: https://web.law.columbia.edu/sites/default/files/microsites/climate-change/fha_cc_and_extreme_weather_vulnerability_assessment_framework.pdf, accessed August 22, 2019.

81 The White House. 2017. *Presidential Executive Order on Promoting Energy Independence and Economic Growth*. Available online at: https://www.whitehouse.gov/presidential-actions/presidential-executive-order-promoting-energy-independence-economic-growth/, accessed August 13, 2019.

3.8.2.3 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.[82] 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.

Senate Bill 1078 (SB 1078), Senate Bill 107 (SB 107), Executive Order (EO) S-14-08, Executive Order S-21-09 (Renewables Portfolio Standard), and Senate Bill 100 (SB 100)

On September 12, 2002, Governor Gray Davis signed SB 1078 (Chapter 516, Statutes of 2002) requiring California to generate 20 percent of its electricity from renewable energy by 2017.[83] 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.[84] 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.[85] Increased use of renewable energy sources will decrease California's reliance on fossil fuels, reducing emissions of GHGs from the

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82 California Coastal Commission. 2019. *Public Resources Code Division 20 California Coastal Act*. Available online at: https://www.coastal.ca.gov/coastact.pdf, accessed August 14, 2019.

83 California Legislative Information. 2002. *Senate Bill 1078.*

84 California Legislative Information. 2006. *Senate Bill 107*.

85 Office of the Governor, Arnold Schwarzenegger. 2008. *Executive Order S-14-08*.

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.[86] SB 350 of 2015 (Chapter 547, Statutes of 2015) increased the renewable portfolio standard to 50 percent by the year 2030.[87]

Executive Order S-21-09 directs CARB to adopt regulations to increase California's Renewables Portfolio Standard (RPS) to 33 percent by 2020.[88] 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. In September 2018, SB 100 was approved by Governor Brown. SB 100 requires an updated goal of 60% renewable energy resources by the year 2030, and 100% zero-carbon energy by the year 2045.[89]

Assembly Bill 1493 (AB 1493) (Pavley Regulations) - Vehicular Emissions Greenhouse Gas Emission Standards

In September 2002, AB 1493 (Chapter 200, Statutes of 2002) (referred to as Pavley I)[90] 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.*).[91] Fleet average emission standards were to reach a 22 percent reduction by 2012 and 30 percent by 2016.

Assembly Bill 32 (AB 32) and CARB Scoping Plan

The State of California has implemented numerous laws targeting GHG emissions. Chief among these is the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) (Health & Safety Code Section 38500 et seq.).[92] AB 32 represents the first enforceable statewide program to limit GHG emissions from all major sectors with penalties for noncompliance. Like EO S-3-05, AB 32 requires the State of

86 California Legislative Information. 2011. *Senate Bill 2*.

87 California Legislative Information. 2015. *SB-350 Clean Energy and Pollution Reduction Act of 2015*.

88 The Center for Climate Strategies. 2010. *Executive Order S-21-09*. Available online at: http://www.climatestrategies.us/library/library/view/290, accessed August 14, 2019.

89 California Legislative Information. 2018. *Senate Bill 100.*

90 Assembly Bill No. 1493. 2002.

91 California Air Resources Board. 2007. *The California Low-Emission Vehicle Regulations*. Available online at: https://ww3.arb.ca.gov/msprog/levprog/cleandoc/cleancomplete_lev-ghg_regs_9-07.pdf, accessed on August 14, 2019.

92 Assembly Bill 32. 2006.

California to reduce its emissions to 1990 levels by 2020. The Act establishes key deadlines for certain actions the state must take in order to achieve the reduction target. The first action under AB 32 resulted in California Air Resources Board's (CARB) 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.[93]

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 $MMTCO_2e$.[94] 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.*).[95] 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 CO_2 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 allowed 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 will take place annually or every three years, depending on the type of facility.

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93 CARB. *Early Action Items*. Available online at: https://ww3.arb.ca.gov/cc/ccea/ccea.htm, accessed April 17, 2018.

94 CARB. 2017. *California 1990 Greenhouse Gas Emissions Level and 2020 Limit*. Available online at: https://www.arb.ca.gov/cc/inventory/1990level/1990level.htm, accessed April 18, 2017.

95 CARB. 2007. *Notice of Public Availability of Modified Text: Public Hearing to Consider Adoption of a Regulation for the Mandatory Reporting of Greenhouse Gas Emissions*. Available online at: https://ww3.arb.ca.gov/regact/2007/ghg2007/15daynotice.pdf, accessed August 21, 2019.

In December 2008, CARB adopted a *Climate Change Scoping Plan*[96] indicating how emission reductions will be achieved from significant sources of GHGs via regulations, market mechanism, and other actions. The *Climate Change Scoping Plan* identifies 18 recommended strategies the state should implement to achieve AB 32.

CARB's initial Scoping Plan contains the main strategies California would implement to reduce the projected 2020 Business-as-Usual (BAU) emissions to 1990 levels, as required by AB 32. These strategies are intended to reduce CO_2e[97] emissions by 174 million metric tons (MT), or approximately 30 percent, from the State's projected 2020 emissions level of 596 million $MTCO_{2e}$ (MMTCO2e) under a BAU[98] scenario. This reduction of 42 million $MTCO_{2e}$, or almost 10 percent from 2002 to 2004 average emissions, would be required despite the population and economic growth forecast through 2020.

CARB's initial Scoping Plan calculates 2020 BAU emissions as those expected to occur in the absence of any GHG reduction measures. The 2020 BAU emissions estimate was derived by projecting emissions from a past baseline year using growth factors specific to each of the different economic sectors (e.g., transportation, electrical power, commercial and residential, industrial). CARB used 3-year average emissions, by sector, for 2009 to 2011 to forecast emissions to 2020. The measures described in CARB's Scoping Plan are intended to reduce the projected 2020 BAU to 1990 levels, as required by AB 32.[99]

On December 14, 2017, CARB approved the final version of *California's 2017 Climate Change Scoping Plan* (2017 Scoping Plan Update – discussed in more detail below), which outlines the proposed framework of action for achieving the SB 32 2030 GHG target of 40 percent reduction in GHG emissions relative to 1990 levels.[100] See further discussion below.

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96 CARB. 2013. *Initial AB 32 Climate Change Scoping Plan* Document. Available online at: https://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm, accessed April 17, 2018.

97 Carbon dioxide equivalent (CO_2e) – A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential.

98 "Business-as-Usual" refers to emissions expected to occur in the absence of any GHG reduction measure (California Environmental Protection Agency Air Resources Board Website, http://www.arb.ca.gov/cc/inventory/data/bau.htm, Accessed June 1, 2016). Note that there is significant controversy as to what BAU means. In determining the GHG 2020 limit, CARB used the above as the "definition."

99 The First Update to California's Climate Change Scoping Plan was developed by CARB in collaboration with the CAT and reflects the input and expertise of a range of state and local government agencies. The 2014 Scoping Plan Update lays the foundation for establishing a broad framework for continued emission reductions beyond 2020.

100 CARB. 2017. *California's 2017 Climate Change Scoping Plan*. Available online at: https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf, accessed August 14, 2019.

Senate Bill 1 (SB 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.[101] 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.

Assembly Bill 811 (AB 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.[102] 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.

SB 1383-Short Lived Climate Pollutants

Short-lived climate pollutants (SLCP) SLCPs include black carbon (soot), methane, and fluorinated gases (F-gases). SB 1383 of 2016 (Chapter 395, Statutes of 2016) sets forth legislative direction for control of SLCPs.[103] It 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 also specifies targets for reducing organic waste in landfills. SB 1383 also 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 375 (SB 375)

SB 375, adopted in 2008, builds on AB 32, SB 375 (Chapter 728, Statutes of 2008)[104] seeks to coordinate land use planning, housing planning, regional transportation planning, and GHG reductions. By

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101 California Legislative Information. 2006. *Senate Bill 1.*

102 California Legislative Information. 2008. *Assembly Bill 811.*

103 California Legislative Information. 2016. *Senate Bill 1383.*

104 California Legislative Information. 2008. *Senate Bill 375*.

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 emissions; regional transportation plans are required to identify how they will meet these targets.

SB 375 has three major components:

- Using the regional transportation planning process to achieve reductions in 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 process while maintaining local authority over land use decisions.

A Sustainable Communities Strategy (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) must be prepared if the SCS is unable to reduce emissions and achieve the emissions reduction targets established by CARB.

Certain transportation planning and programming activities must be consistent with the SCS; however, 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. For the 2016 RTP/SCS cycle, CARB set reduction targets for the SCAG region at 8 percent for 2020 and 19 percent for 2035. This was an update to the previous 2035 target of 13 percent.[105]

The 2018 Progress Report for SB 375 was written to assess progress made toward meeting GHG reduction targets and to include data-supported metrics for strategies utilized to meet those targets. It found that California is not on track to meet GHG reductions expected under SB 375, largely due to the fact that statewide passenger vehicle travel per capita is increasing. While California has hit its 2020 climate target ahead of schedule due to strong performance in the energy sector, meeting future targets will require a greater contribution from the transportation sector. Despite increases in fuel efficiency and decreases in the carbon content of fuel, transportation emissions have grown due to the high cost of housing, forcing residents to drive longer distances between the places they need to go.

The 2018 Progress Report also found that these growth patterns reinforce racial and economic injustices by disproportionately burdening low-income residents, who pay the highest proportion of their wages

105 CARB Updated Targets March 2018 https://ww3.arb.ca.gov/cc/sb375/sb375old.htm

for housing and commuting. These residents also often live in communities with the most health impacts from lack of active transportation infrastructure and transportation pollution. Overall, CARB finds that structural changes at all levels of government are still necessary to meet climate goals and ancillary benefits.[106]

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; (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. [107, 108]

SB 743 directed OPR to identify appropriate criteria for the evaluation of transportation impacts. OPR selected VMT as the preferred transportation impact 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 has until July 1, 2020, to adopt VMT as the metric for evaluation of transportation impacts, but until that date, lead agencies may elect to use VMT and/or LOS to analyze transportation impacts (although CEQA has already been revised to indicate VMT as the appropriate metric for evaluation of transportation impacts).

With respect to identifying what represents an appropriate threshold of significance for VMT impacts, the California Air Resources Board (CARB) published the *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals* (CARB Report) which includes non-binding technical information on what level of statewide VMT reduction, in the judgment of CARB staff, would promote achievement of statewide GHG emission reduction targets. [109] CARB asserts that the currently adopted SCSs throughout the state "would achieve in aggregate, a nearly 18 percent reduction in statewide per capita on-road light-duty transportation-related GHG emissions relative to 2005 by 2035, if those SCSs were successfully

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106 CARB. 2018. *2018 Progress Report.* November. Available online at: https://ww2.arb.ca.gov/sites/default/files/2018-11/Final2018Report_SB150_112618_02_Report.pdf, accessed October 1, 2019.

107 California Legislative Information. 2013. *Senate Bill No. 743*.

108 For a further discussion of SB 743, see Section 3.17 *Transportation, Traffic and Safety*.

109 California Air Resources Board. *CARB 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals* (Jan. 2019). Available online at: https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf, accessed October 24, 2019.

implemented." However, in order to meet the state goals, the full reduction needed is a 25 percent reduction in statewide per capita on-road light-duty transportation-related GHG emissions, however, CARB has "determined that those targets would be infeasible for MPOs to achieve with currently available resources."

The CARB Report is based on modeling that incorporates cleaner technologies and fuels (CTF) assumptions consistent with the 2017 Scoping Plan Update and the 2016 Mobile Source Strategy (as discussed below) and provides an "alternate assessment tool for jurisdictions that choose to use them to complete analyses directed by the CEQA Guidelines." The CARB Report finds that:

> *Certain land use development projects located in areas that would produce rates of **total** VMT per capita that are approximately 14.3 percent lower than existing conditions, or rates of **light-duty** VMT per capita that are approximately 16.8 percent lower than existing conditions (either lower than the regional average or other appropriate planning context) could be, by virtue of their location and land use context, interpreted to be consistent with the transportation assumptions embedded in the 2017 Scoping Plan and with 2050 State climate goals. (Emphasis in original).*[110]

However, CARB notes that the modeling used for the CTF forecast identifies ratios of total statewide VMT to population and that the suggested per capita reductions are not household generated VMT and that values are not directly comparable to output from a local or regional travel demand model.

The *Technical Advisory on Evaluating Transportation Impacts in CEQA* (OPR Technical Advisory) also provides non-binding recommendations regarding assessment of VMT, thresholds of significance, and mitigation measures. [111] OPR cites to the CARB Report to reiterate that "consistency with RTP/SCSs does not necessarily lead to a less-than-significant VMT impact."[112] OPR finds:

> *Based on OPR's extensive review of the applicable research, and in light of an assessment by the California Air Resources Board quantifying the need for VMT reduction in order to meet the State's long-term climate goals, OPR recommends that a per capita [residential] or per employee [office] VMT that is fifteen percent below that of existing development may be a reasonable threshold.*[113]

As discussed in more detail in **Section 3.17 Transportation, Traffic and Safety**, for roadway capacity projects, OPR also recommends developing a project-level threshold based on VMT levels required to

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110 CARB Report at p. 11.

111 Governor's Office of Planning and Research. *Technical Advisory – On Evaluating Transportation Impacts in CEQA*. Available online at: http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf, accessed July 25, 2019.

112 OPR Technical Advisory at p. 11.

113 *Id.* at p.10.

achieve legally mandated GHG emission reduction targets as set forth in the CARB Scoping Plan and 2016 Mobile Source Strategy. OPR generally recommends a threshold of 15 percent below existing VMT per capita for residential and office with a no net increase for retail projects. OPR asserts that "land use projects, residential projects, office and retail projects tend to have the greatest influence on VMT" and suggests that lead agencies with more specific location information may develop their own more specific thresholds.

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.[114, 115] EO S-3-05 also calls for the Secretary of California Environmental Protection Agency (Cal/EPA) to be responsible for coordination of state agencies and progress reporting.

In response to the Executive Order, the Secretary of the Cal/EPA created the Climate Action Team (CAT).[116] 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.

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114 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.

115 Office of the Governor, Arnold Schwarzenegger. 2005. *Executive Order S-3-05.*

116 State of California. *Climate Action Team & Climate Action Initiative*. Available online at: https://www.climatechange.ca.gov/climate_action_team/, accessed on August 14, 2019.

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.[117] The CAT Report discusses mitigation and adaptation strategies, state research programs, policy development, and future efforts.

Executive Order (EO) S-1-07, the Low Carbon Fuel Standard

On January 18, 2007, EO 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.[118] Regulatory proceedings and implementation of the Low Carbon Fuel Standard have been directed to the California Air Resources Board (ARB). The Low Carbon Fuel Standard has been identified by ARB as a discrete early action item in the *Climate Change Scoping Plan*.[119] 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.

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.[120] 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*[121,122] 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.

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117 Climate Action Team. 2010. *Climate Action Team Report to Governor Schwarzenegger and the California Legislature*. Available at: https://ww2.energy.ca.gov/2010publications/CAT-1000-2010-005/CAT-1000-2010-005.PDF, accessed on August 14, 2019.

118 Office of the Governor, Arnold Schwarzenegger. 2007. *Executive Order S-01-07*. Available online at: https://ww3.arb.ca.gov/fuels/lcfs/eos0107.pdf, accessed August 14, 2019.

119 CARB. 2017. *California's 2017 Climate Change Scoping Plan,* November.

120 The Center for Climate Strategies. 2008. *Executive Order S-13-08*. Available online at: http://www.climatestrategies.us/library/library/view/293, accessed August 14, 2019.

121 California Natural Resources Agency. 2009. *2009 California Climate Adaption Strategy.*

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

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

In March 23, 2012, Governor Brown issued Executive Order B-16-2012 to encourage zero-emission vehicles (ZEVs) and related infrastructure.[123] 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.

Executive Order N-19-19

On September 20, 2019, Governor Newsom issued Executive Order N-19-19 which requires the redoubling of the state's "efforts to reduce greenhouse gas emissions and mitigate the impacts of climate change while building a sustainable, inclusive economy." EO N-19-19 requires the Department of Finance to create a Climate Investment Framework with a strategy to align the state's $700 billion investment portfolio towards industries and sectors that contribute to the reduction of carbon emissions and increased resilience to the impacts of climate change. The State Transportation Agency shall leverage over $5 billion in annual state transportation spending to reduce fuel consumption and GHG emissions associated with the transportation sector. The Department of General Services shall reduce the state government's GHG footprint. Finally, the California Air Resources Board (CARB) shall develop new criteria for the clean vehicle incentive programs, propose new strategies to increase demand for zero

123 State of California. 2012. *Executive Order B-16-2012*. Available online at: https://www.ca.gov/archive/gov39/2012/03/23/news17472/index.html, accessed on August 14, 2019.

emission vehicles, and consider strengthening existing or adopting new transportation-GHG reduction regulations in order to meet California's goal of five million zero emissions vehicle sales by 2030.[124]

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. 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 CO_2e 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.

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.

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124 Adaptation Clearinghouse. 2019. *State of California Executive Order N-19-19*. Available online at: https://www.adaptationclearinghouse.org/resources/state-of-california-executive-order-n-19-19.html, accessed October 29, 2019.

Senate Bill 32 (SB 32) and AB 197

On September 8, 2016, California signed into law Senate Bill 32 (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 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.

CARB's 2017 Scoping Plan Update

In December 2017, CARB adopted California's 2017 Climate Change Scoping Plan (2017 Scoping Plan Update), which outlines the proposed framework of action for achieving California's SB 32 2030 GHG target: a 40 percent reduction in GHG emissions by 2030 relative to 1990 levels. The 2030 target is intended to ensure that California remains 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 Update identifies key sectors of the implementation strategy, which includes 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 will need to be made to achieve an additional reduction of 50 $MMTCO_2e$ beyond current policies and programs. Key elements of the 2017 Update include 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.

For the transportations sector, the 2017 Update indicates that while most of the GHG reductions will come from technologies and low carbon fuels, a reduction in the growth of vehicle miles traveled (VMT) is also needed. The 2017 Update indicates 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 that will be needed. It notes 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 recommends 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.

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 *State 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 (*State CEQA Guidelines* Section 15064(h)(3)).

2016 Mobile Source Strategy

On May 16, 2016, the Air Resources Board (ARB or Board) released the updated Mobile Source Strategy that 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 fifteen 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 an 80 percent reduction of smog-forming emissions and a 45 percent reduction in diesel particulate matter from today's levels in the South Coast. CARB estimates statewide, the Mobile Source Strategy would also result in a 45 percent reduction in greenhouse gas emissions, and a 50 percent reduction in the consumption of petroleum-based fuels.

Discussion Draft of CEQA and Climate Change Advisory

In December 2018, OPR published updated guidance with respect to how to evaluate climate change as a whole, including analysis of transportation impacts (including consideration of SB 743) and how to

evaluate different types of projects including transportation projects and land use plans. This document summarizes relevant regulations and discusses different approaches (both quantitative and qualitative) to analyzing different types of projects. The document further discusses how the analysis of GHG for individual projects may be streamlined through the preparation of greenhouse gas emission reduction plans such as climate action plans. The document suggests that emissions from individual projects may best be analyzed and mitigated at the programmatic level in regional-level documents focused on GHG emissions such as climate action plans. [125]

Caltrans Guidance on Incorporating Sea Level Rise

Pursuant to EO S-13-08 and the California Sea Level Rise Interim Guidance Document,[126] 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.

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125 Office of Planning and Research. *Discussion Draft CEQA and Climate Change Advisory* December 2018. Available online at: http://opr.ca.gov/docs/20181228-Discussion_Draft_Climate_Change_Adivsory.pdf, accessed October 29, 2019.

126 State of California. 2010. *State of California Sea-Level Rise Interim Guidance Document*. Available online at: http://opc.ca.gov/webmaster/ftp/pdf/agenda_items/20110311/12.SLR_Resolution/SLR-Guidance-Document.pdf, accessed on August 14, 2019.

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*.[127] 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's Energy Efficiency Standards for Residential and Nonresidential Buildings

California established statewide building energy standards following legislative action. The legislation required the standards to:

- Be cost effective;
- Be based on the building life cycle; and
- Include both prescriptive and performance-based approaches.

The standards have been periodically updated as technology and design have evolved. Generally, the standards are updated every three years. As a result of AB 970, passed in the fall of 2000 in response to the state's electricity crisis, an emergency update of the Standards went into effect in June 2001.[128] The Commission then initiated an immediate follow-on proceeding to consider and adopt updated Standards that could not be completed during the emergency proceeding. The 2005 Building Energy Efficiency Standards were adopted in November 2003, took effect October 1, 2005.[129] The latest amendments were made in June 2015 and went into effect on January 1, 2017.

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127 California Department of Public Health. 2012. *Climate Action for Health: Integrating Public Health into Climate Action Planning.* Available online at: https://www.cdph.ca.gov/Programs/OHE/CDPH%20Document%20Library/CCHEP-General/CDPH-2012-Climate-Action-for-Health_accessible.pdf, accessed August 14, 2019.

128 California Legislative Information. 2000. *Assembly Bill 970*.

129 California Energy Commission. 2005. *2005 Building Energy Efficiency Standards for Residential and Nonresidential Buildings.* Available online at: https://ww2.energy.ca.gov/2006publications/CEC-400-2006-015/CEC-400-2006-015.PDF, accessed August 14, 2019.

Title 24 of the California Code of Regulations comprises the state Building Standards Code.[130] Part 6 of Title 24 is the California Energy Code, which includes the building energy efficiency standards. The standards include provisions applicable to all buildings, residential and non-residential, which describe requirements for documentation and certificates that the building meets the standards. These provisions include mandatory requirements for efficiency and design of the following types of systems, equipment, and appliances:

- Air conditioning systems
- Heat pumps
- Water chillers
- Gas- and oil-fired boilers
- Cooling equipment
- Water heaters and equipment
- Pool and spa heaters and equipment
- Gas-fired equipment including furnaces and stoves/ovens
- Windows and exterior doors
- Joints and other building structure openings (envelope)
- Insulation and cool roofs
- Lighting control devices.

The standards include additional mandatory requirements for space conditioning (cooling and heating), water heating and indoor and outdoor lighting systems and equipment in non-residential, high-rise residential, and hotel or motel buildings.

130 California Energy Commission. 2019. *Building Energy Efficiency Standards – Title 24.* Available online at: https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards, accessed August 14, 2019.

In May 2018, the California Energy Commission voted unanimously, 5-0, to recommend energy efficiency standards to be added to state building regulations later in 2018, effecting all construction after Jan. 1, 2020.[131] The rules will make California the first state in the nation to require solar panels on new homes.

California Green Building Standards Code (2016), California Code of Regulations Title 24, Part 11

California's green building code, referred to as "CalGreen," was developed to provide a consistent approach to green building within the State.[132] Taking effect in January 2016, the most recent version of the Code lays out the minimum requirements for newly constructed residential and nonresidential buildings to reduce GHG emissions through improved efficiency and process improvements. It also includes voluntary tiers to further encourage building practices that improve public health, safety and general welfare by promoting the use of building concepts which minimize the building's impact on the environment and promote a more sustainable design. Local jurisdictions are required to adopt the CalGreen provisions. CalGreen is complimentary with California Energy Code, Title 24, Part 6, which continues to regulate energy efficiency in buildings.

Caltrans Strategic Management Plan, 2015 - 2020

The most recent Caltrans Strategic Management Plan[133] redefines the Caltrans mission statement and provides a vision statement. The Caltrans mission statement is: *Provide a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability*. The Caltrans vision is: *A performance-driven, transparent, and account- able organization that values its people, resources, and partners and meets new challenges through leadership, innovation, and teamwork.* The document identifies five goals: 1) Safety and Health, 2) Stewardship and Efficiency, 3) Sustainability, Livability and Economy, 4) System Performance, and 5 Organizational Excellence. The document identifies numerous performance measures and targets including the following target with respect to Sustainability, Livability and Economy: to increase non-auto modes (triple bicycles, double pedestrian and double transit (2010 – 12 California Household Travel survey is the baseline), achieve a 15 percent reduction in per capita VMT (3 percent per year) reported by each District relative to 2010 by 2020, 85 percent reduction in diesel

131 California Energy Commission. 2019. *2019 Building Energy Efficiency Standards.* Available online at: https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2019-building-energy-efficiency, accessed August 14, 2019.

132 Building Standards Commission. 2018. *CalGreen.* Available online at: https://www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/CALGreen, accessed August 14, 2019.

133 Caltrans. *Strategic Management Plan 2015-2020*. Available online at: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/caltrans-strategic-mgmt-plan-033015-a11y.pdf, accessed November 15, 2019.

particulate matter (relative to 2000), 80 percent reduction in NOx in the South Coast Air Basin by 2023 (from 2010).[134]

Local Development – Intergovernmental Review Program Interim Guidance, Implementing Caltrans Strategic Management Plan 2015 – 2020 Consistent with SB 743[135]

Caltrans developed this guidance for Caltrans use in providing comments to local jurisdictions through the Intergovernmental Review process. This guidance document supports the implementation of the Strategic Management Plan including achieving the identified targets.

3.8.2.4 Regional and Local

SCAG Sustainability Planning Grant Program

Formerly known as the Compass Blueprint Grant Program, SCAG's Sustainability Program works actively with Southern California communities and stakeholders to create a dynamic regional growth vision based on the principles of mobility, livability, prosperity, and sustainability. The program's work focuses on implementing the region's Sustainable Communities Strategy, the state-mandated plan for reducing GHG emissions from cars and light trucks through integrated transportation, land use, housing and environmental planning.[136]

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. [137]

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134 This document does not provide a detailed comparison to these targets because year 2000 and year 2010 comparable data is not available, and Caltrans VMT data for districts in the SCAG region is not available.

135 Caltrans. 2016. Local Development – Intergovernmental Review Program Interim Guidance, Implementing Caltrans Strategic Management Plan 2015 – 2020 Consistent with SB 743

136 Southern California Association of Governments. 2015. *Sustainability*. Available online at: http://www.scag.ca.gov/programs/Pages/Programs/Sustainability.aspx, accessed March 25, 2019.

137 South Coast Air Quality Management District. 2019. *Climate Change.* Available online at: http://www.aqmd.gov/nav/about/initiatives/climate-change, accessed August 14, 2019.

SCAQMD Draft Guidance Regarding Interim CEQA GHG Significance Thresholds

SCAQMD released draft guidance regarding interim CEQA GHG significance thresholds. In its October 2008 document, the SCAQMD proposed the use of a percent emission reduction target (e.g., 30 percent) to determine significance for commercial/residential projects that emit greater than 3,000 metric tons per year. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for stationary source/industrial projects where the SCAQMD is lead agency.[138] However, SCAQMD has yet to adopt a GHG significance threshold for land use development projects (e.g., residential/commercial projects) and has formed a GHG Significance Threshold Working Group to further evaluate potential GHG significance thresholds.[139]

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.[140] 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% below 1990 levels by 2030 (see **Section 3.8.2.3**). 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.

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138 South Coast Air Quality Management District. 2008. *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans*. Available online at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2, accessed August 14, 2019.

139 South Coast Air Quality Management District. *Greenhouse Gases (GHG) CEQA Significance Thresholds.* Available online at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/ghg-significance-thresholds/page/2, accessed March 25, 2019.

140 South Coast Air Quality Management District. Accessed October 12, 2019. *Chapter 3 – Interim GHG Significance Threshold Staff Proposal.* Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqasignificance-thresholds/ghgattachmente.pdf?sfvrsn=2

Counties

Los Angeles County

The Los Angeles County Office of Sustainability[141] 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. 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.

As of March 2015, Los Angeles County Board of Supervisors approved the first Community Climate Action Plan (CCAP). The CCAP provides a roadmap to reduce GHGs in Los Angeles County by 11 percent by 2020. This target can be achieved through cool roofs, solar, tree canopies, and more active transportation and public transit use. The County of Los Angeles Department of Regional Planning will implement the CCAP and work to develop climate adaptation strategies beyond 2020.[142]

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.[143]

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141 County of Los Angeles. *LA County Chief Sustainability Office.* Available online at: https://www.lacounty.gov/sustainability/, accessed August 14, 2019.

142 Climate Resolve. 2015. *Approved: LA County's Community Climate Action Plan*. Available at: http://climateresolve.org/countyclimateactionplan/, accessed March 25, 2019.

143 OurCounty. The Plan. Available online at: https://ourcountyla.org/plan, accessed October 2, 2019.

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).[144] 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.

Riverside County

In July 2018, Riverside County created a Climate Action Plan to establish a clear path to sustainability and GHG reduction. The Plan establishes a 2020 reduction goal of 15% to 2008 emissions in order to be consistent with AB 32.[145]

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.[146]

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. The plan 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 plan is in

144 OCTA/COG. 2011. *Orange County Sustainable Communities Strategy (SCS)*. Available online at: https://www.fullerton.edu/cdr/_resources/pdf/OCSCS20110614.pdf, accessed August 14, 2019.

145 Riverside County Planning Department. 2018. *Climate Action Plan*. Available online at: https://planning.rctlma.org/Portals/14/CAP/CAP_071717.pdf, accessed August 14, 2019.

146 Western Riverside Council of Governments. 2014. *Subregional Climate Action Plan*. Available online at: http://www.wrcog.cog.ca.us/DocumentCenter/View/188/Subregional-Climate-Action-Plan-CAP-PDF?bidId=, accessed March 25, 2019.

accordance with AB 32 and other regional and general plans and provides a baseline of information for jurisdictions addressing greenhouse gas emissions.[147]

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.[148]

Imperial County

In October 2018, Imperial County announced the development of a Climate Action Plan in order to identify GHG emissions and reduction strategies in the Imperial Valley region.

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.[149] 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 3.8-4, California Jurisdictions Addressing Climate Change in the SCAG Region (2019).**

147 San Bernardino Associated Governments. 2014. *Regional Greenhouse Gas Reduction Plan.* Available online at: https://www.gosbcta.com/plans-projects/plans/greenhouse-gas/SBC-RegionalGreenHouseGasReduction-Final.pdf, accessed March 25, 2019.

148 County of Ventura. *Working & Living Sustainably.* Available online at: https://cobapps.countyofventura.org/sustain/, accessed March 25, 2019.

149 Office of Planning and Research. 2016. *Announcement: The DRAFT California Jurisdictions Addressing Climate Change summary document now available for public review*. Available online at: http://www.opr.ca.gov/news/2016/02-11.html, accessed October 23, 2019.

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 calls for reaching 100 percent renewable electricity by 2045, creating 300,000 green jobs by 2035, and reducing overall greenhouse gas emissions to 50 percent of 1990 levels by 2025.[150]

150 LA's Green New Deal, Sustainable City pLAn 2019. Available online at: https://plan.lamayor.org/sites/default/files/pLAn_2019_final.pdf, accessed October 1, 2019.

Table 3.8-4
California Jurisdictions Addressing Climate Change in the SCAG Region (2019)

County	Jurisdiction	Type	Document or Website Link	Vulnerability Assessment	GHG Emissions Inventory	GHG Reduction Plan	Climate Action Plan	Energy Action Plan	Adaptation or Resilience Plan	Sustainability Plan	General Plan Policy	General Plan Implementation Measures	Codes or Ordinances	Other (Specify)
Imperial	Brawley	City	City of Brawley		C	C	C				C	IP		
Imperial	Calexico	City	Climate Action Plan			P	P							
Imperial	Calipatria	City	City of Calipatria											
Imperial	El Centro	City	City of El Centro											
Imperial	Holtville	City	City of Holtville											
Imperial	Imperial	County	Imperial County											
Imperial	Imperial	City	City of Imperial											
Imperial	Westmorland	City	City of Westmorland											
Los Angeles	Agoura Hills	City	City of Agoura Hills								A	A		
Los Angeles	Alhambra	City	City of Alhambra				IP				C			
Los Angeles	Arcadia	City	Sustainable Arcadia							A	A	A	A	
Los Angeles	Artesia	City	City of Artesia											
Los Angeles	Avalon	City	City of Avalon								C			
Los Angeles	Azusa	City	City of Azusa											
Los Angeles	Baldwin Park	City	City of Baldwin Park								A			
Los Angeles	Bell	City	City of Bell											
Los Angeles	Bell Gardens	City	City of Bell Gardens											
Los Angeles	Bellflower	City	Climate Action Plan		C	P	P				A	A		
Los Angeles	Beverly Hills	City	Sustainable City Plan				P			P	A	A		
Los Angeles	Bradbury	City	General Plan Climate Action Plan		C	C	C				C			
Los Angeles	Burbank	City	General Plan			A	A			A	A	A		
Los Angeles	Calabasas	City	City of Calabasas								A	A	A	
Los Angeles	Carson	City	City of Carson		C	A	A							
Los Angeles	Cerritos	City	City of Cerritos											
Los Angeles	Claremont	City	Sustainable City Plan							A	A	A		
Los Angeles	Commerce	City	City of Commerce											
Los Angeles	Compton	City	City of Compton											

County	Jurisdiction	Type	Document or Website Link	Vulnerability Assessment	GHG Emissions Inventory	GHG Reduction Plan	Climate Action Plan	Energy Action Plan	Adaptation or Resilience Plan	Sustainability Plan	General Plan Policy	General Plan Implementation Measures	Codes or Ordinances	Other (Specify)
Los Angeles	Covina	City	Energy Climate Action Plan		C	A		A						
Los Angeles	Cudahy	City	City of Cudahy											
Los Angeles	Culver City	City	City of Culver	C						P				
Los Angeles	Diamond Bar	City	City of Diamond Bar		C		IP				P			
Los Angeles	Downey	City	Green Task Force					A						
Los Angeles	Duarte	City	City of Duarte		C			A						
Los Angeles	El Monte	City	City of El Monte		C	P								
Los Angeles	El Segundo	City	City of El Segundo		C	A	A							
Los Angeles	Gardena	City	Energy Action Plan		C	A		A						
Los Angeles	Glendale	City	Greener Glendale Plan		C	A				A				
Los Angeles	Glendora	City	City of Glendora											
Los Angeles	Hawaiian Gardens	City	City of Hawaiian Gardens											
Los Angeles	Hawthorne	City	City of Hawthorne		C		A							
Los Angeles	Hermosa Beach	City	GO GREEN/Sustainability		C	A	A			A				
Los Angeles	Hidden Hills	City	City of Hidden Hills											
Los Angeles	Huntington Park	City	City of Huntington Park											
Los Angeles	Industry	City	City of Industry											
Los Angeles	Inglewood	City	Inglewood Sustainability		C		A	A						
Los Angeles	Irwindale	City	City of Irwindale											
Los Angeles	La Canada Flintridge	City	City of La Canada Flintridge											
Los Angeles	La Habra Heights	City	City of La Habra Heights											
Los Angeles	La Mirada	City	City of La Mirada											
Los Angeles	La Puente	City	City of La Puente											
Los Angeles	La Verne	City	City of La Verne											
Los Angeles	Lakewood	City	City of Lakewood		C	A	A	A	A	A		A		
Los Angeles	Lancaster	City	City of Lancaster		A	A	A	A		A		A		
Los Angeles	Lawndale	City	City of Lawndale											
Los Angeles	Lomita	City	Greenhouse Gas Inventory Report		C		A							

County	Jurisdiction	Type	Document or Website Link	Vulnerability Assessment	GHG Emissions Inventory	GHG Reduction Plan	Climate Action Plan	Energy Action Plan	Adaptation or Resilience Plan	Sustainability Plan	General Plan Policy	General Plan Implementation Measures	Codes or Ordinances	Other (Specify)
Los Angeles	Long Beach	City	Sustainable City Plan							A				
Los Angeles	Los Angeles	City	Green LA	C		C	IP			C	A	A	A	
Los Angeles	Los Angeles	County	Community Climate Action Plan		C	A	A				A	A	A	
Los Angeles	Lynwood	City	City of Lynwood											
Los Angeles	Malibu	City	City of Malibu											
Los Angeles	Manhattan Beach	City	Climate Action Plan		C	P	P			C				
Los Angeles	Maywood	City	City of Maywood											
Los Angeles	Monrovia	City	Energy Action Plan					A						
Los Angeles	Montebello	City	City of Montebello											
Los Angeles	Monterey Park	City	Climate Action Plan		C	A	A				A			
Los Angeles	Norwalk	City	City of Norwalk											
Los Angeles	Palmdale	City	Energy Action Plan		C	A		A						
Los Angeles	Palos Verdes Estates	City	City of Palos Verdes Estates				A							
Los Angeles	Paramount	City	City of Paramount											
Los Angeles	Pasadena	City	Green City Action Plan		C	A	A			A	A	A	A	
Los Angeles	Pico Rivera	City	General Plan								C	C		
Los Angeles	Pomona	City	Green Plan		C		IP	A		A	A	A		
Los Angeles	Rancho Palos Verdes	City	City of Rancho Palos Verdes		C						A	IP		
Los Angeles	Redondo Beach	City	City of Redondo Beach				A							
Los Angeles	Rolling Hills	City	City of Rolling Hills				A							
Los Angeles	Rolling Hills Estates	City	City of Rolling Hills Estates		C	P	A						A	
Los Angeles	Rosemead	City	City of Rosemead					IP			A	A		
Los Angeles	San Dimas	City	Energy Efficiency and Cons Strategy				IP							
Los Angeles	San Fernando	City	City of San Fernando											
Los Angeles	San Gabriel	City	Sustainability Action Plan		C			A		A				
Los Angeles	San Marino	City	City of San Marino											

County	Jurisdiction	Type	Document or Website Link	Vulnerability Assessment	GHG Emissions Inventory	GHG Reduction Plan	Climate Action Plan	Energy Action Plan	Adaptation or Resilience Plan	Sustainability Plan	General Plan Policy	General Plan Implementation Measures	Codes or Ordinances	Other (Specify)
Los Angeles	Santa Clarita	City	Climate Action Plan		C	A	A				A	A	A	
Los Angeles	Santa Fe Springs	City	City of Santa Fe Springs											
Los Angeles	Santa Monica	City	15x15 Climate Action Plan		C	A	A			A			A	
Los Angeles	Sierra Madre	City	General Plan		C						A	A	A	
Los Angeles	Signal Hill	City	Sustainable City Committee											
Los Angeles	South El Monte	City	City of South El Monte											
Los Angeles	South Gate	City	City of South Gate								A			
Los Angeles	South Pasadena	City	City of South Pasadena											
Los Angeles	Temple City	City	Temple City								A			
Los Angeles	Torrance	City	City of Torrance								A			
Los Angeles	Vernon	City	Green Vernon							A				
Los Angeles	Walnut	City	City of Walnut											
Los Angeles	West Covina	City	City of West Covina	C							A			
Los Angeles	West Hollywood	City	Climate Action Plan		C	A	A				A	A		
Los Angeles	Westlake Village	City	City of Westlake Village											
Los Angeles	Whittier	City	City of Whittier											
Orange	Aliso Viejo	City	Green Initiative		C	P								
Orange	Anaheim	City	Greenhouse Gas Reduction Plan		C	A								Sustainable Center and Green Power Program
Orange	Brea	City	City of Brea			P	P	A		A				
Orange	Buena Park	City	General Plan		C	A	P			P	A	A		
Orange	Costa Mesa	City	City of Costa Mesa		C									
Orange	Cypress	City	City of Cypress											
Orange	Dana Point	City	Energy Efficiency and Conservation Plan		C	A		A						
Orange	Fountain Valley	City	City of Fountain Valley											
Orange	Fullerton	City	City of Fullerton		C	A	A							

County	Jurisdiction	Type	Document or Website Link	Vulnerability Assessment	GHG Emissions Inventory	GHG Reduction Plan	Climate Action Plan	Energy Action Plan	Adaptation or Resilience Plan	Sustainability Plan	General Plan Policy	General Plan Implementation Measures	Codes or Ordinances	Other (Specify)
Orange	Garden Grove	City	City of Garden Grove											
Orange	Huntington Beach	City	Energy Action Plan					A			A			
Orange	Irvine	City	Energy Action Plan		C			A						
Orange	La Habra	City	Climate Action Plan		C	A	A				A	A		
Orange	La Palma	City	City of La Palma											
Orange	Laguna Beach	City	City of Laguna Beach		C	A	A				A	A		
Orange	Laguna Hills	City	City of Laguna Hills		C									
Orange	Laguna Niguel	City	City of Laguna Niguel		C									
Orange	Laguna Woods	City	City of Laguna Woods				A		A					
Orange	Lake Forest	City	City of Lake Forest	A	C									
Orange	Los Alamitos	City	City of Los Alamitos				IP							
Orange	Mission Viejo	City	Sustainability Action Plan		C	A				A	A			
Orange	Newport Beach	City	Energy Action Plan					A						
Orange	Orange	City	General Plan								A			
Orange	Orange	County	Orange County Public Works											
Orange	Placentia	City	City of Placentia								A			
Orange	RanchFo Santa Margarita	City	City of Rancho Santa Margarita											
Orange	San Clemente	City	Climate Action Plan		C	A	A			A	A	A		
Orange	San Juan Capistrano	City	GO GREEN SJC											
Orange	Santa Ana	City	Climate Action Plan		C	P	P							
Orange	Seal Beach	City	City of Seal Beach											Sea Level Rise Vulnerability assessment
Orange	Stanton	City	City of Stanton											
Orange	Tustin	City	City of Tustin											
Orange	Villa Park	City	City of Villa Park								A			
Orange	Westminster	City	City of Westminster								A			
Orange	Yorba Linda	City	City of Yorba Linda											

County	Jurisdiction	Type	Document or Website Link	Vulnerability Assessment	GHG Emissions Inventory	GHG Reduction Plan	Climate Action Plan	Energy Action Plan	Adaptation or Resilience Plan	Sustainability Plan	General Plan Policy	General Plan Implementation Measures	Codes or Ordinances	Other (Specify)
Riverside	Banning	City	City of Banning											
Riverside	Beaumont	City	Climate Action Plan		C	A	A			C				
Riverside	Blythe	City	Energy Action Plan					P						
Riverside	Calimesa	City	Climate Action Plan		C	A	A				A	A		
Riverside	Canyon Lake	City	City of Canyon Lake											
Riverside	Cathedral City	City	Climate Action Plan		C	A	A	P						
Riverside	Coachella	City	City of Coachella			A	A				A	A		
Riverside	Corona	City	Climate Action Plan		C	A	A							
Riverside	Desert Hot Springs	City	City of Desert Hot Springs				IP						A	
Riverside	Eastvale	City									A			
Riverside	Hemet	City	General Plan							A	A	A		
Riverside	Indian Wells	City	Green Building Program		C	A	A	A		A				
Riverside	Indio	City	General Plan Update			IP	IP				IP			
Riverside	Jurupa Valley	City	City of Jurupa Valley			A					A	A		
Riverside	La Quinta	City	City of La Quinta		C	P				IP				
Riverside	Lake Elsinore	City	Climate Action Plan		C	A	A						A	
Riverside	Menifee	City	City of Menifee											
Riverside	Moreno Valley	City	Energy Efficiency and Climate Strategy		C	A	A	A						
Riverside	Murrieta	City	General Plan		C	A	A				A	A		
Riverside	Norco	City	City of Norco											
Riverside	Palm Desert	City	Sustainability Plan		C	A				A	A			
Riverside	Palm Springs	City	City of Palm Springs		C	A	A	A		A				
Riverside	Perris	City	General Plan		C	A	A			A	A	A	A	
Riverside	Rancho Mirage	City	City of Rancho Mirage		C			A		A	A			
Riverside	Riverside	City	Climate Action Plan		C	P	P							
Riverside	Riverside	County	Climate Action Plan		C	IP	IP			A	A	A	A	
Riverside	San Jacinto	City	City of San Jacinto											
Riverside	Temecula	City	Sustainability Plan							P				
Riverside	Wildomar	City	City of Wildomar											

County	Jurisdiction	Type	Document or Website Link	Vulnerability Assessment	GHG Emissions Inventory	GHG Reduction Plan	Climate Action Plan	Energy Action Plan	Adaptation or Resilience Plan	Sustainability Plan	General Plan Policy	General Plan Implementation Measures	Codes or Ordinances	Other (Specify)
San Bernardino	Adelanto	City	Energy Leader Partnership			P								
San Bernardino	Apple Valley	Town	Climate Action Plan		C	A	A				A	A		
San Bernardino	Barstow	City	Greenhouse Gas Analysis	C	C									
San Bernardino	Big Bear Lake	City	Greenhouse Gas Reduction Plan		C	A								
San Bernardino	Chino	City	Climate Action Plan		C	A	A				A	A	A	
San Bernardino	Chino Hills	City	City of Chino Hills		C	A	A				A			
San Bernardino	Colton	City	City of Colton		C		A							
San Bernardino	Fontana	City	City of Fontana		C	C	IP			C	C	IP		
San Bernardino	Grand Terrace	City	City of Grand Terrace							A	A			
San Bernardino	Hesperia	City	General Plan		C	A	A							
San Bernardino	Highland	City	City of Highland											
San Bernardino	Loma Linda	City	Loma Linda General Plan				A			A	A			
San Bernardino	Montclair	City	City of Montclair											
San Bernardino	Needles	City	City of Needles											
San Bernardino	Ontario	City	City of Ontario		C	A	A				A			
San Bernardino	Rancho Cucamonga	City	Rancho Cucamonga General Plan								A	A		
San Bernardino	Redlands	City	Green Initiatives				A			A	A		A	Climate Action Task Force
San Bernardino	Rialto	City	City of Rialto								A			
San Bernardino	San Bernardino	City	County of San Bernardino			IP				IP	A	A		
San Bernardino	San Bernardino	County	Regional GHG Reduction Plan		C	A					A	A	A	
San Bernardino	Twentynine Palms	City	City of Twentynine Palms								A			

County	Jurisdiction	Type	Document or Website Link	Vulnerability Assessment	GHG Emissions Inventory	GHG Reduction Plan	Climate Action Plan	Energy Action Plan	Adaptation or Resilience Plan	Sustainability Plan	General Plan Policy	General Plan Implementation Measures	Codes or Ordinances	Other (Specify)
San Bernardino	Upland	City	Climate Action Plan		C	P	A				A	A		
San Bernardino	Victorville	City	City of Victorville								A			
San Bernardino	Yucaipa	City	City of Yucaipa				A				A			
San Bernardino	Yucca Valley	Town	Town of Yucca Valley								A			
Ventura	Camarillo	City	City of Camarillo											
Ventura	Fillmore	City	Energy Action Plan					A						
Ventura	Moorpark	City	City of Moorpark											
Ventura	Ojai	City	City of Ojai											
Ventura	Oxnard	City	General Plan		C	A		A		A	A	A		
Ventura	Port Hueneme	City	City of Port Hueneme											
Ventura	Santa Paula	City	Sustainability Policy							A	IP		A	
Ventura	Simi Valley	City	Climate Action Plan		C		A	A			A	A		
Ventura	Thousand Oaks	City	City of Thousand Oaks							A				
Ventura	Ventura	City												
Ventura	Ventura	County	County of Ventura		C		A							

Source: Office of Planning and Research. 2016. 2016 California Jurisdictions Addressing Climate Change Summary. Available online at: http://www.ccpda.org/191-2016-california-jurisdictions-addressing-climate-change-summary.
SCAG, 2019
Note: A=Adopted; C=Completed; IP=In Progress; P=Planned.

3.8.3 ENVIRONMENTAL IMPACTS

3.8.3.1 Thresholds of Significance

The impacts related to GHG emissions resulting from the implementation of the proposed project would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the *State CEQA Guidelines*:

- 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, Traffic and Safety,** CARB and OPR have recommended project-level VMT thresholds of significance in their guidance documents for use in evaluating traffic impacts in CEQA documents. These thresholds are intended to meet statewide GHG emissions targets through VMT reductions from the transportation sector. Both CARB and OPR acknowledge that MPO's are tasked with meeting SB 375 GHG emissions targets, and while CARB has determined that meeting these targets will not be sufficient to attain state climate goals, more can be done at the project level. At the project level, lead agencies may consider CARB, OPR and other recommended thresholds of significance and determine which ones 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 CARB and OPR targets.

3.8.3.2 Methodology

GHG emissions and climate change were evaluated in accordance with Appendix G the 2019 *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; a review of related literature germane to the SCAG region.

CEQA Guidelines Section 15064.4 states that, 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. 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.

The methodology for determining the significance of GHG emissions includes the use of SCAG's 2019 Scenario Planning Model (SPM) and transportation modeling in order to estimate GHG emissions from energy, water, and transportation. GHG emissions and transportation data were projected to 2045 using SCAG's Regional Travel Demand Model and ARB's EMFAC2014 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.

Analysis of the potential GHG impacts of Connect SoCal 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 2017 Scoping Plan, emission rates associated with energy use are anticipated to decrease. However, in order to present a conservative analysis and without knowledge of future regulations, 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. 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.").

The mitigation measures in the PEIR are divided into two categories: SCAG mitigation and project-level mitigation measures. SCAG mitigation measures shall be implemented by SCAG over the lifetime of the Plan. For projects proposing to streamline environmental review pursuant to SB 375, SB 743, or SB 226 (as described in **Section 1.0 Introduction**), or for projects otherwise tiering off this PEIR, the project-level mitigation measures described below (or comparable measures) can and should be considered and implemented by Lead Agencies and Project Sponsors during the subsequent, project- or site-specific environmental reviews for transportation and development projects as applicable and feasible. However, SCAG cannot require implementing agencies to adopt mitigation, and it is ultimately the responsibility of the implementing agency to determine and adopt project-specific mitigation.

3.8.3.3 Impacts and Mitigation Measures

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

Significant and Unavoidable- Mitigation Required.

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 source) GHG emissions resulting from implementation of the Plan are anticipated to decrease compared to existing conditions and compared to No Project conditions, they are not anticipated to be reduced sufficiently to meet the GHG emissions reduction targets established for California (as discussed in **Impact GHG-2**). 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 SoCal Projects and Strategies and Associated GHG Emissions -- Overview

Connect SoCal includes transportation projects which promote increased public transit ridership, connect public transit lines, increase active transportation opportunities and facilities, and manage traffic congestion. A complete list of SCAG's transportation projects is provided in **Appendix 2.0, Project List**. The region is anticipated to experience substantial increases in population, households, and jobs by 2045 (see **Section 2.0, Project Description**, and **Section 3.14, Population and Housing**). Connect SoCal also includes the land use strategies that seek to balance that the region's land use choices and transportation investments. This means Connect SoCal focuses new growth and development in existing urbanized settings and opportunity areas such as high-quality transit corridors (HQTAs) and incorporates strategies to increase walking, biking or other forms of active transportation, in fact 48% of housing units are expected to be within HQTAs in 2045 compared to 38% under existing conditions.

Changes in technology are anticipated to complement transportation projects and land use 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).

A complete list of emerging technologies and SCAG's associated land use, street design, and pricing and system management policies is included in the **Connect SoCal's - Emerging Technologies Technical Report**. 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**).

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 as a result of electricity from stationary sources. Indirect sources include off-site emissions occurring as a result of 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. As part of Connect SoCal, transportation network improvements would be included, and more compact, infill, walkable, and mixed-use development strategies to accommodate new region's growth would be encouraged to accommodate increases in population, housing, employment, and travel demand. Additionally, Connect SoCal includes improvements to the active transportation network as well as passenger and rail in order to decrease fuel emissions.

Transportation Emissions

In order to assess the impacts of direct emissions as a result of Connect SoCal, 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 3.8-5, Greenhouse Gas Emissions from All On-Road Vehicles in the SCAG Region,** and **Table 3.8-6, Greenhouse Gas Emissions from Other Transportation Sources in the SCAG Region**. **Table 3.8-7, Greenhouse Gas Emissions from All On-Road Vehicles and Other Transportation Sources in the SCAG Region,** provides a summary of **Tables 3.8-5** and **3.8-6** to demonstrate that the SCAG region will decrease mobile-source GHG emissions by approximately 12 percent from 2019 to 2045.

Table 3.8-5
Greenhouse Gas Emissions from All On-Road Vehicles in the SCAG Region
(Million Metric Tons per Year)

On-Road Vehicles	2019 (MMT/year)			2045 (Plan) (MMT/year)		
	CO_2	CH_4	NO_2	CO_2	CH_4	NO_2
Light and Medium Duty Vehicles	59.43	0.002	0.0009	38.08	0.001	0.0002
Heavy Duty Vehicles	15.46	0.000	0.002	24.16	0.001	0.0009
Buses	1.50	0.0010	0.00024	1.38	0.0003	0.00004
On-Road Vehicles (Subtotal) in CO_2	76.4	0.004	0.003	63.6	0.002	0.001
On-Road Vehicles (Subtotal) in CO_2e*	76.4	0.076	0.9	63.6	0.04	0.4
Total GHG Emissions from on-road vehicles in CO_2e		77.4			64.0	

Source: SCAG Modeling, 2019.
Note: CO_2 was converted to CO_{2e} based on the Global Warming Potential (GWP): http://www.arb.ca.gov/cc/inventory/background/gwp.htm

Table 3.8-6
Greenhouse Gas Emissions from Other Transportation Sources in the SCAG Region
(Million Metric Tons per Year)

Off-Road Vehicles	2019 Base Year			2045 (Plan)		
	CO_2	CH_4	NO_2	CO_2	CH_4	NO_2
Rail	2.16	0.00004	0.0010	3.86	0.00002	0.0005
Aviation	3.15	0.00002	0.000	1.97	0.00002	0.00001
Ocean-going Vessel	1.13	0.00003	0.0005	3.95	0.0001	0.0004
Other Transportation Sources (Subtotal) in CO_2	6.4	0.000	0.002	9.8	0.000	0.001
Other Transportation Sources (Subtotal) in CO_{2e}*	6.4	0.002	0.5	9.8	0.00	0.3
Total GHG Emissions from off-road vehicles in CO_{2e}*		6.9			10.1	

Source: SCAG Modeling, 2019
Note: CO_2 was converted to CO_{2e} based on the Global Warming Potential (GWP): http://www.arb.ca.gov/cc/inventory/background/gwp.htm

Table 3.8-7
Greenhouse Gas Emissions (CO2e) from All On-Road and Other Transportation Sources in the SCAG Region
(Million Metric Tons per Year)

	2019 Base Year	2045 (Plan)
Total GHG Emissions from on-road vehicles in CO_{2e}	77.4	64.0
Total GHG Emissions from other transportation sources in CO_{2e}	6.9	10.1
All Transportation Sector (On-Road and Other Sources) in CO_{2e}	84.3	74.1
2045 Plan vs. 2016 Base Year	-12%	

Source: SCAG Modeling, 2019
Note: CO_2 was converted to CO_{2e} based on the Global Warming Potential (GWP): http://www.arb.ca.gov/cc/inventory/background/gwp.htm

Between 2019 and 2045, 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 12 percent (on road only would decrease by approximately 17 percent). The largest decreases would occur in the most populous counties -- Los Angeles, Orange, and Ventura Counties (**Table 3.8-8, Greenhouse Gas Emissions All On-Road and Other Transportation Sources by County [CO_2]**). As shown in **Table 3.8-8**, transportation GHG emissions in Imperial and San Bernardino Counties are expected to increase between 2019 and 2045.

Table 3.8-8
Greenhouse Gas Emissions All On-Road and Other Transportation Sources by County (CO2e)*
Million Metric Tons per Year

	2005 Base Year	2019 PEIR Base Year	2020 No Project	2020 Plan	2030 Plan	2035 Plan	2045 No Project	2045 Plan	2019 Compared to Plan Year (2045)	2005 Compared to Plan Year (2045)
Imperial	1.4	1.44	1.39	1.48	1.47	1.5	1.88	1.92	35%	37%
Los Angeles	46.81	37.57	35.5	36.73	27.89	25.67	27.98	27.64	-26%	-41%
Orange	14.08	11.81	11.08	11.5	8.73	7.99	8.41	8.33	-29%	-41%
Riverside	11.8	10.72	10.19	10.63	9.4	9.09	10.31	10.45	-3%	-11%
San Bernardino	13.05	11.42	10.8	11.29	10.2	10.14	12.03	12.26	7%	-6%
Ventura	3.68	2.84	2.69	2.77	2.07	1.91	2.05	2.03	-29%	-45%
SCAG Total	**90.82**	**75.8**	**71.66**	**74.41**	**59.86**	**56.28**	**62.64**	**62.62**	**-17%**	**-31%**
Bus (region)	-	1.59	-	1.56	1.4	1.37	-	1.4	-12%	-
Rail (region)	-	2.48	-	2.53	2.99	3.28	-	4.01	62%	-
Aviation (Region)	-	3.16	-	3.14	2.97	2.63	-	1.97	-38%	-
OGV (Region)	-	1.30	-	1.32	1.99	2.55	-	4.09	216%	=
Total All Sectors	**-**	**84.33**	**-**	**82.95**	**69.20**	**66.12**	**=**	**74.09**	**-12%**	**-**

*Note: *Light and medium duty vehicles and heavy-duty truck*
Source: SCAG modeling, 2019.

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 focuses growth in existing urban regions and 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) a factor of 11.66 pounds (lb) CO_{2e}/therm for natural gas and 0.74 CO_{2e}/kilowatt-hour (kWh) for electricity were used to estimate 2019 and 2045 emissions). Indoor and outdoor water-related energy[151] assumed factors of 13,040 kWh/MG and 12,544 kWh/MG, respectively for 2019 and 2045. 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 3.8-9, 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. It does not account for technological and other reductions that are anticipated to substantially reduce emissions compared to what is shown in **Table 3.8-9.**

As shown in **Table 3.8-9, Greenhouse Gas Emissions for the SCAG Region from Three Primary Sources (CO2e) (Million Metric Tons per Year)**, the total GHG emissions from transportation, building and water-related energy are anticipated to decrease by 15.9 percent with Connect SoCal in 2045 compared to existing (2019) conditions. These three sectors account for approximately 70 percent of the total GHG emissions in the SCAG region. Additionally, as compared to 2045 No Project, GHG emissions from the three primary sources are anticipated to be approximately 10.8% lower under Connect SoCal. Compared to 2005, GHG emissions from the three primary sources are estimated to be 25.9% less than in 2005.

It is important to note that the Plan is not responsible for addressing sectors beyond transportation, including building energy and water-related energy consumption. In addition, even with respect to transportation sources, the Plan has no control over the fuels used by vehicles in the region or the types of vehicles used. As outlined in CARB's 2016 Mobile Source Strategy, changes to fuel type and types of vehicles are anticipated to result in additional substantial reductions in GHG from the transportation

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

sector. Note that the analysis above does not include emissions from construction equipment, agricultural operations, industrial processes, wildfires, and other unique sources.

Table 3.8-9
Greenhouse Gas Emissions for the SCAG Region from Three Primary Sources (CO2e)
(Million Metric Tons per Year)

Area	2005 Base Year[d]	2019 Base Year	2030 Plan	2035 Plan	2045 No Project	2045 Plan	2019 vs 2045 Plan	2005 vs 2045 Plan
Transportation[a]	83.6	77.4	61.3	60.0	74.6	64	-17.3%	-23.4%
Building energy[b]	44.5	35.8	34.6	35.5	32.4	31.3	-12.6%	-30%
Water-related energy[c]	3.82	3.1	2.8	2.8	2.6	2.5	-19.4%	-34.6%
Total	**131.92**	**116.3**	**98.7**	**98.3**	**109.6**	**97.8**	**-15.9%**	-25.9%

Notes:
/a/ On-road and other transportation.
/b/ Includes estimates of emissions from energy used in the region but generated outside the region.
/c/ Water related estimates of energy consumption includes the electricity used in the transport, treatment, and distribution of water
/d/ 2012 RTP/SCS PEIR
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, aircraft, ships/watercraft, trains, agriculture, wildfires, industrial process or other sources.
Source: SCAG Modeling, 2019.

Construction Emissions

The construction of transportation and development 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. The 2016 RTP/SCS PEIR notes that construction emissions are relatively minor -- typically accounting for less than 0.3 percent of total regional emissions.

Industrial, Agricultural and Other Sources

It is 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. The SCAQMD's 2016 AQMP uses an integrated approach in order 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% of energy in the SCAB region, therefore contributing to a significant portion of GHG emissions. The SCAQMD's 2016 AQMP proposes to modernize industrial facilities, promotes equipment electrification, and incorporating newer technologies such as smart girds and solar panels to reduce the reliance on fossil fuel without generating more emissions from electricity use.152

Wildfires

In 2018, more than 1.8 million acres of California land burned in wildfires. The Woolsey Fire in November 2018 burned approximately 96,949 acres and 1,643 structures in Ventura and Los Angeles Counties, representing the largest fire of that year within the SCAG region.[153] At the same time, California's most destructive fire, the Camp Fire, in Butte County destroyed 18,804 structures. California's 2018 wildfires emitted approximately 45.5 $MMTCO_2e$, which represents about 11 percent of California's total GHG emissions that year.[154] 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.[155]

Summary

In summary, while GHG emissions are anticipated to decrease compared to existing conditions and compared to No Project conditions, 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

152 SCAQMD. 2017. *Final 2016 Air Quality Management Plan*. Available online at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf?sfvrsn=15, accessed November 4, 2019.

153 County of Los Angeles Fire Department. 2018. *Woolsey Fire Incident Update*. Available online at: https://www.fire.lacounty.gov/woolsey-fire-incident/, accessed October 23, 2019.

154 Next10. 2019. *California's Green Innovation Index*. Available online at: https://www.next10.org/sites/default/files/2019-10/2019-california-green-innovation-index-final.pdf, accessed October 23, 2019.

155 Ibid.

Framework and discussion of Impact GHG-2 below), and therefore the GHG emissions resulting directly and indirectly from the Plan may result in significant and unavoidable impacts. However, 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 technology that are expected to substantially reduce emissions compared to what is presented here. Nonetheless, this impact is considered significant requiring the consideration of mitigation measures.

Mitigation Measures

SCAG Mitigation Measures

SMM GHG-1: SCAG, in partnership with local air districts, shall continue to work with the counties and cities to adopt qualified GHG reduction plans (e.g., climate action plans [CAPs], develop GHG-reducing planning policies, and implement local climate initiatives. These reductions can be achieved through a combination of programs, that implement plans developed collaboratively, including ZNE in new construction, retrofits of existing buildings, incentivizing the development of renewable energy sources that serve both new and existing land uses, as well as measures to reduce GHG emissions form transportation sources.

SMM GHG-2: SCAG shall encourage energy efficient design for buildings, through SCAG's Sustainable Communities Program potentially including strengthening local building codes for new construction and renovation to achieve a higher level of energy efficiency.

SMM GHG-3: SCAG shall continue working with partners including universities, utilities, regulating agencies, the private sector and NGO's, and member agencies to support deployment of electric vehicle (EV) charging in the region. SCAG shall provide resources to member agencies and supply them with available information and data so that they can better take advantage of legislation and funding for EV charging.

SMM GHG-4: SCAG shall continue to pursue partnerships with SCE, municipal utilities, locally operated electricity providers and CPUC to promote energy efficient development in the SCAG region, through coordinated planning and data and information sharing activities.

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) Prohibit 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.

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.

Level of Significance after Mitigation

As discussed above, regulations and polices would reduce impacts but given the regional scale of the analysis in this PEIR, it is not possible to determine if all impacts would be fully mitigated by existing

regulations and policies. Therefore, this EIR identifies project-level mitigation measures consistent with applicable regulations and polices designed to reduce impacts. Lead Agencies may choose to include project-level mitigation measures in environmental documents as they determine to be appropriate and feasible. However, because of the regional nature of the analysis and the difficulty in quantifying the effectiveness of the mitigation measures identified above, and SCAG's lack of authority to implement project-level mitigation measures, this PEIR finds impacts related to greenhouse gas emissions to be significant and unavoidable.

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 – Mitigation Required.

Pursuant to Appendix G of the *CEQA Guidelines*, a significant GHG impact is identified if the Plan could conflict with applicable GHG reduction plans, policies, or regulations. Transportation projects and anticipated development under the Plan would be subject to complying with SB 375, SB 743, AB 32, and SB 32. SB 375 requires MPO's to meet per capita 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 40% below 1990 levels by 2030, respectively. The Plan will meet the reduction goals set forth in SB 375, as discussed below. However, CARB has indicated that achievement of the SB 375 goals is insufficient for the transportation sector to meet the state's overall GHG reduction goals. In addition, without additional information as to how other sectors (energy, water-related energy and other sources of emissions) would reduce emissions to meet targets, the Plan would not be consistent with AB 32 and SB 32. As a result, the impact would be significant and unavoidable.

Compliance with 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 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 levels by 2020 and 19 percent below 2005 levels by 2035. Determining the per capita CO_2 emissions requires modeling vehicle miles traveled (VMT) by passenger vehicles and light trucks that emit CO_2 and dividing the number by the total population.

SCAG estimates that the per capita 2005 emissions from cars and light-duty trucks as 23.8 pounds of CO_2 per person per day (**Table 3.8-10, SB 375 Analysis**).

Table 3.8-10
SB 375 Analysis

	2005 (Baseline)	2020 (Plan)	2035 (Plan)
Resident population (per 1,000)	17,161	19,194	21,110
CO2 emissions (per 1,000 tons)	204.0/a/	204.5/b/	198.6/b/
Per capita emissions (pounds/day)	23.8	21.3	18.8
% difference from Plan (2020) to Baseline (2005)			–8%
% difference from Plan (2035) to Baseline (2005)			–19%/c/

Note:
/a/ Based on EMFAC2007
/b/Based on EMFAC2014 and SCAG modeling, 2019.
/c/ Includes off-model adjustments for 2035 and 2045
Source: SCAG modeling, 2019.
http://www.scag.ca.gov/committees/CommitteeDocLibrary/jointRCPC110515fullagn.pdf

As shown in **Table 3.8-10, SB 375 Analysis**, per capita CO_2 emissions from cars and light-duty trucks (only) are calculated at 21.3 pounds per day in 2020 with the Plan. The result of the Plan is an 8 percent decrease in per capita CO_2 emissions from 2005 to 2020. The percent decrease would achieve the 8 percent emissions reduction target by 2020 for the region set by SB 375. By 2035, Connect SoCal projects 18.8 pounds per day for per capita CO_2 emissions from cars and light-duty trucks (only). This represents an approximately 19 percent decrease in per capita CO_2 emissions from 2005 to 2035. This 19 percent decrease would achieve the 19 percent emissions reduction target set by CARB for 2035. CARB has not set per capita GHG emission reduction targets for passenger vehicles for the Plan's horizon year (2045). However, due to the projects and policies proposed by SCAG to reduce GHG emissions through transit improvements, traffic congestion management, emerging technology, and active transportation, the Plan's GHG emission reduction trajectory is expected to meet more aggressive GHG emission reductions by 2045. Additional reduction strategies are provided in the SCS and include congestion pricing, mileage-based user fees, and co-working at strategic locations.

By meeting the SB 375 targets for 2020 and 2035, as well as providing strategies and policies to further reduce per capita GHG emissions into 2045, the Plan would be in compliance with SB 375 with respect to meeting CARB targets.

SB 743 and VMT Guidance

As also discussed in **Section 3.17, Transportation, Traffic, and Safety**, in January 2019, CARB identified guidance with respect to necessary VMT reductions to meet state climate goals.[156] That guidance indicates that population in the state is anticipated to grow by 24 percent as compared to 2015, and that in order to meet the state's 2050 climate goal, the increase in total cumulative statewide daily VMT should not be more than 6.5 percent as compared to 2015. This corresponds to a reduction of 14.3 percent in per capita total daily VMT as compared to 2015 (from 24.6 VMT per capita in 2015 to about 21 VMT per capita in 2050) and 16.8 percent decrease in per capita daily VMT for light-duty vehicles (from 22.2 VMT per capita in 2015 to about 18.5 VMT per capita in 2050). CARB notes that the modeling used for the Cleaner Technology and Fuels (CTF) forecast identifies ratios of total statewide VMT to population and that the suggested per capita reductions are not household generated VMT and that values are not directly comparable to output from a local or regional travel demand model. Given that the CARB guidance is not intended to be directly compared to regional travel demand model outputs, VMT from SCAG's model should not be compared to these guidance numbers for purposes of determining consistency with SB 743 and associated CARB guidance. However, for purposes of general comparison and information, **Table 3.8-11, Population and Daily VMT (2019 and 2045),** presents information related to population, daily VMT and VMT per capita for the years 2019 and 2045.

Table 3.8-11
Population and VMT (2019 and 2045)

	2019	2045	2045 vs 2019
Total Population	19,339,700	22,507,200	14.1%
Total VMT	460,153,316	517,631,374	11.1%
VMT Per Capita Light Duty Vehicles	22.09	20.67	-6.4%
VMT Per Capita All Vehicles	23.79	22.89	-3.8%

Source: SCAG modeling, 2019.

OPR and Caltrans have also provided guidance on recommended VMT thresholds at the project level which are discussed in **Section 3.17, Transportation, Traffic, and Safety**. According to OPR, VMT is the preferred transportation impact metric in CEQA documents. OPR developed the *Technical Advisory on Evaluating Transportation Impacts in CEQA* (OPR Technical Advisory) which provides non-binding recommendations regarding assessment of VMT, thresholds of significance, and mitigation measures.

156 California Air Resources Board, January 2019 https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf

OPR recommends that a per capita (residential) or per employee (office) VMT that is 15% below that of existing development may be a reasonable threshold.[157] In addition, as discussed above, Caltrans prepared their *Strategic Management Plan 2015-2020*, which set a target of 15% reduction in per capita VMT relative to 2010 levels by 2020.[158]

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 created to further reduce GHG emissions and requires the state to reduce GHG emissions to 40 percent below 1990 levels by 2030. In order to ensure the state reaches these goals, CARB was ordered to prepare an updated Scoping Plan. In November 2017, CARB released the 2017 Scoping Plan as a framework to meet the 2030 reduction requirements. The Scoping Plan is designed to shift California's economy away from fossil fuels to more sustainable options that deliver economic growth, job development, and environmental benefits. Key programs that are part of the Scoping Plan include Cap-and-Trade regulation, the Low Carbon Fuel Standard, cleaner cars, trucks and freight travel, renewable energy, and reduce methane emissions from agricultural and other wastes.[159]

The 2017 Scoping Plan is designed to reduce statewide GHG emissions across different economic sectors, including: energy, transportation, industry, water, waste management, agriculture, and natural and working lands. As discussed above, under the Plan, per capita mobile source GHG emissions from cars and light-duty trucks would be reduced by approximately 8 percent by 2020 and 19 percent by 2035 which meets (for 2035) the SB 375 reduction targets.

In 2045 under the Plan, GHG emissions from the three primary sources -- transportation, energy, and water-related energy are all anticipated to decrease as compared to existing conditions (see **Table 3.8-9, Greenhouse Gas Emissions for the SCAG Region from Three Primary Sources [CO2e])**.

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157 Governor's Office of Planning and Research. 2018. *Technical Advisory – On Evaluating Transportation Impacts in CEQA*. Available online at: http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf, accessed November 15, 2019.

158 Caltrans. *Strategic Management Plan 2015-2020*. Available online at: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/caltrans-strategic-mgmt-plan-033015-a11y.pdf, accessed November 15, 2019. This document does not provide a detailed comparison to these targets because year 2000 and year 2010 comparable data is not available, and Caltrans VMT data for districts in the SCAG region is not available.

159 CARB. 2017. *California's 2017 Climate Change Scoping Plan*. Available online at: https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf, accessed August 14, 2019.

Transportation Sources -- Cars and Light-Duty Vehicles

In November of 2018, CARB released its 2018 California's Sustainable Communities and Climate Protection Act Progress Report.[160] The report recognizes the importance of realizing and measuring the benefits identified through the SB 375 planning work. Key findings of the report include that while positive gains have been made to improve the alignment of transportation, land use, and housing policies with state goals, the data suggest that more is necessary for climate success.

CARB indicates their regional 2035 GHG emissions reduction targets under SB 375 are not adequate to fully meet the goals of the 2017 Scoping Plan for the cars and light-duty trucks. Collectively, 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. In the target re-setting report, CARB expressed 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).[161] Therefore, even with meeting CARBs SB 375 GHG emissions reduction targets, a 6 percent gap compared to the state's 25 percent reduction need remains.

As CARB notes, "[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."[162] CARB has also noted that greater reductions in VMT will be required to make up the 6 percent gap in GHG. Further, according to the 2018 Sustainable Communities Progress Report, "California – at the state, regional, and local levels – has not yet gone far enough in making the systemic and structural changes to how we build and invest in communities that are needed to meet state climate goals." 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.

OPR and CARB have both provided recommendations for reducing VMT reductions at the project level which could be a means to close the gap between GHG reductions achieved through SCS implementation

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160 CARB. 2018. *2018 Progress Report California's Sustainable Communities and Climate Protection Act*. Available online at: https://ww2.arb.ca.gov/sites/default/files/2018-11/Final2018Report_SB150_112618_02_Report.pdf, accessed October 3, 2019.

161 CARB. 2017. *Final Staff Report Proposed Update to the SB 375 Greenhouse Gas Emission Reduction Targets*. Available online at: https://ww3.arb.ca.gov/cc/sb375/final_staff_proposal_sb375_target_update_october_2017.pdf?_ga=2.217174102.1993336916.1570127197-1229197864.1566229390, accessed October 4, 2019.

162 Ibid.

and the GHG reductions necessary to meet the state's GHG reduction goals. For example, OPR has provided a recommended threshold of 15 percent VMT reduction at the project level.[163] CARB also recommends project specific VMT reduction thresholds of 16.8 percent reduction from baseline for light-duty vehicle VMT (i.e., passenger cars and light trucks) or a 14.3 percent reduction for total VMT (i.e., all vehicles).[164] As GHG reductions from the transportation sector become more difficult to achieve, it is also possible that Cap-and-Trade could be a viable method of capturing transportation emissions and reducing them through market-based carbon trading.[165] Such an expansion of that program is speculative at the time of writing this PEIR, however.

Given the state's emphasis on VMT reduction as the only feasible way to achieve additional GHG reductions needed from cars and light-duty trucks, and in recognition of the climate change benefits that occur from reduced VMT resulting in reductions in GHGs, the projected land use pattern proposed under the Plan supports HQTAs. 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 **Section 2.0, 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 hit its 2020 climate target ahead of schedule due to advances in the energy sector, the transportation sector has not seen the same gains and is still 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.[166]

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163 Office of Planning and Research Technical Advisory on Evaluating Transportation Impacts in CEQA, December 2018 http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf?

164 California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals, January 2019.

165 In June 2015, fuels (gasoline, diesel, and natural gas) were covered under the Cap-and-Trade programs, which would require fuel suppliers to reduce GHG emissions by supplying low carbon fuels or purchase allowances to cover the GHG emissions produced when conventional petroleum- based fuel is burned. Therefore, a program is already in place within the Cap-and-Trade program to reduce GHG emissions from the transportation section. (See: CARB. *California's Cap and Trade Program: Fuel Facts*. Available online at: https://ww3.arb.ca.gov/cc/capandtrade/guidance/facts_fuels_under_the_cap.pdf, accessed October 23, 2019.)

166 CARB. 2017. *Final Staff Report Proposed Update to the SB 375 Greenhouse Gas Emission Reduction Targets*. Available online at: https://ww3.arb.ca.gov/cc/sb375/final_staff_proposal_sb375_target_update_october_2017.pdf?_ga=2.217174102.1993336916.1570127197-1229197864.1566229390, accessed October 4, 2019.

Other Emission 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 3.8-8, Greenhouse Gas Emissions All On-Road and Other Transportation Sources by County (CO2e)**). For example, emissions from agriculture and the solid waste sector may be reduced through regulatory requirements of SB 1383, which requires a 50 percent reduction in the level of statewide disposal of organic waste compared to 2014 levels by 2020 and a 75 percent reduction 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 2017 Scoping Plan recognizes that 2030 serves as a benchmark year in the state's long-term climate change goals; however, the 2017 Scoping Plan guides the state only to the 2030 goal. Moreover, given that the 2050 target of achieving an 80 percent reduction from 1990 GHG levels has not yet been codified in legislation (although established by Executive Order S-3-05), the 2017 Scoping Plan does not provide a framework to achieve emissions targets beyond 2030. Nonetheless, given the identified gap between SCAG's 19 percent reduction target and the state's 25 percent reduction target for 2030, it is anticipated that such a gap would remain when looking toward 2050.

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 3.8-9, Greenhouse Gas Emissions for the SCAG Region from Three Primary Sources, provides a comparison of estimated emissions for three primary sources for the years 2005, 2019 and 2045. When 1990 data is not available, 15 percent below 2005 may be used as an estimate of 1990.[167] Therefore

[167] CARB. 2014. *First Update to the Climate Change Scoping Plan*. Available online at: https://ww3.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf, accessed November 4, 2019.

estimated 1990 emissions for three primary sources of emissions in the SCAG region is 15 percent less than 131.92 MMT or 112.13. 2045 total emissions these sources are estimated at 97.8 MMT or about 13 percent less than estimated 1990 emissions. Therefore 2045 emissions for the SCAG region (as estimated by currently available emissions and consumption factors that do not take into account GHG reduction requirements) would not meet 2030 emission targets and would not be on track to meet 2050 emission targets.

Summary

The Plan has demonstrated that it will meet and exceed CARB's targets for greenhouse gas emissions from light duty passenger vehicles for 2020 and 2035, respectively. By meeting the SB 375 targets, the Plan has technically contributed its share (in the transportation sector), towards meeting the AB 32, SB 32, and the Scoping Plan targets. As discussed above, GHG impacts are generally cumulative in nature and have broader (i.e. statewide, national, and global) implications. Also, CARB has indicated that even if all MPOs meet their regional SB 375 GHG targets, the state would not be able to meet the statewide GHG reduction goals of AB 32, SB 32, and the Scoping Plan. As recognized by CARB, MPO's do not have land use authority to implement additional VMT reductions. Furthermore, SCAG has no control or authority over the other key sectors (e.g., energy, industry, water, waste and agriculture) in meeting the AB 32, SB 32, and Scoping Plan targets. Assuming existing available emission factors, GHG emissions in the SCAG region are not on-track to achieve targets identified in AB 32, SB 32 and the Scoping Plan resulting in a significant and unavoidable impact. Mitigation is required.

Mitigation Measures

SCAG Mitigation Measures

See **SMM GHG -1, SMM GHG-2, SMM GHG-3,** and **SMM GHG-4.**

Project Level Mitigation Measures

See **PMM-GHG-1.**

Level of Significance after Mitigation

As discussed above, regulations and policies would reduce impacts but given the regional scale of the analysis in this PEIR, it is not possible to determine if all impacts would be fully mitigated by existing regulations and policies. Therefore, this EIR identifies project-level mitigation measures consistent with applicable regulations and policies designed to reduce impacts. Lead Agencies may choose to include project-level mitigation measures in environmental documents as they determine to be appropriate and

feasible. However, because of the regional nature of the analysis, the estimated GHG emissions from the three primary sources, the difficulty in quantifying both future emission and water and energy consumption factors and the effectiveness of the mitigation measures identified above, and SCAG's lack of authority to implement project-level mitigation measures, this PEIR finds impacts related to greenhouse gas emissions and potential conflicts with applicable plans, policies and regulations to be significant and unavoidable.

3.8.4 SOURCES

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