5.6 GREENHOUSE GAS EMISSIONS

This section of the Draft Environmental Impact Report (DEIR) evaluates the potential for implementation of the City of Hope Campus Plan to cumulatively contribute to greenhouse gas (GHG) emissions impacts. Because no single project is large enough to result in a measurable increase in global concentrations of GHG emissions, climate change impacts of a project are considered on a cumulative basis.

This evaluation is based on the methodology recommended by the South Coast Air Quality Management District (SCAQMD). Transportation-sector impacts are based on average daily vehicle trips associated with the project and vehicle miles traveled provided by Fehr and Peers (see Appendix J1). Overall GHG emissions are quantified using the California Emissions Estimator Model (CalEEMod), Version 2016.3.1. Modeling output sheets for the project are included in Appendix C1 of this DEIR.

Terminology

- **Greenhouse gases (GHG).** Gases in the atmosphere that absorb infrared light, thereby retaining heat in the atmosphere and contributing to a greenhouse effect.
- **Global warming potential (GWP).** Metric used to describe how much heat a molecule of a greenhouse gas 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.
- **Carbon dioxide-equivalent (CO_2e).** The standard unit to measure the amount of greenhouse gases 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.
- **$MTCO_2e$.** Metric ton of CO_2e.
- **$MMTCO_2e$.** Million metric tons of CO_2e.

5.6.1 Environmental Setting

5.6.1.1 GREENHOUSE GASES AND CLIMATE CHANGE

Scientists have concluded that human activities are contributing to global climate change by adding large amounts of heat-trapping gases, known as GHGs, to the atmosphere. The primary source of these GHGs is fossil fuel use. The Intergovernmental Panel on Climate Change (IPCC) has identified four major GHGs—water vapor, carbon dioxide (CO_2), methane (CH_4), and ozone (O_3)—that are the likely cause of an increase in global average temperatures observed within the 20th and 21st centuries. Other GHGs identified by the IPCC that contribute to global warming to a lesser extent are nitrous oxide (N_2O), sulfur hexafluoride (SF_6),

hydrofluorocarbons, perfluorocarbons, and chlorofluorocarbons (IPCC 2001).[1],[2] The major GHGs are briefly described below.

- **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 also 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.

- **Methane (CH_4)** is 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 landfills and water treatment facilities.

- **Nitrous oxide (N_2O)** is emitted during agricultural and industrial activities as well as during the combustion of fossil fuels and solid waste.

- **Fluorinated gases** are 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 because they are potent GHGs, they are sometimes referred to as high GWP gases.

    - ***Chlorofluorocarbons (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), CFCs drift into the upper atmosphere where, given suitable conditions, they break down the ozone layer. These gases are therefore being replaced by other compounds that are GHGs covered under the Kyoto Protocol.

    - ***Perfluorocarbons (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 hydrofluorocarbons (HFCs), to ozone-depleting substances. In addition, PFCs are emitted as by-products of industrial processes and are used in manufacturing. PFCs do not harm the stratospheric ozone layer, but they have a high GWP.

    - ***Sulfur Hexafluoride (SF_6)*** is a colorless gas soluble in alcohol and ether, and slightly soluble in water. SF_6 is a strong GHG used primarily in electrical transmission and distribution systems as an insulator.

[1] Water vapor (H_2O) is the strongest GHG and the most variable in its phases (vapor, cloud droplets, ice crystals). However, water vapor is not considered a pollutant because it is considered part of the feedback loop rather than a primary cause of change.

[2] Black carbon contributes to climate change both directly, by absorbing sunlight, and indirectly, by depositing on snow (making it melt faster) and by interacting with clouds and affecting cloud formation. Black carbon is the most strongly light-absorbing component of particulate matter (PM) emitted from burning fuels such as coal, diesel, and biomass. Reducing black carbon emissions globally can have immediate economic, climate, and public health benefits. California has been an international leader in reducing emissions of black carbon, with close to 95 percent control expected by 2020 due to existing programs that target reducing PM from diesel engines and burning activities (CARB 2017a). However, state and national GHG inventories do not include black carbon due to ongoing work resolving the precise global warming potential of black carbon. Guidance for CEQA documents does not yet include black carbon.

- ***Hydrochlorofluorocarbons (HCFCs)*** contain hydrogen, fluorine, chlorine, and carbon atoms. Although they are ozone-depleting substances, they are less potent than CFCs. They have been introduced as temporary replacements for CFCs.

- ***Hydrofluorocarbons (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. (IPCC 1995; USEPA 2017)

GHGs are dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. Some GHGs have a stronger greenhouse effect than others. These are referred to as high GWP gases. The GWP of GHG emissions are shown in Table 5.6-1, *GHG Emissions and their Relative Global Warming Potential Compared to CO_2*. The GWP is used to convert GHGs to CO_2 equivalence (CO_2e) to show the relative potential that different GHGs have to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. For example, under IPCC's Fourth Assessment Report (AR4) GWP values for CH_4, a project that generates 10 metric tons (MT) of CH_4 would be equivalent to 250 MT of CO_2. [3]

Table 5.6-1 GHG Emissions and their Relative Global Warming Potential Compared to CO_2

GHGs	Second Assessment Report Atmospheric Lifetime (Years)	Fourth Assessment Report Atmospheric Lifetime (Years)	Second Assessment Report Global Warming Potential Relative to CO_2[1]	Fourth Assessment Report Global Warming Potential Relative to CO_2[1]
Carbon Dioxide (CO_2)	50 to 200	50 to 200	1	1
Methane[2] (CH_4)	12 (±3)	12	21	25
Nitrous Oxide (N_2O)	120	114	310	298
Hydrofluorocarbons:				
HFC-23	264	270	11,700	14,800
HFC-32	5.6	4.9	650	675
HFC-125	32.6	29	2,800	3,500
HFC-134a	14.6	14	1,300	1,430
HFC-143a	48.3	52	3,800	4,470
HFC-152a	1.5	1.4	140	124
HFC-227ea	36.5	34.2	2,900	3,220
HFC-236fa	209	240	6,300	9,810
HFC-4310mee	17.1	15.9	1,300	1,030
Perfluoromethane: CF_4	50,000	50,000	6,500	7,390
Perfluoroethane: C_2F_6	10,000	10,000	9,200	12,200
Perfluorobutane: C_4F_{10}	2,600	NA	7,000	8,860
Perfluoro-2-methylpentane: C_6F_{14}	3,200	NA	7,400	9,300
Sulfur Hexafluoride (SF_6)	3,200	NA	23,900	22,800

[3] CO_2-equivalence is used to show the relative potential that different GHGs have to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. The global warming potential of a GHG is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere.

Table 5.6-1 GHG Emissions and their Relative Global Warming Potential Compared to CO_2

GHGs	Second Assessment Report Atmospheric Lifetime (Years)	Fourth Assessment Report Atmospheric Lifetime (Years)	Second Assessment Report Global Warming Potential Relative to CO_2[1]	Fourth Assessment Report Global Warming Potential Relative to CO_2[1]

Source: IPCC 1995; IPCC 2007.

Notes: The IPCC has published updated global warming potential (GWP) values in its Fifth Assessment Report (2013) that reflect new information on atmospheric lifetimes of GHGs and an improved calculation of the radiative forcing of CO_2. However, GWP values in AR4 are used by SCAQMD to maintain consistency in statewide GHG emissions modeling. In addition, the 2014 Scoping Plan Update was based on AR4 GWP values.

1 Based on 100-year time horizon of the GWP of the air pollutant relative to CO_2.

2 The methane GWP includes direct effects and 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.

California's GHG Sources and Relative Contribution

California is the 20th largest GHG emitter in the world and the second largest emitter of GHG emissions in the United States, surpassed only by Texas (CARB 2014a). However, California also has over 12 million more people than Texas. Because of more stringent air emission regulations, in 2014, California ranked third lowest in energy-related carbon emissions per capita (EIA 2014).

In 2016, the statewide GHG emissions inventory was updated for 2000 to 2014 emissions using the GWPs in IPCC's AR4.[4] Based on these GWPs, California produced 442 $MMTCO_2e$ GHG emissions in 2014. California's transportation sector remains the single largest generator of GHG emissions, producing 36.1 percent of the state's total emissions. Industrial sector emissions made up 21.1 percent and electric power generation made up 20.0 percent of the state's emissions inventory. Other major sectors of GHG emissions include commercial and residential (8.7 percent), agriculture (8.2 percent), high-GWP GHGs (3.9 percent), and recycling and waste (2.0 percent) (CARB 2016a).

Human Influence on Climate Change

For approximately 1,000 years before the Industrial Revolution, the amount of GHGs in the atmosphere remained relatively constant. During the 20th century, however, scientists observed a rapid change in the climate and the quantity of climate change pollutants in the Earth's atmosphere that is attributable to human activities. The amount of CO_2 in the atmosphere has increased by more than 35 percent since preindustrial times and has increased at an average rate of 1.4 parts per million per year since 1960, mainly due to combustion of fossil fuels and deforestation (IPCC 2007). These recent changes in the quantity and concentration of climate change pollutants far exceed the extremes of the ice ages, and the global mean temperature is warming at a rate that cannot be explained by natural causes alone. Human activities are directly altering the chemical composition of the atmosphere through the buildup of climate change pollutants (CAT 2006). In the past, gradual changes in the earth's temperature changed the distribution of species, availability of water, etc. However, human activities are accelerating this process so that environmental impacts associated with climate change no longer occur in a geologic time frame but within a human lifetime (IPCC 2007).

[4] Methodology for determining the statewide GHG inventory is not the same as the methodology used to determine statewide GHG emissions under Assembly Bill 32 (2006).

Like the variability in the projections of the expected increase in global surface temperatures, the environmental consequences of gradual changes in the Earth's temperature are also hard to predict. Projections of climate change depend heavily upon future human activity. Therefore, climate models are based on different emission scenarios that account for historic trends in emissions and on observations of the climate record that assess the human influence of the trend and projections for extreme weather events. Climate-change scenarios are affected by varying degrees of uncertainty. For example, there are varying degrees of certainty on the magnitude of the trends for:

- Warmer temperatures and fewer cold days and nights over most land areas.
- Warmer temperatures and more frequent hot days and nights over most land areas.
- An increase in frequency of warm spells/heat waves over most land areas.
- An increase in frequency of heavy precipitation events (or proportion of total rainfall from heavy falls) over most areas.
- Larger areas affected by drought.
- Intense tropical cyclone activity increases.
- Increased incidence of extremely high sea level (excludes tsunamis).

Observed changes over the last several decades across the western United States reveal clear signs of climate change. Statewide average temperatures increased by about 1.7°F from 1895 to 2011, and warming has been greatest in the Sierra Nevada. By 2050, California is projected to warm by approximately 2.7°F above 2000 averages, a threefold increase in the rate of warming over the last century. By 2100, average temperatures could increase from 4.1 to 8.6°F, depending on emissions levels (CCCC 2012).

Potential Climate Change Impacts for California

In California and western North America, observations of the climate have shown: 1) a trend toward warmer winter and spring temperatures; 2) a smaller fraction of precipitation falling as snow; 3) a decrease in the amount of spring snow accumulation in the lower and middle elevation mountain zones; 4) an advanced snowmelt of 5 to 30 days earlier in the springs; and 5) a similar shift (5 to 30 days earlier) in the timing of spring flower blooms (CAT 2006). According to the California Climate Action Team, even if actions could be taken to immediately curtail climate change emissions, the potency of emissions that have already built up, their long atmospheric lifetimes (see Table 5.6-1), and the inertia of the Earth's climate system could produce as much as 0.6°C (1.1°F) of additional warming. Consequently, some impacts from climate change are now considered unavoidable. Global climate change risks to California are listed in Table 5.6-2, *Summary of GHG Emissions Risks to California*, and include impacts to public health, water resources, agriculture, coastal sea level, forest and biological resources, and energy.

Table 5.6-2 Summary of GHG Emissions Risks to California

Impact Category	Potential Risk
Public Health Impacts	Heat waves will be more frequent, hotter, and longer Fewer extremely cold nights Poor air quality made worse Higher temperatures increase ground-level ozone levels
Water Resources Impacts	Decreasing Sierra Nevada snow pack Challenges in securing adequate water supply Potential reduction in hydropower Loss of winter recreation
Agricultural Impacts	Increasing temperature Increasing threats from pests and pathogens Expanded ranges of agricultural weeds Declining productivity Irregular blooms and harvests
Coastal Sea Level Impacts	Accelerated sea level rise Increasing coastal floods Shrinking beaches Worsened impacts on infrastructure
Forest and Biological Resource Impacts	Increased risk and severity of wildfires Lengthening of the wildfire season Movement of forest areas Conversion of forest to grassland Declining forest productivity Increasing threats from pest and pathogens Shifting vegetation and species distribution Altered timing of migration and mating habits Loss of sensitive or slow-moving species
Energy Demand Impacts	Potential reduction in hydropower Increased energy demand

Sources: CEC 2006; CEC 2009; CCCC 2012; CNRA 2014.

Specific climate change impacts that could affect the proposed project include:

- **Water Resources Impacts.** By the late twenty-first century, all projections show drying, and half of the projections suggest 30-year average precipitation will decline by more than 10 percent below the historical average. This drying trend is caused by an apparent decline in the frequency of rain and snowfall. Even in projections with relatively small or no declines in precipitation, central and southern parts of the state can be expected to be drier from the warming effects alone because the spring snowpack will melt sooner, and the moisture in soils will evaporate during long dry summer months (CCCC 2012).

- **Wildfire Risks.** Earlier snowmelt, higher temperatures, and longer dry periods over a longer fire season will directly increase wildfire risk. Indirectly, wildfire risk will also be influenced by potential climate-related changes in vegetation and ignition potential from lightning. Human activities will continue to be the biggest factor in ignition risk. The number of large fires statewide is estimated to increase from 58

percent to 128 percent above historical levels by 2085. Under the same emissions scenario, estimated burned area will increase by 57 percent to 169 percent, depending on location (CCCC 2012).

- **Health Impacts.** Many of the gravest threats to public health in California stem from the increase of extreme conditions, principally more frequent, more intense, and longer heat waves. Particular concern centers on the increasing frequency of multiple hot days in succession, and simultaneous heat waves in several regions throughout the state. Public health could also be affected by climate change impacts on air quality, food production, the amount and quality of water supplies, energy pricing and availability, and the spread of infectious diseases. Higher temperatures also increase ground-level ozone levels. Furthermore, wildfires can increase particulate air pollution in the major air basins of California (CCCC 2012).

- **Increased Energy Demand.** Increases in average temperature and higher frequency of extreme heat events combined with new residential development across the state will drive up the demand for cooling in the increasingly hot and long summer season and decrease demand for heating in the cooler season. Warmer, drier summers also increase system losses at natural gas plants (reduced efficiency in the electricity generation process from higher temperatures) and hydropower plants (lower reservoir levels). Transmission of electricity will also be affected by climate change. Transmission lines lose 7 percent to 8 percent of transmitting capacity in high temperatures while needing to transport greater loads. This means that more electricity needs to be produced to make up for the loss in capacity and the growing demand (CCCC 2012).

5.6.1.2 REGULATORY SETTING

This section describes the federal, state, and local regulations applicable to GHG emissions.

Federal Laws

The US Environmental Protection Agency (EPA) announced on December 7, 2009, that GHG emissions threaten the public health and welfare of the American people and that GHG emissions from on-road vehicles contribute to that threat. The EPA's final findings respond to the 2007 US Supreme Court decision that GHG emissions fit within the Clean Air Act definition of air pollutants. The findings did not themselves impose any emission reduction requirements, but allowed the EPA to finalize the GHG standards proposed in 2009 for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation (USEPA 2009).

To regulate GHGs from passenger vehicles, EPA was required to issue an endangerment finding. The finding covers emissions of six key GHGs—CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, and SF_6—that have been the subject of scrutiny and intense analysis for decades by scientists in the United States and around the world. The first three are applicable to the proposed project's GHG emissions inventory because they constitute the majority of GHG emissions, and according to SCAQMD guidance are the GHG emissions that should be evaluated as part of a project's GHG emissions inventory.

US Mandatory Reporting Rule for GHGs (2009)

In response to the endangerment finding, the EPA issued the Mandatory Reporting of GHG Rule that requires substantial emitters of GHG emissions (large stationary sources, etc.) to report GHG emissions data. Facilities that emit 25,000 $MTCO_2e$ or more per year must submit an annual report.

Update to Corporate Average Fuel Economy Standards (2010/2012)

The current Corporate Average Fuel Economy standards (for model years 2011 to 2016) incorporate stricter fuel economy requirements promulgated by the federal government and California into one uniform standard. Additionally, automakers are required to cut GHG emissions in new vehicles by roughly 25 percent by 2016 (resulting in a fleet average of 35.5 miles per gallon by 2016). Rulemaking to adopt these new standards was completed in 2010. California agreed to allow automakers who show compliance with the national program to also be deemed in compliance with state requirements. The federal government issued new standards in 2012 for model years 2017–2025, which will require a fleet average of 54.5 miles per gallon in 2025. However, the EPA is reexamining the 2017-2025 emissions standards.

EPA Regulation of Stationary Sources under the Clean Air Act (Ongoing)

Pursuant to its authority under the Clean Air Act, the EPA has been developing regulations for new stationary sources such as power plants, refineries, and other large sources of emissions. Pursuant to former President Obama's 2013 Climate Action Plan, the EPA will be directed to develop regulations for existing stationary sources also. However, the EPA is reviewing the Clean Power Plan under President Trump's Energy Independence Executive Order.

State Laws

Current State of California guidance and goals for reductions in GHG emissions are generally embodied in Executive Orders S-03-05 and B-30-15, Assembly Bill 32 (AB 32), Senate Bill 32 (SB 32), and SB 375.

Executive Order S-03-05

Executive Order S-03-05, signed June 1, 2005, set the following GHG reduction targets for the state:

- 2000 levels by 2010
- 1990 levels by 2020
- 80 percent below 1990 levels by 2050

Assembly Bill 32, the Global Warming Solutions Act (2006)

Current State of California guidance and goals for reductions in GHG emissions are generally embodied in AB 32, the Global Warming Solutions Act. AB 32 was passed by the California state legislature on August 31, 2006, to place the state on a course toward reducing its contribution of GHG emissions. AB 32 follows the 2020 tier of emissions reduction targets established in Executive Order S-03-05.

CARB 2008 Scoping Plan

The final Scoping Plan was adopted by CARB on December 11, 2008. The *2008 Scoping Plan* identified that GHG emissions in California are anticipated to be approximately 596 $MMTCO_2e$ in 2020. In December 2007, CARB approved a 2020 emissions limit of 427 $MMTCO_2e$ (471 million tons) for the state (CARB 2008). In order to effectively implement the emissions cap, AB 32 directed CARB to establish a mandatory reporting system to track and monitor GHG emissions levels for large stationary sources that generate more than 25,000 $MTCO_2e$ per year, prepare a plan demonstrating how the 2020 deadline can be met, and develop appropriate regulations and programs to implement the plan by 2012.

First Update to the Scoping Plan

CARB completed a five-year update to the 2008 Scoping Plan, as required by AB 32. The First Update to the Scoping Plan was adopted at the May 22, 2014, board hearing. The update highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals defined in the original 2008 Scoping Plan. As part of the update, CARB recalculated the 1990 GHG emission levels with the updated GWPs in the Fourth Assessment Report, and the 427 $MMTCO_2e$ 1990 emissions level and 2020 GHG emissions limit, established in response to AB 32, is slightly higher at 431 $MMTCO_2e$ (CARB 2014b).

As identified in the Update to the Scoping Plan, California is on track to meeting the goals of AB 32. However, the update also addresses the state's longer-term GHG goals within a post-2020 element. The post-2020 element provides a high level view of a long-term strategy for meeting the 2050 GHG goals, including a recommendation for the state to adopt a midterm target. According to the Update to the Scoping Plan, local government reduction targets should chart a reduction trajectory that is consistent with or exceeds the trajectory created by statewide goals (CARB 2014b). CARB identified that reducing emissions to 80 percent below 1990 levels will require a fundamental shift to efficient, clean energy in every sector of the economy. Progressing toward California's 2050 climate targets will require significant acceleration of GHG reduction rates. Emissions from 2020 to 2050 will have to decline several times faster than the rate needed to reach the 2020 emissions limit (CARB 2014b).

Executive Order B-30-15

Executive Order B-30-15, signed April 29, 2015, sets a goal of reducing GHG emissions within the state to 40 percent below 1990 levels by year 2030. Executive Order B-30-15 also directs CARB to update the Scoping Plan to quantify the 2030 GHG reduction goal for the state and requires state agencies to implement measures to meet the interim 2030 goal as well as the long-term goal for 2050 in Executive Order S-03-05. It also requires the Natural Resources Agency to conduct triennial updates of the California adaption strategy, Safeguarding California, in order to ensure climate change is accounted for in state planning and investment decisions.

Senate Bill 32 and Assembly Bill 197

In September 2016, Governor Brown signed SB 32 and AB 197 into law, making the Executive Order goal for year 2030 into a statewide mandated legislative target. AB 197 established a joint legislative committee on

climate change policies and requires the CARB to prioritize direction emissions reductions rather than the market-based cap-and-trade program for large stationary, mobile, and other sources.

2017 Climate Change Scoping Plan Update

Executive Order B-30-15 and SB 32 required CARB to prepare another update to the Scoping Plan to address the 2030 target for the state. On January 20, 2017, CARB released the *Draft 2017 Climate Change Scoping Plan Update* with adoption hearings planned for December of 2017. The *Draft 2017 Climate Change Scoping Plan Update* includes the potential regulations and programs including strategies consistent with AB 197 requirements to achieve the 2030 target. The 2017 Scoping Plan establishes a new emissions limit of 260 $MMTCO_2e$ for the year 2030, which corresponds to a 40 percent decrease in 1990 levels by 2030 (CARB 2017b).

California's climate strategy will require contributions from all sectors of the economy, including the land base, and will include enhanced focus on zero- and near-zero emission (ZE/NZE) vehicle technologies; continued investment in renewables, including solar roofs, wind, and other distributed generation; greater use of low carbon fuels; integrated land conservation and development strategies; coordinated efforts to reduce emissions of short-lived climate pollutants (methane, black carbon, and fluorinated gases); and an increased focus on integrated land use planning, to support livable, transit-connected communities and conservation of agricultural and other lands. Requirements for direct GHG reductions at refineries will further support air quality co-benefits in neighborhoods, including in disadvantaged communities historically located adjacent to these large stationary sources, as well as efforts with California's local air pollution control and air quality management districts (air districts) to tighten emission limits on a broad spectrum of industrial sources. Major elements of the 2017 Scoping Plan framework include:

- Implementing and/or increasing the standards of the Mobile Source Strategy, which include increasing zero-emissions buses and trucks;
- Low Carbon Fuel Standard (LCFS), with an increased stringency (18 percent by 2030);
- Implementation of SB 350, which expands the Renewables Portfolio Standard (RPS) to 50 percent RPS and doubles energy efficiency savings by 2030;
- California Sustainable Freight Action Plan, which improves freight system efficiency, utilizes near-zero emissions technology, and deployment of zero-emissions trucks;
- Implementing the proposed Short-Lived Climate Pollutant Strategy (SLPS), which focuses on reducing methane and hydroflurocarbon emissions by 40 percent and anthropogenic black carbon emissions by 50 percent by year 2030;
- Continued implementation of SB 375;
- Post-2020 Cap-and-Trade Program that includes declining caps;

- 20 percent reduction in GHG emissions from refineries by 20305; and
- Development of a Natural and Working Lands Action Plan to secure California's land base as a net carbon sink.

In addition to the statewide strategies listed above, the *2017 Climate Change Scoping Plan* also identified local governments as essential partners in achieving the State's long-term GHG reduction goals and identified local actions to reduce GHG emissions. As part of the recommended actions, CARB recommends that local governments achieve a community-wide goal to achieve emissions of no more than 6 $MTCO_2e$ or less per capita by 2030 and 2 $MTCO_2e$ or less per capita by 2050. For CEQA projects, CARB states that lead agencies may develop evidenced-based bright-line numeric thresholds—consistent with the Scoping Plan and the State's long-term GHG goals—and projects with emissions over that amount may be required to incorporate on-site design features and mitigation measures that avoid or minimize project emissions to the degree feasible; or, a performance-based metric using a climate action plan or other plan to reduce GHG emissions is appropriate (CARB 2017b).

The Scoping Plan scenario is set against what is called the business-as-usual (BAU) yardstick—that is, what would the GHG emissions look like if the State did nothing at all beyond the existing policies that are required and already in place to achieve the 2020 limit, as shown in Table 5.6-3, *2017 Climate Change Scoping Plan Emissions Reductions Gap to Achieve the 2030 GHG Target*. It includes the existing renewables requirements, advanced clean cars, the "10 percent" Low Carbon Fuel Standard (LCFS), and the SB 375 program for more vibrant communities, among others. However, it does not include a range of new policies or measures that have been developed or put into statute over the past two years. As also shown in the table, the known commitments are expected to result in emissions that are 50 $MMTCO_2e$ above the target in 2030. In order to make up the "gap", a new Post- 2020 Cap-and-Trade Program and refinery measure are key components of the 2017 Scoping Plan.

Table 5.6-3 2017 Climate Change Scoping Plan Emissions Reductions Gap to Achieve the 2030 GHG Target

Modeling Scenario	2030 GHG Emissions $MMTCO_2e$
Reference Scenario (Business-as-Usual)	392.4
With Known Commitments	310
2030 GHG Target	**260**

Source: CARB 2017b

[5] The plan includes policies to require direct GHG reductions at some of the State's largest stationary sources and mobile sources in accordance with AB 197. These policies include the use of lower GHG fuels, efficiency regulations, and the Cap-and-Trade Program, which constrains and reduces emissions at covered sources.

Table 5.6-4, *2017 Climate Change Scoping Plan Emissions Change by Sector to Achieve the 2030 Target*, provides estimated GHG emissions by sector, compared to 1990 levels, and the range of GHG emissions for each sector estimated for 2030.

Table 5.6-4 2017 Climate Change Scoping Plan Emissions Change by Sector to Achieve the 2030 Target

Scoping Plan Sector	1990 $MMTCO_2e$	2030 Proposed Plan Ranges $MMTCO_2e$	% Change from 1990
Agricultural	26	24-25	-4% to -8%
Residential and Commercial	44	38-40	-9% to -14%
Electric Power	108	42-62	-43% to -61%
High GWP	3	8-11	167% to 267%
Industrial	98	77-87	-11% to -21%
Recycling and Waste	7	8-9	14% to 29%
Transportation (including TCU)	152	103-111	-27% to -32%
Net Sink[1]	-7	TBD	TBD
Sub Total	431	300-345	-20% to -30%
Cap-and-Trade Program	NA	40-85	NA
Total	431	260	-40%

Source: CARB 2017b
Notes: TCU = Transportation, Communications, and Utilities; TBD: To Be Determined.
[1] Work is underway through 2017 to estimate the range of potential sequestration benefits from the natural and working lands sector.

Senate Bill 1383

On September 19, 2016, the Governor signed SB 1383 to supplement the GHG reduction strategies in the Scoping Plan to consider short-lived climate pollutants, including black carbon and CH_4. Black carbon is the light-absorbing component of fine particulate matter (PM) produced during incomplete combustion of fuels. SB 1383 requires the state board, no later than January 1, 2018, to approve and begin implementing that comprehensive strategy to reduce emissions of short-lived climate pollutants to achieve a reduction in methane by 40 percent, hydrofluorocarbon gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030, as specified. The bill also establishes targets for reducing organic waste in landfill. On March 14, 2017, CARB adopted the *Final Short-Lived Climate Pollutant Strategy*, which identifies the state's approach to reducing anthropogenic and biogenic sources of short-lived climate pollutants. Anthropogenic sources of black carbon include on- and off-road transportation, residential wood burning, fuel combustion (charbroiling), and industrial processes. According to CARB, ambient levels of black carbon in California are 90 percent lower than in the early 1960s, despite the tripling of diesel fuel use (CARB 2017a). In-use on-road rules are expected to reduce black carbon emissions from on-road sources by 80 percent between 2000 and 2020. SCAQMD is one of the air districts that require air pollution control technologies for chain-driven broilers, which reduces particulate emissions from these char broilers by over 80 percent (CARB 2017a). Additionally, SCAQMD Rule 445, wood-burning devices limits installation of new fireplaces in the SoCAB.

Senate Bill 375

In 2008, SB 375, the Sustainable Communities and Climate Protection Act, was adopted to connect the GHG emissions reductions targets established in the 2008 Scoping Plan for the transportation sector to local land use decisions that affect travel behavior. Its intent is to reduce GHG emissions from light-duty trucks and automobiles (excludes emissions associated with goods movement) by aligning regional long-range transportation plans, investments, and housing allocations to local land use planning to reduce VMT and vehicle trips. Specifically, SB 375 required CARB to establish GHG emissions reduction targets for each of the 18 metropolitan planning organizations (MPOs). The Southern California Association of Governments (SCAG) is the MPO for the Southern California region, which includes the counties of Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial.

Pursuant to the recommendations of the Regional Transportation Advisory Committee, CARB adopted per capita reduction targets for each of the MPOs rather than a total magnitude reduction target. SCAG's targets are an 8 percent per capita reduction from 2005 GHG emission levels by 2020 and a 13 percent per capita reduction from 2005 GHG emission levels by 2035 (CARB 2010).

The 2020 targets are smaller than the 2035 targets because a significant portion of the built environment in 2020 has been defined by decisions that have already been made. In general, the 2020 scenarios reflect that more time is needed for large land use and transportation infrastructure changes. Most of the reductions in the interim are anticipated to come from improving the efficiency of the region's transportation network. The targets would result in 3 $MMTCO_2e$ of reductions by 2020 and 15 $MMTCO_2e$ of reductions by 2035. Based on these reductions, the passenger vehicle target in CARB's Scoping Plan (for AB 32) would be met (CARB 2010).

2017 Update to the SB 375 Targets

CARB is currently in the process of updating the next round of targets and methodology to comply with the requirement for updates every eight years. In June 2017, CARB released updated targets and technical methodology. The updated targets consider the need to further reduce VMT, as identified in the draft 2017 Scoping Plan Update, while balancing the need for additional and more flexible revenue sources to incentivize positive planning and action toward sustainable communities. Like the 2010 targets, the updated SB 375 targets are in units of percent per capita reduction in GHG emissions from automobiles and light trucks relative to 2005. This excludes reductions anticipated from implementation of state technology and fuels strategies and any potential future state strategies such as statewide road user pricing. The proposed targets call for greater per capita GHG emission reductions from SB 375 than are currently in place, which for 2035, translate into proposed targets that either match or exceed the emission reduction levels in the MPOs' currently adopted SCSs. As proposed, CARB staff's proposed targets would result in an additional reduction of over 10 $MMTCO_2e$ in 2035 compared to the current targets. For the next round of SCS updates, CARB's updated targets for the SCAG region are an 8 percent per capita GHG reduction in 2020 from 2005 levels (unchanged from the 2010 target) and a 21 percent per capita GHG reduction in 2035 from 2005 levels (compared to the 2010 target of 13 percent) (CARB 2017c). CARB anticipates adoption of the updated targets and methodology in Fall 2017. The updated targets and methodology will take effect on January 1, 2018, and SCS adopted in 2018 and later would be subject to these new targets.

SCAG's 2016-2040 RTP/SCS

SB 375 requires the MPOs to prepare a sustainable communities strategy in their regional transportation plan. For the SCAG region, the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) was adopted on April 7, 2016, and is an update to the 2012 RTP/SCS (SCAG 2016). In general, the SCS outlines a development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, would reduce vehicle miles traveled from automobiles and light duty trucks and thereby reduce GHG emissions from these sources.

The 2016-2040 RTP/SCS projects that the SCAG region will meet or exceed the passenger per capita targets set in 2010 by CARB. It is projected that VMT per capita in the region for year 2040 would be reduced by 7.4 percent with implementation of the 2016-2040 RTP/SCS compared to a no-plan year 2040 scenario. Under the 2016-2040 RTP/SCS, SCAG anticipates lowering GHG emissions 8 percent below 2005 levels by 2020, 18 percent by 2035, and 21 percent by 2040. The 18 percent reduction by 2035 over 2005 levels represents a 2 percent increase in reduction compared to the 2012 RTP/SCS projection. Overall, the SCS is meant to provide growth strategies that will achieve the aforementioned regional GHG emissions reduction targets. Land use strategies to achieve the region's targets include planning for new growth around high quality transit areas and livable corridors, and creating neighborhood mobility areas to integrate land use and transportation and plan for more active lifestyles (SCAG 2016). However, the SCS does not require that local general plans, specific plans, or zoning be consistent with the SCS; instead, it provides incentives to governments and developers for consistency.

Assembly Bill 1493

California vehicle GHG emission standards were enacted under AB 1493 (Pavley I). Pavley I is a clean-car standard that reduces GHG emissions from new passenger vehicles (light-duty auto to medium-duty vehicles) from 2009 through 2016 and is anticipated to reduce GHG emissions from new passenger vehicles by 30 percent in 2016. California implements the Pavley I standards through a waiver granted to California by the EPA. In 2012, the EPA issued a Final Rulemaking that sets even more stringent fuel economy and GHG emissions standards for model year 2017 through 2025 light-duty vehicles (see also the discussion on the update to the Corporate Average Fuel Economy standards under *Federal Laws*, above). In January 2012, CARB approved the Advanced Clean Cars program (formerly known as Pavley II) for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single package of standards. Under California's Advanced Clean Car program, by 2025, new automobiles will emit 34 percent less global warming gases and 75 percent less smog-forming emissions.

Executive Order S-01-07

On January 18, 2007, the state set a new low carbon fuel standard (LCFS) for transportation fuels sold within the state. Executive Order S-01-07 sets a declining standard for GHG emissions measured in carbon dioxide equivalent gram per unit of fuel energy sold in California. The LCFS requires a reduction of 2.5 percent in the carbon intensity of California's transportation fuels by 2015 and a reduction of at least 10 percent by 2020. The standard applies to refiners, blenders, producers, and importers of transportation fuels, and would

use market-based mechanisms to allow these providers to choose how they reduce emissions during the "fuel cycle" using the most economically feasible methods.

Senate Bills 1078, 107, X1-2, and Executive Order S-14-08

A major component of California's Renewable Energy Program is the renewables portfolio standard (RPS) established under SBs 1078 (Sher) and 107 (Simitian). Under the RPS, certain retail sellers of electricity were required to increase the amount of renewable energy each year by at least 1 percent in order to reach at least 20 percent by December 30, 2010. Executive Order S-14-08 was signed in November 2008, which expands the state's renewable energy standard to 33 percent renewable power by 2020. This standard was adopted by the legislature in 2011 (SBX1-2). Renewable sources of electricity include wind, small hydropower, solar, geothermal, biomass, and biogas. The increase in renewable sources for electricity production will decrease indirect GHG emissions from development projects, because electricity production from renewable sources is generally considered carbon neutral.

Senate Bill 350

SB 350 (de Leon), was signed into law September 2015 and establishes tiered increases to the RPS—40 percent by 2024, 45 percent by 2027, and 50 percent by 2030. SB 350 also set a new goal to double the energy-efficiency savings in electricity and natural gas through energy efficiency and conservation measures.

Executive Order B-16-2012

On March 23, 2012, the state identified that CARB, the California Energy Commission (CEC), the Public Utilities Commission, and other relevant agencies worked with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to accommodate zero-emissions vehicles in major metropolitan areas, including infrastructure to support them (e.g., electric vehicle charging stations). The executive order also directs the number of zero-emission vehicles in California's state vehicle fleet to increase through the normal course of fleet replacement so that at least 10 percent of fleet purchases of light-duty vehicles are zero-emission by 2015 and at least 25 percent by 2020. The executive order also establishes a target for the transportation sector of reducing GHG emissions from the transportation sector 80 percent below 1990 levels.

California Building Code: Building Energy Efficiency Standards

Energy conservation standards for new residential and nonresidential buildings were adopted by the California Energy Resources Conservation and Development Commission (now the CEC) in June 1977 and most recently revised in 2013 (Title 24, Part 6, of the California Code of Regulations [CCR]). Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. On June 10, 2015, the CEC adopted the 2016 Building Energy Efficiency Standards, which went into effect on January 1, 2017.

The 2016 Standards will continue to improve upon the current 2013 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. Under the 2016 Standards, residential

buildings are 28 percent more energy efficient than the 2013 Standards, and nonresidential buildings are 5 percent more energy efficient than the 2013 Standards (CEC 2015a). Buildings that are constructed in accordance with the 2013 Building Energy Efficiency Standards are 25 percent (residential) to 30 percent (nonresidential) more energy efficient than the 2008 standards as a result of better windows, insulation, lighting, ventilation systems, and other features. The 2016 standards do not achieve zero net energy, they do get very close to the state's goal and make important steps toward changing residential building practices in California. The 2019 standards will take the final step to achieve zero net energy for newly constructed residential buildings throughout California (CEC 2015b).

California Building Code: CALGreen

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (24 CCR, Part 11, known as "CALGreen") was adopted as part of the California Building Standards Code. CALGreen established planning and design standards for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants.[6] The mandatory provisions of CALGreen became effective January 1, 2011, and were last updated in 2016. The 2016 Standards became effective on January 1, 2017.

2006 Appliance Efficiency Regulations

The 2006 Appliance Efficiency Regulations (20 CCR §§ 1601–1608) were adopted by the CEC on October 11, 2006, and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both federally regulated appliances and non–federally regulated appliances. Though these regulations are now often viewed as "business as usual," they exceed the standards imposed by all other states, and they reduce GHG emissions by reducing energy demand.

Solid Waste Regulations

California's Integrated Waste Management Act of 1989 (AB 939, Public Resources Code §§ 40050 et seq.) set a requirement for cities and counties throughout the state to divert 50 percent of all solid waste from landfills by January 1, 2000, through source reduction, recycling, and composting. In 2008, the requirements were modified to reflect a per capita requirement rather than tonnage. To help achieve this, the act requires that each city and county prepare and submit a source reduction and recycling element. AB 939 also established the goal for all California counties to provide at least 15 years of ongoing landfill capacity.

AB 341 (Chapter 476, Statutes of 2011) increased the statewide goal for waste diversion to 75 percent by 2020 and requires recycling of waste from commercial and multifamily residential land uses.

The California Solid Waste Reuse and Recycling Access Act (AB 1327, Public Resources Code §§ 42900 et seq.) requires areas to be set aside for collecting and loading recyclable materials in development projects. The act required the California Integrated Waste Management Board to develop a model ordinance for adoption

[6] The green building standards became mandatory in the 2010 edition of the code.

by any local agency requiring adequate areas for collection and loading of recyclable materials as part of development projects. Local agencies are required to adopt the model or an ordinance of their own.

Section 5.408 of the 2016 CALGreen also requires that at least 65 percent of the nonhazardous construction and demolition waste from nonresidential construction operations be recycled and/or salvaged for reuse.

In October of 2014 Governor Brown signed AB 1826 requiring businesses to recycle their organic waste on and after April 1, 2016, depending on the amount of waste they generate per week. This law also requires that on and after January 1, 2016, local jurisdictions across the state implement an organic waste recycling program to divert organic waste generated by businesses, including multifamily residential dwellings that consist of five or more units. Organic waste means food waste, green waste, landscape and pruning waste, nonhazardous wood waste, and food-soiled paper waste that is mixed in with food waste.

Water Efficiency Regulations

The 20x2020 Water Conservation Plan was issued by the Department of Water Resources (DWR) in 2010 pursuant to Senate Bill 7, which was adopted during the 7th Extraordinary Session of 2009–2010 and therefore dubbed "SBX7-7." SBX7-7 mandated urban water conservation and authorized the DWR to prepare a plan implementing urban water conservation requirements (20x2020 Water Conservation Plan). In addition, it required agricultural water providers to prepare agricultural water management plans, measure water deliveries to customers, and implement other efficiency measures. SBX7-7 requires urban water providers to adopt a water conservation target of 20 percent reduction in urban per capita water use by 2020 compared to 2005 baseline use.

The Water Conservation in Landscaping Act of 2006 (AB 1881) requires local agencies to adopt the updated DWR model ordinance or an equivalent. AB 1881 also requires the CEC to consult with the DWR to adopt, by regulation, performance standards and labeling requirements for landscape irrigation equipment, including irrigation controllers, moisture sensors, emission devices, and valves to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy or water.

Local

The following discusses the applicable Duarte and Irwindale plans and regulations that would contribute to reducing GHG emissions. Per the Alfred E. Alquist Hospital Facilities Seismic Safety Act of 1983, the Office of Statewide Health Planning and Development (OSHPD) is the enforcement agency for hospital buildings, acute psychiatric hospitals, skilled nursing facilities, and intermediate care facilities—as defined in Section 129725 of the Health and Safety Code—with regard to the applicable Title 24 building standards, preempting the local jurisdiction. However, the City of Duarte or City of Irwindale would have jurisdiction over parts of the proposed Specific Plan that are not under OSHPD's jurisdiction—such as surface parking, landscaping, parking structure, and other buildings not subject to OSHPD.

City of Duarte

City of Duarte Energy Action Plan

The City of Duarte prepared the Energy Action Plan (EAP) in conjunction with the San Gabriel Valley Council of Governments—a sub-entity of SCAG—and Southern California Edison as part of supporting the California Long-Term Energy Efficiency Strategic Plan. The EAP is a stand-alone document and was prepared to be equivalent to an electricity efficiency chapter of a climate action plan. It identifies both municipal and community-wide strategies to achieve long-term electricity efficiency goals. It also serves as part of the state and regional effort for achieving energy efficiency and reducing GHG emissions. The specific objectives of the EAP are to:

- Create a long-term vision for energy efficiency.
- Provide and assess information related to energy use and GHG emissions.
- Establish reduction targets for energy efficiency.
- Identify goals, policies, and actions to achieve energy reductions.
- Provide a framework to implement the identified goals, policies, and actions.

Under the premise of meeting the state-recommended GHG reduction target of 15 percent below baseline levels by year 2020, the EAP sets the following energy efficiency targets for Duarte:

- Residential: Reduce annual existing residential electricity usage by 20 percent below year 2005 baseline levels by year 2020.

- Nonresidential: Reduce annual existing nonresidential electricity usage by 10 percent below year 2005 baseline levels by year 2020.

- Municipal: Achieve platinum-level status in Southern California Edison's Energy Leader Partnership Model.

- Residential and Nonresidential: Achieve a net zero electricity use in new residential and nonresidential buildings by year 2020.

The EAP strategy to meet these electricity reduction targets involves setting goals, policies, and implementation actions focused around seven topic areas: 1) existing residential buildings, 2) existing nonresidential buildings, 3) new development, 4) planning framework, 5) urban cooling, 6) water and electricity efficiency, and 7) municipal operations. The goals corresponding to these seven topic areas include:

- **Goal 1:** Reduce average household energy costs.

- **Goal 2:** Transform Duarte's nonresidential buildings into a model for energy efficient communities.

- **Goal 3:** By 2020, new residential construction with five units or more and new nonresidential construction projects of 25,000 square feet or more in Duarte will have no net impact on community-wide energy demand.

- **Goal 4:** Generate citizen interest and support for an energy efficient local economy.

- **Goal 5:** Optimize shading and cooling to reduce community-wide energy demand.

- **Goal 6:** Integrate water conservation efforts into new and existing development to conserve energy used to pump, treat, and convey water.

- **Goal 7:** Conserve energy and limited fiscal resources through energy efficiency improvements to City facilities and infrastructure.

City of Duarte Sustainable Development Practices

The City of Duarte Sustainable Development Practices is codified in Chapter 19.52, Article 3, of the City's Development Code. This chapter includes guidelines and standards focused on conservation of natural resources, increase in energy efficiency, and also on transit (e.g., transportation demand management, active transit design, etc.). Under this chapter, specific sustainable design requirements are dependent upon the level of development a particular project is categorized based on size (e.g., number of dwelling units, amount of non-residential square footage). There are four levels of development, Level 1 to Level 4, with Level 1 requiring the least requirements and Level 4 requiring the most requirements.

City of Irwindale

City of Irwindale Energy Action Plan

The City of Irwindale also prepared the EAP in conjunction with the San Gabriel Valley Council of Governments and Southern California Edison. Under the premise of meeting the state-recommended GHG reduction target of 15 percent below baseline levels by year 2020, the EAP sets the following energy efficiency targets for Irwindale:

- Support state actions to achieve a 15 percent reduction below baseline community-wide GHG emissions by 2020.

- Achieve a 20 percent reduction in electricity use per capita from the 2008 baseline by 2020.

- Achieve a 15 percent reduction in municipal electricity use from the 2008 baseline by 2020.

Similar to the Duarte EAP, the Irwindale EAP strategy to meet these electricity reduction targets involves setting goals, policies, and implementation actions focused around the same seven topic areas: 1) existing residential buildings, 2) existing nonresidential buildings, 3) new development, 4) planning framework, 5) urban cooling, 6) water and electricity efficiency, and 7) municipal operations. The goals corresponding to these seven topic areas include:

- **Goal 1:** Improve energy efficiency in existing residential development and reduce residential energy costs.
- **Goal 2:** Improve energy efficiency in existing nonresidential development and reduce residential energy costs.
- **Goal 3:** Reduce the average electricity intensity of new construction and move toward net zero construction by 2020.
- **Goal 4:** Create a logical business and regulatory environment that fosters, incentivizes, and prioritizes energy efficiencies.
- **Goal 5:** Maximize use of shading and cooling to sustain a comfortable and energy-efficient urban environment.
- **Goal 6:** Expand knowledge and education related to water conservation and improve water efficiency in new and existing development.

City of Irwindale Green Building Standards Code

The City of Irwindale has incorporated the Los Angeles County Green Building Standards Code, which incorporates the 2013 CALGreen.

5.6.1.3 EXISTING CONDITIONS

The planning area consists of the existing City of Hope medical campus. Operation of the City of Hope generates GHG emissions from natural gas used for energy, heating, and cooking; electricity usage; vehicle trips for staff, patrons, visitors, and deliveries; area sources such as landscaping equipment and consumer cleaning products; water demand; waste generation; and solid waste generation. Table 5.6-5, *Existing Annual Operational Phase GHG Emissions Inventory*, shows the existing emissions currently associated with the City of Hope campus.

Table 5.6-5 Existing Annual Operational Phase GHG Emissions Inventory

Sector	GHG Emissions $MTCO_2e$/Year	Percent of Total
Land Uses		
Area	2	<1%
Energy[1]	13,276	28%
On-Road Transportation[2]	28,524	59%
Solid Waste Disposal	5,499	11%
Water/Wastewater[3]	778	2%
Total	48,080	—
Service Population (SP)[4]	6,448	—
$MTCO_2e$/SP	7.5	—
Stationary Equipment		
Central Utilities Plant[5]	14,354	—

Source: CalEEMod 2016.3.1. Based on IPCC's AR4 GWPs.
Notes: Totals may not add to 100 percent due to rounding.
[1] Existing residential and nonresidential building energy use modeled using historical energy demand rates in CalEEMod.
[2] Transportation emissions are based on trip generation and VMT data provided by Fehr & Peers. Assumed vehicle fleet mix based on the annual average daily trips identified by Caltrans for the segment of Interstate 210 west of interstate 605 (Caltrans 2016a).
[3] Water use is based on the water demand rates provided by KPFF.
[4] Service population based on inpatients, outpatients, and full- and part-time employees (Fehr & Peers 2016).
[5] Emissions are provided by LSA and are based on the existing stationary equipment currently operating at the City of Hope central utilities plant. Per CalEEMod methodology, emissions associated with boilers in the Energy sector are based on building energy demand and are encompassed within the total Energy sector emissions shown. In addition, emissions from permitted stationary equipment such as installed in the central utilities plant (e.g., boilers) are controlled through the SCAQMD permitting process.

5.6.2 Thresholds of Significance

According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would:

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

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

South Coast Air Quality Management District

Permitted GHG Threshold

SCAQMD has adopted a significance threshold of 10,000 $MTCO_2e$ per year for permitted (stationary) sources of GHG emissions for which SCAQMD is the designated lead agency.

Land Use Development Project GHG Thresholds

To provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents, SCAQMD convened a GHG CEQA Significance Threshold Working Group (Working Group).

Based on the last Working Group meeting (Meeting No. 15) in September 2010, SCAQMD identified a tiered approach for evaluating GHG emissions for development projects where SCAQMD is not the lead agency (SCAQMD 2010):

- **Tier 1.** If a project is exempt from CEQA, project-level and cumulative GHG emissions are less than significant.

- **Tier 2.** If the project complies with a GHG emissions reduction plan or mitigation program that avoids or substantially reduces GHG emissions in the project's geographic area (i.e., city or county), project-level and cumulative GHG emissions are less than significant.

For projects that are not exempt or where no qualifying GHG reduction plans are directly applicable, SCAQMD requires an assessment of GHG emissions. SCAQMD Working Group has identified a "bright-line" screening-level threshold of 3,000 $MTCO_2e$ annually for all land use types or the following land-use-specific thresholds: 1,400 $MTCO_2e$ for commercial projects, 3,500 $MTCO_2e$ for residential projects, or 3,000 $MTCO_2e$ for mixed-use projects. These bright-line thresholds are based on a review of the Governor's Office of Planning and Research database of CEQA projects. Based on their review of 711 CEQA projects, 90 percent of CEQA projects would exceed the bright-line thresholds. Therefore, projects that do not exceed the bright-line threshold would have a nominal, and therefore, less than cumulatively considerable impact on GHG emissions:

- **Tier 3.** If GHG emissions are less than the screening-level threshold, project-level and cumulative GHG emissions are less than significant.

- **Tier 4.** If emissions exceed the screening threshold, a more detailed review of the project's GHG emissions is warranted.

The SCAQMD Working Group has identified an efficiency target for projects that exceed the bright-line threshold: a 2020 efficiency target of 4.8 $MTCO_2e$ per year per service population ($MTCO_2e$/year/SP) for project-level analyses and 6.6 $MTCO_2e$/year/SP for plan level projects (e.g., general plans). Service population is generally defined as the sum of residential and employment population of a project. The per capita efficiency targets are based on the AB 32 GHG reduction target and 2020 GHG emissions inventory prepared for CARB's 2008 Scoping Plan.[7]

Project-related GHG emissions include on-road transportation, energy use, water use and wastewater generation, solid waste disposal, area sources, off-road emissions, and construction activities. The SCAQMD Working Group identified that because construction activities would result in a "one-time" net increase in GHG emissions, construction activities should be amortized into the operational phase GHG emissions inventory based on the service life of a building. For buildings, in general, it is reasonable to look at a 30-year time frame, since this is a typical interval before a new building requires the first major renovation.

[7] SCAQMD took the 2020 statewide GHG reduction target for land use only GHG emissions sectors and divided it by the 2020 statewide employment for the land use sectors to derive a per capita GHG efficiency metric that coincides with the GHG reduction targets of AB 32 for year 2020.

For the purpose of this proposed project, SCAQMD's project-level threshold for all land use types is used as the plan-level efficiency metric is more appropriate for general plan-level analysis. If projects exceed the thresholds, GHG emissions would be considered potentially significant in the absence of mitigation measures. However, as the proposed project's horizon year is beyond year 2020 with an anticipated buildout of 2035, the efficiency target has been adjusted based on the mid-term GHG reduction target of SB 32, which establishes a target of 40 percent below 1990 levels by 2030, and the long-term reduction goal of Executive Order S-03-05, which sets a goal of 80 percent below 1990 levels by 2050 (see Table 5.6-6, *Forecasting the Post-2020 GHG Reduction Targets*).

Table 5.6-6 Forecasting the Post-2020 GHG Reduction Targets

1990 Emissions Sector[1]	GHG Emissions $MTCO_2e$/Year	Tailoring the CARB Land Use Inventory
Electricity	95,964,000	Removed Industrial energy use
Transportation	140,906,000	Includes the on-road transportation sector emissions only
Landfills	7,448,000	Landfill extracted from the Industrial sector
Wastewater	3,581,000	Wastewater treatment extracted from the Industrial sector
Commercial	13,873,000	Removed National Security emissions
Residential	29,740,000	Includes all emissions from this sector
Other	1,269,000	Not specified/various
Construction	673,000	—
1990 Land Use Sector Total	**293,454,000**	—
2035 Land Use Sector GHG Target[2]	**146,727,000**	Trend-line: 50 Percent Reduction from 1990 Levels by 2035.
2035 Population and Employment Forecasts	**Demographics**	**Notes**
Population[3]	**44,085,600**	Based the California Department of Finance forecasts
Employment[4]	**20,027,660**	Based on Caltrans socio-economic forecasts
Service Population	**64,113,260**	—
2035 Efficiency Target	**2.3 $MTCO_2e$/SP**	—

Sources:
1 CARB 2016b. Based on AR4 GWPs.
2 Based on the 2030 target of 40 percent below 1990 levels by 2030 under SB 32 and the goal of 80 percent below 1990 levels by 2050 under Executive Order S-03-05.
3 DOF 2016.
4 Caltrans 2016b.

Based on these long-term targets, project emissions are compared to the SCAQMD's project-level efficiency threshold of:

- The 2020 GHG estimated efficiency target would be 4.8 $MTCO_2e$/SP/yr to align with SCAQMD's efficiency target, identified in its CEQA Guidelines, which is consistent with AB 32.
- The 2035 GHG estimated efficiency target would be 2.3 $MTCO_2e$/SP/yr to align with the midterm GHG reduction target of SB 32 and the long-term reduction goal of Executive Order S-03-05.

Calculating Service Population for Nonresidential Uses

Service population is traditionally defined as the number of residents and employees that are generated by a project. The service population metric is derived from CARB's 2008 Scoping Plan. The Scoping Plan identified that, based on the GHG emissions inventories for the state, people living in California generate approximately 14 tons of GHG emissions per capita and need to reduce GHG emissions to approximately 10 tons per capita to meet the GHG reduction target of AB 32. Because people who live in California generally work in California, the service population metric in the Scoping Plan did not include employees. As CEQA significance thresholds were being developed by individual air districts, air districts considered applying this type of efficiency metric to the air district's boundaries. In line with the methodology developed by the Regional Targets Advisory Committee as part of SB 375 target setting discussions, the definition of service population for a local air district was amended to include employees as well as residents because the transportation sector is the primary source of project-related GHG emissions and, unlike the state as a whole, people who work in one county/air district may not live in the same air district/city/county. However, it should be noted that people who live and work within the air district/city/county would also have other trip ends to services such as schools, retail uses, and parks. Therefore, for an air district/city/county as a whole, the per capita metric does not include other users (e.g., park visitors, restaurant patrons, etc.…). However, a project encompasses a much smaller area than an air district/city/county, and for commercial and other nonresidential development projects, the primary users of a site are not only the employees, but patrons as well. Depending on the land use, these may include patients, customers, students, clients, etc. Therefore, for the purpose of this project, whose primary users would be the patients of the City of Hope, the service population includes employees and patients.

5.6.3 Environmental Impacts

Methodology

The analysis in this section is based on buildout of the proposed campus as modeled using CalEEMod, Version 2016.3.1, using 2035 emission rates.

- **Transportation:** GHG emissions are based on the annual average trip generation and vehicle miles traveled data provided by Fehr & Peers (see Appendix J1 of this DEIR). For purposes of this analysis, an average trip distance of 14.3 miles per trip is used for both the existing and project buildout scenarios. Based on the estimated 11,903 average daily trips generated under existing conditions and the 16,645 average daily trips generated under full buildout conditions, approximately 170,213 vehicle miles per day are generated currently, and 238,024 vehicle miles per day would be generated under full buildout conditions (Fehr & Peers 2016).

- **Solid Waste Disposal:** Indirect emissions from waste generation are based on California Department of Resources, Recycling, and Recovery solid waste generation rates for all uses except for the hospital land use, which is based on the solid waste generation rate provided in CalEEMod 2016.3.1.

- **Water/Wastewater:** GHG emissions from this sector are associated with the embodied energy used to supply water, treat water, distribute water, and then treat wastewater and fugitive GHG emissions from wastewater treatment. Emissions are based on average water demand and wastewater generation provided by KPFF (see Appendices K1 and K2).

- **Area Sources:** Area and stationary sources are based on the CalEEMod defaults for use of consumer products and cleaning supplies.

- **Energy:** GHG emissions from this sector are from use of electricity and natural gas by the proposed buildings and the existing buildings. For purposes of this analysis, new buildings are assumed to comply with the 2016 Building Energy Efficiency Standards, which are 5 percent more energy efficient for nonresidential buildings than the 2013 Building Energy Efficiency Standards. In addition, the non-Title 24 energy intensity for the proposed 30,000-square-foot data center is assumed at 800 kilowatt-hours per square foot per year based on information provided by the City of Hope. Lastly, the existing buildings are assumed to comply with the 2005 Building Energy Efficiency Standards.

- **Stationary Sources:** Per CalEEMod methodology, emissions associated with operation of boilers are encompassed within the energy sector emissions associated with building energy demand. In addition, specific planned future improvements to the City of Hope central utilities plant are currently unknown and speculative. Furthermore, any future improvements to the central utilities plant that includes modifications to or the addition of new stationary equipment would require a permit to operate from SCAQMD per SCAQMD Regulation XIII, New Source Review. Permitting would require future CEQA processing and discretionary approval by SCAQMD and provide a control for stationary-source emissions. However, for purposes of this analysis, emissions from the potential installation of two new boilers (Phase 2 and Phase 4) at the existing City of Hope central utilities plant are included for informational purposes only and are not additive to the overall total operational-phase emissions. While two new emergency generators could also be installed, operation of an emergency generator would only occur during emergencies and periodic testing and its operation would be minimal overall. Also, and as stated, installation of a new emergency boiler would be subject to the SCAQMD permitting process. Thus, emissions from the assumed two new boilers are not quantified. Boiler emissions are based on the following:

  - Boilers:
    - Fuel Type: Compressed natural gas
    - Boiler Rating: 4 MMBtu per hour
    - Daily Heat Input Per Boiler: 131.79 MMBtu per day
    - Annual Heat Input Per Boiler: 49,003 MMBtu per year

- **Construction:** Construction emissions are based on the construction information provided by City of Hope (see Section 5.2.3 of this DEIR for further details). Emissions are amortized over a 30-year period and are included as part of the overall inventory.

Life cycle emissions are not included in this analysis because not enough information is available for the proposed project, and therefore life cycle GHG emissions would be speculative.[8] Black carbon emissions are not included in the GHG analysis because CARB does not include this pollutant in the state's AB 32 inventory and treats this short-lived climate pollutant separately.[9]

The following impact analysis addresses thresholds of significance for which the Initial Study disclosed potentially significant impacts. The applicable thresholds are identified in brackets after the impact statement.

Impact 5.6-1: Buildout of the City of Hope Campus Plan would generate a substantial increase in GHG emissions compared to existing conditions and would have a significant impact on the environment. [GHG-1]

Impact Analysis: Global climate change is not confined to a particular project area and is generally accepted as the consequence of global industrialization over the last 200 years. A typical project, even a very large one, does not generate enough greenhouse gas emissions on its own to influence global climate change significantly; hence, the issue of global climate change is, by definition, a cumulative environmental impact.

Implementation of the proposed project would contribute to global climate change through direct emissions of GHG from on-site area sources and vehicle trips generated by the proposed project, and indirectly through off-site energy production required for on-site activities, water use, and waste disposal. Annual GHG emissions were calculated for construction and operation of the proposed project. The emissions associated with the proposed project include emissions associated with the new facilities, the overall growth in the service population (e.g., mobile-source emissions), and the existing remaining facilities. Total construction emissions were amortized over 30 years and included in the emissions inventory to account for the short-term, one-time GHG emissions from the construction phase of the proposed project. The total and net annual GHG emissions associated with full buildout of the proposed project are shown in Table 5.6-7, *Annual Operational Phase GHG Emissions*.

[8] Life cycle emissions include indirect emissions associated with materials manufacture. However, these indirect emissions involve numerous parties, each of which is responsible for GHG emissions of their particular activity. The California Resources Agency, in adopting the CEQA Guidelines Amendments on GHG emissions found that lifecycle analyses was not warranted for project-specific CEQA analysis in most situations, for a variety of reasons, including lack of control over some sources, and the possibility of double-counting emissions (see Final Statement of Reasons for Regulatory Action, December 2009). Because the amount of materials consumed during the operation or construction of the proposed project is not known, the origin of the raw materials purchased is not known, and manufacturing information for those raw materials are also not known, calculation of life cycle emissions would be speculative. A life-cycle analysis is not warranted (OPR 2008).

[9] Particulate matter emissions, which include black carbon, are analyzed in Section 5.2, *Air Quality*. Black carbon emissions have sharply declined due to efforts to reduce on-road and off-road vehicle emissions, especially diesel particulate matter. The State's existing air quality policies will virtually eliminate black carbon emissions from on-road diesel engines within 10 years (CARB 2017a).

Table 5.6-7 Annual Operational Phase GHG Emissions

Sector	GHG Emissions $MTCO_2e$/Year						
	Existing	Phase 1	Phase 2	Phase 3	Full Buildout	Change from Existing	Percent Change from Existing
Land Uses							
Area	2	2	2	2	2	<1	(-19%)
Energy[1]	13,276	18,349	21,373	30,423	31,336	18,061	136%
On-Road Transportation[2]	28,524	23,010	23,125	23,703	25,496	-3,028	(-11%)
Solid Waste Disposal	5,499	4,921	7,577	8,280	8,466	2,967	54%
Water/Wastewater[3]	778	953	1,043	1,104	1,220	442	57%
Amortized Construction[4]	NA	191	366	465	557	557	NA
Total	**48,080**	**47,427**	**53,487**	**63,978**	**67,078**	18,998	40%
SCAQMD Bright-Line Threshold	—	—	—	—	—	3,000	—
Exceed Threshold?	—	—	—	—	—	Yes	—
Full Buildout Service Population (SP)[5]	6,448	—	—	—	9,393	2,945	—
$MTCO_2e$/SP	7.4	—	—	—	7.1	-0.4	—
2035 Per Service Population Threshold[6]	—	—	—	—	2.3	—	—
Exceed Threshold?	—	—	—	—	**Yes**	—	—
New Potential Stationary Sources							
Central Utilities Plant – Boiler[7]	—	—	*2,616*	—	***5,233***	—	—

Source: CalEEMod 2016.3.1. Based on IPCC's AR4 GWPs.
Notes: Totals may not add to 100 percent due to rounding.

1 Existing residential and nonresidential building energy use modeled using historical energy demand rates in CalEEMod. New buildings would achieve the 2016 Building Energy Efficiency Standards which are 5 percent more energy efficient for nonresidential structures compared to the 2013 Building Energy Efficiency Standards. For purposes of this analysis and per the City of Hope, the proposed data center is assumed to have a non-Title 24 electricity usage rate of 800 kWh per square foot per year.

2 Transportation emissions are based on trip generation and VMT data provided by Fehr & Peers. Assumed vehicle fleet mix based on the annual average daily trips identified by Caltrans for the segment of Interstate 210 west of interstate 605 (Caltrans 2016a).

3 Water use is based on the water demand rates provided by KPFF.

4 Total construction emissions during the buildout period are amortized over a 30-year project lifetime in accordance with SCAQMD guidance and incorporated into the operational emissions analysis.

5 Service population based on inpatients, outpatients, and full- and part-time employees (Fehr & Peers 2016).

6 Based on the SCAQMD 2020 per capita target of 4.8 $MTCO_2e$ per service population and extrapolating it for the mid-term year 2030 GHG reduction target of SB 32 and the long term GHG reduction goals of Executive Order S-03-05 for 2050.

7 Shown for informational purposes. For purposes of this analysis, it is assumed a new boiler would be installed at the City of Hope central utilities plant in Phase 2 and Phase 4 for a total of two new boiler units. Per CalEEMod methodology, the Energy sector emissions calculated for land uses encompasses emissions associated with boilers. In addition, installation of new or additional boilers and other stationary equipment such as an emergency generator would require a permit to operate from SCAQMD and would be subject to SCAQMD Regulation XIII, New Source Review.

5. Environmental Analysis
GREENHOUSE GAS EMISSIONS

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As shown in the table, implementation of the proposed project would result in a net increase of 18,998 $MTCO_2e$ per year compared to the existing campus and would exceed SCAQMD's bright-line threshold of 3,000 $MTCO_2e$ per year. Consequently, the proposed project's emissions are compared to the SCAQMD's efficiency threshold. Implementation of the proposed project would generate approximately 7.1 $MTCO_2e$ per service population per year. Implementation of the proposed project under full buildout conditions would result in slightly lower GHG emissions on a per service population basis compared to the existing City of Hope land uses (7.1 $MTCO_2$/SP compared to 7.5 $MTCO_2e$/SP), but the proposed project would exceed the forecast year 2035 efficiency metric threshold of 2.3 $MTCO_2e$ per service population per year. The increase in overall emissions would be attributable to the additional buildings and facilities as well as the increases in the numbers of new employees and people served. Although the newer buildings would be more energy efficient, the proposed project would result in a large increase in overall building space onsite, resulting in an overall increase in energy usage. Overall, the proposed project's cumulative contribution to the long-term GHG emissions impacts in the state would be considered potentially significant.

Impact 5.6-2: Implementation of the proposed City of Hope Campus Plan would not conflict with plans adopted for the purpose of reducing GHG emissions. [Threshold GHG-2]

Impact Analysis: Applicable plans adopted for the purpose of reducing GHG emissions include CARB's Scoping Plan, SCAG's 2016 RTP/SCS, and local GHG reduction plans adopted by the City of Duarte and the City of Irwindale. A consistency analysis with these plans is presented below:

CARB Scoping Plan

The CARB Scoping Plan is applicable to state agencies, but is not directly applicable to cities/counties and individual projects (i.e., the Scoping Plan does not require the City to adopt policies, programs, or regulations to reduce GHG emissions). However, new regulations adopted by the state agencies outlined in the Scoping Plan result in GHG emissions reductions at the local level. As a result, local jurisdictions benefit from reductions in transportation emissions rates, increases in water efficiency in the building and landscape codes, and other statewide actions that would affect a local jurisdiction's emissions inventory from the top down. Statewide strategies to reduce GHG emissions include the low-carbon fuel standard and changes in the corporate average fuel economy standards (e.g., Pavley I and Pavley California Advanced Clean Cars programs).

The proposed project is required to adhere to the programs and regulations identified by the Scoping Plan and implemented by state, regional, and local agencies. The proposed project would comply with these state GHG emissions reduction measures, since they are statewide strategies. For example, the new buildings under the proposed project would meet the applicable CALGreen and Building Energy Efficiency Standards. By 2030, the CEC anticipates that new nonresidential buildings will be required to achieve zero net energy. The proposed project's GHG emissions in Table 5.6-7 include reductions associated with statewide strategies that have been adopted since AB 32. Therefore, the proposed program would not obstruct implementation of the CARB Scoping Plan.

SCAG's Regional Transportation Plan/Sustainable Communities Strategy

SCAG's 2016-2040 RTP/SCS was adopted April 7, 2016. The RTP/SCS identifies multimodal transportation investments, including bus rapid transit, light rail transit, heavy rail transit, commuter rail, high-speed rail, active transportation strategies (e.g., bike ways and sidewalks), transportation demand management strategies, transportation systems management, highway improvements (interchange improvements, high-occupancy vehicle lanes, high-occupancy toll lanes), arterial improvements, goods movement strategies, aviation and airport ground access improvements, and operations and maintenance to the existing multimodal transportation system.

SCAG's RTP/SCS identifies that land use strategies that focus on new housing and job growth in areas served by high quality transit and other opportunity areas would be consistent with a land use development pattern that supports and complements the proposed transportation network. The overarching strategy in the 2016-2040 RTP/SCS is to allow the southern California region to grow in more compact communities in existing urban areas; provide neighborhoods with efficient and plentiful public transit and abundant and safe opportunities to walk, bike, and pursue other forms of active transportation; and preserve more of the region's remaining natural lands (SCAG 2016). The 2016-2040 RTP/SCS transportation projects help more efficiently distribute population, housing, and employment growth and forecast development that is generally consistent with regional-level general plan data. The projected regional development pattern, when integrated with the proposed regional transportation network identified in the RTP/SCS, would reduce per capita vehicular travel-related GHG emissions and achieve the GHG reduction per capita targets for the SCAG region.

As discussed in Impact 5.9-1 and shown in Table 5.9-2 of Chapter 5.9, *Land Use and Planning*, the proposed project would be consistent with the RTP/SCS goals. In addition, as discussed in Impact 5.11-1 of this DEIR, the new jobs anticipated to be created from implementation of the proposed Campus Plan would likely be filled by the local labor force. Based on the existing average service population of 6,448 persons and an estimated 170,585 VMT per day, the current VMT per capita is approximately 26.5 vehicle miles per person. At full buildout, the City of Hope's average daily service population would be 9,393 persons, who would generate approximately 238,553 VMT. This would equate to a VMT per capita of approximately 25.4 vehicle miles per person, which would be a 1-mile per person decrease over existing conditions. Thus, implementation of the proposed Campus Plan would be consistent with the overall RTP/SCS goal of reducing VMT. Therefore, overall, implementation of the proposed City of Hope Campus Plan would not interfere with SCAG's ability to implement the regional strategies in the RTP/SCS.

Local GHG Reduction Plans

City of Duarte Energy Action Plan

Portions of the project site within the City of Duarte would be subject to Duarte's EAP and development standards. Table 5.6-8, *Consistency with the Duarte Energy Action Plan*, evaluates the proposed project's consistency with the goals and policies in the EAP. The EAP goals and policies focus on reducing GHG emissions through reducing citywide and municipal electricity demand (Duarte 2012). As shown in the table, implementation of the City of Hope Campus Plan would replace some of the existing facility buildings with

newer, more energy-efficient buildings that would comply with the current and future Building Energy Efficiency Standards. Additionally, the future individual projects under the proposed City of Hope Campus Plan would comply with the City of Duarte's Sustainable Development Practices (Article 3, Chapter 19.52 of the City of Duarte Development Code), which include a variety of requirements in energy efficiency and water conservation. Furthermore, the City of Hope Campus Plan design guidelines include measures that encourage and promote incorporation and inclusion of design features that would contribute to increasing energy efficiency, reducing energy demand, and conserving water. Therefore, overall, the proposed project would be consistent with the City's EAP.

Table 5.6-8 Consistency with the City of Duarte Energy Action Plan

EAP Goal	EAP Policies	Compliance with Goals
Goal 1: Reduce average household energy costs.	**Policy 1.1:** Propose energy conservation by residents of existing residential structures.	**Not applicable:** This goal is not applicable to the proposed project, which is a medical campus improvement project.
	Policy 1.2: Reduce energy use and plug load demand through upgrades to household appliances and equipment.	
	Policy 1.3: Facilitate voluntary residential energy efficiency improvements through energy benchmarking and retrofit programs.	
	Policy 1.4: Identify opportunities to improve the energy efficiency of renter-occupied housing units.	
Goal 2: Transform Duarte's nonresidential buildings into a model for energy efficient communities.	**Policy 2.1:** Identify opportunities to conserve additional energy resources in the nonresidential building sector.	**Consistent:** The proposed project would replace existing less energy-efficient buildings with newer, more energy-efficient buildings that would comply with the current 2016 Building Energy Efficiency Standards at minimum.
	Policy 2.2: Facilitate retrofits and energy efficiency improvements to existing nonresidential buildings.	
	Policy 2.3: Maximize energy efficiency in large nonresidential facilities greater than 25,000 square feet.	
Goal 3: By 2020, new residential construction with five units or more and new nonresidential construction projects of 25,000 square feet or more in Duarte will have no net impact on community-wide energy demand.	**Policy 3.1:** The City will work with project applicants to maximize the energy-efficient design and orientation of new buildings pursuant to the City's sustainable development practices.	**Consistent:** Implementation of the Specific Plan would comply with Duarte's sustainable development practices (Article 3, Chapter 19.52 of the development code) for the components not subject to the jurisdiction of OSHPD. Duarte's sustainable development practices include compliance with the latest Building Energy Efficiency Standards at minimum and 15 percent and 30 percent beyond the standards for projects categorized as a Level 3 or Level 4 development project; incorporating water efficiency landscape designs; and reducing heat island effect. Components subject to OSHPD jurisdiction would comply with the latest Building Energy Efficiency Standards. Additionally, the proposed Specific Plan design guidelines promote energy efficiency, such as encouraging buildings to integrate photovoltaic
	Policy 3.2: Regularly update the City's sustainable development practices to integrate new or revised building code standards that improve energy efficiency.	
	Policy 3.3: The City will encourage the use of energy-efficient appliances and equipment in new buildings.	

Table 5.6-8 Consistency with the City of Duarte Energy Action Plan

EAP Goal	EAP Policies	Compliance with Goals
		panels and green roofs, incorporation of natural lighting and ventilation, and exceeding local and state energy efficiency building requirements (see the applicable Energy Efficiency and Conservation PDFs, below).
Goal 4: Generate citizen interest and support for an energy efficient local economy.	**Policy 4.1:** Identify funding opportunities and financing programs to support community energy efficiency upgrades and retrofits.	**Not applicable:** This goal is applicable at the city level and is not applicable to the proposed project.
	Policy 4.2: Provide educational opportunities and recognize best practices to support energy efficient behaviors and practices.	
Goal 5: Optimize shading and cooling to reduce community-wide energy demand.	**Policy 5.1:** Increase shading and cooling capacity of the community's urban forest through additional tree planting, preservation of existing trees, and proper maintenance.	**Consistent:** Implementation of the Specific Plan will comply with Duarte's sustainable development practices. Future specific individual projects under the proposed project that are not subject to OSHPD jurisdiction would be subject to minimum sustainable design requirements for the development category they fall into (§ 19.52.020(B) of the development code). At minimum, except for components under OSHPD jurisdiction, all future projects would be required to incorporate designs to reduce the heat island effect. In addition, the proposed Specific Plan design guidelines encourage and promote use of shading design features, such as incorporating the use large specimen trees near major new buildings, creating shading through landscaping or man-made structures in landscaped areas, using shades for south- and west-facing windows (see the applicable Energy Efficiency and Conservation PDFs, below).
	Policy 5.2: Maximize the use of cool roofs and surfaces to reduce building energy use.	
Goal 6: Integrate water conservation efforts into new and existing development to conserve energy used to pump, treat, and convey water.	**Policy 6.1:** Encourage voluntary water conservation, efficient use behaviors, and related energy efficiency efforts in the community.	**Consistent:** Implementation of the Specific Plan would comply with Duarte's sustainable development practices, for components not under OSHPD jurisdiction. Projects would be required to comply with Section 19.52.050(A), Water Conservation, of the development code. Additionally, the Specific Plan irrigation standards encourage use of water-efficient irrigation systems such as drip emitters, evapotranspiration controllers, and moisture sensors (see the Water Conservation PDFs, below).
	Policy 6.2: Promote water efficient landscaping practices.	
	Policy 6.3: Facilitate the use of water-conserving appliances.	
	Policy 6.4: Maximize the efficient use of limited water resources through efficient building and landscaping practices in new development.	

Table 5.6-8 Consistency with the City of Duarte Energy Action Plan

EAP Goal	EAP Policies	Compliance with Goals
Goal 7: Conserve energy and limited fiscal resources through energy conservation improvements to City facilities and infrastructure.	**Policy 7.1:** Implement an energy-efficient procurement policy to ensure the purchase of efficient equipment that will result in energy costs savings that outweigh additional upfront costs.	**Not applicable:** This goal is applicable at the city level and to City facilities and infrastructure only.
	Policy 7.2: Identify additional opportunities to improve the energy efficiency of City facilities.	
	Policy 7.3: Work with the SCVCOG to use regional partners for creation of an energy management position to track energy use at City facilities, identify opportunities for efficiencies and cost savings, and implement energy efficiency projects.	

Source: Duarte 2012.

City of Irwindale Energy Action Plan

Portions of the project site within the City of Irwindale would be subject to Irwindale's EAP. Table 5.6-9, *Consistency with the City of Irwindale Energy Action Plan*, evaluates the proposed project's consistency with the goals and policies in the City's EAP. Implementation of the City of Hope Campus Plan would replace some of the existing facility buildings with newer, more energy-efficient buildings that would comply with the current and future Building Energy Efficiency Standards. Additionally, the Specific Plan design guidelines include measures that encourage and promote incorporation and inclusion of design features that would contribute to increasing energy efficiency, reducing energy demand, and conserving water. Therefore, overall, the proposed project would generally not be inconsistent with the City or Irwindale's EAP.

Table 5.6-9 Consistency with the City of Irwindale Energy Action Plan

EAP Goal	EAP Policies	Compliance with Goals
Goal 1: Improve energy efficiency in existing residential development and reduce residential energy costs.	**Policy 1.1:** Promote the use of energy-efficient appliances and equipment in homes.	**Not applicable:** The City of Hope is a medical campus and only has a few dwelling units to accommodate medical students.
	Policy 1.2: Encourage energy audits so that 30 percent to 40 percent of existing households participate in audits by 2020 and implement retrofits based on audit findings.	
	Policy 1.3: Develop a voluntary energy efficiency checklist at time of residential building sale.	
Goal 2: Improve energy efficiency in existing nonresidential development and reduce [non]-residential energy costs.	**Policy 2.1:** Promote the use of energy-efficient appliances and equipment in businesses.	**Consistent:** The proposed project would replace existing, less energy-efficient buildings with newer, more energy-efficient buildings that would comply with the current 2016 Building Energy Efficiency Standards at minimum. Additionally, the Specific Plan includes design guidelines that promote energy efficiency, such as encouraging buildings to integrate photovoltaic panels and green roofs,
	Policy 2.2: Encourage nonresidential building owners to achieve a 30 percent to 40 percent participation rate in audits by 2020 and implement retrofits based on audit findings.	
	Policy 2.3: Development educational materials and a voluntary energy efficiency checklist at time of nonresidential building sale.	

Table 5.6-9 Consistency with the City of Irwindale Energy Action Plan

EAP Goal	EAP Policies	Compliance with Goals
	Policy 2.4: Maximize energy efficiency in large nonresidential facilities greater than 25,000 square feet.	incorporation of natural lighting and ventilation, and exceeding local and state energy efficiency building requirements (see the applicable Energy Efficiency and Conservation PDFs, below).
Goal 3: Reduce the average electricity intensity of new construction and move toward net zero construction by 2020.	**Policy 3.1:** Increase energy efficiency of all new construction.	**Consistent:** See Goal 2, above.
	Policy 3.2: Encourage the use of smart-grid technology, energy management systems, and energy-efficient appliances and equipment in new buildings.	
	Policy 3.3: Continue to conduct outreach and education to the community.	
Goal 4: Create a local business and regulatory environment that prioritizes energy efficiencies.	**Policy 4.1:** Integrate energy efficiency into the City's discretionary permit review framework.	**Not applicable:** This goal is applicable at the city level and is not applicable to the proposed project.
Goal 5: Maximize use of shading and cooling to sustain a comfortable and energy-efficient urban environment.	**Policy 5.1:** Maximize the cooling of buildings through tree planting and shading to reduce building electricity demands.	**Consistent:** The Specific Plan includes design guidelines encouraging and promoting use of shading design and features, such as incorporating large specimen trees near major new buildings, creation of shading through landscaping or man-made structures in landscaped areas, use of shades for south- and west-facing windows (see the applicable Energy Efficiency and Conservation PDFs, below).
	Policy 5.2: Reduce building electricity demands through voluntary standards and outreach to promote cool roofs and surfaces.	
Goal 6: Expand knowledge and education related to water conservation and improve water efficiency in new and existing development.	**Policy 6.1:** Continue to leverage City resources and programs to encourage water conservation.	**Not applicable:** This goal is applicable at the city level and is not applicable to the proposed project. However, the City of Hope Specific Plan includes irrigation standards that encourage use of water-efficient irrigation systems such as drip emitters, evapotranspiration controllers, and moisture sensors (see the Water Conservation PDFs, below).
	Policy 6.2: Encourage the use of water conserving landscaping practices that reduce electricity used for water pumping.	

Source: Irwindale 2012.

5.6.4 Cumulative Impacts

Project-related GHG emissions are not confined to a particular air basin, but are dispersed worldwide. Therefore, impacts identified under Impact 5.6-1 are not project-specific impacts to global warming, but the proposed project's contribution to this cumulative impact. The recommended mitigation measures would ensure that GHG emissions from buildout of the proposed project would be minimized. With mitigation, GHG emissions and the project's cumulative contribution to global climate change impacts would be less than cumulatively considerable, and therefore, less than significant.

5.6.5 Existing Regulations

This analysis assumes compliance with all applicable laws. The following codes, rules, and regulations pertain to greenhouse gas emissions and were described in detail in Sections 5.6.1.1 of this DEIR and are listed below

State

- California Global Warming Solutions Act (AB 32)
- California Global Warming Solutions Act of 2006: Emissions Limit (SB 32)
- Sustainable Communities and Climate Protection Act (SB 375)
- Greenhouse Gas Emission Reduction Targets (Executive Order S-03-05)
- Clean Car Standards – Pavley (AB 1493)
- Renewables Portfolio Standards (SB 1078)
- California Integrated Waste Management Act of 1989 (AB 939)
- California Mandatory Commercial Recycling Law (AB 341)
- California Advanced Clean Cars CARB (Title 13 CCR)
- Low-Emission Vehicle Program – LEV III (Title 13 CCR)
- Heavy-Duty Vehicle Greenhouse Gas Emissions Reduction Measure (Title 17 CCR)
- Low Carbon Fuel Standard (Title 17 CCR)
- California Water Conservation in Landscaping Act of 2006 (AB 1881)
- California Water Conservation Act of 2009 (SBX7-7)
- Statewide Retail Provider Emissions Performance Standards (SB 1368).
- Airborne Toxics Control Measure to Limit School Bus Idling and Idling at Schools (13 CCR 2480)
- Airborne Toxic Control Measure to Limit Diesel-Fuel Commercial Vehicle Idling (13 CCR 2485)
- In-Use Off-Road Diesel Idling Restriction (13 CCR 2449)
- Building Energy Efficiency Standards (Title 24, Part 6)
- California Green Building Code (Title 24, Part 11)
- Appliance Energy Efficiency Standards (Title 20)

Local

- City of Duarte Sustainable Development Practices, Chapter 19.52, Article 3 of the Development Code
- City of Irwindale Green Building Standards Code, Chapter 15.10, Title 15 of the Municipal Code

5.6.6 Level of Significance Before Mitigation

Upon implementation of regulatory requirements, the following impact would be less than significant: 5.6-2.

Without mitigation, this impact would be **potentially significant**:

- **Impact 5.6-1** Buildout of the City of Hope Campus Plan would generate a substantial increase in GHG emissions compared to existing conditions and would have a significant impact on the environment.

5.6.7 Mitigation Measures

Project Design Features (PDFs)

The following project design features (PDF) would contribute to reducing GHG emissions associated with the proposed project:

Energy Efficiency and Conservation

- Exceeding local and state energy-efficiency building requirements is encouraged.
- Energy-efficient design and natural lighting and ventilation should be used wherever possible.
- The use of materials that reduce heat transfer into and out of buildings (such as light-colored roofing materials) is encouraged.
- Whenever possible, building articulation and form should be expressive of and driven by environmental and site conditions, such as solar orientation, views, noise, prevailing winds, and local climate. South- and west-facing windows should either be tinted or shaded with an overhang, deciduous trees, or awnings to reduce summer exposure.
- Buildings are encouraged to integrate sustainable design features such as photovoltaic panels (especially on top of parking decks), renewable materials with proven longevity, and stormwater treatment where feasible.
- Green roofs may be considered as alternatives to active spaces and to help reduce the urban heat island effect.
- Planting of trees along southern and western building walls is encouraged to reduce the urban heating effect.
- Large specimen trees should be incorporated near major new buildings to provide a signature landscape element and to help increase the building's energy efficiency through additional shading.
- Lighting design should consider the use of control systems that reduce light levels during low-usage times whole not sacrificing uniformity or safety.

Healthy Design

- Recreational amenities should be incorporated on campus, including community gardens, gathering spaces, campus walking paths/routes, and areas for physical activity.
- Buildings should provide visibility and access to active/recreational areas.
- Bicycle storage and infrastructure should be secure, easily accessible and identifiable, and near building entrances.
- To facilitate pedestrian movement, a continuous, unobstructed path of travel must be maintained in any pathway.
- Pedestrian pathways can be used to connect less active outdoor spaces with more active uses.

Water Conservation

- Irrigation systems should use water-conserving methods and water-efficient technologies such as drip emitters, evapotranspiration controllers, and moisture sensors.
- Irrigation systems shall be operated automatically using an electric controller and low-voltage remove control valves.
- Plant material should incorporate native and low-water-use species consistent with the plant palettes recommended by the City of Duarte and City of Irwindale landscape regulations.
- Landscaping areas should use plants that require minimal water resources. Drought-tolerant grasses should be used for lawn areas where possible.

Mitigation Measures

Impact 5.6-1

GHG-1 Prior to the issuance of building permits for new development projects under the City of Hope Specific Plan, the City of Hope shall adhere to and comply with the following sustainable development features for all components of the project that are not subject to the jurisdiction of the Office of Statewide Health Planning and Development (OSHPD):

- Future Alternative Energy Production, Roof Layout Plan. Building orientation and layout shall be designed to facilitate future alternative energy production on-site. The City of Hope shall provide a roof layout plan that illustrates how future installation of a photovoltaic system could be accommodated, including plans that identify installation of conduit from the roof to the electrical room—or to electrical panels if no electrical

room is provided—to accommodate future photovoltaic system or other collector/power generation installation.

- Energy Efficient Appliances. Projects shall incorporate energy-efficient appliances, such as tankless or solar water heaters and energy-efficient heating and cooling systems.
- Transit Stop Improvements. Building entrances and pedestrian walkways shall be designed to provide safe and efficient access to nearby public transit stops. Buildings that abut a transit stop shall install a bus pad, turnouts, benches, trash receptacles (and service), shade/shelter, security lighting, bike racks, water features, and/or landscaping. When practical, the bus stop shall be built into the project and be compatible with the development.
- Alternative Fuel Vehicles. The City of Hope shall provide preferential parking for alternative-fuel vehicles in the parking structures. The alternative-fuel vehicle parking space shall be provided with a sign that identifies the parking space as designated for use by alternative fuel vehicles. Preferential parking spaces shall be as close as possible to the primary entrance without conflicting with parking provided to meet the Americans with Disability Act requirements or preferential parking provided for carpool/vanpools.
- Energy Efficiency, Medium Sized Projects (i.e., nonresidential new construction or modifications of 25,000 to 49,999 square feet of gross floor area). At minimum, the City of Hope shall design medium-sized projects to meet the Tier 1 energy performance standard (Section A5.203.1.2.1) of the 2016 California Green Building Standards Code. If there are applicable local or state standards in effect at the time of project development that would provide higher building energy efficiency than the aforementioned CALGreen Tier 1 performance standard, development projects shall meet those local or state standards.
- Energy Efficiency, Large Sized Projects (i.e., nonresidential new construction or modifications of 50,000 or more square feet of gross floor area). At minimum, the City of Hope shall design large-sized projects to meet the Tier 2 energy performance standard (Section A5.203.1.2.2) of the 2016 California Green Building Standards Code. If there are applicable local or state standards in effect at the time of project development that would provide higher building energy efficiency than the aforementioned CALGreen Tier 2 performance standard, development projects shall meet those local or state standards.
- Energy Efficient Outdoor Lighting. The City of Hope shall provide overnight security and safety lighting or outdoor lighting on timers or motion detection sensors, or otherwise have the capacity to switch to a dimmer, less energy-intensive mode during hours of reduced activity.

- Shading, Medium and Large Size Projects. The City of Hope shall require medium- and large-sized projects to incorporate window shading devices into project design. Window shading devices could include any single or combination of elements, such as extended roof overhangs (i.e., greater than 12 inches), window awnings, decorative sail shades, trellises, or similar elements. Nonglare window tinting may, in appropriate circumstances, function as shading.

- Leadership in Energy and Environmental Design (LEED) Certification. The City of Hope shall design small projects (i.e., nonresidential new construction or modifications of less than 25,000 square feet of gross floor area) and medium projects so that they are built to achieve LEED certification (or its equivalent for design features). The City of Hope shall design large projects so that they are built to achieve LEED Silver compliance (or its equivalent for design features).

- Heat Island Effect. The City of Hope shall use lighter-colored paving or open-grid paving materials for surface parking areas, or break up large expanses of paved area with shade trees or shade structures, or use light colored roofing materials.

All project design features related to the above listed sustainable development features shall be noted on all building plans of future specific projects submitted to the City of Duarte or City of Irwindale, based on the location of the specific project. Adherence to and implementation of all applicable sustainable development features shall be verified by the City of Duarte or City of Irwindale prior to the issuance of a certificate of occupancy.

GHG-2 Components of future development projects within the City of Hope Specific Plan that are subject to the jurisdiction of the Office of Statewide Health Planning and Development (OSHPD) shall be required to comply with Mitigation Measure GHG-1 unless the requirements in these two mitigation measures are in direct conflict with the applicable regulations and building code requirements specific to components/facilities under OSHPD jurisdiction.

5.6.8 Level of Significance After Mitigation

Impact 5.6-1

Implementation of Mitigation Measures GHG-1 and GHG-2 would ensure that GHG emissions generated from implementation of the City of Hope Specific Plan would be minimized to the extent feasible. However, additional federal and state measures would be necessary to reduce GHG emissions to meet the midterm GHG reduction target of SB 32 and the long-term GHG reduction goal of Executive Order and S-03-05, which are, respectively, 40 percent of 1990 levels by 2030 and 80 percent of 1990 levels by 2050. Although the 2017 Scoping Plan Update is being prepared by CARB with a planned adoption in December of 2017, there is currently no adopted statewide plan past 2020 that achieves the midterm GHG reduction target of SB 32 or the long-term GHG reduction goal of S-03-05. Furthermore, at this time, the state cannot meet the 2050 goal without major advancements in technology (CCST 2012). Since no additional federal or state

measures are currently available that would ensure that the City of Hope Specific Plan project could achieve the post-2020 targets, Impact 5.6-1 would remain ***significant and unavoidable***.

5.6.9 References

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