4.7 GREENHOUSE GAS EMISSIONS

4.7.1 INTRODUCTION

This section describes the existing setting of the project site related to greenhouse gas emissions and climate change, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed SDSU New Student Housing Project (project or proposed project). Information used throughout this chapter is primarily based on the Air Quality and Greenhouse Gases Technical Report for the proposed project, prepared by Dudek, and is included as **Appendix C** to this EIR. Additional emission calculations and supporting materials are found in **Appendix N-7** to this EIR.

4.7.2 METHODOLOGY

Information contained in this section is based on data gathered from the project applicant; default assumptions within the California Emissions Estimator Model (CalEEMod), Version 2016.3.1; and best engineering judgment.

Following issuance of the Notice of Preparation (NOP) for the proposed projects, CSU/SDSU received five (5) comment letters from public and private entities related to greenhouse gas emissions. These comment letters were concerning, increased heating and lighting costs, energy consumption and GHG output; requests that the analysis quantify the impacts on solar systems; clean energy potential reductions; increase in pollution; and concern of compliance with both the County and City of San Diego Climate Action Plans.

4.7.3 EXISTING CONDITIONS

4.7.3.1 ENVIRONMENTAL SETTING

The Greenhouse Effect

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind, lasting for an extended period (decades or longer). Gases that trap heat in the atmosphere are often called GHGs. The greenhouse effect traps heat in the troposphere through a threefold process: short-wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and back toward the

Earth. This "trapping" of the long-wave (thermal) radiation emitted back toward the Earth is the underlying process of the greenhouse effect.

The greenhouse effect is a natural process that contributes to regulating the Earth's temperature. Without it, the temperature of the Earth would be about 0˚F (−18˚C) instead of its current 57˚F (15˚C) (Qiancheng 1998). Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect.

Greenhouse Gases

GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), O_3, water vapor, fluorinated gases (hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6) and nitrogen trifluoride (NF_3)), chlorofluorocarbons (CFCs), and hydrochlorofluorocarbons (HCFCs). Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted to the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Manufactured GHGs, which have a much greater heat-absorption potential than CO_2, include fluorinated gases, such as HFCs, PFCs, and SF_6, which are associated with certain industrial products and processes. A summary of the most common GHGs and their sources is included in the following text.[1]

Carbon Dioxide. CO_2 is a naturally occurring gas and a by-product of human activities and is the principal anthropogenic GHG that affects the Earth's radiative balance. Natural sources of CO_2 include respiration of bacteria, plants, animals, and fungus; evaporation from oceans, volcanic out-gassing; and decomposition of dead organic matter. Human activities that generate CO_2 are from the combustion of coal, oil, natural gas, and wood.

Methane. CH_4 is a flammable gas and is the main component of natural gas. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

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[1] The descriptions of GHGs are summarized from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (1995), IPCC Fourth Assessment Report (2007), CARB's Glossary of Terms Used in GHG Inventories (2015), and EPA's Glossary of Climate Change Terms (2016).

Nitrous Oxide. Sources of N_2O include soil cultivation practices (microbial processes in soil and water), especially the use of commercial and organic fertilizers, manure management, industrial processes (such as in nitric acid production, nylon production, and fossil-fuel-fired power plants), vehicle emissions, and the use of N_2O as a propellant (such as in rockets, racecars, aerosol sprays).

Fluorinated Gases. Fluorinated gases (also referred to as F-gases) are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are commonly used as substitutes for stratospheric ozone-depleting substances (e.g., CFCs, HCFCs, and halons). The most prevalent fluorinated gases include the following:

Hydrofluorocarbons: HFCs are compounds containing only hydrogen, fluorine, and carbon atoms. HFCs are synthetic chemicals that are used as alternatives to ozone-depleting substances in serving many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are used in manufacturing.

Perfluorocarbons: PFCs are a group of human-made chemicals composed of carbon and fluorine only. These chemicals were introduced as alternatives, along with HFCs, to the ozone depleting substances. The two main sources of PFCs are primarily aluminum production and semiconductor manufacturing. Since PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere, these chemicals have long lifetimes, ranging between 10,000 and 50,000 years.

Sulfur Hexafluoride: SF_6 is a colorless gas that is soluble in alcohol and ether and slightly soluble in water. SF_6 is used for insulation in electric power transmission and distribution equipment, semiconductor manufacturing, the magnesium industry, and as a tracer gas for leak detection.

Nitrogen trifluoride: NF_3 is used in the manufacture of a variety of electronics, including semiconductors and flat panel displays.

Chlorofluorocarbons. CFCs are synthetic chemicals that have been used as cleaning solvents, refrigerants, and aerosol propellants. CFCs are chemically unreactive in the lower atmosphere (troposphere) and the production of CFCs was prohibited in 1987 due to the chemical destruction of stratospheric O_3.

Hydrochlorofluorocarbons. HCFCs are a large group of compounds, whose structure is very close to that of CFCs—containing hydrogen, fluorine, chlorine, and carbon atoms—but including one or more hydrogen atoms. Like HFCs, HCFCs are used in refrigerants and

propellants. HCFCs were also used in place of CFCs for some applications; however, their use in general is being phased out.

Black Carbon. Black carbon is a component of fine particulate matter, which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation, and darkens the surface of snow and ice, which accelerates heat absorption and melting. Black carbon is a short-lived species that varies spatially, which makes it difficult to quantify the global warming potential. Diesel particulate matter emissions are a major source of black carbon and are also TACs that have been regulated and controlled in California for several decades to protect public health. In relation to declining diesel particulate matter from CARB's regulations pertaining to diesel engines, diesel fuels, and burning activities, the CARB estimates that annual black carbon emissions in California have reduced by 70% between 1990 and 2010, with 95% control expected by 2020 (CARB 2014b).

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

Ozone. Tropospheric O_3, which is created by photochemical reactions involving gases from both from natural sources and from human activities, acts as a GHG. Stratospheric O_3, which is created by the interaction between solar ultraviolet radiation and molecular oxygen (O_2), plays a decisive role in the stratospheric radiative balance. Depletion of stratospheric O_3, due to chemical reactions that may be enhanced by climate change, results in an increased ground-level flux of ultraviolet-B radiation.

Aerosols. Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light.

Global Warming Potential

Gases in the atmosphere can contribute to climate change both directly and indirectly. Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the

atmospheric lifetimes of other gases, and/or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo) (EPA 2014).

The Intergovernmental Panel on Climate Change (IPCC) developed the global warming potential (GWP) concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP of a GHG is defined as the ratio of the time-integrated radiative forcing from the instantaneous release of 1 kilogram of a trace substance relative to that of 1 kilogram of a reference gas (IPCC 2014). The reference gas used is CO_2; therefore, GWP-weighted emissions are measured in metric tons of CO_2 equivalent (MT CO_2E).

The current version of the CalEEMod, version 2016.3.1, assumes that the GWP for CH_4 is 25 (which means that emissions of one MT of CH_4 are equivalent to emissions of 25 MT of CO_2), and the GWP for N_2O is 298, based on the IPCC Fourth Assessment Report (IPCC 2007). The GWP values identified in CalEEMod were applied to the project.

Contributions to Greenhouse Gas Emissions

Per the EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2013 (2015), total United States GHG emissions were approximately 6,870.5 million metric tons (MMT) CO_2E in 2014. The primary GHG emitted by human activities in the United States was CO_2, which represented approximately 80.9% of total GHG emissions (5,556.0 MMT CO_2E). The largest source of CO_2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 93.7% of CO_2 emissions in 2014 (5,208.2 MMT CO_2E). Total United States GHG emissions have increased by 7.4% from 1990 to 2014, and emissions increased from 2013 to 2014 by 1.0% (70.5 MMT CO_2E). Since 1990, United States GHG emissions have increased at an average annual rate of 0.3%; however, overall, net emissions in 2014 were 8.6% below 2005 levels (EPA 2015).

According to California's 2000–2014 GHG emissions inventory (2016 edition), California emitted 441.5 MMT CO_2E in 2014, including emissions resulting from out-of-state electrical generation (CARB 2016d). The sources of GHG emissions in California include transportation, industry, electric power production from both in-state and out-of-state sources, residential and commercial activities, agriculture, high global-warming potential substances, and recycling and waste. The California GHG emission source categories and their relative contributions in 2014 are presented in **Table 4.7-1**.

Table 4.7-1
GHG Emissions Sources in California

Source Category	Annual GHG Emissions (MMT CO_2E)	Percent of Total[a]
Transportation	159.53	36%
Industrial uses	93.32	21%
Electricity generation[b]	88.24	20%
Residential and commercial uses	38.34	9%
Agriculture	36.11	8%
High global warming potential substances	17.15	4%
Recycling and waste	8.85	2%
Totals	**441.54**	**100%**

Source: CARB 2016d.

Notes: Emissions reflect the 2014 California GHG inventory.

MMT CO_2E = million metric tons of CO_2 equivalent per year

[a] Percentage of total has been rounded, and total may not sum due to rounding.

[b] Includes emissions associated with imported electricity, which account for 36.51 MMT CO_2E annually.

During the 2000 to 2014 period, per capita GHG emissions in California have continued to drop from a peak in 2001 of 13.9 metric tons (MT) per person to 11.4 MT per person in 2014, representing an 18% decrease. In addition, total GHG emissions in 2014 were 2.8 MMT CO_2E less than 2013 emissions. The declining trend in GHG emissions, coupled with programs that will continue to provide additional GHG reductions going forward, demonstrates that California is on track to meet the statewide 2020 target of 431 MMT CO_2E established by Assembly Bill 32, discussed in the following text (CARB 2016d).

Potential Effects of Human Activity on Climate Change

Globally, climate change has the potential to affect numerous environmental resources through uncertain impacts related to future air temperatures and precipitation patterns. The 2014 Intergovernmental Panel on Climate Change Synthesis Report indicated that warming of the climate system is unequivocal and since the 1950s, many of the observed changes are unprecedented over decades to millennia. Signs that global climate change has occurred include warming of the atmosphere and ocean, diminished amounts of snow and ice, and rising sea levels (IPCC 2014).

In California, climate change impacts have the potential to affect sea level rise, agriculture, snowpack and water supply, forestry, wildfire risk, public health, and electricity demand and supply. The primary effect of global climate change has been a 0.2˚C rise in average global tropospheric temperature per decade, determined from meteorological measurements

worldwide between 1990 and 2005. Scientific modeling predicts that continued emissions of GHGs at or above current rates would induce more extreme climate changes during the twenty-first century than were observed during the twentieth century. A warming of about 0.2˚C (0.36˚F) per decade is projected, and there are identifiable signs that global warming could be taking place.

Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. A scientific consensus confirms that climate change is already affecting California. The average temperatures in California have increased, leading to more extreme hot days and fewer cold nights; shifts in the water cycle have been observed, with less winter precipitation falling as snow, and both snowmelt and rainwater running off earlier in the year; sea levels have risen; and wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010a).

An increase in annual average temperature is a reasonably foreseeable effect of climate change. Observed changes over the last several decades across the western United States reveal clear signals 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 by 4.1˚F to 8.6˚F, depending on emissions levels. Springtime warming—a critical influence on snowmelt—will be particularly pronounced. Summer temperatures will rise more than winter temperatures, and the increases will be greater in inland California, compared to the coast. Heat waves will be more frequent, hotter, and longer. There will be fewer extremely cold nights. A decline of Sierra snowpack, which accounts for approximately half of the surface water storage in California and much of the State's water supply, by 30% to as much as 90% is predicted over the next 100 years (CAT 2010a).

Model projections for precipitation over California continue to show the Mediterranean pattern of wet winters and dry summers with seasonal, year-to-year, and decade-to-decade variability. For the first time, however, several of the improved climate models shift toward drier conditions by the mid-to-late 21st century in Central and, most notably, Southern California. By late-century, all projections show drying, and half of them suggest 30-year average precipitation will decline by more than 10% below the historical average (CAT 2010a).

A summary of current and future climate change impacts to resource areas in California, as discussed in the Safeguarding California: Reducing Climate Risk (NRA 2014), is provided in the following text.

Agriculture. The impacts of climate change on the agricultural sector are far more severe than the typical variability in weather and precipitation patterns that occur year to year. Some of the specific challenges faced by the agricultural sector and farmers include more drastic and unpredictable precipitation and weather patterns; extreme weather events that range from severe flooding to extreme drought, to destructive storm events; significant shifts in water availably and water quality; changes in pollinator lifecycles; temperature fluctuations, including extreme heat stress and decreased chill hours; increased risks from invasive species and weeds, agricultural pests and plant diseases; and disruptions to the transportation and energy infrastructure supporting agricultural production. These challenges and associated short-term and long-term impacts can have both positive and negative effects on agricultural production. Nonetheless, it is predicted that current crop and livestock production will suffer long-term negative effects resulting in a substantial decrease in the agricultural sector if not managed or mitigated (NRA 2014).

Biodiversity and Habitat. The state's extensive biodiversity stems from its varied climate and assorted landscapes, which have resulted in numerous habitats where species have evolved and adapted over time. Specific climate change challenges to biodiversity and habitat include species migration in response to climatic changes, range shift, and novel combinations of species; pathogens, parasites and disease; invasive species; extinction risks; changes in the timing of seasonal life-cycle events; food web disruptions; and threshold effects (i.e., a change in the ecosystem that results in a "tipping point" beyond which irreversible damage or loss has occurs). Habitat restoration, conservation, and resource management across California and through collaborative efforts amongst public, private and nonprofit agencies has assisted in the effort to fight climate change impacts on biodiversity and habitat. One of the key measures in these efforts is ensuring species' ability to relocate as temperature and water availability fluctuate as a result of climate change, based on geographic region.

Energy. The energy sector provides California residents with a supply of reliable and affordable energy through a complex integrated system. Specific climate change challenges for the energy sector include temperature, fluctuating precipitation patterns, increasing extreme weather events and sea level rise. Increasing temperatures and reduced snowpack negatively impact the availability of a steady flow of snowmelt to hydroelectric reservoirs. Higher temperatures also reduce the capacity of thermal power plants since power plant cooling is less efficient at higher

ambient temperatures. Natural gas infrastructure in coastal California is threatened by sea level rise and extreme storm events (NRA 2014).

Forestry. Forests occupy approximately 33% of California's 100 million acres and provide key benefits such as wildlife habitat, absorption of CO_2, renewable energy and building materials. The most significant climate change related risk to forests is accelerated risk of wildfire and more frequent and severe droughts. Droughts have resulted in more large scale mortalities and combined with increasing temperatures have led to an overall increase in wildfire risks. Increased wildfire intensity subsequently increases public safety risks, property damage, fire suppression and emergency response costs, watershed and water quality impacts and vegetation conversions. These factors contribute to decreased forest growth, geographic shifts in tree distribution, loss of fish and wildlife habitat and decreased carbon absorption. Climate change may result in increased establishment of non-native species, particularly in rangelands where invasive species are already a problem. Invasive species may be able to exploit temperature or precipitation changes, or quickly occupy areas denuded by fire, insect mortality or other climate change effects on vegetation (NRA 2014).

Ocean and Coastal Ecosystems and Resources. Sea level rise, changing ocean conditions and other climate change stressors are likely to exacerbate long-standing challenges related to ocean and coastal ecosystems in addition to threatening people and infrastructure located along the California coastline and in coastal communities. Sea level rise in addition to more frequent and severe coastal storms and erosion are threatening vital infrastructure such as roads, bridges, power plants, ports and airports, gasoline pipes, and emergency facilities, as well as negatively impacting the coastal recreational assets such as beaches and tidal wetlands. Water quality and ocean acidification threaten the abundance of seafood and other plant and wildlife habitats throughout California and globally (NRA 2014).

Public Health. Climate change can impact public health through various environmental changes and is the largest threat to human health in the twenty-first century. Changes in precipitation patterns affect public health primarily through potential for altered water supplies, and extreme events such as heat, floods, droughts, and wildfires. Increased frequency, intensity and duration of extreme heat and heat waves is likely to increase the risk of mortality due to heat related illness as well as exacerbate existing chronic health conditions. Other extreme weather events are likely to negatively impact air quality and increase or intensify respiratory illness such as asthma and allergies. Additional health impacts that may be impacted by climate change include cardiovascular disease, vector-borne diseases, mental health impacts, and malnutrition

injuries. Increased frequency of these ailments is likely to subsequently increase the direct risk of injury and/or mortality (NRA 2014).

Transportation. Residents of California rely on airports, seaports, public transportation and an extensive roadway network to gain access to destinations, goods and services. While the transportation industry is a source of GHG emissions it is also vulnerable to climate change risks. Particularly, sea level rise and erosion threaten many coastal California roadways, airports, seaports, transit systems, bridge supports, and energy and fueling infrastructure. Increasing temperatures and extended periods of extreme heat threaten the integrity of the roadways and rail lines. High temperatures cause the road surfaces to expand which leads to increased pressure and pavement buckling. High temperatures can also cause rail breakages, which could lead to train derailment. Other forms of extreme weather events, such as extreme storm events, can negatively impact infrastructure which can impair movement of peoples and goods, or potentially block evacuation routes and emergency access roads. Increased wildfires, flooding, erosion risks, landslides, mudslides, and rockslides can all profoundly impact the transportation system and pose a serious risk to public safety (NRA 2014).

Water. Water resources in California support residences, plants, wildlife, farmland, landscapes and ecosystems and bring trillions of dollars in economic activity. Climate change could seriously impact the timing, form, amount of precipitation, runoff patterns, and frequency and severity of precipitation events. Higher temperatures reduce the amount of snowpack and lead to earlier snowmelt, which can impact water supply availability, natural ecosystems and winter recreation. Water supply availability during the intense dry summer months is heavily dependent on the snowpack accumulated during the winter time. Increased risk of flooding has a variety of public health concerns including water quality, public safety, property damage, displacement and post-disaster mental health problems. Prolonged and intensified droughts can also negatively groundwater reserves and result in increased overdraft and subsidence. Droughts can also negatively impact agriculture and farmland throughout the state. The higher risk of wildfires can lead to increased erosion, which can negatively impact watersheds and result in poor water quality. Water temperatures are also prone to increase, which can negatively impact wildlife that rely on a specific range of temperatures for suitable habitat (NRA 2014).

4.7.4 RELEVANT PLANS, POLICIES, AND ORDINANCES

Federal

Massachusetts vs. EPA

On April 2, 2007, in *Massachusetts v. EPA*, the Supreme Court directed the U.S. Environmental Protection Agency (EPA) Administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the EPA Administrator is required to follow the language of Section 202(a) of the Clean Air Act (CAA). On December 7, 2009, the Administrator signed a final rule with two distinct findings regarding GHGs under Section 202(a) of the CAA:

- The Administrator found that elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the "endangerment finding."
- The Administrator further found the combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the CAA.

Energy Independence and Security Act

On December 19, 2007, President Bush signed the Energy Independence and Security Act of 2007. Among other key measures, the Act would do the following, which would aid in the reduction of national GHG emissions:

1. Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
2. Set a target of 35 miles per gallon (mpg) for the combined fleet of cars and light trucks by model year 2020 and direct National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy project for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.

3. Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

Federal Vehicle Standards

On April 1, 2010, the EPA and NHTSA announced a joint final rule to establish new standards for light-duty vehicles model years 2012 through 2016. The joint rule is intended to reduce GHG emissions and improve fuel economy and became effective on July 6, 2010 (75 FR 25324–25728).

The EPA GHG standards require new passenger cars, light-duty trucks, and medium-duty passenger vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile in model year 2016, equivalent to 35.5 mpg if the automotive industry were to meet this CO_2 level through fuel economy improvements alone. The Corporate Average Fuel Economy (CAFE) standards for passenger cars and light trucks were phased in between 2012 and 2016, with the final standards equivalent to 37.8 mpg for passenger cars and 28.8 mpg for light trucks, resulting in an estimated combined average of 34.1 mpg. Together, these standards will cut GHG emissions by an estimated 960 MMT and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the project. The rules will simultaneously reduce GHG emissions, improve energy security, increase fuel savings, and provide clarity and predictability for manufacturers (EPA 2011).

In August 2012, the EPA and NHTSA approved a second round of GHG and CAFE standards for model years 2017 and beyond (77 FR 62623–63200). These standards will reduce motor vehicle GHG emissions to 163 grams of CO_2 per mile, which is equivalent to 54.5 mpg if this level were achieved solely through improvements in fuel efficiency, for cars and light-duty trucks by model year 2025. A portion of these improvements, however, will likely be made through improvements in air conditioning leakage and through use of alternative refrigerants, which would not contribute to fuel economy. The first phase of the CAFE standards, for model year 2017 to 2021, are projected to require, on an average industry fleet-wide basis, a range from 40.3 to 41.0 mpg in model year 2021. The second phase of the CAFE project, for model years 2022 to 2025, are projected to require, on an average industry fleet-wide basis, a range from 48.7 to 49.7 mpg in model year 2025. The second phase of standards have not been finalized due to the statutory requirement that NHTSA set average fuel economy standards not more than five model years at a time. The regulations also include targeted incentives to encourage early

adoption and introduction into the marketplace of advanced technologies to dramatically improve vehicle performance, including:

- Incentives for electric vehicles, plug-in hybrid electric vehicles, and fuel cells vehicles.
- Incentives for hybrid technologies for large pickups and for other technologies that achieve high fuel economy levels on large pickups.
- Incentives for natural gas vehicles.
- Credits for technologies with potential to achieve real-world greenhouse gas reductions and fuel economy improvements that are not captured by the standards test procedures.

In August 2016, the EPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all types and sizes of buses and work trucks. The final standards are expected to lower CO2 emissions by approximately 1.1 billion MT and reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program (EPA and NHTSA 2016).

Climate Action Plan

In June 2013, President Obama issued a national Climate Action Plan (Plan) that consisted of a wide variety of executive actions and had three pillars: (1) cut carbon in America, (2) prepare the U.S. for impacts of climate change, and (3) lead international efforts to combat global climate change and prepare for its impacts (EOP 2013).

The Plan outlines 75 goals within the three main pillars.

1. *Cut Carbon in America* – The Plan consists of actions to help cut carbon by deploying clean energy, such as cutting carbon from power plants, promoting renewable energy, and unlocking long-term investment in clean energy innovation. In addition, the Plan includes actions designed to help build a 21st century transportation sector; cut energy waste in homes, businesses, and factories; and reduce other GHG emissions, such as HFCs and methane. The Plan commits to lead in clean energy and energy efficiency at the federal level.
2. *Prepare the U.S. for Impacts of Climate Change* – The Plan consists of actions to help prepare for the impacts of climate change through building stronger and safer communities and infrastructure, supporting climate resilient investments, supporting

communities and tribal areas as they prepare for impacts, and boosting resilience of building and infrastructure; protecting the economy and natural resources by identifying vulnerabilities, promoting insurance leadership, conserving land and water resources, managing drought, reducing wildfire risks, and preparing for future floods; and using sound science to manage climate impacts.

3. ***Lead International Efforts*** – The Plan consists of actions to help the U.S. lead international efforts through working with other countries to take action by enhancing multilateral engagements with major economies, expanding bilateral cooperation with major emerging economies, combating short-lived climate pollutants, reducing deforestation and degradation, expanding clean energy use and cutting energy waste, global free trade in environmental goods and services, and phasing out subsidies that encourage wasteful use of fossil fuels and by leading efforts to address climate change through international negotiations.

In June 2014, the Center for Climate and Energy Solutions (C2ES) published a 1-year review of progress in implementation of the Plan (C2ES 2014). The C2ES found that the administration had made marked progress in its initial implementation. The administration made at least some progress on most of the Plan's 75 goals, and many of the specific tasks outlined had been completed. Notable areas of progress included steps to limit carbon pollution from power plants; improve energy efficiency; reduce CH_4 and HFC emissions; help communities and industry become more resilient to climate change impacts; and end U.S. lending for coal-fired power plants overseas.

U.N. Framework Convention on Climate Change Pledge

On March 31, 2015, the State Department submitted the U.S. target to cut net GHG emissions to the United Nations Framework Convention on Climate Change. The submission, referred to as an Intended Nationally Determined Contribution, is a formal statement of the U.S. target, announced in China last year, to reduce our emissions by 26%–28% below 2005 levels by 2025, and to make best efforts to reduce by 28% (C2ES 2016).

The target reflects a planning process that examined opportunities under existing regulatory authorities to reduce emissions in 2025 of all GHGs from all sources in every economic sector. Several U.S. laws, as well as existing and proposed regulations thereunder, are relevant to the implementation of the U.S. target, including the Clean Air Act (42 U.S.C. 7401 et seq.), the Energy Policy Act (42 U.S.C. 13201 et seq.), and the Energy Independence and Security Act (42 U.S.C. 17001 et seq.).

Clean Power Plan and New Source Performance Standards for Electric Generating Units

On October 23, 2015, EPA published a final rule (effective December 22, 2015) establishing the Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (80 FR 64510–64660), also known as the Clean Power Plan. These guidelines prescribe how states must develop plans to reduce GHG emissions from existing fossil-fuel-fired electric generating units. The guidelines establish CO_2 emission performance rates representing the best system of emission reduction for two subcategories of existing fossil-fuel-fired electric generating units: (1) fossil-fuel-fired electric utility steam-generating units, and (2) stationary combustion turbines. Concurrently, EPA published a final rule (effective October 23, 2015) establishing Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (80 FR 64661–65120). The rule prescribes CO_2 emission standards for newly constructed, modified, and reconstructed affected fossil-fuel-fired electric utility generating units. Implementation of the Clean Power Plan has been stayed by the U.S. Supreme Court pending resolution of several lawsuits.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA published the Final Mandatory Greenhouse Gas Reporting Rule (Reporting Rule) in the Federal Register. The Reporting Rule requires reporting of GHG data and other relevant information from fossil fuel and industrial GHG suppliers, vehicle and engine manufacturers, and all facilities that would emit 25,000 MT CO_2E or more per year. Facility owners are required to submit an annual report with detailed calculations of facility GHG emissions on March 31 for emissions from the previous calendar year. The Reporting Rule also mandates recordkeeping and administrative requirements to enable EPA to verify the annual GHG emissions reports.

Council on Environmental Quality Guidance

On August 1, 2016, the Council on Environmental Quality (CEQ) released final guidance for federal agencies on considering the impacts of GHG emissions in NEPA reviews (CEQ 2016). This guidance supersedes the draft GHG and climate change guidance released by CEQ in 2010 and 2014. The final guidance applies to all proposed federal agency actions, including land and resource management actions. This guidance explains that agencies should consider both the potential effects of a proposed action on climate change, as indicated by its estimated GHG emissions, and the implications of climate change for the environmental effects of a proposed action. The guidance recommends that agencies quantify a proposed agency action's projected

direct and indirect GHG emissions, taking into account available data and GHG quantification tools that are suitable for the proposed agency action.

State

Executive Order (EO) S-3-05

EO S-3-05 (June 2005) established the following goals: GHG emissions should be reduced to 2000 levels by 2010, GHG emissions should be reduced to 1990 levels by 2020, and GHG emissions should be reduced to 80% below 1990 levels by 2050. Under EO S-3-05, the California Environmental Protection Agency is directed to report biannually on progress made toward meeting the GHG targets and the impacts to California due to global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry. The Climate Action Team was formed, which subsequently issued the 2006 Climate Action Team Report to Governor Schwarzenegger and the Legislature (CAT 2006).

The 2009 Climate Action Team Biennial Report (CAT 2010b) expands on the policy outlined in the 2006 assessment. The 2009 report identifies the need for additional research in several different aspects that affect climate change to support effective climate change strategies. Subsequently, the 2010 Climate Action Team Report to Governor Schwarzenegger and the California Legislature (CAT 2010a) reviews past climate action milestones including voluntary reporting programs, GHG standards for passenger vehicles, the Low Carbon Fuel Standard, a statewide renewable energy standard, and the cap-and-trade program.

Assembly Bill (AB) 32

In furtherance of the goals established in EO S-3-05, the legislature enacted AB 32 (Núñez and Pavley), the California Global Warming Solutions Act of 2006 (September 27, 2006). AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020, representing a reduction of approximately 15% below emissions expected under a "business-as-usual" scenario.

CARB has been assigned responsibility for carrying out and developing the programs and requirements necessary to achieve the goals of AB 32. Under AB 32, CARB must adopt regulations requiring the reporting and verification of statewide GHG emissions. This program will be used to monitor and enforce compliance with the established standards. CARB is also required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 also authorized CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately

responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted. These efforts target GHG emission reductions from cars and trucks, electricity production, fuels, and other sources. The full implementation of AB 32 will help mitigate risks associated with climate change while improving energy efficiency, expanding the use of renewable energy resources and cleaner transportation, and reducing waste.

Of relevance to this analysis, in 2007, CARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline (427 MMT CO_2E). CARB's adoption of this limit is in accordance with Health and Safety Code Section 38550. In addition to the 1990 emissions inventory, CARB also adopted regulations requiring mandatory reporting of GHGs for the large facilities that account for 94% of GHG emissions from industrial and commercial stationary sources in California.

Further, in 2008, CARB adopted the Climate Change Scoping Plan: A Framework for Change (Scoping Plan) in accordance with Health and Safety Code, Section 38561. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various emission sources/sectors to 1990 levels by 2020. The 2020 emissions limit was set at 427 MMT of CO_2E. The Scoping Plan establishes an overall framework for a suite of measures that will be adopted to sharply reduce California's GHG emissions. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction features by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. The key elements of the Scoping Plan include the following (CARB 2008):

1. Expanding and strengthening existing energy efficiency programs as well as building and appliance standards
2. Achieving a statewide renewable energy mix of 33%
3. Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85% of California's GHG emissions
4. Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets

5. Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard
6. Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation

In the Scoping Plan, CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5% from the otherwise projected 2020 emissions level; i.e., those emissions that would occur in 2020, absent GHG-reducing laws and regulations (referred to as "Business-As-Usual" (BAU)). For example, in further explaining CARB's BAU methodology, CARB assumed that all new electricity generation would be supplied by natural gas plants, no further regulatory action would impact vehicle fuel efficiency, and building energy efficiency codes would be held at 2005 standards.

In the 2011 Final Supplement to the Scoping Plan's Functional Equivalent Document, CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations. Based on the new economic data, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7% (down from 28.5%) from the BAU conditions. When the 2020 emissions level projection also was updated to account for newly implemented regulatory measures, including Pavley I (model years 2009–2016) and the Renewable Portfolio Standard (12% to 20%), CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16% (down from 28.5%) from the BAU conditions.

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

In the First Update, CARB identified "six key focus areas comprising major components of the state's economy to evaluate and describe the larger transformative actions that will be needed to

meet the state's more expansive emission reduction needs by 2050" (CARB 2014b). Those six areas are: (1) energy, (2) transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure), (3) agriculture, (4) water, (5) waste management, and (6) natural and working lands. The First Update identifies key recommended actions for each sector that will facilitate achievement of Executive Order S-3-05's 2050 reduction goal.

Based on CARB's research efforts presented in the First Update, CARB has a "strong sense of the mix of technologies needed to reduce emissions through 2050." Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings and industrial machinery; decarbonizing electricity and fuel supplies; and, the rapid market penetration of efficient and clean energy technologies.

As part of the First Update, CARB recalculated the state's 1990 emissions level using more recent GWPs identified by the IPCC. Using the recalculated 1990 emissions level (431 MMT CO_2E) and the revised 2020 emissions level projection identified in the 2011 Final Supplement, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 15% (instead of 28.5% or 16%) from the BAU conditions. The update also recommends that a statewide mid-term target and mid-term and long-term sector targets be established toward meeting the 2050 goal established by EO S-3-05 (i.e., reduce California's GHG emissions to 80% below 1990 levels), although no specific recommendations are made.

On January 20, 2017, CARB released The 2017 Climate Change Scoping Plan Update (Second Update) for public review and comment (CARB 2017). This update to the scoping plan proposes CARB's strategy for achieving the states 2030 GHG target, including continuing the Cap-and-Trade Program through 2030 and includes a new approach to reduce GHGs from refineries by 20%. The Second Update incorporates approaches to cutting super pollutants from the Short Lived Climate Pollutants Strategy and acknowledges the need for reducing emissions in agriculture and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon. During development of the Second Update, CARB held a number of public workshops in the Natural and Working Lands, Agriculture, Energy and Transportation sectors. When discussing project-level GHG emissions reduction actions and thresholds, the Second Update states "achieving no net increase in GHG emissions is the correct overall objective, but it may not be appropriate or feasible for every development project. And the inability to mitigate a project's GHG emissions to zero does not necessarily imply a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA." It is expected that the Second Update will be considered by CARB in June 2017.

EO B-30-15

EO B-30-15 (April 2015) identified an interim GHG reduction target in support of targets previously identified under S-3-05 and AB 32. EO B-30-15 set an interim target goal of reducing GHG emissions to 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing GHG emissions to 80% below 1990 levels by 2050 as set forth in S-3-05. To facilitate achievement of this goal, EO B-30-15 calls for an update to CARB's Scoping Plan to express the 2030 target in terms of MMT CO_2E. The EO also calls for state agencies to continue to develop and implement GHG emission reduction programs in support of the reduction targets. Sector-specific agencies in transportation, energy, water, and forestry were required to prepare GHG reduction plans by September 2015, followed by a report on action taken in relation to these plans in June 2016. EO B-30-15 does not require local agencies to take any action to meet the new interim GHG reduction threshold.

SB 32 and AB 197

SB 32 and AB 197 (enacted in 2016) are companion bills that set a new statewide GHG reduction targets; make changes to CARB's membership, and increase legislative oversight of CARB's climate change-based activities; and expand dissemination of GHG and other air quality-related emissions data to enhance transparency and accountability. SB 32 codified the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40% below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of the Senate and three members of the Assembly, in order to provide ongoing oversight over implementation of the state's climate policies. AB 197 also added two members of the Legislature to CARB as nonvoting members; requires CARB to make available and update (at least annually via its website) emissions data for GHGs, criteria air pollutants, and TACs from reporting facilities; and, requires CARB to identify specific information for GHG emissions reduction measures when updating the scoping plan.

EO B-18-12

EO B-18-12 (April 2012) directs state agencies, departments, and other entities under the governor's executive authority to take action to reduce entity-wide GHG emissions by at least 10% by 2015 and 20% by 2020, as measured against a 2010 baseline. EO B-18-12 also established goals for existing state buildings for reducing grid-based energy purchases and water use.

SB 605

SB 605 (September 2014) requires CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants in the state no later than January 1, 2016. As defined in the statute, short-lived climate pollutant means "an agent that has a relatively short lifetime in the atmosphere, from a few days to a few decades, and a warming influence on the climate that is more potent than that of carbon dioxide" (SB 605). SB 605, however, does not prescribe specific compounds as short-lived climate pollutants or add to the list of GHGs regulated under AB 32. In developing the strategy, the CARB must complete an inventory of sources and emissions of short-lived climate pollutants in the state based on available data, identify research needs to address any data gaps, identify existing and potential new control measures to reduce emissions, and prioritize the development of new measures for short-lived climate pollutants that offer co-benefits by improving water quality or reducing other criteria air pollutants that impact community health and benefit disadvantaged communities. The *Proposed Short-Lived Climate Pollution Reduction Strategy* released by CARB in April 2016 focuses on CH_4, black carbon, and fluorinated gases, particularly HFCs, as important short-lived climate pollutants. The strategy recognizes emission reduction efforts implemented under AB 32 (e.g., refrigerant management programs) and other regulatory programs (e.g., in-use diesel engines, solid waste diversion) along with additional measures to be developed.

Building Energy

Title 24, Part 6

Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically establishes Building Energy Efficiency Standards that are designed to ensure new and existing buildings in California achieve energy efficiency and preserve outdoor and indoor environmental quality. The California Energy Commission (CEC) is required by law to adopt standards every 3 years that are cost effective for homeowners over the 30-year lifespan of a building (CEC 2013). These standards are updated to consider and incorporate new energy efficient technologies and construction methods. As a result, these standards save energy, increase electricity supply reliability, increase indoor comfort, avoid the need to construct new power plants, and help preserve the environment.

The 2016 Title 24 building energy efficiency standards, which became effective on January 1, 2017, further reduce energy used and associated GHG emissions. In general, single-family homes built to the 2016 standards are anticipated to use about 28% less energy for lighting,

heating, cooling, ventilation, and water heating than those built to the 2013 standards, and nonresidential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards (CEC 2015).

Although the proposed project would be required, at a minimum, to comply with 2016 Title 24 standards because its building construction phase would commence after January 1, 2017, this analysis conservatively does not quantify the increase energy efficiency associated with the 2016 Title 24 standards but instead reflects the parameters of the 2013 Title 24 standards that were used to establish the default parameters of CalEEMod.

Title 24, Part 11

In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CALGreen, and establishes minimum mandatory standards as well as voluntary standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and interior air quality. The CALGreen standards took effect in January 2011 and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential and state-owned buildings and schools and hospitals. The CALGreen 2016 standards became effective on January 1, 2017. The mandatory standards require the following (24 CCR Part 11):

- Mandatory reduction in indoor water use through compliance with specified flow rates for plumbing fixtures and fittings
- Mandatory reduction in outdoor water use through compliance with a local water efficient landscaping ordinance or the California Department of Water Resources' Model Water Efficient Landscape Ordinance
- 65% of construction and demolition waste must be diverted from landfills
- Mandatory inspections of energy systems to ensure optimal working efficiency
- Inclusion of electric vehicle charging stations or designated spaces capable of supporting future charging stations
- Low-pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring, and particle boards

The CALGreen standards also include voluntary efficiency measures that are provided at two separate tiers and implemented at the discretion of local agencies and applicants. CALGreen's Tier 1 standards call for a 15% improvement in energy requirements, stricter water conservation, 65% diversion of construction and demolition waste, 10% recycled content in building materials, 20% permeable paving, 20% cement reduction, and cool/solar-reflective roofs. CALGreen's more rigorous Tier 2 standards call for a 30% improvement in energy requirements, stricter water conservation, 75% diversion of construction and demolition waste, 15% recycled content in building materials, 30% permeable paving, 25% cement reduction, and cool/solar-reflective roofs.

The California Public Utilities Commission, CEC, and CARB also have a shared, established goal of achieving zero net energy for new construction in California. The key policy timelines include: (1) all new residential construction in California will be zero net energy by 2020, and (2) all new commercial construction in California will be zero net energy by 2030.[2]

Title 20

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

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[2] See CPUC's California's Zero Net Energy Policies and Initiatives (Sept. 18, 2013) (http://www.cpuc.ca.gov/NR/rdonlyres/C27FC108-A1FD-4D67-AA59- 7EA82011B257/0/3.pdf). It is expected that achievement of the zero net energy goal will occur via revisions to the Title 24 standards.

AB 1493

In a response to the transportation sector accounting for more than half of California's CO_2 emissions, AB 1493 (Pavley) was enacted in July 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles that are primarily used for noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22% in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards will result in a reduction of about 30%.

EO S-1-07

Issued on January 18, 2007, EO S-1-07 sets a declining Low Carbon Fuel Standard for GHG emissions measured in CO_2E grams per unit of fuel energy sold in California. The target of the Low Carbon Fuel Standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered. CARB adopted the implementing regulation in April 2009. The regulation is expected to increase the production of biofuels, including those from alternative sources, such as algae, wood, and agricultural waste. In addition, the Low Carbon Fuel Standard would drive the availability of plug-in hybrid, battery electric, and fuel-cell power motor vehicles. The Low Carbon Fuel Standard is anticipated to lead to the replacement of 20% of the fuel used in motor vehicles with alternative fuels by 2020.

SB 375

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

Strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

Pursuant to Government Code Section 65080(b)(2)(K), a sustainable communities strategy does not: (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it. Nonetheless, SB 375 makes regional and local planning agencies responsible for developing those strategies as part of the federally required metropolitan transportation planning process and the state-mandated housing element process.

In 2010, CARB adopted the SB 375 targets for the regional metropolitan planning organizations. The targets for the SANDAG are a 7% reduction in emissions per capita by 2020 and a 13% reduction by 2035.

SANDAG completed and adopted its 2050 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) in October 2011. In November 2011, CARB, by resolution, accepted SANDAG's GHG emissions quantification analysis and determination that, if implemented, the SCS would achieve CARB's 2020 and 2035 GHG emissions reduction targets for the region.

After SANDAG's 2050 RTP/SCS was adopted, a lawsuit was filed by the Cleveland National Forest Foundation and others. That case presently is pending before the California Supreme Court (Case No. S223603).

Although the EIR for SANDAG's 2050 RTP/SCS is still pending before the California Supreme Court, SANDAG recently adopted the next iteration of its RTP/SCS in accordance with statutorily mandated timelines. More specifically, in October 2015, SANDAG adopted San Diego Forward: The Regional Plan. Like the 2050 RTP/SCS, this planning document meets CARB's 2020 and 2035 reduction targets for the region (SANDAG 2015).

Advanced Clean Car Program

In January 2012, CARB approved the Advanced Clean Cars program, a new emissions-control program for model years 2015 through 2025. The program combines the control of smog- and soot-causing pollutants and GHG emissions into a single coordinated package. The package includes elements to reduce smog-forming pollution, reduce GHG emissions, promote clean cars, and provide the fuels for clean cars (CARB 2012). To improve air quality, CARB has implemented new emission standards to reduce smog-forming emissions beginning with 2015

model year vehicles. It is estimated that in 2025 cars will emit 75% less smog-forming pollution than the average new car sold today. To reduce GHG emissions, CARB, in conjunction with the EPA and the NHTSA, has adopted new GHG standards for model year 2017 to 2025 vehicles; the new standards are estimated to reduce GHG emissions by 34% in 2025. The zero-emission vehicle program will act as the focused technology of the Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of zero-emission vehicles and plug-in hybrid electric vehicles in the 2018 to 2025 model years. The Clean Fuels Outlet regulation will ensure that fuels such as electricity and hydrogen are available to meet the fueling needs of the new advanced technology vehicles as they come to the market.

EO B-16-12

EO B-16-12 (March 2012) directs state entities under the Governor's direction and control to support and facilitate development and distribution of zero-emission vehicles. This EO also sets a long-term target of reaching 1.5 million zero-emission vehicles on California's roadways by 2025. On a statewide basis, EO B-16-12 also establishes a GHG emissions reduction target from the transportation sector equaling 80% less than 1990 levels by 2050.

SB 1078

SB 1078 (Sher) (September 2002) established the Renewable Portfolio Standard (RPS) program, which requires an annual increase in renewable generation by the utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. This goal was subsequently accelerated, requiring utilities to obtain 20% of their power from renewable sources by 2010 (see SB 107, EOs S-14-08, and S-21-09.)

SB 1368

In September 2006, Governor Schwarzenegger signed SB 1368, which requires the CEC to develop and adopt regulations for GHG emission performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by the California Public Utilities Commission (CPUC). This effort will help protect energy customers from financial risks associated with investments in carbon-intensive generation by allowing new capital investments in power plants whose GHG emissions are as low as or lower than new combined-cycle natural gas plants by requiring imported electricity to meet GHG performance standards in California and by requiring that the standards be developed and adopted in a public process.

EO S-14-08

EO S-14-08 (November 2008) focuses on the contribution of renewable energy sources to meet the electrical needs of California while reducing the GHG emissions from the electrical sector. This EO requires that all retail suppliers of electricity in California serve 33% of their load with renewable energy by 2020. Furthermore, the EO directs state agencies to take appropriate actions to facilitate reaching this target. The CNRA, through collaboration with the CEC and California Department of Fish and Wildlife (formerly the California Department of Fish and Game), is directed to lead this effort. Pursuant to a Memorandum of Understanding between the CEC and California Department of Fish and Wildlife regarding creating the Renewable Energy Action Team, these agencies will create a "one-stop" process for permitting renewable energy power plants.

EO S-21-09

EO S-21-09 (September 2009) directed CARB to adopt a regulation consistent with the goal of EO S-14-08 by July 31, 2010. CARB is further directed to work with the CPUC and CEC to ensure that the regulation builds upon the RPS program and is applicable to investor-owned utilities, publicly owned utilities, direct access providers, and community choice providers. Under this order, CARB is to give the highest priority to those renewable resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health and can be developed the most quickly in support of reliable, efficient, cost-effective electricity system operations. On September 23, 2010, CARB adopted regulations to implement a Renewable Electricity Standard, which would achieve the goal of the EO with the following intermediate and final goals: 20% for 2012–2014, 24% for 2015–2017, 28% for 2018–2019, and 33% for 2020 and beyond. Under the regulation, wind; solar; geothermal; small hydroelectric; biomass; ocean wave, thermal, and tidal; landfill and digester gas; and biodiesel would be considered sources of renewable energy. The regulation would apply to investor-owned utilities and public (municipal) utilities.

SB X1 2

SB X1 2 (April 2011) expanded the RPS by establishing a goal of 20% of the total electricity sold to retail customers in California per year by December 31, 2013, and 33% by December 31, 2020, and in subsequent years. Under the bill, a renewable electrical generation facility is one that uses biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts or less, digester gas, municipal solid waste

conversion, landfill gas, ocean wave, ocean thermal, or tidal current, and that meets other specified requirements with respect to its location. In addition to the retail sellers covered by SB 107, SB X1 2 adds local, publicly owned electric utilities to the RPS. By January 1, 2012, the CPUC is required to establish the quantity of electricity products from eligible renewable energy resources to be procured by retail sellers to achieve targets of 20% by December 31, 2013; 25% by December 31, 2016; and 33% by December 31, 2020. The statute also requires that the governing boards for local, publicly owned electric utilities establish the same targets, and the governing boards would be responsible for ensuring compliance with these targets. The CPUC will be responsible for enforcement of the RPS for retail sellers, while the CEC and CARB will enforce the requirements for local publicly owned electric utilities.

SB 350

SB 350 (October 2015) expands the RPS by establishing a goal of 50% of the total electricity sold to retail customers in California per year by December 31, 2030. In addition, SB 350 includes the goal to double the energy efficiency savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses on which an energy-efficiency program is focused) of retail customers through energy conservation and efficiency. The bill also requires the CPUC, in consultation with the CEC, to establish efficiency targets for electrical and gas corporations consistent with this goal. SB 350 also provides for the transformation of the California Independent System Operator into a regional organization to promote the development of regional electricity transmission markets in the western states and to improve the access of consumers served by the California Independent System Operator to those markets, pursuant to a specified process.

EO B-29-15

In response to the ongoing drought in California, EO B-29-15 (April 2015) set a goal of achieving a statewide reduction in potable urban water usage of 25% relative to water use in 2013. The term of the EO extended through February 28, 2016, although many of the directives have become permanent water-efficiency standards and requirements. The EO includes specific directives that set strict limits on water usage in the state. In response to EO B-29-15, the California Department of Water Resources has modified and adopted a revised version of the Model Water Efficient Landscape Ordinance that, among other changes, significantly increases the requirements for landscape water use efficiency and broadens its applicability to include new development projects with smaller landscape areas.

Solid Waste

AB 939 341

In 1989, AB 939, known as the Integrated Waste Management Act (California Public Resources Code Section 40000 et seq.), was passed because of the increase in waste stream and the decrease in landfill capacity. The statute established the California Integrated Waste Management Board, which oversees a disposal reporting system. AB 939 mandated a reduction of waste being disposed where jurisdictions were required to meet diversion goals of all solid waste through source reduction, recycling, and composting activities of 25% by 1995 and 50% by the year 2000.

AB 341

(Chapter 476, Statutes of 2011 (Chesbro)) amended the California Integrated Waste Management Act of 1989 to include a provision declaring that it is the policy goal of the state that not less than 75% of solid waste generated be source-reduced, recycled, or composted by the year 2020, and annually thereafter. In addition, AB 341 required the California Department of Resources Recycling and Recovery (CalRecycle) to develop strategies to achieve the state's policy goal. CalRecycle conducted several general stakeholder workshops and several focused workshops and in August 2015 published a discussion document titled AB 341 Report to the Legislature, which identifies five priority strategies that CalRecycle believes would assist the state in reaching the 75% goal by 2020, legislative and regulatory recommendations, and an evaluation of program effectiveness.

Increasing the amount of commercial solid waste that is recycled, reused, or composted will reduce GHG emissions primarily by (1) reducing the energy requirements associated with the extraction, harvest, and processing of raw materials; and (2) using recyclable materials that require less energy than raw materials to manufacture finished products (CalRecycle 2015). Increased diversion of organic materials (green and food waste) will also reduce GHG emissions (CO_2 and CH_4) resulting from decomposition in landfills by redirecting this material to processes that use the solid waste material to produce vehicle fuels, heat, electricity, or compost.

Other State Regulations and Goals

The California State University

SDSU has signed the American College and University Presidents' Climate Commitment (PCC). The PCC requires campuses to set a goal for climate neutrality, develop climate action plans, and implement steps to reduce GHG emissions.

Additionally, on May 20, 2014, the California State University Sustainability Policy was adopted by the Board of Trustees of the California State University. That Policy states that the CSU shall reduce systemwide facility GHG emissions to 1990 levels, or below, by 2020 consistent with AB 32 (CSU 2014). The CSU Policy also set a goal for the CSU to reduce facility GHG emissions to 80% below 1990 levels by 2040. The CSU Policy also encourages the use of alternative transportation and/or alternative fuels to reduce GHG emissions related to university associated transportation, including commuter and business travel. The Policy also aims to procure renewable energy either on-site or off-site up to 80 megawatts by 2020. The Policy requires all CSU buildings and facilities to operate in the most energy efficient manner. The Policy also has goals and requirements for water conservation, waste management, sustainable procurement, sustainable food service, and sustainable building practices, all of which have direct or indirect effects on CSU GHG emissions.

EO S-13-08

EO Order S-13-08 (November 2008) is intended to hasten California's response to the impacts of global climate change, particularly sea-level rise. It directs state agencies to take specified actions to assess and plan for such impacts. It directs the CNRA, in cooperation with the California Department of Water Resources, CEC, California's coastal management agencies, and the Ocean Protection Council, to request that the National Academy of Sciences prepare a Sea Level Rise Assessment Report by December 1, 2010. The Ocean Protection Council, California Department of Water Resources, and CEC, in cooperation with other state agencies, are required to conduct a public workshop to gather information relevant to the Sea Level Rise Assessment Report. The Business, Transportation, and Housing Agency was ordered to assess within 90 days of issuance of the EO the vulnerability of the state's transportation systems to sea-level rise. The Governor's Office of Planning and Research and the CNRA are required to provide land use planning guidance related to sea-level rise and other climate change impacts. The EO also required the other state agencies to develop adaptation strategies by June 9, 2009, to respond to the impacts of global climate change that are predicted to occur over the next 50 to 100 years. A discussion draft adaptation strategies report was released in August 2009, and the final 2009 California Climate Adaptation Strategy report was issued in December 2009 (NRA 2009). An update to the 2009 report, Safeguarding California: Reducing Climate Risk, was issued in July 2014 (NRA 2014). To assess the state's vulnerability, the report summarizes key climate change impacts to the state for the following areas: agriculture, biodiversity and habitat, emergency management, energy, forestry, ocean and coastal ecosystems and resources, public health, transportation, and water.

2015 State of the State Address

In January 2015, Governor Brown in his inaugural address and annual report to the Legislature established supplementary goals which would further reduce GHG emissions over the next 15 years. These goals include an increase in California's renewable energy portfolio from 33% to 50%, a reduction in vehicle petroleum use for cars and trucks by up to 50%, measures to double the efficiency of existing buildings, and decreasing emissions associated with heating fuels.

2016 State of the State Address

In his January 2016 address, Governor Brown established a statewide goal to bring per capita GHG emission down to 2 tons per person, which reflects the goal of the Global Climate Leadership Memorandum of Understanding (Under 2 MOU; OPR 2016 to limit global warming to less than 2˚C by 2050. The Under 2 MOU agreement pursues emission reductions of 80% to 95% below 1990 levels by 2050 and/or reach a per capita annual emissions goal of less than two metric tons by 2050. A total of 135 jurisdictions representing 32 countries and 6 continents, including California, have signed or endorsed the Under 2 MOU (OPR 2016).

Local

City of San Diego General Plan

The State of California requires cities and counties to prepare and adopt a general plan to set out a long-range vision and comprehensive policy framework for its future. The state also mandates that the plan be updated periodically to ensure relevance and utility. The City of San Diego General Plan 2008 (General Plan) was unanimously adopted by the City Council on March 10, 2008, with additional amendments approved in December 2010 and January 2012. The General Plan builds upon many of the goals and strategies of the former 1979 General Plan, in addition to offering new policy direction in the areas of urban form, neighborhood character, historic preservation, public facilities, recreation, conservation, mobility, housing affordability, economic prosperity, and equitable development. It recognizes and explains the critical role of the community planning project as the vehicle to tailor the City of Villages strategy for each neighborhood. It also outlines the plan amendment process, and other implementation strategies, and considers the continued growth of the City beyond the year 2020 (City of San Diego 2008).

Climate Action Plan for San Diego State University

In March 2014, the San Diego State University (SDSU) President signed Second Nature's "American College and University Presidents' Climate Commitment" (Carbon Commitment), demonstrating the campus' commitment to sustainability by agreeing to achieve campus wide carbon neutrality by 2050 (SDSU 2017). In furtherance of the Carbon Commitment, the SDSU Climate Action Plan (CAP) was issued on May 1, 2017. The CAP provides background information on the campus' sustainability initiatives; presents a GHG inventory for campus-related activities; sets GHG emissions reduction goals; details activity-specific assessments, visions, and actions; and provides a draft energy and sustainability policy.

Based on information presented in the CAP, 48.4% of the campus' GHG emissions come from its natural gas cogeneration power plant (28.0% is attributable to electricity and 20.4% is attributable to steam), 30.8% of emissions come from student commuting, and 10.8% (6.1% to faculty/staff commuting and 4.7% to air travel) come from SDSU transportation, with the remaining 10.0% from purchased electricity, solid waste, water/wastewater, and other.

The following goals are presented within the CAP:

- GHG Emission-Reduction Goals
  - Reach 1990 campus wide carbon emissions levels by 2020
  - Reach 1990 operational emissions levels by 2025
  - Reach operational carbon neutrality by 2040
  - Reach campus wide carbon neutrality by 2050
- Water Goals
  - Reduce water usage 25 percent below 2013 levels by 2020
  - Reduce water usage 30 percent below 2013 levels by 2025
- Waste Goals
  - Divert 50 percent of non-construction and demolition waste by 2020
  - Divert 60 percent of total waste by 2020
  - Divert 80 percent of total waste by 2025

A climate action planning council was formed to oversee and coordinate the development of the CAP. The council includes representatives from SDSU administration, staff, faculty, and students. SDSU also formed working groups to complete a baseline campus wide GHG

emissions inventory. Much of the data gathered for the inventory came from utility bills, and for transportation, a survey was sent out to all campus faculty, staff, administration, and students to determine the means by which and distance they commute to campus. This inventory data provided SDSU CAP collaborators with the baseline needed to strategize GHG reduction priorities for the campus. In addition to faculty, staff, students, and administration collaborating on the CAP, outside consultants also contributed to the document. The principal author of the CAP was Tom Abram, the Assistant Director for Campus Sustainability, Facilities Services.

Although the SDSU CAP fulfills many of the requirements enumerated in CEQA Guidelines Section 15183.5 (Tiering and Streamlining the Analysis of GHG Emissions), it does not comply with subsection (b)(1)(F), which requires the plan to be adopted in a public process following environmental review. Because the SDSU CAP is not a qualified "Plan for the Reduction of GHG Emissions" as set forth in the CEQA Guidelines, it may not be used in a cumulative impacts analysis within a CEQA document to ~~ab~~determine the significance of impacts per CEQA Guidelines Section 15064.4(b)(3). However, the CAP may be included in a CEQA document for information purposes. Accordingly, the SDSU New Student Housing Project's consistency with the SDSU CAP is provided in Appendix N-6 for informational purposes only.

City of San Diego General Plan Conservation Element

The Conservation Element contains policies to guide the conservation of resources that are fundamental components of San Diego's environment, that help define the City's identity, and that are relied upon for continued economic prosperity. The purpose of this element is to help the City become an international model of sustainable development and conservation and to provide for the long-term conservation and sustainable management of the rich natural resources that help define the City's identity, contribute to its economy, and improve its quality of life.

The City has also adopted the following General Plan Conservation Element policies related to climate change:

- **CE-A.2.** Reduce the City's carbon footprint. Develop and adopt new or amended regulations, projects, and incentives as appropriate to implement the goals and policies set forth in the General Plan to:
    - Create sustainable and efficient land use patterns to reduce vehicular trips and preserve open space;

  - Reduce fuel emission levels by encouraging alternative modes of transportation and increasing fuel efficiency;
  - Improve energy efficiency, especially in the transportation sector and buildings and appliances;
  - Reduce the Urban Heat Island effect through sustainable design and building practices, as well as planting trees (consistent with habitat and water conservation policies) for their many environmental benefits, including natural carbon sequestration;
  - Reduce waste by improving management and recycling projects;
  - Plan for water supply and emergency reserves.

- **CE-A.8.** Reduce construction and demolition waste in accordance with Public Facilities Element, Policy PF-1.2, or by renovating or adding on to existing buildings, rather than constructing new buildings.
- **CE-A.9.** Reuse building materials, use materials that have recycled content, or use materials that are derived from sustainable or rapidly renewable sources to the extent possible, through factors including:
  - Scheduling time for deconstruction and recycling activities to take place during project demolition and construction phases;
  - Using life cycle costing in decision-making for materials and construction techniques. Life cycle costing analyzes the costs and benefits over the life of a particular product, technology, or system.
- **CE-F.3.** Continue to use methane as an energy source from inactive and closed landfills.
- **CE-I.4.** Maintain and promote water conservation and waste diversion projects to conserve energy.
- **CE-I.5.** Support the installation of photovoltaic panels, and other forms of renewable energy production.
  - Seek funding to incorporate renewable energy alternatives in public buildings.
  - Promote the use and installation of renewable energy alternatives in new and existing development.
- **CE-I.10.** Use renewable energy sources to generate energy to the extent feasible.

City of San Diego Climate Action Plan

On January 29, 2002, the San Diego City Council unanimously approved the San Diego Sustainable Community Program. Actions identified include:

1. Participation in the Cities for Climate Protection (CCP) program coordinated through the International Council of Local Environmental Initiatives (ICLEI);
2. Establishment of a 15% GHG reduction goal set for 2010, using 1990 as a baseline; and
3. Direction to use the recommendations of a scientific Ad Hoc Advisory Committee as a means to improve the GHG Emission Reduction Action Plan within the City organization and to identify additional community actions.

In 2005, the City released a Climate Protection Action Plan. In December 2015, the City adopted its final Climate Action Plan (CAP) (City of San Diego 2015). A Program Environmental Impact Report (PEIR) was prepared for the City's Draft CAP, which was certified in December 2015. With implementation of the CAP, the City aims to reduce emissions 15% below the baseline to approximately 11.1 MMT CO_2E by 2020, 40% below the baseline to approximately 7.8 MMT CO_2E by 2030, and 50% below the baseline to approximately 6.5 MMT CO_2E by 2035. It is anticipated that the City would exceed its reduction target by 1.3 MMT CO_2E in 2020, 176,528 MT CO_2E in 2030, and 127,135 MT CO_2E in 2035 with implementation of the CAP.

Through 2020, the CAP meets the requirements set forth in CEQA Guidelines section 15183.5, whereby a lead agency (e.g., the City of San Diego) may analyze and mitigate the significant effects of GHG emissions at a programmatic level, such as in a general plan, a long range development plan, or a separate plan to reduce GHG emissions. On July 12, 2016, The City amended the CAP to include a Consistency Review Checklist, which is intends to provide a streamlined review process for the GHG emissions analysis of proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to CEQA.

4.7.5 THRESHOLDS OF SIGNIFICANCE

The California Natural Resources Agency, through its December 2009 amendments to the CEQA Guidelines (14 CCR 15000 et seq.), and the City of San Diego, through its interim guidance for assessment of GHG emissions, provide a framework for the evaluation of the GHG emissions associated with construction and operation of the project components. The state's and City's guidance are discussed below.

State of California

The significance criteria used to evaluate the project impacts to greenhouse gases/climate change are based on Appendix G of the CEQA Guidelines. According to Appendix G of the CEQA Guidelines, a significant impact related to greenhouse gas emissions would occur if the project would:

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

Neither the State of California nor the SDAPCD has adopted emission-based thresholds for GHG emissions under CEQA. The Office of Planning and Research's (OPR's) Technical Advisory titled CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review states that "public agencies are encouraged but not required to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the project contributes to a significant, cumulative climate change impact" (OPR 2008). Furthermore, the advisory document indicates in the third bullet item on page 6 that "in the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a 'significant impact,' individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice."

City of San Diego

The City of San Diego's latest update to the CEQA Significance Determination Thresholds document in July 2016 added a GHG emission threshold section. Pursuant to CEQA Guidelines sections 15183.5(b), 15064(h)(3), and 15130(d), the City may determine that a project's incremental contribution to a cumulative GHG effect is not cumulatively considerable if the project complies with the requirements of a previously adopted GHG emission reduction plan.

An environmental document that relies on a GHG emissions reduction plan for a cumulative impacts analysis must identify those requirements specified in the plan that apply to the project, and if those requirements are not otherwise binding and enforceable, incorporate those requirements as mitigation measures applicable to the project, in accordance with CEQA Guidelines Section 15183.5(b)(2).

The City's CAP was adopted by the City Council on December 15, 2015. The Climate Action Plan quantifies existing GHG emissions as well as projected emissions for the years 2020, 2030, and 2035 resulting from activities within the City's jurisdiction. CSU/SDSU is a state agency and is therefore not subject to this plan. However, the following discussion is provided for informational purposes.

Under the City's CEQA Thresholds, the method for determining significance for project-level environmental documents is through the CAP Consistency Checklist (City of San Diego 2016). The CAP Consistency Checklist, adopted July 12, 2016, is the primary document used by the City of San Diego to ensure project-by-project consistency with the underlying assumptions in the CAP and that the City would achieve its emission reduction targets identified in the CAP. The CAP Checklist includes a 3-step process to determine project consistency. Step 1 consists of an evaluation to determine the project's consistency with existing General Plan, Community and zoning designations for the site. If the project is able to answer "yes" to Step 1 and demonstrate the project would be consistent with existing General Plan, Community Plan and zoning designations for the site, or the project can demonstrate consistency with existing land uses by comparing the proposed project's GHG emissions with those that would be generated under existing land uses, then the project may proceed to Step 2. If the project must answer "no" to Step 1, then the project would be deemed inconsistent with the CAP and GHG impacts as identified under CEQA would be considered significant and unavoidable.

Step 2 includes the list of measures each project would be required to implement. Regardless of whether the project would answer "yes" or "no" to Step 1, implementation of the measures listed in Step 2 would be required for all projects, if applicable.

Step 3 would only be applicable for projects that would not be consistent with existing land use designations, and would not be consistent with planned site land use GHG emissions, but that would be located in a Transit Priority Area (TPA) as defined by the City's Development Services Department. In accordance with SB 743, TPAs are defined as "an area within one-half mile of a major transit stop that is existing or planned, if the planned stop is scheduled to be completed within the planning horizon included in a Transportation Improvement Program adopted pursuant to Section 450.216 or 450.322 of Title 23 of the Code of Federal Regulations (City of San Diego 2016). Appendix B of the CAP includes a map of TPAs as designated by the City (see Appendix B, "Transit Priority Areas per SB 743"). The TPAs map is based on the adopted SANDAG San Diego Forward Regional Plan. SDSU is located within a TPA as defined and shown in the City's CAP.

4.7.6 IMPACTS ANALYSIS

Following issuance of the Notice of Preparation (NOP) for the proposed projects, CSU/SDSU received five (5) comment letters from public and private entities related to greenhouse gas emissions. These comment letters were concerning~~,~~ increased heating and lighting costs, energy consumption and GHG output; requests that the analysis quantify the impacts on solar systems; clean energy potential reductions; increase in pollution; and concern of compliance with both the County and City of San Diego Climate Action Plans. The analysis presented below addresses each of these topics.

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

Construction Impacts

General Approach and Methodology

GHG emissions would be associated with the construction phase of the project components through use of construction equipment and vehicle trips. Emissions of CO_2E were estimated using the California Emissions Estimator Model (CalEEMod), Version 2016.3.1, available online (www.caleemod.com). ~~The proposed project consists of three construction phases. Phase I includes Residence Hall 3 and the Food Service Building; Phase II includes Residence Hall 4; and Phase III includes Residence Halls 1 and 2.~~ For the purposes of modeling, it was assumed that construction of project components would commence in November 2017 ~~for Phase I~~ and final facilities ~~in Phase III~~ would be completed by~~may come online as late as September~~ June ~~2025~~2019. The detailed project construction phasing is shown in **Chapter 2, Project Description**, of this EIR.

The construction assumptions in **Chapter 2** of this EIR also apply to estimating the GHG emissions from construction of the project. The combustion of fuels from construction equipment, worker vehicle trips, vendor trips, and hauling trips all generate GHG emissions. Additionally, the project proposed using electric cranes and aerial lifts for certain phases of the project. The GHG emissions associated with electricity use for those equipment were also quantified.

Table 4.7-2, Estimated Annual Construction GHG Emissions, shows the estimated annual GHG construction emissions associated with the project~~, as well as the annualized construction emissions over a 30-year "project life."~~ Complete details of the emissions calculations are provided in **Appendix C**~~N~~-7.

Table 4.7-2
Estimated Annual Construction GHG Emissions

Year	CO_2	CH_4	N_2O	CO_2E
	Metric Tons per Year			
2017	~~164.63~~148.45	~~0.04~~0.03	0.00	~~165.58~~149.30
2018	~~496.54~~440.94	~~0.10~~0.05	0.00	~~499.15~~442.29
2019	~~336.16~~326.27	~~0.07~~0.03	0.00	~~337.79~~326.98
~~2020~~	~~169.78~~	~~0.03~~	~~0.00~~	~~170.41~~
~~2021~~	~~229.63~~	~~0.02~~	~~0.00~~	~~230.12~~
~~2022*~~	~~-~~	~~-~~	~~-~~	~~-~~
~~2023~~	~~346.46~~	~~0.05~~	~~0.00~~	~~347.77~~
~~2024~~	~~556.56~~	~~0.05~~	~~0.00~~	~~557.82~~
Total	**~~2,299.75~~952.67**	**~~0.36~~0.13**	**0.00**	**~~2,308.65~~918.57**

Source: CalEEMod Version 2016.3.1. See Appendix ~~C~~ N-7 for complete results.
~~* Construction is not anticipated to occur in 2022.~~

As shown in **Table 4.7-2**, the estimated total GHG emissions during construction ~~of~~ would be approximately ~~2,309~~919 MT CO_2E total over the construction period. Estimated project-generated construction emissions amortized over a 30~~-~~ ~~—~~years~~ "project life" would be approximately ~~76.96~~31 MT CO_2E per year. As with project-generated construction air quality pollutant emissions, GHG emissions generated during construction of the project would be short-term in nature, lasting only for the duration of the construction period, and would not represent a long-term source of GHG emissions. Because there is no separate GHG threshold for construction, the evaluation of significance is discussed in the operational emissions analysis in the following text.

Operational Impacts

Operation of the project would result in direct GHG emissions from vehicular traffic, natural gas use, testing and maintenance of stationary diesel generators, and indirect GHG emissions from use of electricity and solid waste disposal.

Energy

The generation of electricity through combustion of fossil fuels typically results in emissions of CO_2 and, to a smaller extent, CH_4 and N_2O. Electricity would be required to operate various components of the project. The project components will be powered by a mix of existing on-site cogeneration facility (77.1%), solar photovoltaic (3.6%), and utility grade (19.3%). The GHG emission factors were based on the current mix of electricity used at SDSU. For the utility provided electricity, 34.5% of it

came from CEC eligible renewable sources (Tom Abram 2017). The electricity use for the project was provided by SDSU. The GHG emissions were calculated using CalEEMod 2016.3.1. The project is estimated to use 13,920,148 ~~40,116,444~~ kWh of electricity per year.

The proposed project would also use natural gas for domestic heating and for cooking in the dining hall. The total annual natural gas use for the proposed project was provided by SDSU and is estimated to be ~~935,038~~358,922 therms per year. CalEEMod was used to estimate GHG emissions from natural gas use.

Mobile Sources (Motor Vehicles)

The project would result in ~~2,566~~850 beds. It is expected that during normal operations, the project would result in ~~11,458~~3,793 vehicle miles traveled per day. The project did not include on-site parking for the residents because there is ample available parking on-campus. The only on-site parking spaces available are for project staff.

Annual CO_2 emissions from motor vehicle trips for full project buildout were quantified using CalEEMod Version 2016.3.1 (refer to **Appendix ~~C~~ N-7** for additional details and model assumptions). Project-related traffic was assumed to include a mixture of vehicles in accordance with the model outputs for traffic. Emission factors representing the vehicle mix and emissions for ~~2025~~ 2020 were used to estimate emissions associated with the final phase of the project.

Diesel Generators

In addition to operational emissions from vehicular sources, it was conservatively assumed that one diesel-powered emergency generator would be required for back-up power for the proposed project~~ for each phase, for a total of three generators~~. For the purposes of a conservative analysis, it was assumed that ~~each~~ the generator would be approximately 677 horsepower with a kilowatt rating of 505. It was assumed that the generator would only be used for emergency back-up power in the event of power outages, as well as for routine testing and maintenance. The proposed project would not run at full capacity while running off power from the emergency generator. Based on historical operations of emergency generators on the SDSU campus, it was assumed that the generator would run for 15 minutes every other week for a total of 20 hours per year. GHG emissions were calculated using CalEEMod 2016.3.1.

Solid Waste

The project would generate solid waste, and therefore, result in CO_2E emissions associated with landfill off-gassing. CalEEMod default values for solid waste generation were used to

estimate GHG emissions associated with solid waste. Project compliance with the 80% diversion rate by 2020, consistent with the CSU Sustainability Policy (CSU 2014), has been included in the GHG assessment.

Water and Wastewater

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

Summary of GHG Emissions

Table 4.7-3 presents the estimated operational GHG emissions plus amortized construction emissions for the project.

Table 4.7-3
Estimated Annual Operational GHG Emissions

Emission Source	CO_2	CH_4	N_2O	CO_2E
	Metric Tons Per Year			
Area	~~9.12~~3.02	0.00~~1~~	0.00	~~9.35~~3.09
Energy	~~5,131.88~~9,623.63	~~0.10~~0.34	~~0.09~~0.10	~~5,162.38~~9,661.56
Mobile	~~3,288.30~~619.39	~~0.23~~0.04	0.00	~~3,293.98~~620.38
Emergency Generator	~~15.47~~5.16	0.00	0.00	~~15.52~~5.17
Solid waste	~~14.64~~6.73	~~0.87~~0.40	0.00	~~36.27~~16.67
Water supply and wastewater	~~28.36~~346.37	~~2.91~~1.01	~~0.07~~0.03	~~121.68~~379.41
Total	**~~8,487.77~~10,604.29**	**~~4.11~~1.80**	**~~0.16~~0.13**	**~~8,639.18~~10,686.28**
			Amortized Construction Emissions	*~~76.96~~30.62*
			Operation + Amortized Construction Total	**10,716.90~~8,716.14~~**

Source: See Appendix ~~C~~ N-7 for complete results.

As shown in **Table 4.7-3**, estimated annual project-generated GHG emissions would be approximately ~~8,639~~10,686 MT CO_2E per year as a result of project operation. Estimated annual project-generated operational emissions in ~~2025~~ 2020 and amortized project construction emissions would be approximately ~~8,716~~10,717 MT CO_2E per year.

As discussed in **Section 4.7.3**, the City of San Diego evaluates GHG significance based on a project's consistency with the City's CAP using the CAP Consistency Checklist (see **Appendix ~~C~~N-7**). Although the City's CAP and CEQA Guidelines do not apply to this project, application of the CAP Consistency Checklist is utilized herein to inform the significance evaluation for the project's GHG emissions. Step 1 of the Checklist determines the project's consistency with the land use assumptions used in the CAP. As discussed in **Section 4.10** of the Draft EIR (DEIR), Land Use, the project is anticipated to be in conformance with adopted land use designations of applicable community or general plans. See **Section 4.10** of the Draft EIR for a description of the zoning and land use designations for the project components. Implementation of the project would result in an increase in ~~2,566~~850 housing units. The City of San Diego's housing is projected to grow from 515,426 in 2010, to 559,197 in 2020, 640,194 in 2035, and 691,629 in 2050 (SANDAG 2013). The SANDAG projections assume an annual increase of 4,377 units between 2010 and 2020, 5,400 units between 2020 and 2035, and 3,429 units between 2035 and 2050. ~~The projects operation will be phased, with Phase I becoming~~e operational in ~~2019 with 850 units, Phase II in 2022 with 850 units, and Phase III in 2025 with 866 units.~~ The additional 850 units expected ~~with Phase I~~ is within the projected annual increase of 4,377 units per year. ~~Similarly, the addition of 850 units in 2022 and 866 units in 2025 is within the SANDAG annual projections of 5,400 and 3,429 units per year, respectively.~~ Thus, the proposed project would be consistent with the SANDAG projections and therefore, the project would be consistent with Step 1 of the CAP Checklist.

Step 2 of the Checklist is applicable to development projects that would require a certificate of occupancy from the Building Official. The following discussion outlines the proposed project's applicability to Step 2 of the CAP Consistency Checklist.

Strategy 1: Energy & Water Efficient Buildings.

1. ***Cool/Green Roofs***

   This checklist item requires projects to include cool or green roofs as a design feature. The proposed project would consist of ~~up to 8~~ green roofs~~. The green roofs would provide area~~ for stormwater infiltration, would reduce the heat island effect, and would create habitat areas. A portion of each roof may be hardscape for resident use, while other areas may be landscaping only. The project would answer Yes to this checklist question.

2. ***Plumbing Fixtures and Fittings***

   This item requires nonresidential buildings to have plumbing fixtures and fittings that meet the requirements under the CalGreen standard, Section A5.303.3. As the proposed

project is committed to achieving the LEED Silver Certification, one of the main components to the projects design is water efficiency. The proposed project is designed to include ultra-low-flow fixtures that exceed the minimum flow rates in the CalGreen standard. The proposed project would answer Yes to the checklist question.

Strategy 2: Clean & Renewable Energy

3. *Energy Performance Standard/Renewable Energy*

This checklist question requires nonresidential projects to have an energy budget that exceeds Title 24 standards with indoor lighting, mechanical systems, or through on-site renewable energy generation. The proposed project will be designed to be a minimum LEED Silver accreditation. In order to meet that, the project must use at least 10 percent less energy than Title 24, which would exceed the requirement for this checklist item. The project would exceed the minimum requirement for this checklist item and the proposed project would answer Yes to this checklist question.

Strategy 3: Bicycling, Walking, Transit & Land Use

4. *Electric Vehicle Charging*

This checklist item requires multiple-family projects of more than 10 dwelling units to install electric vehicle charging stations at the project site. According to Table 4 of Attachment A of the CAP Consistency Checklist, for colleges, electric vehicle charging stations are required for projects with 3,000 or more students for a new college or expansion of a 3,000 plus student college by 20 percent. The proposed project does not meet any of those three criteria so the answer to the checklist question would be N/A. SDSU does provide electric vehicle charging stations: A total of 14 parking spaces on campus are designated charging stations. The charging stations are located in parking structures 4, 5, 6 and 8, as well as the SDSU Associated Students' Children's Center.

5. *Bicycle Parking Spaces*

This checklist question asks if the project would provide more short- and long-term bicycle parking spaces than is required in the City's Municipal Code (Chapter 14, Article 2, Division 5). The code requires residential developments to have 5% of the required automobile parking available for bicycle parking spaces. As the proposed project is committed to achieving the LEED Silver Certification, one of the main components to the projects design is centered around location and transportation. The proposed project does not include vehicle parking for residents onsite in order to encourage alternative

transportation options, including bicycling. The project will include bicycle parking for every resident included which far exceeds the City's code. The proposed project would answer Yes to the checklist question.

6. *Shower Facilities*

   This checklist question asks if the proposed development has over 10 employees and if a shower/changing facility is incorporated into the design. The proposed project is residential and thus this item does not apply. However, the project does include showers for all residents. As the checklist item does not apply to this project it would answer N/A to this checklist item.

7. *Designated Parking Spaces*

   This checklist question asks if the project within a transit priority area provides designated parking for a combination of low-emitting, fuel-efficient, and carpool/vanpool vehicles. The proposed project is located within a transit priority area but is a residential project and thus this does not apply to the project. Therefore, the proposed project would answer N/A to this checklist question.

8. *Transportation Demand Management Program*

   This checklist question asks if projects that accommodate over 50 employees include a transportation demand management program. The proposed project is a residential project and thus this checklist item would not apply. Therefore, the proposed project would answer N/A to this checklist question.

   Step 3 of the Checklist is only applicable if step one is answered in the affirmative under option three, which is not the case for the project, which answered step one in the affirmative under option one. Therefore, Step 3 is not applicable to the project.

The project would be consistent with the City of San Diego's CAP Checklist Steps 1 and 2 as discussed above; Step 3 would not apply to the project. Accordingly, the project is consistent with the City's CAP. Therefore, the project would have a **less than significant impact**.

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

The following discussion outlines the CAP strategies and how the project is consistent with them. As previously discussed, the project is consistent with the City of San Diego's CAP Checklist. The City approved the CAP on December 15, 2015 (City of San Diego 2015). The CAP

includes the following five strategies developed to reduce City-wide GHG emissions and to achieve reduction targets for the years 2020 and 2035:

1. Energy and Water Efficient Buildings
2. Clean and Renewable Energy
3. Bicycling, Walking, Transit & Land Use
4. Zero Waste (Gas & Waste Management)
5. Climate Resiliency

Each of the City's CAP strategies includes goals to identify ways to reduce GHG emissions. The project's consistency with the applicable strategies is discussed below.

Strategy 1

The CAP's first strategy is aimed at energy and water efficient buildings. The City's goals under strategy 1 include reducing residential building and municipal energy consumption, and reducing daily per capita water consumption. Actions to reduce energy consumption include consideration of a residential Energy Conservation and Disclosure Ordinance and a Municipal Energy Strategy and Implementation Plan. Actions related to water efficiency include implementing new water rates and billing structure, consideration of a Water Conservation and Disclosure Ordinance, and implementation of an Outdoor Landscaping Ordinance requiring weather-based irrigation controllers. Strategy 1 actions are directed at City staff and City Council to adopt ordinances, plans, and supporting City requirements to achieve the City's targets.

The project would support achievement of Strategy 1 by providing an energy efficient residential project to the campus. The project will be designed to be at least LEED Silver, which requires the project to be at least 10% more energy efficient than Title 24. The project includes features such as daylighting, green roofs, and landscaping to provide shading during the summer to reduce energy loads. The project will also incorporate ultra-low use water fixtures to minimize water consumption. In addition, the project would not conflict with the City's ability to implement the actions identified in the CAP related to energy and water efficient buildings. The project would be consistent with the applicable CAP goals and actions identified in Strategy 1.

Strategy 2

Strategy 2 focuses on clean and renewable energy. Strategy 2 goals of transitioning to 100% renewable energy on the city-wide electrical grid by 2035, increasing municipal zero emissions

vehicles, and converting existing diesel municipal solid waste collection trucks to compressed natural gas or other alternative low emissions fuels would be implemented by the City and would not apply to implementation of the project.

The project would source its energy needs from the campus mix, which includes solar photovoltaic and a natural gas cogeneration plant onsite. The cogeneration plant is 77% efficient (meaning 77% of the input energy is utilized) due to the capture and reuse of the waste heat produced during power production (SDSU 2012). Also, because the cogeneration plant is on SDSU it avoids much of the losses associated with transmission and distribution common with grid-sourced electricity. The remaining power needs for the campus are sourced from the local utility which includes a mix of renewable resources. Therefore, the project would support the City's goal to increase use of renewable energy. In addition, the project would not conflict with the City's ability to implement the actions identified in the Strategy 2.

Strategy 3

Strategy 3 outlines goals and actions related to bicycling, walking, transit, and land use. Strategy 3 goals include increasing the use of mass transit, increasing commuter walking and bicycling opportunities, reducing vehicle fuel consumption, and promoting effective land use to reduce vehicle miles traveled.

The proposed project would include bicycle parking for all residents onsite. As it is residential, the residents will have access to showers as well. Student residents would also have access to mass transit located at the on-campus San Diego Trolley's Green Line SDSU Transit Center. The project will not include onsite vehicle parking for residents, further encouraging use of alternative transportation. Therefore, the project would support the City's strategy to reduce vehicle miles traveled. In addition, the project would not conflict with the City's ability to implement the actions identified in the Strategy 3.

Strategy 4

Strategy 4, which focuses on zero waste, includes the goal of diverting solid waste and capturing landfill CH_4 gas emissions, and capturing CH_4 gas from wastewater treatment. The goal for the city is to achieve a 75% waste diversion rate by 2020 and for zero waste disposal by 2040.

The project will comply with the CSU Sustainability Policy goal of 80% solid waste diversion by 2020 (CSU 2014), which exceeds the City's goal of 75%. The project would be consistent with the applicable CAP goals and actions identified in Strategy 4.

Strategy 5

The fifth and last strategy relates to climate resiliency and includes the goal of increasing tree canopy coverage. The action under this goal includes consideration of a city-wide Urban Tree Planting Program, which would incorporate water conservation measures and prioritization of drought-tolerant and native trees and plantings in areas with recycled water.

The proposed project would incorporate up to 8 green roofs and at least 8 garden/courtyard areas as part of the proposed landscaping design. These landscaped areas would serve to mediate the climate of the housing complex by providing both shade and insulation. Green roofs are known to prevent heat from leaving the buildings that they shelter in cool weather and prevent heat from entering through the roof in warm weather. Landscaping cools buildings by shading the structures and by cooling the air around the structures. Moreover, the project would not conflict with the City's actions to increase tree canopy coverage through a planting program and supporting measures. The project would support Strategy 5 by increasing canopy coverage and using green roofs and would not conflict with the City's actions to implement Strategy 5.

The project would not conflict with the CAP strategies applicable to the project and the project would not impede the City's ability to implement the actions identified in the CAP to achieve the CAP's goals and targets and associated GHG emission reductions. As such, the project would comply with, and support the goals and policies of, the City's CAP, as well as those of the General Plan (CE-A.2, CE-A.8, CE-A.9, CE-F.3, CE-I.4, and CE-I.5). Therefore, the project would have a **less than significance** impact.

SANDAG RTP/SCS

Implementation of the project would result in an increase in ~~2,566~~850 student-housing beds. The City of San Diego's housing is projected to grow from 515,426 in 2010, to 559,197 in 2020, 640,194 in 2035, and 691,629 in 2050 (SANDAG 2013). The SANDAG RTP/SCS projections assume an annual increase of 4,377 units between 2010 and 2020, 5,400 units between 2020 and 2035, and 3,429 units between 2035 and 2050. ~~The projects operation will be phased, with Phase I becominge operational in 2019 with 850 student-housing beds, Phase II in 2022 with 850 student-housing beds, and Phase III in 2025 with 866 student-housing beds.~~ The additional 850 student housing beds ~~expected with Phase I~~ is within the projected annual increase of 4,377 housing per year. ~~Similarly, the addition of 850 student housing beds in 2022 and 866 student housing beds in 2025 is within the SANDAG annual projections of 5,400 and 3,429 housing units per year, respectively.~~ In addition, and of relevance, the proposed project is not expected to

create an increase in student enrollments or local population. The project will allow students who are currently living off campus to live on campus. Therefore, the proposed project would be consistent with the SANDAG projections.

EO B-30-15 and S-3-05

In regards to consistency with EO B-30-15 (goal of reducing GHG emissions to 40% below 1990 levels by 2030) and EO S-3-05 (goal of reducing GHG emissions to 80% below 1990 levels by 2050), there are no established protocols or thresholds of significance for that future year analysis. However, CARB forecasts that compliance with the current Scoping Plan puts the state on a trajectory of meeting these long-term GHG goals, although the specific path to compliance is unknown (CARB 2014). The proposed project would consistent with the GHG emission reduction measures in the Scoping Plan and would not conflict with the state's trajectory toward future GHG reductions. In addition, since the specific path to compliance for the state in regards to the long-term goals will likely require development of technology or other changes that are not currently known or available, specific additional mitigation measures for the project would be speculative and cannot be identified at this time. The project's consistency would assist in meeting the campus' contribution to GHG emission reduction targets in California. With respect to future GHG targets under the EOs, CARB has also made clear its legal interpretation that it has the requisite authority to adopt whatever regulations are necessary, beyond the AB 32 horizon year of 2020, to meet EO S-3-05's 80% reduction target in 2050; this legal interpretation by an expert agency provides evidence that future regulations will be adopted to continue the state on its trajectory toward meeting these future GHG targets.

Therefore, the project's GHG emissions would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG and would have a less than significant impact on the environment.

4.7.7 MITIGATION MEASURES

All potential impacts of the proposed project would be less than significant as a result of compliance with applicable laws and regulations and the implementation of corresponding project design features. Therefore, no mitigation measures are required.

4.7.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

There are no mitigation measures required; therefore, project impacts related to greenhouse gas emissions would remain less than significant.

4.7.9 REFERENCES

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