3.6 GREENHOUSE GAS EMISSIONS

This section presents an analysis of the greenhouse gas (GHG) emissions impacts associated with implementation of the Master Plan Update. This section estimates GHG emissions resulting from short-term construction and long-term operational activities of the Master Plan Update; assesses the project's consistency with applicable regulations to reduce GHG emissions; and describes potential direct and indirect impacts from implementation of the Master Plan Update. This section is based, in part, on the Air Quality and Greenhouse Gas Emissions Calculations included as Appendix C.

Comments from the South Coast Air Quality Management District (SCAQMD) related to GHG emissions were received during the public scoping period in response to the NOP. These comments provide recommendations for air quality and greenhouse gas emission modeling methodology, including for construction and operation. For a complete list of public comments received during the public scoping period, refer to Appendix A.

For analysis of Master Plan Update-related energy consumption, refer to Section 3.13, Utilities and Energy, of this Draft EIR.

Greenhouse Gas Emissions Overview

A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. As defined in California Health and Safety Code § 38505(g), for purposes of administering many of the state's primary GHG emissions reduction programs, GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (see also California Code of Regulations Title 14, § 15364.5).[1] Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted into the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are the predominant GHGs emitted as the result of 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.[2,3,4]

GHGs are further discussed below in Section 3.6.2, Environmental Setting.

3.6.1 Regulatory Setting

Federal

Energy Independence and Security Act of 2007

To aid in the reduction of GHG emissions nationwide, the Energy Independence and Security Act of 2007 set a mandatory Renewable Fuel Standard for biofuels to be produced; directed the National Highway Traffic Safety Administration (NHTSA) to establish fuel economy programs and standards for vehicles; and prescribed or revised standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy

1 Climate-forcing substances include GHGs and other substances such as black carbon and aerosols.
2 Intergovernmental Panel on Climate Change, 2007, Fourth Assessment Report, available at: https://www.ipcc.ch/assessment-report/ar4/, accessed April 4, 2023.
3 California Air Resources Board, Glossary of Terms Used in GHG Inventories, available at: https://ww2.arb.ca.gov/ghg-inventory-glossary, accessed April 4, 2023.
4 U.S. Environmental Protection Agency, Climate Change, available at: https://www.epa.gov/climate-change, accessed April 4, 2023.

conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

Federal Clean Air Act and Vehicle Standards

In response to the Massachusetts v. U.S. Environmental Protection Agency (EPA) U.S. Supreme Court ruling which directed the EPA 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, the George W. Bush Administration issued Executive Order 13432 in 2007 directing the EPA, the Department of Transportation, and the Department of Energy to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines.

In 2009, the EPA found that elevated concentrations of GHGs in the atmosphere threaten the public health and welfare of current and future generations and that the combined emissions of GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. These two findings were necessary to establish the foundation for federal regulation of GHGs from new motor vehicles as air pollutants under Section 202(a) of the Clean Air Act (42 USC § 7401).

In 2010, President Barack Obama issued a memorandum directing the Department of Transportation, Department of Energy, EPA, and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for light-duty vehicles. However, in 2018 (during the administration of President Trump), the EPA and NHTSA proposed to amend certain fuel economy and GHG standards for passenger cars and light trucks. Compared to maintaining the post-2020 standards then in place, the 2018 proposal increased U.S. fuel consumption by about half a million barrels per day (2 to 3 percent of total daily consumption, according to the Energy Information Administration) and would impact the global climate by 3/1000th of one degree Celsius by 2100.

In 2019, the EPA and NHTSA published the final Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program (84 FR 51310), which revoked California's authority to set its own GHG emissions standards and set zero-emission vehicle (ZEV) mandates in California. The EPA and NHTSA subsequently issued the Part Two Rule in March 2020, which set less aggressive CO_2 emissions standards and corporate average fuel economy standards for passenger vehicles and light-duty trucks. In 2021, President Joe Biden issued Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, which called for review of both parts of the SAFE Vehicles Rule. The NHTSA concluded that the SAFE Rule overstepped the agency's legal authority and established overly broad prohibitions that did not account for a variety of important state and local interests. The final rule adopted by the NHTSA ensures that the SAFE Rule will no longer form an improper barrier to states exploring creative solutions to address their local communities' environmental and public health challenges.

Additionally, in 2021, the EPA finalized its revisions to the federal GHG emissions standards for passenger cars and light-duty trucks. These standards have been described as the "strongest vehicle emissions standards ever established for the light-duty vehicle sector" and are expected

to result in the avoidance of more than 3 billion tons of GHG emissions through 2050.[5] At the same time, the EPA also announced its intent to initiate a separate rulemaking to establish multi-pollutant emissions standards to transition the federal government's passenger vehicle fleet to a zero-emissions fleet consistent with Executive Order 14057, which sets a path for reducing GHG emissions across federal operations, investing in clean energy industries and manufacturing, and creating clean, healthy, and resilient communities to achieve carbon neutrality by 2050.

State

State Climate Change Targets

Executive Order S-3-05

Executive Order S-3-05 (June 2005) set forth a series of target dates by which statewide emissions of GHGs would be progressively reduced: the state would reduce GHG emissions to 2000 levels by 2010; reduce GHG emissions to 1990 levels by 2020; and ultimately reduce GHG emissions to 80 percent below 1990 levels by 2050. The Executive Order directed the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels and submit annual report cards to the governor and California State legislature describing the progress made toward the emissions targets, the impacts of global climate change on California's resources, and mitigation and adaptation plans to combat these impacts.

To comply with the Executive Order, CalEPA created the California Climate Action Team, made up of members from various state agencies and commissions. The team releases annual Climate Action Team Report Cards tracking the GHG emission reduction strategies progress by documenting the effectiveness of the measures implemented to reduce GHG emissions in California and from each of the state agencies' operations.[6] The GHG reduction targets are achieved by building on the voluntary actions of California businesses, local governments, and communities and through state incentive and regulatory programs.

Assembly Bill 32

California passed the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32; California Health and Safety Code Division 25.5, §§ 38500-38599). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. AB 32 specifies that the state's agency for air quality and climate change, California Air Resource Board (CARB), must adopt regulations to "achieve the maximum technologically feasible and cost-effective GHG emission reductions" to "help mitigate risks associated with climate change while improving energy efficiency, expanding the use of renewable energy resources, cleaner transportation and reducing waste."7 The 2020 goal was ultimately reached four years ahead of schedule in 2016.

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5 U.S. Environmental Protection Agency*, Final Rule to Revise Existing National GHG Emissions Standards for Passenger Cars and Light Trucks Through Model Year 2026,* available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-revise-existing-national-ghg-emissions, accessed April 4, 2023.

6 California Environmental Protection Agency, 2023., Climate Action, available at: https://calepa.ca.gov/climate-action/, accessed April 12, 2023.

7 California Air Resources Board, 2023, AB 32 Global Warming Solutions Act of 2006, https://ww2.arb.ca.gov/resources/fact-sheets/ab-32-global-warming-solutions-act-2006, accessed April 12, 2023.

The Cap-and-Trade program is a key regulation that complements other regulations to ensure that California cost-effectively meets its goals for GHG emissions reductions. The program establishes a declining limit on major sources of GHG emissions throughout California and creates an economic incentive for investment in cleaner, more efficient technologies.[8]

Senate Bill 605 and Senate Bill 1383

Senate Bill (SB) 605 (2014) required CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants (SLCPs) in the state (California Health and Safety Code § 39730). SB 1383 (2016) required CARB to approve and implement that strategy by January 1, 2018 (California Public Resources Code § 42652-43654). SB 1383 established specific targets for the reduction of SLCPs: 40 percent below 2013 levels by 2030 for CH_4 and HFCs, and 50 percent below 2013 levels by 2030 for anthropogenic black carbon. Accordingly, CARB adopted its Short-Lived Climate Pollutant Reduction Strategy (SLCP Reduction Strategy) in March 2017. The SLCP Reduction Strategy establishes a framework for the statewide reduction of emissions of black carbon, CH_4, and fluorinated gases.

Executive Order B-30-15

Executive Order B-30-15 (April 2015) added an interim target to reduce statewide GHG emissions 40 percent below 1990 levels by 2030 and required CARB to update the AB 32 Climate Change Scoping Plan (Scoping Plan) to identify measures to meet the 2030 target.

Senate Bill 32 and Assembly Bill 197

SB 32 and AB 197 (enacted in 2016) are companion bills. SB 32 codified the 2030 emissions-reduction goal of Executive Order B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40 percent 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, to provide ongoing oversight for implementation of the state's climate policies. AB 197 also requires CARB to make available and update (at least annually) emissions data for GHGs, criteria air pollutants, and toxic air contaminants from reporting facilities; and requires CARB to identify specific information for GHG emission-reduction measures when updating the Scoping Plan.

Executive Order B-55-18

Executive Order B-55-18 (September 2018) establishes a new statewide goal to achieve carbon neutrality no later than 2045 and achieve and maintain net negative emissions thereafter. The goal is an addition to the existing statewide targets of reducing the state's GHG emissions. CARB will work with relevant state agencies to ensure that future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal.

Assembly Bill 1279

The California Climate Crisis Act, AB 1279 (enacted September 2022), establishes the target of: 1) achieving net zero GHG emissions as soon as possible, but no later than 2045, and 2) achieving and maintaining net negative GHG emissions thereafter, and to ensure that by 2045, statewide anthropogenic GHG emissions are reduced to at least 85 percent below 1990 levels. AB 1279 would require CARB to update the Scoping Plan and work with state agencies to identify

[8] California Air Resources Board, 2023, Cap-and-Trade Program, available at: https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program/about, accessed April 13, 2023.

and implement measures to achieve these policy goals which include solutions for CO_2 removal such as carbon capture, utilization, and storage technologies.

2022 Climate Change Scoping Plan

AB 32 also requires CARB to develop a Scoping Plan, which functions as a roadmap to achieve the California GHG reductions required by AB 32 through subsequently enacted regulations. Updated at least once every five years, CARB's Scoping Plan contains strategies and policies California would implement to reduce the projected 2020 "Business as Usual" (BAU) emissions to 1990 levels, as required by AB 32. Since 2008, there have been three updates to the Scoping Plan. Each update builds upon the previous plan's policies to help the state achieve its GHG emissions reduction targets while leveraging new and existing programs with the primary goal of reducing harmful air pollution. CARB's 2013 Scoping Plan Update summarized the state's progress in reducing GHG emissions, discussed anticipated impacts to California including the levels of GHG reduction necessary to avoid irreparable damage, and recommended strategies focused on areas where further reductions could be achieved to help meet the 2020 target established by AB 32. CARB's 2017 Scoping Plan Update identified the state's post-2020 reduction strategy set by Executive Order B-30-15 and codified by SB 32 to reduce GHG emissions 40 percent below 1990 levels by 2030. The 2017 Scoping Plan Update established a new statewide emissions limit of 260 million metric tons (MMT) carbon dioxide equivalents (CO_2e)[9] for the year 2030, which corresponded to a 40 percent decrease in 1990 levels by that date.

On December 15, 2022, CARB released the 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan), which identifies the strategies to achieving carbon neutrality by 2045 or earlier. The 2022 Scoping Plan contains strategies that build on existing GHG reductions, technology, and clean energy programs and integrate equity and environmental justice to ensure that vulnerable communities are not disproportionately affected by climate change. The 2022 Scoping Plan was developed to achieve carbon neutrality by 2045 through a substantial reduction in fossil fuel dependence, while at the same time increasing deployment of efficient non-combustion technologies and distribution of clean energy. The plan would also reduce emissions of SLCPs and includes CO_2 capture and sequestration actions from natural and working lands using mechanical and nature-based strategies. Under the 2022 Scoping Plan, by 2045, California aims to cut GHG emissions by 85 percent below 1990 levels, reduce smog-forming air pollution by 71 percent, reduce the demand for liquid petroleum by 94 percent compared to current usage, improve health and welfare, and create millions of new jobs.

Building Energy

Title 24, Part 6 and Part 11

In 1978, the California Energy Commission established the Building Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations, Title 24, Part 6), commonly referred to as Title 24 or the Energy Code. These California energy efficiency standards for residential and non-residential buildings were written in response to a legislative mandate to create uniform building codes to reduce California's energy consumption and provide energy efficiency standards for residential and non-residential buildings. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The latest Energy Code is the 2022 Title 24 standards which builds on current technology innovations and encourages energy efficient approaches to encourage

[9] A carbon dioxide equivalent is the number of metric tons of CO_2 emissions with the same global warming potential as one metric ton of another GHG.

building decarbonization. The latest updates include the use of efficient electric heat pumps, establishing electric-ready requirements for new construction, expanding solar photovoltaic and battery storage installation requirements to commercial buildings, and strengthening ventilation standards to help California progress towards 100 percent clean carbon neutrality.

The California Green Building Standards (CALGreen or Part 11 of Title 24) were developed in 2007 by the California Building Standards Commission to meet the targets established by AB 32 as buildings are the second largest source of GHG emissions in California. The California Building Standards Commission works closely with other state agencies to develop green building standards for residential and nonresidential structures that include new buildings or portions of new buildings, additions and alterations to reduce building GHG emissions; promote environmentally responsible, cost-effective, and healthier places to live and work; reduce energy and water consumption, and respond to the latest environmental directives of the administration.[10]

Renewable Energy and Energy Procurement

Renewables Portfolio Standard Program

The California Renewables Portfolio Standard (RPS) program was established in 2002 under SB 1078 (California Public Utilities Code § 399.11 et seq.) and required that by 2017, a retail seller of electricity purchase 20 percent of electricity generated by eligible renewable energy resources (e.g., solar thermal, photovoltaic, wind, biomass, geothermal, hydroelectric, municipal solid waste conversion, ocean/tidal, etc.). The RPS program is jointly implemented by the California Public Utilities Commission and the California Energy Commission.

Executive Order S-14-08 (2008) expanded the RPS to 33 percent renewable power by 2020 and in 2010, CARB adopted regulations for most publicly owned electricity retailers to obtain this target under the direction of Executive Order S-21-09 (2009).

SB 350 (2015) further expanded the RPS program by establishing a goal of 50 percent renewable electricity sold to retail customers in California by 2030. In addition, SB 350 required California to double the energy efficiency savings in electricity and natural gas 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 by 2030.

Most recently, SB 100 (2018) increased the standards set forth in SB 350 and required a 44 percent RPS by 2024, 52 percent RPS by 2027, and 60 percent RPS by 2030. Furthermore, California's electricity is required to be 100 percent carbon free by 2045.[11] This bill requires that the achievement of 100 percent zero-carbon energy resources does not increase carbon emissions elsewhere or be offset through resource shuffling.

Mobile Sources

California Air Resources Board Mobile Source Strategy

On May 16, 2016, CARB released the 2016 Mobile Source Strategy that demonstrates how the state can simultaneously meet air quality standards, achieve GHG emission reduction targets, decrease health risk from transportation emissions, and reduce petroleum consumption over the

[10] California Department of General Services Building Standards Commission, 2021, CALGreen, available at: https://www.dgs.ca.gov/BSC/CALGreen, accessed April 12, 2023.

[11] California Public Utilities Commission, 2021, Renewables Portfolio Standard (RPS) Program, available at: https://www.cpuc.ca.gov/rps/, accessed April 12, 2023.

next fifteen years. The actions contained in the 2016 Mobile Source Strategy aim to deliver broad environmental and public health benefits, as well as support much needed efforts to modernize and upgrade transportation infrastructure, enhance system-wide efficiency and mobility options, and promote clean economic growth in the mobile sector. Implementation of the concepts laid out in the 2016 Mobile Source Strategy would also result in a 45 percent reduction in GHG emissions and a 50 percent reduction in the consumption of petroleum-based fuels.[12]

The 2020 Mobile Source Strategy builds upon the foundation established by the 2016 Mobile Source Strategy and includes a comprehensive strategy for phasing in cleaner medium and heavy-duty vehicles needed to meet mandated air quality standards and 2030 and 2050 climate goals. Though not a regulatory document, the 2020 Mobile Source Strategy, as implemented by the State Implementation Plan, the updated Scoping Plan, community risk reduction plans, state and local incentive programs, and other CARB regulations, would achieve a 76 percent reduction in GHG emissions from 2020 levels from mobile sources by 2045, which is largely attributable to transitioning towards a zero-emissions fleet.[13]

Assembly Bill 1493

AB 1493 (2002) was enacted in response to the transportation sector accounting for more than half of California's CO_2 emissions at the time of its drafting (California Health and Safety Code § 43018.5 and § 42823 amendments). AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles primarily used for non-commercial personal transportation in the state.

Executive Order S-1-07

Executive Order S-1-07 (2007, implementing regulation adopted in 2009) 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 percent by 2020 and 20 percent by 2030 (California Code of Regulations, Title 17, § 95480 *et seq*.). The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel per unit of energy delivered which includes extraction/feedstock production, processing, transportation, and final consumption.

Heavy Duty Diesel-Powered Vehicles

The Heavy-Duty Truck and Bus Regulation (2008) requires nearly all diesel-powered trucks and buses to have a 2010 or newer model year engine by January 1, 2023. Exemptions are only given to vehicles traveling less than 1,000 miles per calendar year or to vehicles with a particulate matter filter operating exclusively in designated NOx exempt areas of the state.

CARB also adopted an Airborne Toxic Control Measure (amended 2013) to limit idling of diesel-powered commercial vehicles with gross vehicle weights greater than 10,000 pounds to idle no more than 5 minutes at any location (California Code of Regulations, Title 13, § 2485).

Senate Bill 375

SB 375 (2008) (California Government Code § 65080) addresses GHG emissions associated with

[12] California Air Resources Board, 2016 Mobile Source Strategy, available at: https://ww2.arb.ca.gov/resources/documents/2016-mobile-source-strategy, accessed April 13, 2023.

[13] California Air Resources Board, April 2021, *2020 Mobile Source Strategy Fact Sheet*.

the transportation sector through regional transportation and sustainability plans. SB 375 requires CARB to adopt regional GHG-reduction targets for the automobile and light-truck sector for 2020 and 2035, and to update those targets every 8 years. SB 375 requires the state's 18 regional metropolitan planning organizations (MPOs) to prepare a Sustainable Communities Strategy (SCS) as part of their Regional Transportation Plan that will achieve the GHG-reduction targets set by CARB. Though an SCS 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, 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.

Executive Order B-16-12

Executive Order B-16-12 (March 2012) required that state entities under the Governor's direction control, support, and facilitate the rapid commercialization of ZEVs. It ordered CARB, California Energy Commission, California Public Utilities Commission, and other relevant agencies to work with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to help achieve benchmark goals by 2015, 2020, and 2025. On a statewide basis, Executive Order B-16-12 established a target reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels by 2050. This directive did not apply to vehicles that have special performance requirements necessary for the protection of the public safety and welfare.

Advanced Clean Cars Program and Zero-Emission Vehicle Program

CARB's Advanced Clean Cars (ACC) program (2012) is an emission-control program to reduce smog- and soot-causing pollutants and GHG emissions and promote clean fuels for cars. To reduce GHG emissions, CARB, in conjunction with the EPA and the NHTSA, adopted new GHG standards estimated to reduce vehicle GHG emissions by 34 percent in 2025.[14] The Zero-Emission Vehicle program is part of the ACC and is designed to achieve the state's long-term emission reduction goals by increasing the requirements for zero-emission vehicles through both increased stringency of ZEV sales and associated actions to support wide-scale adoption and use of zero-emission vehicles. Executive Order B-48-18 (2018) set a target of 5 million ZEVs and 250,000 chargers by 2025.[15]

Executive Order N-79-20 (2020) set a course to end the sale of new internal combustion passenger vehicles by 2035. The primary mechanism to facilitate achievement of this specific target is through the ACC II program. The executive order also sets ZEV penetration targets for medium- and heavy-duty vehicles, drayage trucks, as well as off-road vehicles and equipment.

The ACC II program was adopted in 2022 and establishes the next level of LEV and ZEV requirements for vehicles to meet federal ambient air quality ozone standards and California's carbon neutrality standards. The ACC II regulations take the state's already growing zero-emission vehicle market and robust motor vehicle emission control rules and augments them to meet more aggressive tailpipe emissions standards and ramp up to 100 percent zero-emission vehicles. By 2035 all new passenger cars, trucks and SUVs sold in California will be

[14] California Air Resources Board, 2023, Advanced Clean Cars Program, available at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/about, accessed April 13, 2023.

[15] California Air Resources Board, 2023, Zero-Emission Vehicle Program, available at: https://ww2.arb.ca.gov/our-work/programs/zero-emission-vehicle-program/about, accessed April 13, 2023.

zero-emission.[16]

CARB also approved the Advanced Clean Trucks Regulation in 2020 which accelerates the market for ZEVs in the medium- and heavy-duty truck sector and to reduce air pollutant emissions generated from on-road mobile sources.[17]

Additionally, CARB approved amendments to the Small Off-Road Engine (SORE) Regulations in 2021, which would require most newly manufactured SORE such as those found in leaf blowers, lawn mowers and other equipment to be zero-emission starting in 2024. Portable generators, including those in recreational vehicles, would be required to meet more stringent standards in 2024 and meet zero-emission standards starting in 2028.

Water

Energy is needed to process, move, and heat water as it is used by consumers. In California, approximately 20 percent of statewide electricity and 20 percent of natural gas is used for water.[18] Thus, water conservation correlates directly with energy savings, ultimately reducing GHG emissions. The following state water conservation regulations support reductions in GHG emissions.

Executive Order B-29-15

In response to the ongoing drought in California, Executive Order B-29-15 (April 2015) set a goal of achieving a statewide reduction in potable urban water usage of 25 percent relative to water use in 2013. Many of the directives have since become permanent water-efficiency standards and requirements. The California Department of Water Resources has modified and adopted a revised version of the Model Water Efficient Landscape Ordinance that, among other changes, increases the requirements for landscape water use efficiency and broadens its applicability to include new development projects with smaller landscape areas.

Executive Order B-37-16

Issued May 2016, Executive Order B-37-16 directed the State Water Resources Control Board (Water Board) to adjust emergency water conservation regulations through the end of January 2017 to reflect differing water supply conditions across the state. The Water Board must also develop a proposal to achieve a mandatory reduction of potable urban water usage that builds off the mandatory 25 percent reduction called for in Executive Order B-29-15. The Water Board and Department of Water Resources also was tasked with developing new, permanent water use targets that build upon the existing state law requirements that the state achieve a 20 percent reduction in urban water usage by 2020. Executive Order B-37-16 also specified that the Water Board will permanently prohibit water-wasting practices such as hosing off sidewalks, driveways, and other hardscapes; washing automobiles with hoses not equipped with a shut-off nozzle; using non-recirculated water in a fountain or other decorative water feature; watering lawns in a manner that causes runoff, or within 48 hours after measurable precipitation; and irrigating ornamental turf on public street medians.

16 California Air Resources Board, 2023, Advanced Clean Cars Program, available at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/about, accessed April 13, 2023.

17 California Air Resources Board, 2023, Advanced Clean Trucks, available at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks/about, accessed April 13, 2023.

18 Spang, Edward, et. al., 2020, *The cost-effectiveness of energy savings through water conservation: a utility-scale assessment*.

Executive Order B-40-17

Executive Order B-40-17 (2017) lifted the drought emergency in all California counties except Fresno, Kings, Tulare, and Tuolumne. It also rescinded Executive Order B-29-15, but expressly stated that Executive Order B-37-16 remains in effect and directs the Water Board to continue development of permanent prohibitions on wasteful water use.

Assembly Bill 1668 and Senate Bill 606

AB 1668 and SB 606 (2018) require the State Water Resources Control Board, in coordination with the Department of Water Resources, to adopt long-term standards for the efficient use of water and would establish specified standards for per capita daily indoor and outdoor residential water use, water losses, and other uses. The bill establishes as the standard for indoor residential water use: 55 gallons per capita daily until the end of 2024, 52.5 gallons per capita daily beginning January 1, 2025, and 50 gallons per capita daily beginning January 1, 2030. The bills also require the Department of Water Resources to conduct studies on the effects of landscaping on the climate throughout the state.

Executive Order N-10-19

Executive Order N-10-19 (2019) directs the California Natural Resources Agency, CalEPA, the California Department of Food and Agriculture, and the Department of Finance to prepare a water resilience portfolio that reassesses the strategies in the 2016 California Water Action Plan, updates the projected climate change impacts to California's water systems, and identify strategies to implement and integrate the policies across state agencies. The portfolio assesses the growing risks of drought, flood, and other challenges to water supply reliability then develops strategies that include more efficient use of water, recycling of water, additional storage, additional conveyance to facilitate recharge of aquifers, improved forecasting tools, better data about river flows and water consumption, and restoration of upper watersheds.

Solid Waste

GHG gas emissions are linked to solid waste through waste collection and landfill activities. Municipal solid waste landfills are the third largest source of human-related CH_4 emissions in the United States, accounting for approximately 14.5 percent of these emissions in 2020.[19] The diversion of waste going into landfills through reduction, reuse, and recycling helps decrease GHG emissions by minimizing waste overall, repurposing and remanufacturing of recycled materials, and conserving raw, natural resources. The following state waste management regulations support reductions in GHG emissions.

Assembly Bill 939

In 1989, AB 939, known as the Integrated Waste Management Act (California Public Resources Code, § 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 (replaced in 2010 by the California Department of Resources Recycling and Recovery, or CalRecycle), 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

[19] U.S. Environmental Protection Agency, 2023, Landfill Methane Outreach Program: Basic Information about Landfill Gas, available at: https://www.epa.gov/lmop/basic-information-about-landfill-gas, accessed April 13, 2023.

source reduction, recycling, and composting activities of 25 percent by 1995 and 50 percent by the year 2000.

Assembly Bill 341

AB 341 (2011) 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 percent of solid waste generated be source-reduced, recycled, or composted by the year 2020, and annually thereafter. In addition, AB 341 required CalRecycle to develop strategies to achieve the state's policy goal. CalRecycle has conducted multiple workshops and published documents that identify priority strategies that it believes would assist the state in reaching the 75 percent goal by 2020.

Senate Bill 1383

To help reduce GHG emissions from organic waste, SB 1383 (2016) established the targets of reducing organic waste disposal 50 percent by 2020 and 75 percent by 2025. To facilitate achievement of this target, starting in 2022, all jurisdictions are required to (i) provide organic waste collection services to all residents and business, and (ii) recycle collected organic materials using recycling facilities, such as anaerobic digestion facilities and composting facilities.

California State University

California State University Sustainability Policy

The CSU has identified sustainability as a systemwide priority, as detailed in the CSU Sustainability Policy, which was first adopted in 2014 and updated in March 2022. The CSU Sustainability Policy encompasses the tenets of human and ecological health, social justice, and economic vitality, and promotes the environmental sustainability of the CSU's operations for the built environment.[20] The policy is organized into the following areas:

- University Sustainability – The CSU will integrate sustainability and climate literacy into the academic curriculum and all areas of the university; promote new and existing environmental and social justice programs; develop the green job workforce; promote the development of sustainable products and services; and foster sustainable economic development.
- Climate Action Plan – The CSU will strive to reduce systemwide facility carbon emissions to 40 percent below 1990 levels consistent with SB 32. These emissions will include both state and auxiliary organization purchases of electricity and natural gas; fleet and marine vessel usage; and other emissions the university or self-support entity has direct control over. Additionally, the CSU will strive to reduce facility carbon emissions to 80 percent below 1990 levels by 2040 in order to achieve carbon neutrality by 2045 in accordance with statewide mandates.
- Energy Resilience and Procurement – The CSU will endeavor to reduce energy capacity requirements from fossil fuels, enhance electrical demand flexibility, and use available and economically feasible technology for on-site renewable generation, microgrids, and other fossil fuel-free energy storage solutions. The CSU aims to increase its self-generated renewable energy and battery capacity from 32 to 80 megawatts (MW) by

[20] The California State University, PolicyStat, California State University Sustainability Policy, available at: https://calstate.policystat.com/policy/11699668/latest/#autoid-9wenv, accessed April 13, 2023.

2030.

Additionally, the CSU will consider cost-effective opportunities to exceed the California RPS sooner than the established goal of procuring 60 percent of its electricity needs from renewable sources by 2030 consistent with SB 100. To minimize the use of natural gas, universities will transition from fossil fuel-sourced equipment to electric equipment as replacements or renovations are needed.

- Energy Conservation, Carbon Reduction and Utility Management – All CSU buildings and facilities will be operated in the most energy-efficient manner and transition to a low carbon strategy without endangering public health and safety and without diminishing the quality of education and the academic program. The universities shall continue to identify energy-efficient and carbon reduction improvement measures to the greatest extent possible and coordinate with federal, state, and local governments and organizations in achieving energy conservation carbon reduction and utilities management objectives. The CSU will monitor monthly energy and utility usage on all campuses and the Chancellor Office of the Chancellor and will prepare a system-wide annual report on energy utilization and GHG emissions. Each CSU university will develop and maintain a campus-wide utility master plan to guide the overall climate action program, which will include an integrated strategic energy resource plan, with tactical recommendations in the areas of new construction, decarbonization, deferred maintenance, climate resilience, facility renewal, energy projects, water conservation, solid waste management, and an energy management plan.
- Water Conservation – All CSU universities shall pursue cost-effective water resource conservation to reduce consumption by 10 percent by 2030, as compared to a 2019 baseline, consistent with AB 1668 including steps to develop sustainable, drought-tolerant or native landscaping, reduce turf, install controls to optimize irrigation water use, reduce water usage, and promote the use of reclaimed/recycled water. In the event of a declaration of drought, the CSU will cooperate with the state, city, and county governments to the greatest extent possible to reduce water use.
- Sustainable Procurement – Universities will support the use of suppliers that integrate sustainable, environmentally friendly, and socially responsible practices, including encouraging those that recycle to move toward zero waste.
- Waste Management – Universities will aim to reduce landfill-bound waste to 50 percent of total campus waste by 2030, divert at least 80 percent from landfill by 2040, and move toward zero waste.
- Sustainable Food Service – Universities will improve their sustainable food purchases and operations.
- Sustainable Building & Lands Practices – All future CSU new construction, remodeling, renovation, and repair projects will be designed with consideration of optimum energy utilization, decarbonization, and low life-cycle operating costs and shall exceed all applicable energy codes and regulations (Building Energy Efficiency Standards, Title 24 California Code of Regulations Section 6) by 10 percent. Regarding specialized construction that is not regulated through the current energy standards (e.g., historical buildings, museums, auditoriums), the CSU will ensure that these facilities are designed to maximize energy efficiency. The CSU will design and build all new buildings and major renovations to meet or exceed the minimum requirements equivalent to Leadership in Energy and Environmental Design (LEED) Silver. For informal or unlandscaped areas, and where appropriate, universities will work to support a naturally functioning habitat,

promote biodiversity, and preserve native landscapes.

Capital planning for state and non-state facilities and infrastructure will consider features of a sustainable and durable design to achieve a low life-cycle cost. Universities will also design, construct, operate, and maintain green building-certified high-performing buildings that improve occupant productivity and wellness, optimize life-cycle costs, and minimize carbon impact. Principles and best practices will be implemented to the greatest extent possible.

Existing building energy performance will be optimized through improved operation, maintenance and repair, and capital improvement, enabling universities to meet carbon reduction goals. To balance long-term institutional needs with environmental concerns, sustainable design for capital projects will include:

- Siting and design considerations that take advantage of local geographic features to improve sustainability of the project, such as proximity to public transportation and maximizing use of vistas, microclimate, and prevailing winds;
- Durable systems and finishes with long life cycles that minimize maintenance and replacement;
- Optimization of layouts and designing spaces that can be reconfigured with the expectation that the facility will be renovated and reused (versus demolished);
- Systems designed for optimization of energy, water, and other natural resources;
- Optimization of indoor environmental quality for occupants;
- Utilization of environmentally preferable products and processes, such as long life-cycle materials and components, recycled-content and recyclable materials;
- Procedures that monitor, trend, and report operational performance as compared to the optimal design and operating parameters; and
- Cost-effective design features which align with the CSU Basic Needs Initiative and support university diversity, equity and inclusion efforts.

- Physical Plant Management – Each university will operate and maintain a comprehensive energy management system to achieve optimum efficiency in the use of natural gas, electricity, or any other purchased energy resources to meet the heating, cooling, and lighting needs of the buildings and/or facilities.
- Transportation – The CSU will encourage and promote the use of alternative transportation and/or alternative fuels to reduce GHG emissions related to campus associated transportation, including commuter and business travel. All CSU universities will develop and maintain a transportation demand management (TDM) plan to reduce Vehicle Miles Traveled (VMT) and carbon emissions; strive to increase electric vehicle (EV), electric bicycle, and other electric mobility and transportation device charging infrastructure and incentive programs to further support university carbon reduction strategies; and develop and maintain a long-range plan for transitioning fleet, and grounds equipment to zero emissions, excluding public safety patrol vehicles if necessary. By 2035, 50 percent of all light duty vehicle purchases will be ZEV, with no addition of gas-powered light duty vehicles to the fleet after 2035. All small off-road engine equipment used for campus grounds will be all-electric by 2035. All buses and heavy-duty vehicles will be ZEV by 2045 in alignment with state regulations.

Additional CSU Policies

The Policy Statement on Energy Conservation, Sustainable Building Practices, and Physical Plant Management for the California State University (formerly, Executive Order 987) provides a policy statement on energy conservation, sustainable building practices, and physical plant management for the CSU. CSULB operates under this Executive Order, which sets minimum efficiency standards for new construction and renovations, and establishes operating practices intended to ensure that CSU buildings are used in the most energy efficient and sustainable manner possible while still meeting the programmatic needs of the university.[21]

Policy 9170, Revised Policy on Energy Conservation and Utilities Management and Energy Consumption Reduction Goal for 2004/2005 Compared to 1999/2000 per the CSU standards set forth in PolicyStat, provides that all CSU buildings and facilities will be operated in the most energy-efficient manner without endangering public health and safety. The policy also indicates that all future CSU new construction, remodeling, renovation and repair projects will be designed for optimum energy utilization, lowest life-cycle operating costs, and in compliance with all applicable energy codes (Enhanced Title 24 Energy Codes) and regulations. Incorporation of energy-efficient design features in the project plans and specifications will be prioritized.[22]

California State University, Long Beach 2022 Climate Action and Adaptation Plan

In 2014, CSULB completed the first iteration of its Climate Action Plan. In March 2022, the university issued an update to that plan with the release of the Climate Action & Adaptation Plan (CAAP). The purpose of the CAAP is to outline a flexible roadmap for CSULB to eliminate GHGs from campus operations in line with the university's commitment to carbon neutrality and adapt to the inevitable negative impacts of climate change. The CSULB CAAP is a culmination of extensive stakeholder engagement resulting in development of a technically, logistically, and economically feasible pathway for CSULB to decarbonize campus operations by 2030 and commute related emissions by 2040. It builds on the efforts the university has already undertaken to maximize energy efficiency, increase renewable energy production, support clean air vehicle adoption, embrace the most ambitious green building standards, and integrate sustainability and environmental justice across curricula.

The CSULB CAAP is focused specifically on addressing the following GHG emissions:

- *Scope 1 GHG emissions* – direct emissions from combustion of natural gas and other fugitive emissions (11 percent)
- *Scope 2 GHG emissions* – indirect emissions from purchased electricity associated with the need to heat, cool, and power campus facilities (17 percent)
- *Scope 3 GHG emissions* – indirect emissions from transportation to and from campus (60 percent)

[21] The California State University, PolicyStat, Executive Order 0987: Policy Statement on Energy Conservation, Sustainable Building Practices, and Physical Plant Management for the California State University, available at: https://calstate.policystat.com/policy/6589455/latest, accessed July 24, 2023.

[22] The California State University, PolicyStat, Section IX: Energy Conservation and Utilities Management, Section 9170, Revised Policy on Energy Conservation and Utilities Management and Energy Consumption Reduction Goal for 2004/2005 Compared to 1999/2000, available at: https://calstate.policystat.com/policy/7056253/latest, accessed July 24, 2023.

The CSULB CAAP identifies the following goals and considerations:

- Synthesize existing energy project studies into a climate neutrality roadmap
- Determine the most feasible and actionable climate resilience strategies
- Identify appropriate metrics for measuring progress towards resilience goals
- Leverage other university priorities to ensure optimal CAAP implementation
- Generate buy-in for CAAP implementation
- Integrate scope 3 carbon neutrality goal
- Provide sufficient details to compel and guide university decision makers
- Communicate a concise and engaging plan to the diverse community
- Clarify approach to carbon offsets – targets cannot be met through projects and efficiencies alone
- Outline an adaptable roadmap – the feasibility of certain projects and strategies is still unknown or subject to other variables
- Integrate resilience strategies alongside mitigation strategies

California State University, Long Beach Carbon and Climate Commitments

In 2011, CSULB's then-President Alexander signed the Carbon Commitment, formerly known as the American College and University Presidents' Climate Commitment. The Carbon Commitment is a formal commitment to eliminate net GHG emissions from specified campus operations, and to promote the research and educational efforts that will help to equip society to re-stabilize the earth's climate.

As a Carbon Commitment signatory, CSULB is required to:

- Complete an annual greenhouse gas emissions inventory and make it publicly available
- Create a plan for mitigating carbon emissions (i.e., the CAAP)
- Complete and submit annual progress reports on CAAP implementation
- Achieve climate neutrality by a self-selected target year. Per the CAAP, CSULB has adopted targets of 2030 for operational emissions and 2040 for commute-related emissions.
- Integrate climate literacy into the curriculum and make it part of the educational experience

California State University, Long Beach Clean Energy Master Plan

In 2017, CSULB developed a Clean Energy Master Plan, which provides a strategic roadmap for GHG emission mitigation measures to not only reduce CSULB's Scope 1 and 2 emissions, but also drive operational savings and improve campus facilities and infrastructure. The Clean Energy Master Plan helps guide CSULB's energy strategy as the university works toward becoming carbon neutral by 2030. The Clean Energy Master Plan included a robust assessment of campus energy sources, demands, and utilization to identify clean energy alternatives and strategies to improve the efficiency of campus operations.

California State University, Long Beach Strategic Energy Plan

A comprehensive Strategic Energy Plan was prepared in 2011 that identifies energy efficiency projects, evaluates the provision of alternative energy sources at the campus, and analyzes their contribution to help the university reduce energy consumption and associated GHG emissions.

Regional

Southern California Association of Governments

On September 3, 2020, the Regional Council of the Southern California Association of Governments (SCAG) formally adopted the *2020-2045 Regional Transportation Plan/Sustainable Communities Strategy of the Southern California Association of Governments – Connect SoCal* (2020–2045 RTP/SCS). The SCS portion of the 2020-2045 RTP/SCS highlights strategies for the region to reach the regional target of reducing GHGs from autos and light-duty trucks by 8 percent per capita by 2020, and 19 percent by 2035 (compared to 2005 levels). Specially, these strategies are to focus growth near destinations and mobility options; promote diverse housing choices; leverage technology innovations; support implementation of sustainability policies; and promote a green region.

Furthermore, the 2020-2045 RTP/SCS discusses a variety of land use tools to help achieve the state-mandated reductions in GHG emissions through reduced per capita VMT. Some of these tools include center focused placemaking and focusing on priority growth areas, job centers, and transit priority areas, as well as high-quality transit areas and green regions.

3.6.2 Environmental Setting

Global Climate Change

Globally, climate change has the potential to impact numerous environmental resources through anticipated, though uncertain, impacts related to future air temperatures and precipitation patterns. The global climate continues to change rapidly compared to the pace of the natural variations in climate that have occurred throughout Earth's history. Trends in globally averaged temperature, sea level rise, upper-ocean heat content, land-based ice melt, arctic sea ice, depth of seasonal permafrost thaw, and other climate variables provide consistent evidence of a warming planet. These observed trends are robust and have been confirmed by multiple independent research groups around the world.[23]

The frequency and intensity of extreme heat and heavy precipitation events are increasing in most continental regions of the world. These trends are consistent with expected physical responses to a warming climate. Climate model studies are also consistent with these trends, although models tend to underestimate the observed trends, especially for the increase in extreme precipitation events. The frequency and intensity of extreme high temperature events are certain to increase in the future as global temperature increases.[24]

Global climate is projected to continue to change over this century and beyond. The magnitude of climate change beyond the next few decades will depend primarily on the amount of GHGs emitted globally and on the remaining uncertainty in the sensitivity of Earth's climate to those heat-trapping emissions. With substantial reductions in GHG emissions, the global annually averaged temperature rise could be limited to 3.6 degrees Fahrenheit (2 degrees Celsius) or less.

[23] U.S. Global Change Research Program, 2017, Climate Science Special Report, Fourth National Climate Assessment (NCA4), available at: https://science2017.globalchange.gov/, accessed July 24, 2023.

[24] Ibid.

However, without major reductions in these GHG emissions, the increase in annual average global temperatures relative to preindustrial times could reach 9 degrees Fahrenheit (5 degrees Celsius) or more by the end of this century.[25] The severity of effects caused by climate change will depend on the path of future human activities. More GHG emissions will lead to more climate extremes and widespread damaging effects across our planet.

Greenhouse Gases

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected toward space. The natural process through which heat is retained in the troposphere is called the "greenhouse effect."[26] The greenhouse effect traps heat in the troposphere through a threefold process as follows: 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 this long wave radiation into space and 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 most abundant GHGs are water vapor and CO_2. Many other trace gases have greater ability to absorb and re-radiate long wave radiation; however, these gases are not as plentiful. For this reason, and to gauge the potency of GHGs, scientists have established a Global Warming Potential (GWP) for each GHG based on its ability to absorb and re-radiate long wave radiation. GHGs normally associated with development projects include the following:[27,28,29]

Carbon Dioxide (CO_2). Carbon dioxide is primarily generated by fossil fuel combustion in stationary and mobile sources. Due to the emergence of industrial facilities and mobile sources in the past 250 years, CO_2 emissions from fossil fuel combustion increased by a total of 1.8 percent between 1990 and 2019.[30] Between 2019 and 2020, the decrease in total GHG emissions was driven largely by a 10.5 percent decrease in CO_2 emissions from fossil fuel combustion, including a 13.3 percent decrease in transportation sector emissions from less travel due to the COVID-19 pandemic and a 10.4 percent decrease in emissions in the electric power sector.[31] CO_2 is the most widely emitted GHG and is the reference gas (GWP of 1) for determining GWPs for other GHGs.

Methane (CH_4). Methane is emitted from biogenic sources, incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. The top three CH_4 sources in the nation are landfills, natural gas systems, and enteric fermentation. CH_4 is the primary component of natural gas, used for space and water heating, steam production, and power

25 U.S. Global Change Research Program, 2017, Climate Science Special Report, Fourth National Climate Assessment (NCA4), available at: https://science2017.globalchange.gov/, accessed July 24, 2023.

26 The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface to 10 to 12 kilometers.

27 All GWPs are given as 100-year GWP. Generally, GWPs were obtained from the Intergovernmental Panel on Climate Change Fourth Assessment Report (AR4) and Fifth Assessment Report (AR5), with the addition of GWPs from the Intergovernmental Panel on Climate Change's Fifth Assessment Report for fluorinated GHGs that did not have GWPs in the AR4 and AR5.

28 Intergovernmental Panel on Climate Change, 2007, Fourth Assessment Report, available at: https://www.ipcc.ch/assessment-report/ar4/, accessed April 4, 2023.

29 Intergovernmental Panel on Climate Change, 2014, Fifth Assessment Report, available at: https://www.ipcc.ch/assessment-report/ar5/, accessed April 4, 2023.

30 U.S. Environmental Protection Agency, 2020, *Inventory of United States Greenhouse Gas Emissions and Sinks 1990 to 2019*.

31 Ibid.

generation. The GWP of CH_4 is 27.9.

Nitrous Oxide (N_2O). Nitrous oxide is produced by both natural and human related sources. Primary human related sources include agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. The GWP of N_2O is 273.

Hydrofluorocarbons (HFCs). Typically used as refrigerants for both stationary refrigeration and mobile air conditioning, use of HFCs for cooling and foam blowing is increasing, as the continued phase out of chlorofluorocarbons (CFCs) and HFCs gains momentum. In 2022, California banned the sale of new bulk HFCs and only allows the use of reclaimed HFCs. The GWP of HFCs range from 4.84 for HFC-161 to 14,600 for HFC-23.

Perfluorocarbons (PFCs). PFCs are compounds consisting of carbon and fluorine and are primarily created as a byproduct of aluminum production and semiconductor manufacturing. PFCs are potent GHGs with a GWP several thousand times that of CO_2, depending on the specific PFC. Another area of concern regarding PFCs is their long atmospheric lifetime (up to 50,000 years). The GWP of PFCs range from 7,380 to 12,400.

Sulfur hexafluoride (SF_6). SF_6 is a colorless, odorless, nontoxic, nonflammable gas. SF_6 is the most potent GHG that has been evaluated by the Intergovernmental Panel on Climate Change with a GWP of 25,200. However, its global warming contribution is not as high as the GWP would indicate due to its low mixing ratio compared to CO_2 (4 parts per trillion [ppt] in 1990 versus 365 ppm, respectively).

Water Vapor (H_2O). Although H_2O has not received the scrutiny of other GHGs, it is the primary contributor to the greenhouse effect. Natural processes, such as evaporation from oceans and rivers, and transpiration from plants, contribute 90 percent and 10 percent of the water vapor in our atmosphere, respectively. The primary human related source of H_2O comes from fuel combustion in motor vehicles; however, it does not contribute a significant amount (less than one percent) to atmospheric concentrations of H_2O. The Intergovernmental Panel on Climate Change has not determined a GWP for H_2O.

In addition to the six major GHGs discussed above (excluding H_2O), many other compounds have the potential to contribute to the greenhouse effect. Some of these substances were previously identified as stratospheric ozone (O_3) depletors; therefore, their gradual phase out is currently in effect. The following is a listing of these compounds:

Hydrochlorofluorocarbons (HCFCs). HCFCs are solvents, similar in use and chemical composition to CFCs. The main uses of HCFCs are for refrigerant products and air conditioning systems. As part of the Montreal Protocol, all developed countries that adhere to the Montreal Protocol are subject to a consumption cap and gradual phase out of HCFCs. The United States is scheduled to achieve a 100 percent reduction to the cap by 2030. The GWP of HCFCs range from 56.4 for HCFC-122 to 2,300 for HCFC-142b.

1,1,1 trichloroethane. 1,1,1 trichloroethane or methyl chloroform is a solvent and degreasing agent commonly used by manufacturers. The GWP of methyl chloroform is 161 times that of CO_2.

Chlorofluorocarbons (CFCs). CFCs are used as refrigerants, cleaning solvents, and aerosols spray propellants. CFCs were also part of the EPA's Final Rule (57 Federal Register 3374) for the phase out of O_3 depleting substances. Currently, CFCs have been replaced by HFCs in

cooling systems and a variety of alternatives for cleaning solvents. Nevertheless, CFCs remain suspended in the atmosphere contributing to the greenhouse effect. CFCs are potent GHGs with GWPs ranging from 3,550 for CFC-11 to 16,200 for CFC-13.

GHG Emissions Inventories

California's GHG Emissions Inventory

According to CARB's California 2000–2020 GHG emissions inventory, California emitted 369.2 MMT CO_2e in 2020, 35.3 MMT CO_2e lower than 2019 levels and 61.8 MMT CO_2e below the 2020 GHG limit of 431 MMT CO_2e.[32] The transportation sector remains the largest source of GHG emissions in the state. Direct emissions from vehicle tailpipes, off-road transportation sources, intrastate aviation, and other transportation sources, account for approximately 37 percent of statewide emissions in 2020. Emissions from the electricity sector account for approximately 16 percent of the inventory in 2020 and had a slight decrease of 0.7 MMT CO_2e compared to 2019. Continued growth of in-state solar generation and increases in imported renewable electricity more than compensate for the drop in in-state hydropower generation due to below average precipitation levels. The industrial sector trend has been relatively flat in recent years but saw a decrease of 7.1 MMT CO_2e in 2020. Commercial and residential emissions saw a decrease of 1.7 MMT CO_2e. Emissions from high-GWP gases have continued to increase as they replace ozone depleting substances that are being phased out under the international 1987 Montreal Protocol treaty. Emissions from other sectors have remained relatively constant in recent years. Table 3.6-1 presents California GHG emission source categories and their relative contributions to the emissions inventory in 2020.

Table 3.6-1: Greenhouse Gas Emissions Sources in California (2020)

Sources Category	Annual GHG Emissions (MMT CO_2e)	Percent of Total
Transportation	135.8	36.8%
Electric Power	59.5	19.9%
Industrial	73.3	16.1%
Commercial and Residential	38.7	10.5%
Agriculture	31.6	8.6%
High GWP	21.3	5.8%
Recycling and Waste	8.9	2.4%

Source: California Air Resources Board, October 2022, California Greenhouse Gas Emissions for 2000 to 2020 Trends of Emissions and Other Indicators.

CSULB's GHG Emissions Inventory

CSULB formalized its commitment to climate action in 2010 as a part of the Carbon Commitment. As a Carbon Commitment signatory, CSULB is responsible for conducting regular GHG inventories, creating and regularly updating the CAAP, and setting a date by which the university will achieve climate neutrality. Table 3.6-2 below lists each of the emissions sources and their relative contributions to the emissions inventory from 2017-2018.

[32] California Air Resources Board, October 2022, *California Greenhouse Gas Emissions for 2000 to 2020: Trends of Emissions and Other Indicators*.

Table 3.6-2: CSULB Greenhouse Gas Emissions for 2017-2018

Scope Number	Emission Sources	Annual GHG Emissions (MMT CO_2e)	Percent of Total
1	Stationary Combustion	6,471	12%
	Mobile Combustion/Fleet Fuels	391	1%
	Fugitive Emissions	1,083	2%
2	Purchased Electricity	11,436	21%
3	Student Commuting	28,344	51%
	Faculty/Staff Commuting	6,095	11%
	Air Travel	1,617	3%
	Solid Waste	-80	0%
Total GHG Emissions		55,356[a]	100%

a. Totals may not add up precisely due to rounding.

Source: Association for the Advancement of Sustainability in Higher Education, 2021, The Sustainability Tracking, Assessment & Rating System, California State University, Long Beach: OP-1 Emissions Inventory and Disclosure, 2021, available at: https://reports.aashe.org/institutions/california-state-university-long-beach-ca/report/2021-01-29/OP/air-climate/OP-1/, accessed April 14, 2023.

3.6.3 Methodology

Scope of Analysis for Climate Change

The study area for climate change and the analysis of GHG emissions is broad, as climate change is influenced by worldwide emissions and their global effects. The appropriate baseline against which to compare potential impacts of the project includes the natural and anthropogenic drivers of global climate change, including worldwide GHG emissions from human activities that have likely increased global surface temperature by 1.06 degrees Celsius (33.91 degrees Fahrenheit) from 2010 to 2019.[33]

The state of California is leading the nation in managing GHG emissions. Accordingly, the impact analysis for this project relies on guidelines, analyses, policy, and plans for reducing GHG emissions established by CARB.

Program- and Project-Level Review

The GHG emissions impact analysis in this section includes a program-level analysis of the proposed Master Plan Update. The analysis also includes a project-level analysis of the most impactful near- and mid-term development projects, in terms of GHG emissions, that would be implemented under the proposed Master Plan Update. Of the near- and mid-term projects described in Chapter 2, Project Description, the most impactful projects were identified and modeled based on their respective anticipated construction scenarios, construction duration, construction equipment, existing and/or new building square footage, and demolition requirements. These projects were selected because they represent projects with the most

[33] Intergovernmental Panel on Climate Change, 2021, Sixth Assessment Report, available at: https://www.ipcc.ch/assessment-report/ar6/, accessed July 20, 2023.

intensive construction scenarios for GHG emissions.

Both construction and operation of the project are considered in the impact analysis, where relevant.

Project-related GHG emissions would include emissions from direct and indirect sources. Direct project-related GHG emissions include emissions from construction activities, area sources, and mobile sources, while indirect sources include emissions from energy consumption, water demand, and solid waste generation.

The proposed project would result in direct and indirect emissions of CO_2, CH_4, and N_2O, and would result in negligible emissions of other GHGs that would not facilitate a meaningful analysis. According to CARB,[34] CO_2, CH_4, and N_2O consist of over 94 percent of the state's total emissions in 2020. Furthermore, the California Emissions Estimator Model (CalEEMod), referenced below, only provides emissions for CO_2, CH_4, and N_2O. Therefore, this analysis focuses on these three types of GHG emissions.

The direct and indirect emissions are described below.

Construction Emissions Methodology

Emissions from the construction phase of implementation of the Master Plan Update were calculated using CalEEMod Version 2020.4.0. The analysis of GHG emissions used the same methodology and modeling inputs as the analysis of air quality impacts in Section 3.2, Air Quality, of this Draft EIR. Refer to Section 3.2.3, Methodology, for a discussion of construction emissions calculation methodology and modeling inputs used in CalEEMod.

Construction of the project would result in GHG emissions primarily associated with use of off-road construction equipment, on-road hauling, vendor (material delivery) trucks, and worker vehicles.

Based on SCAQMD guidance,[35] total construction GHG emissions need to be amortized over the lifetime of the project (assumed to be 30 years) and added to operational emissions. Construction of the most impactful near- and mid-term projects was estimated to occur over approximately seven years (2024 through 2031) based on construction information provided by program planners in the Design & Construction Services Department at CSULB. To estimate the average annual construction emissions under the Master Plan Update buildout, total construction emissions of the most impactful near- and mid-term projects were divided by seven years, then multiplied by the Master Plan Update's 12-year buildout (2024 through 2035, inclusive), and then divided by the assumed lifetime of the Master Plan Update of 30 years.

Operational Emissions Methodology

Emissions from the operational phase of the Master Plan Update for all proposed development described in Chapter 2, Project Description, were calculated using CalEEMod Version 2020.4.0, based on an operational year 2035, the horizon year for the Master Plan Update. Emissions from the existing land uses (modeled as 4-year University/College) on the campus were also calculated

[34] California Air Resources Board, California Greenhouse Gas Inventory for 2000-2020 — by Gas, https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/ghg_inventory_bygas.pdf, accessed July 20, 2023.

[35] South Coast Air Quality Management District, October 2008, *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold*.

using CalEEMod to present the net change in GHG emissions. Operational year 2019 was used for existing conditions in the modeling, consistent with the baseline year for the transportation analysis (see Section 3.11, Transportation).

CalEEMod provides conservative and representative default values (e.g., emission factors) for each emissions source type, so that the model may be used to estimate emissions once all project-specific and existing land use characteristics and information have been input into the model. Default values in CalEEMod were replaced with project-/campus-specific information, where such information was readily available. The GHG emissions inventories for the project and existing campus conditions reflect the use of project-/campus-specific and default inputs, as described further below. In this respect, the methodologies used in the emission calculations presented in this analysis would differ from the university-reported inventory, which utilizes the Sustainability Tracking, Assessment & Rating System, a self-reporting framework for colleges and universities to gauge relative progress toward sustainability.

To calculate the net increase in operational emissions associated with implementation of the Master Plan Update, the emissions from the existing operation of the campus were subtracted from the emissions from the operational phase of the Master Plan Update, as the operational phase estimate includes all proposed development and all existing campus development that would not change with implementation of the Master Plan Update.

Existing and potential operational GHG emissions generated for implementation of the Master Plan Update were estimated for area sources (consumer product use, architectural coatings, and landscape maintenance equipment), energy sources (electricity and natural gas), mobile sources, solid waste, and water and wastewater treatment as further described below. It should be noted that although project design features would be implemented with the Master Plan Update that could reduce GHG emissions in compliance with the CSULB CAAP, as a conservative analysis, none of the features were accounted for in the CalEEMod modeling.

As indicated in the analysis under Threshold GHG-1, the net increase in GHG emissions associated with implementation of the Master Plan Update would not exceed the project-related campus-specific significance thresholds, which are further described below under the Project-Related Campus-Specific Mass Emissions Threshold subheading. Therefore, separate operational emissions estimates were not conducted for each of the near- and mid-term development projects as such estimates were not required to determine the significance of the project-level impacts.

Area Sources

CalEEMod was used to estimate operational emissions from area sources, which include emissions from consumer product use, architectural coatings, and landscape maintenance equipment. Consumer product use and architectural coatings primarily result in criteria air pollutant emissions, which are analyzed in Section 3.2, Air Quality, and would generate little to no GHG emissions.

Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers. The emissions from landscape equipment use are calculated based on CalEEMod default values for emission factors and assumed that landscape maintenance is performed all year-round. However, GHG emissions associated with landscape maintenance equipment are likely overestimated as such emissions are expected to be reduced over time with CARB's approval of amendments to the SORE regulations, which would require newly manufactured landscaping equipment to be

zero-emission starting in 2024.

Energy Sources

The estimation of operational energy emissions was based on estimated existing energy consumption and future energy demand forecast data provided by CSULB for both existing conditions and project buildout. Default values in CalEEMod were updated to reflect these data (electricity and natural gas usage per year).

CSULB's electricity is provided by Southern California Edison (SCE) and on-site solar generation. For modeling purposes, only electricity purchased from SCE was considered, as electricity generated from renewable sources (e.g., solar) does not generate significant GHG emissions. The existing and horizon year natural gas and electricity consumptions were obtained from the Utility Infrastructure Master Plan Update. Based on the Utility Infrastructure Master Plan Update, the natural gas and SCE electricity consumption was 1,377,285 therms (137,695,445 kilo British thermal units (kBtu)) and 37,884,271 kilowatt-hours, respectively, in 2019. Implementation of the Master Plan Update would increase the electricity consumption by 25,291,100 kBtu (7,412,397 kilowatt-hours). To be conservative, this analysis assumes that all additional electricity consumed as part of implementation of the Master Plan Update would be purchased from SCE. This assumption is conservative as the new buildings under the Master Plan Update would be required to install photovoltaic panels per 2022 Title 24 standards, which would generate on-site energy.

Additionally, CSULB is currently in the process of phasing out natural gas use consistent with the goals of the CSULB CAAP, CARB's 2022 Scoping Plan, and statewide initiatives to ban natural gas appliances after 2030; and thus, CSULB would mostly phase out natural gas by 2035. However, to be conservative, this analysis assumes natural gas use for operation in 2035 would remain the same as under existing conditions (1,377,285 therms or 137,695,445 kBtu) to account for the continued use of natural gas at a few buildings on campus that require natural gas, such as laboratories with Bunsen burners and commercial kitchens. This assumption is conservative as the new buildings under the Master Plan Update would be electrified and would not consume natural gas, and some existing buildings would consume less natural gas as they would be retrofitted under the Master Plan Update to be fully electrified. The Title 24, Non-Title 24, and Lighting energy consumption breakdown for the existing conditions and the Master Plan Update were adjusted in proportion to the CalEEMod defaults because the energy consumption breakdown was not provided in the Utility Infrastructure Master Plan Update.

Mobile Sources

Mobile sources related to implementation of the Master Plan Update would primarily be motor vehicles (automobiles and light-duty trucks) traveling to, from, and within the campus. Motor vehicles may be fueled with gasoline, diesel, or alternative fuels. The default vehicle mix provided in CalEEMod 2020.4.0, which is based on CARB's Mobile Source Emissions Inventory model, EMission FACtor, version 2017, was applied. All details for estimating criteria air pollutants from mobile sources during project operation are discussed in Section 3.2, Air Quality, are also applicable for the estimation of operational mobile source GHG emissions.

Regulatory measures related to mobile sources are discussed above in Section 3.6.1, Regulatory Setting, and include AB 1493, the ACC II program, and related federal standards. As previously discussed, AB 1493 required that CARB establish GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by CARB to be vehicles that are primarily used for non-commercial personal transportation in the state. In addition, the NHTSA and EPA have established corporate fuel economy standards and GHG emission standards,

respectively, for passenger vehicles and light-, medium-, and heavy-duty vehicles. Implementation of these standards and fleet turnover (replacement of older vehicles with newer ones) would gradually reduce GHG emissions from the use of motor vehicles related to the implementation of the Master Plan Update. The ACC II regulations will rapidly scale down light-duty passenger car, pickup truck and SUV emissions starting with the 2026 model year through 2035. These rules have been accounted in the default emission factors in CalEEMod.

Trip generation rates and VMT for the Master Plan Update are based on the transportation analysis in Section 3.11, Transportation. According to the transportation analysis, CSULB would generate approximately 33,237 trips per day in the 2019 baseline year without the project, and 44,113 trips per day in the 2035 horizon year with the project (i.e., Master Plan Update). Based on the modeling conducted for the transportation analysis, this would result in a total site-generated VMT of 390,197 miles per day in the 2019 baseline year without the project and 446,213 miles per day in the 2035 horizon year with the project. Default vehicle trip generation rates included in CalEEMod were adjusted to match the existing and project's trip generation estimates from the transportation analysis. In addition, Saturday and Sunday trip rates for the 2019 baseline year without the project and 2035 horizon year with the project were adjusted in proportion to the CalEEMod weekday trip rates because weekend trip-generation rates are not provided in the transportation analysis. CalEEMod default trip distances were adjusted to match the weekday daily VMT for the existing conditions and the project. Other CalEEMod default data, including temperature, trip characteristics, variable start information, and emissions factors were conservatively used for the model inputs. Project-related traffic includes a mix of vehicles in accordance with the model defaults. Emission factors representing the vehicle mix and emissions for the 2019 baseline year and 2035 horizon year were used to estimate emissions under the existing conditions (i.e., without the project) and at project buildout, respectively.

Solid Waste

Solid waste generated during the 2019 baseline year and under the 2035 horizon year with the project would result in CO_2e emissions associated with landfill off-gassing. Landfill gas is a natural byproduct of the decomposition of organic material in landfills. Landfill gas is composed of roughly 50 percent CH_4, 50 percent CO_2, and a small amount of non-methane organic compounds. CH_4 is a potent greenhouse gas 28 to 36 times more effective than CO_2 at trapping heat in the atmosphere over a 100-year period.[36] CalEEMod default values for solid waste generation were used to estimate GHG emissions associated with solid waste generated from current existing land uses and from the future proposed land uses (modeled as a 4-year University/College) with implementation of the Master Plan Update.

Water and Wastewater

Supply, conveyance, treatment, and distribution of water require the use of electricity, which would result in indirect GHG emissions. Similarly, wastewater generated by implementation of the Master Plan Update would require the use of electricity for conveyance and treatment and would also result in indirect GHG emissions. CalEEMod default values were adjusted based on the future forecast data based on the Water Supply Information Report prepared for the proposed project (Appendix I). Based on the Water Supply Information Report prepared for the Master Plan Update, the campus's water use has declined over the years as a result of the installation of water meters and implementation of water conservation measures. The existing water consumption in 2019 at CSULB was approximately 179,621 cubic feet (134.4 million gallons). At buildout, total

[36] U.S. Environmental Protection Agency, Landfill Methane Outreach Program, Basic Information about Landfill Gas, https://www.epa.gov/lmop/basic-information-about-landfill-gas, accessed April 11, 2023.

potable water use at CSULB is estimated to be approximately 159.7 million gallons. This GHG analysis conservatively assumes a 50/50 split between indoor and outdoor water demand.

Thresholds of Significance

The significance thresholds used to evaluate the impacts of the Master Plan Update related to GHG emissions are based on Appendix G of the CEQA Guidelines. Based on Appendix G, a project would have a significant impact related to GHG emissions if it would:

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

Relevant Background Information

As related to Threshold GHG-1, there are currently no established quantitative thresholds adopted by an agency with subject matter expertise (like CARB) for assessing whether the GHG emissions of a project, such as implementation of the Master Plan Update, would be considered a cumulatively considerable contribution to global climate change.[37,38] However, all reasonable efforts should be made to minimize a project's contribution to global climate change. In addition, while GHG impacts are recognized exclusively as cumulative impacts, GHG emissions impacts must also be evaluated on a project-level under CEQA.[39]

The CEQA Guidelines do not prescribe specific methodologies for performing an assessment, do not establish specific thresholds of significance, and do not mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance consistent with the manner in which other impact areas are handled in CEQA. The Governor's Office of Planning and Research's Technical Advisory, titled "Discussion Draft CEQA and Climate Change Advisory," states that,

> "Neither the CEQA statute nor the CEQA Guidelines prescribe thresholds of significance or particular methodologies for perming an impact analysis. This is left to lead agency judgment and discretion, based upon factual data and guidance from regulatory agencies and other sources where available and applicable…Even in the absence of clearly defined thresholds for greenhouse gas emissions, such emissions 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."[40]

Furthermore, the advisory document indicates 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." Section 15064.7(c) of the CEQA Guidelines specifies that

37 California Natural Resources Agency, December 2009, *Final Statement of Reasons for Regulatory Action, pp. 11-13, 14, 16*.

38 Letter from Cynthia Bryant, Director of the Office of Planning and Research to Mike Chrisman, Secretary for Natural Resources, dated April 13, 2009.

39 California Code of Regulations, Title 14, Section 15064(h)(3).

40 State of California, Governor's Office of Planning and Research, December 2018, *Discussion Draft CEQA and Climate Change Advisory*, December 2018.

"when adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence."

CSU has not adopted a threshold of significance for GHG emissions for generally applicable use. The CSULB campus is under the jurisdiction of the SCAQMD, which, to date, likewise has not adopted significance criteria or thresholds for assessing GHG emissions that are applicable to the project.

Project-Related Campus-Specific Mass Emissions Threshold

In the absence of a numeric threshold adopted by either CARB, the SCAQMD, or the CSU, a campus-specific mass emissions threshold was derived based on the state's and CSULB's most recent inventories. This approach is appropriate for the implementation of the Master Plan Update because it compares the project's GHG emissions to statewide GHG reduction goals established for 2045 per CARB's 2022 Scoping Plan. Additionally, this approach is more conservative than using CalEEMod baseline emissions to calculate the campus-specific mass emissions threshold as the threshold calculated from CalEEMod baseline emissions would be higher. The campus-specific mass emission threshold is discussed below.

The first step in the derivation of the campus-specific mass emissions threshold was to identify the percentage reduction that must be achieved statewide for attainment of the 2045 net-zero GHG emissions goal. The state's 2018 emissions inventory (411 MMT CO_2e)[41] was used to derive a percent reduction that would be in line with CARB's 2045 target (net-zero emissions, or zero CO_2e)[42] by applying a straight-line regression between the 2018 inventory and 2045 target. The straight-line regression was then used to yield the 2035 target emissions and the associated percent reduction from 2018 emission level. Based on this calculation, the state would need to reduce emissions by 63 percent from 2018 level by the year of 2035 to be in line with 2045 target.

The second step was to apply the statewide percent reduction of 63 percent to CSULB's 2018 GHG emissions inventory (55,355.83 $MTCO_2e$, as reported in the Sustainability Tracking, Assessment & Rating System)[43] to determine the mass emissions level for 2035, the horizon year for the Master Plan Update, that would be in line with the state's goals. This calculation identified a campus-specific mass emissions limit of 20,503.21 $MTCO_2e$ for the year 2035.

The third step involved dividing the campus-specific mass emissions limit (20,503.21 $MTCO_2e$) by the campus' total anticipated service population, including all students, faculty and staff, and faculty and staff household members (i.e., 38,165 total campus population; refer to Chapter 2, Project Description, Table 2-3, Existing and Anticipated Total Campus Population). This calculation identified a per capita emissions level of 0.54 $MTCO_2e$ per total campus population per year.

The fourth (and final) step involved multiplying the per capita emissions rate by the net increase

41 California Air Resources Board, *2000–2020 GHG Emissions Trends Report Data*, available at: https://ww2.arb.ca.gov/ghg-inventory-data, accessed February 3, 2023.

42 California Air Resources Board, December 2022, *2022 Scoping Plan for Achieving Carbon Neutrality*.

43 Association for the Advancement of Sustainability in Higher Education, 2021, The Sustainability Tracking, Assessment & Rating System, California State University, Long Beach: OP-1 Emissions Inventory and Disclosure, 2021, available at: https://reports.aashe.org/institutions/california-state-university-long-beach-ca/report/2021-01-29/OP/air-climate/OP-1/, accessed February 3, 2023.

in service population resulting from the proposed project (i.e., 5,466 net increase in the total campus population; refer to Chapter 2, Project Description, Table 2-3) to obtain the project-related campus-specific mass emission threshold of 2,936.47 $MTCO_2e$ per year. The equation and calculations discussed above are provided in Appendix C, Air Quality and Greenhouse Gas Emissions Calculations.

3.6.4 Impact Analysis

The impact analysis below is organized into a program-level analysis and a project-level analysis. For the program-level analysis, the Master Plan Update is evaluated as an overall program of development over a multi-year planning horizon for the CSULB campus. For the project-level analysis, near- and mid-term development projects that would be implemented under the Master Plan Update are analyzed.

GHG-1 Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Program-Level Analysis for Master Plan Update

Construction

Construction of the Master Plan Update projects would generally involve activities associated with demolition, grading, building construction, paving, and architectural coating applications. For the purposes of estimating construction emissions, the most impactful projects were modeled separately, and then the GHG emissions for each development project in each construction year were then added up to account for overlapping and determine the program-level emissions. Table 3.6-3, Program-Level Construction Greenhouse Gas Emissions, presents construction emissions for the Master Plan Update from on-site and off-site emission sources.

Construction of the near- and mid-term projects was estimated to last a total of approximately seven years (2024 through 2031) based on construction information provided by program planners in the Design & Construction Services Department at CSULB. As discussed above, the most impactful near-term and mid-term projects in terms of GHG emissions (i.e., with intensive construction scenarios) have been overlapped between the development years of 2024 through 2031 for a conservative analysis. The estimated annual average GHG emissions from the maximum concurrent (overlapped) development construction scenario would be approximately 987.39 $MTCO_2e$ (6,911.71 $MTCO_2e \div 7$ years). The annual average construction emissions were then multiplied over the Master Plan Update's 12-year buildout (2024 through 2035, inclusive) to conservatively estimate the total GHG emissions due to construction. This methodology assumed the same intensity of construction activity and the same emission factors of construction equipment in the future years as the years 2024 through 2031. This assumption is conservative because construction of projects after 2031 is anticipated to be less intensive than the overlapped near- and mid-term projects. Additionally, as technology improves, construction equipment emission factors would be lower in the future, resulting in reduced emissions. Over the 12-year buildout period, it is estimated that project buildout would result in approximately 11,848.64 $MTCO_2e$ (987.39 $MTCO_2e$ x 12 years).

As shown in Table 3.6-3, the estimated project-generated construction emissions amortized over 30 years would be approximately 394.95 $MTCO_2e$ per year. In addition to the most impactful projects modeled, implementation of the Master Plan Update would include various renovation projects for academic facilities, pedestrian/bike lane improvements, mobility and open space enhancements, and athletic facilities improvements through the 2035 horizon year. These types of projects are not included in the modeling for construction emissions as they are considered

minor construction projects with short-term schedules and are not anticipated to result in substantial GHG emissions. Because there is no separate GHG threshold for construction, the evaluation of significance is discussed in the operational emissions analysis below.

Table 3.6-3: Program-Level Construction Greenhouse Gas Emissions

Year	Metric Tons Per Year			
	CO_2	CH_4	N_2O	CO_2e
2024	1,028.32	0.17	0.04	1,046.37
2025	1,963.40	0.21	0.09	1,995.00
2026	1,193.60	0.18	0.05	1,211.56
2027	1,179.97	0.20	0.04	1,196.28
2028	641.63	0.12	0.02	651.09
2029	318.08	0.06	0.01	323.65
2030	423.03	0.02	0.02	428.20
2031	58.97	<0.01	<0.01	59.559
Total Construction Emissions for Maximum Concurrent Development				**6,911.71**
Annual Average				**987.39**
Total Construction Emissions Over 12-Year Buildout (= Annual Average x 12)				**11,848.64**
Amortized Construction Emissions (= Total Construction Emissions / 30)				**394.95**

Operation

Operational emissions related to implementation of the Master Plan Update and existing campus development would decrease with project implementation. Implementation of the Master Plan Update would generate the same types of GHG emissions compared to existing conditions through mobile source (vehicle trips); landscape maintenance equipment operation (area source); energy use (electricity); solid waste disposal; water supply, treatment, and distribution; and wastewater treatment.

As shown in Table 3.6-4, Program-Level Annual Greenhouse Gas Emissions, the total net change in project-related GHG emissions from all sources combined would be a reduction of 7,673.38 $MTCO_2e$ per year compared to existing conditions, which is below the Campus-Specific Mass Emission Threshold of 2,936.47 $MTCO_2e$ per year. The total net change of GHG emissions would be negative, due to the implementation of more stringent emission standards and reduced mobile source emission factors in the future. Mobile source emissions calculations used CalEEMod default emission factors, which decrease annually due to state regulations, including Low Carbon Fuel Standard and Low-Emission Vehicle (LEV) Program. These regulations would reduce mobile source emissions regardless of individual behavioral changes or CSULB's actions, as they regulate fuel and vehicle emission standards at the manufacturer level, not the consumer level. As such, although daily trips and VMT would increase as a result of the Master Plan Update, associated mobile source emissions would significantly decrease.

As discussed in the construction analysis above, implementation of the Master Plan Update would include various renovation projects for academic facilities, pedestrian/bike lane improvements, mobility and open space enhancements, and athletic facilities improvements. However, these projects are not included in the modeling for GHG emissions as they do not typically result in substantial GHG emissions. It is anticipated that renovation projects would further reduce emissions associated with energy (electricity) as renovations would increase energy efficiencies as required by CSU energy policies. For pedestrian/bike lane improvements, mobility and open space enhancements, and athletic facilities improvements, it is anticipated that these types of projects would either reduce emissions associated with energy or remain similar to existing

conditions due to their passive and intermittent use. In addition, transportation improvement projects such as pedestrian/bike lane improvements and mobility enhancement would reduce VMT and/or improve traffic flow, which would reduce mobile source GHG emissions; however, as a conservative analysis, this reduction was not quantified or accounted for in Table 3.6-4. As such, program-level impacts related to generation of GHG emissions would be less than significant.

Table 3.6-4: Program-Level Annual Greenhouse Gas Emissions

Source	CO_2	CH_4		N_2O		Total Metric Tons of CO_2e
	Metric Tons/year[1]	Metric Tons/year[a]	Metric Tons of CO_2e[b]	Metric Tons/year[a]	Metric Tons of CO_2e[b]	
Existing Emissions						
Area Source	1.18	<0.01	0.01	0.00	0.00	1.27
Mobile Source	44,531.29	2.93	73.24	2.08	620.26	45,224.78
Energy	14,065.95	0.71	17.70	0.20	60.61	14,144.27
Solid Waste	1,211.36	71.59	1,789.74	0.00	0.00	3,001.10
Water Demand	308.84	2.21	55.34	0.05	16.27	380.47
Total Existing Emissions[c]	***60,118.63***	***77.44***	***1,936.09***	***2.34***	***697.14***	***62,751.89***
Campus at Buildout Emissions[d]						
Construction (amortized over 30 years)	388.97	0.05	1.37	0.02	4.56	394.95
Area Source	1.38	<0.01	0.01	0.00	0.00	1.47
Mobile Source	34,750.99	2.25	56.28	1.52	454.12	35,261.40
Energy	15,380.64	0.82	20.47	0.22	64.64	15,465.75
Solid Waste	1,413.85	83.56	2,088.91	0.00	0.00	3,502.76
Water Demand	367.05	2.63	65.77	0.06	19.34	452.17
Total Campus at Buildout Emissions[c]	***52,302.89***	***89.32***	***2,232.90***	***1.82***	***542.66***	***55,078.51***
Total Net Change (Campus at Buildout Minus Existing Emissions)	***-7,673.38 $MTCO_2e$/year***					
Campus-Specific Mass Emission Threshold	***2,936.47 $MTCO_2e$/year***					
Threshold Exceeded?	***NO***					

a. Emissions calculated using California Emissions Estimator Model Version 2020.4.0 (CalEEMod) computer model.
b. CO_2 Equivalent values calculated using the EPA Website, *Greenhouse Gas Equivalencies Calculator*, http://www.epa.gov/cleanenergy/energy-resources/calculator.html, accessed February 9, 2023.
c. Totals may not add up precisely due to rounding.
d. Emission reductions applied in the CalEEMod model, or "mitigated emission", include Rule 445 and AB 341.

Source: Refer to Appendix C, Air Quality, Greenhouse Gas Emissions, and Energy Calculations, for detailed model input/output data.

Project-Level Analysis for Near- and Mid-Term Development Projects

Emissions from construction activities associated with the following projects and emissions from operational activities associated with the buildout of the Master Plan Update were calculated using CalEEMod: Engineering Replacement Building, New Parkside Housing Village, Faculty and Staff Housing, USU Renovation/Addition and Cafeteria Replacement, Hillside College Renovations/Addition, Beachside Housing, Aquatics Center and Pool Renovation, College of the Arts Replacement Building, New 7th St. Community Outreach Facility, Jack Rose Track/Commencement Facilities, and Walter Pyramid Renovation. Construction emissions were

calculated based on the assumption that long-term development projects associated with the Master Plan Update would have similar construction intensities as the near- and mid-term development projects, and as such would generate the same level of average annual construction emissions. Predicted construction emissions presented in Table 3.6-4 above include construction emissions from the 11 most impactful projects and were evaluated over a 12-year buildout duration, amortized over 30 years and summed with the project's operational emissions. Similar to the program analysis, in addition to the most impactful projects modeled, implementation of the Master Plan Update would include various renovation projects for academic facilities, pedestrian/bike lane improvements, mobility and open space enhancements, and athletic facilities improvements through the 2035 horizon year. These types of projects are not included in the modeling for construction emissions as they are considered minor construction projects with short-term schedules and are not anticipated to result in substantial GHG emissions.

As shown in Table 3.6-4 above, the net change GHG emissions associated with the implementation of the Master Plan Update, which includes the 11 projects, would be a reduction 15,519.50 $MTCO_2e$ per year and would be well below the mass emission threshold of 2,936.47 $MTCO_2e$ per year. Because evaluation of the program-level analysis includes the near- and mid-term development projects, the project-level impacts would also fall below the mass emission threshold of 2,936.47 $MTCO_2e$ per year. Therefore, project-level construction and operational GHG emissions would be less than significant.

GHG-2 Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Program-Level Analysis for Master Plan Update

The CSU CEQA Handbook states that if a project is located on a campus with a Climate Action Plan that qualifies for CEQA tiering and streamlining through the project's planning horizon year, then the Climate Action Plan should be used to evaluate the project's GHG emissions impact. The project should be analyzed for consistency with all relevant, applicable required actions in the Climate Action Plan in the form of a consistency analysis table. The consistency analysis can be qualitative. If the project is fully consistent with the Climate Action Plan, then the CEQA document for the project can conclude that its GHG emissions are less than significant. As discussed above, CSULB updated their CAAP in 2022 and adopted targets of 2030 for operational emissions and 2040 for commute-related emissions. Therefore, a qualitative consistency analysis is presented below.

The consistency analysis for implementation of the Master Plan Update is based on the 2020-2045 RTP/SCS, 2022 Scoping Plan, CSU Sustainability Policy, CSULB Sustainability Policy, and CSULB CAAP. The 2020-2045 RTP/SCS is a regional growth-management strategy that targets per-capita GHG reduction from passenger vehicles and light-duty trucks in the SCAG region, which encompasses six counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura). The 2020-2045 RTP/SCS incorporates local land use projections and circulation networks from city and county general plans. The 2022 Scoping Plan contains the GHG reductions, technology, and clean energy mandated by statutes. The CSU Sustainability Policy contains systemwide goals in 11 focus areas that would promote the sustainability of CSU's operations for the built environment. The CSULB CAAP contains energy efficiency goals and policies that would help implement energy efficient measures and would subsequently reduce energy consumption and GHG emissions within the campus.

Consistency With the SCAG 2020-2045 RTP/SCS

On September 3, 2020, the Regional Council of SCAG formally adopted the 2020-2045 RTP/SCS.

The 2020-2045 RTP/SCS includes performance goals that were adopted to help focus future investments on the best-performing projects; and different strategies to preserve, maintain, and optimize the performance of the existing transportation system. The SCAG 2020-2045 RTP/SCS is forecasted to help California reach its GHG reduction goals by reducing GHG emissions from passenger cars by eight percent below 2005 levels by 2020 and 19 percent by 2035 in accordance with the most recent CARB targets adopted in March 2018. Five key SCS strategies are included in the 2020-2045 RTP/SCS to help the region meet its regional VMT and GHG reduction goals, as required by the state. Table 3.6-5, Consistency with the 2020-2045 RTP/SCS, shows the project's consistency with these five strategies found within the 2020-2045 RTP/SCS. As shown therein, the Master Plan Update would be consistent with the GHG emission reduction strategies contained in the 2020-2045 RTP/SCS.

Table 3.6-5: Consistency with the 2020-2045 RTP/SCS

Reduction Strategy	Project Consistency Analysis
Focus Growth Near Destinations and Mobility Options	
• Emphasize land use patterns that facilitate multimodal access to work, educational and other destinations • Focus on a regional jobs/housing balance to reduce commute times and distances and expand job opportunities near transit and along center-focused main streets • Plan for growth near transit investments and support implementation of first/last mile strategies • Promote the redevelopment of underperforming retail developments and other outmoded nonresidential uses • Prioritize infill and redevelopment of underutilized land to accommodate new growth, increase amenities and connectivity in existing neighborhoods • Encourage design and transportation options that reduce the reliance on and number of solo car trips (this could include mixed uses or locating and orienting close to existing destinations) • Identify ways to "right size" parking requirements and promote alternative parking strategies (e.g., shared parking or smart parking)	**Consistent.** The CSULB campus is located within an urbanized area that is served by existing transit, sidewalks, and bicycle paths. Future developments projects implemented under the Master Plan Update would consist of infill development that would occur within the CSULB campus. The Master Plan Update would also provide improvements to the campus's pedestrian, bicycle, and all-wheel, on-campus transit, and vehicular networks to increase safety for pedestrians and bicyclists and enhance overall circulation and access as discussed in detail in Section 3.11. Transportation. Further, future development associated with the Master Plan Update could provide additional amenities on campus, such as post office services or childcare, that could reduce vehicle trips. Additionally, implementation of the Master Plan Update would include the Faculty and Staff Housing project on the main campus, which would provide 285 units for campus faculty and staff and their household members, that would reduce commute times and distances. Therefore, implementation of the Master Plan Update would focus growth near destinations and mobility options. Implementation of the Master Plan Update would be consistent with this reduction strategy.
Promote Diverse Housing Choices	
• Preserve and rehabilitate affordable housing and prevent displacement • Identify funding opportunities for new workforce and affordable housing development • Create incentives and reduce regulatory barriers for building context sensitive accessory dwelling units to increase housing supply • Provide support to local jurisdictions to streamline and lessen barriers to housing	**Consistent.** Implementation of the Master Plan Update would include the New Parkside Housing Village, Hillside College Renovations/Addition, and Beachside Housing projects, which would increase the number of student beds on campus by 1,602 beds. Additionally, the proposed Faculty and Staff Housing project would provide 285 units for faculty, staff, and their household members. These projects would provide additional housing for the campus population, and would complement the 2020-2045 RTP/SCS strategy to promote diverse housing choices. As such, the Master

Table 3.6-5: Consistency with the 2020-2045 RTP/SCS

development that supports reduction of greenhouse gas emissions	Plan Update would be consistent with this reduction strategy.
Leverage Technology Innovations	
• Promote low emission technologies such as neighborhood electric vehicles, shared rides hailing, car sharing, bike sharing and scooters by providing supportive and safe infrastructure such as dedicated lanes, charging and parking/drop-off space • Improve access to services through technology—such as telework and telemedicine as well as other incentives such as a "mobility wallet," an app-based system for storing transit and other multi-modal payments • Identify ways to incorporate "micro-power grids" in communities, for example solar energy, hydrogen fuel cell power storage and power generation	**Consistent.** CSULB has a variety of existing technology innovations, including electrical vehicle chargers, increased online learning opportunities, bicycle parking, priority parking for clean air vehicles, and solar panels. Implementation of the Master Plan Update could include, in the long term, multiple mobility hub locations on campus to help serve as key transfer points for different modes, and destinations for services. Future mobility hubs would serve as a location where existing mobility services would converge. Some individual development projects (i.e., all new buildings and major renovations) implemented under the Master Plan Update would meet or exceed minimum requirements equivalent to LEED Silver, with several sustainable design features proposed, including the use of photovoltaic panels for new buildings as required by Title 24 standards. Additionally, CSULB would pursue Net Zero Energy for the proposed buildings and would exceed the energy code requirements for the building by ten percent. Therefore, the Master Plan Update would leverage technology innovations to help the city, county, and state meet their GHG reduction goals. The Master Plan Update would be consistent with this reduction strategy.
Support Implementation of Sustainability Policies	
• Pursue funding opportunities to support local sustainable development implementation projects that reduce greenhouse gas emissions • Support statewide legislation that reduces barriers to new construction and that incentivizes development near transit corridors and stations • Support local jurisdictions in the establishment of Enhanced Infrastructure Financing Districts (EIFDs), Community Revitalization and Investment Authorities (CRIAs), or other tax increment or value capture tools to finance sustainable infrastructure and development projects, including parks and open space • Work with local jurisdictions/communities to identify opportunities and assess barriers to implement sustainability strategies • Enhance partnerships with other planning organizations to promote resources and best practices in the SCAG region • Continue to support long range planning	**Consistent.** CSULB is committed to sustainability and the reduction of GHG emissions. CSULB will continue to foster partnership with the City of Long Beach and other community organizations to meet its climate goals, but is focused on strategies to reduce its own GHG emissions within the campus. As previously discussed, some individual development projects implemented under the proposed Master Plan development would meet or exceed minimum requirements equivalent to LEED Silver and a goal of the Master Plan Update is to achieve net-zero emissions. Implementation of the Master Plan Update would not conflict with any of the strategies to support implementation of sustainability policies. Instead, CSULB's commitment would complement local, regional, and state reduction goals. Thus, the Master Plan Update would be consistent with this reduction strategy.

Table 3.6-5: Consistency with the 2020-2045 RTP/SCS

efforts by local jurisdictions • Provide educational opportunities to local decisions makers and staff on new tools, best practices and policies related to implementing the Sustainable Communities Strategy	
Promote a Green Region	
• Support development of local climate adaptation and hazard mitigation plans, as well as project implementation that improves community resiliency to climate change and natural hazards • Support local policies for renewable energy production, reduction of urban heat islands and carbon sequestration • Integrate local food production into the regional landscape • Promote more resource efficient development focused on conservation, recycling and reclamation • Preserve, enhance and restore regional wildlife connectivity • Reduce consumption of resource areas, including agricultural land • Identify ways to improve access to public park space	**Consistent.** CSULB has prepared its own CAAP, which would serve as a roadmap to minimize GHG emissions from campus operations. Implementation of the Master Plan Update would include proposed improvements to landscaping and open space, including building upon the existing park-like setting to enhance the campus's urban forest, which offers aesthetic, environmental, and wellness benefits. Additionally, projects implemented under the Master Plan Update would be required to exceed the 2022 Title 24 standards by 10 percent and comply with the CALGreen Code, which would help reduce energy consumption and reduce GHG emissions. Thus, the Master Plan Update would support resource efficient development that reduces energy consumption and GHG emissions. The Master Plan Update would be consistent with this reduction strategy.

Source: Southern California Association of Governments, September 2020, *Connect SoCal 2020-2045 RTP/SCS Demographics and Growth Forecast*.

Consistency With the 2022 CARB Scoping Plan Update

The 2022 Scoping Plan identifies reduction measures necessary to achieve the goal of carbon neutrality by 2045 or earlier. Actions that reduce GHG emissions are identified for each AB 32 inventory sector. Table 3.6-6, Consistency with the 2022 Scoping Plan: AB 32 GHG Inventory Sectors, provides an evaluation of applicable reduction actions/strategies by emissions source category to determine how the project would be consistent with or exceed reduction actions/strategies outlined in the 2022 Scoping Plan.

Table 3.6-6: Consistency with the 2022 Scoping Plan: AB 32 GHG Inventory Sectors

Actions and Strategies	Project Consistency Analysis
Smart Growth / Vehicles Miles Traveled	
Reduce VMT per capita to 25% below 2019 levels by 2030, and 30% below 2019 levels by 2045.	**Consistent**. The Master Plan Update provides for planned improvements phased through the 2035 planning horizon. CSULB would implement several Transportation Demand Management (TDM) strategies aimed at reducing vehicle trips to and from campus and their resulting emissions. TDM measures would reduce vehicle trips and prioritize pedestrian and bicycle movement, encourage greater use of transit, pedestrian, and bicycle travel, and reduce dependence on automobiles at the campus. Additionally, as discussed in Section 3.11, Transportation, total network

Table 3.6-6: Consistency with the 2022 Scoping Plan: AB 32 GHG Inventory Sectors

Actions and Strategies	Project Consistency Analysis
	VMT would be reduced, indicating that implementation of the Master Plan Update would result in more efficient travel patterns across the region, As such, implementation of the Master Plan Update would be consistent with this action.
New Residential and Commercial Buildings	
All electric appliances beginning 2026 (residential) and 2029 (commercial), contributing to 6 million heat pumps installed statewide by 2030.	**Consistent**. CSULB is currently in the process of phasing out natural gas use and would not utilize natural gas on campus by 2035. As such, implementation of the Master Plan Update would be consistent with this action.
Food Products	
Achieve 7.5% of energy demand electrified directly and/or indirectly by 2030 and 75% by 2045.	**Consistent**. As mentioned above, there would be no natural gas used for heating and cooking on-site by 2035. Additionally, implementation of the Master Plan Update would include installation of solar panels for some projects. As such, implementation of the Master Plan Update would be consistent with this action.
Non-combustion Methane Emissions	
Divert 75% of organic waste from landfills by 2025.	**Consistent**. Implementation of the Master Plan Update would continue to implement waste reduction, recycling, and composting programs including the Waste Not program in accordance with AB 341, which requires 75% waste diversion. Specifically, the Master Plan Update proposes to achieve zero waste, including organic materials, to landfills by 2030 and would focus on minimizing waste. As such, implementation of the Master Plan Update would be consistent with this action.

Source: California Air Resources Board, December 2022, *2022 Scoping Plan for Achieving Carbon Neutrality*.

Consistency With the CSU Sustainability Policy

The CSU Sustainability Policy encompasses the tenets of human and ecological health, social justice, economic vitality, and promotes the environmental sustainability of CSU's operations for the built environment. The policy focuses on the following 11 areas of sustainability: University Sustainability; Climate Action Plan; Energy Resilience and Procurement; Energy Conservation, Carbon Reduction, and Utility Management; Water Conservation; Sustainable Procurement; Waste Management; Sustainable Food Service; Sustainable Building and Land Practices; Physical Plant Management; and Transportation. Implementation of the Master Plan Update is required to be consistent with the applicable policies set forth in the CSU Sustainability Policy. For instance, the Master Plan Update would comply with the Climate Action Plan goals to reduce systemwide facility carbon emissions through reducing GHG emissions through the buildout of the Master Plan Update (refer to Table 3.6-3). The Master Plan Update would comply with the Energy Resilience and Procurement goals through increasing solar generation and reducing natural gas usage throughout the horizon year. The Master Plan Update would comply with the Energy Conservation, Carbon Reduction and Utility Management and Sustainable Building & Lands Practices goals by meeting the state building code requirements, including use of energy-efficient HVAC systems, installing LED lighting, retrofitting campus water fixtures to low-flow plumbing equipment, and compliance with waste recycling requirements. Additionally, the Master Plan Update would be consistent with Water Conservation goals by installing drought tolerant or native landscaping, reducing turf, installing controls to optimize irrigation water use, reducing

water usage, and promoting the use of reclaimed/recycled water. Lastly, implementation of the Master Plan Update would comply with Transportation goals to promote alternative transportation through pedestrian and bicycle network improvements on the main campus, and would reduce and reduce total network VMT, as discussed in detail in Section 3.11, Transportation.

Consistency With the CSULB 2022 Climate Action and Adaptation Plan

The CSULB CAAP includes a Carbon Neutrality Roadmap as a technical appendix in support of achieving carbon neutrality by 2030 and 2040. This plan is focused specifically on addressing Scope 1, 2, and 3 emissions which are created by transportation to and from campus (60 percent), the need to heat, cool, and power campus facilities via purchased electricity (17 percent) and combustion of natural gas (11 percent). Implementation of the Master Plan Update would support progress towards meeting the carbon neutrality goal by promoting alternative transportation methods such as bicycling and walking, and reducing overall total network VMT, as discussed in Section 3.11, Transportation. To support mode shift from single occupancy vehicles and encourage alternative transportation methods, the university would develop a Transportation Demand Management (TDM) Plan. The TDM Plan would reduce vehicle trips, prioritize pedestrian and bicycle movement, encourage greater use of transit, pedestrian, and bicycle travel, and reduce dependence on automobiles at the campus.

Implementation of the Master Plan Update would include incorporation of energy-efficiency, sustainability, water- and waste-efficiency, and resiliency features to achieve a Net Zero Energy Rating and a LEED Gold, or better, building rating for certain buildings. As required by the CSU Sustainability Policy, all new buildings and major renovations would at least meet or exceed the minimum requirements equivalent to LEED Silver. Building envelopes for new buildings would be configured with several sustainable design features including the use of photovoltaic panels for new buildings as required by Title 24 standards, the use of reclaimed water for water closest and irrigation, and the installation of dry wells to collect storm water flows from the site to comply with low impact development (LID) requirements. The development projects associated with the Master Plan Update would be required to exceed Title 24 Building Energy Efficiency Standards by 10 percent, which provide minimum efficiency standards related to various building features, including appliances, water and space heating and cooling equipment, building insulation and roofing, and lighting. Implementation of the latest Title 24 standards would significantly reduce energy consumption. The Title 24 Building Energy Efficiency Standards are updated every three years and become more stringent between each update; therefore, complying with and exceeding the latest Title 24 standards would make the new buildings on campus more energy efficient than existing buildings built under the earlier versions of the Title 24 standards. In addition, CSULB currently generates solar energy on campus, and would increase their solar generation throughout the future years. By complying with the CSULB CAAP, the Master Plan Update would achieve the 2030 and 2040 climate neutrality goals by mitigating the campus carbon emissions as well as strategies for building adaptive capacity into the campus infrastructure and community. Therefore, implementation of the Master Plan Update would result in a less than significant impact related to conflict with GHG reduction plans.

Project-Level Analysis for Near- and Mid-Term Development Projects

The near- and mid-term development projects consisting of renovation, replacement, and new projects would comply with the CSU Sustainability Policy and the CSULB CAAP through meeting the state building code requirements, including use of energy-efficient HVAC systems, installing LED lighting, retrofitting campus water fixtures to low-flow plumbing equipment, and compliance with waste recycling requirements. New and replacement projects would be required to exceed Title 24 standards by 10 percent and comply with the CALGreen Code, which would help reduce

energy consumption and reduce GHG emissions. Renovation projects consisting of interior and exterior renovations would comply with the CSU standards set forth in PolicyStat such that the renovated buildings are designed for optimum energy utilization and in compliance with all applicable energy codes (Enhanced Title 24 Energy Codes) and regulations. For renovation projects that include mobility, circulation, and open space uses and athletic facilities uses, projects would be designed to include drought tolerant landscaping/turf, reduce the need for irrigation, or enhance the pedestrian or bicycle network, which would further reduce GHG emissions. Additionally, the Central Plant Decarbonization project would replace equipment at the existing Central Plant with electrified equipment, which would be consistent with the CSU Sustainability Policy and the CSULB CAAP.

In addition, the development of near- and mid-term projects would also support progress towards meeting the carbon neutrality goal through implementation of various measures, which would minimize electricity, natural gas, and petroleum consumption. Regarding consistency with the SCAG 2020-2045 RTP/SCS and 2022 Scoping Plan, the near- and mid-term projects would not result in significant population growth that would exceed SCAG growth projections, as discussed in detail in Section 3.9, Population and Housing, and would not conflict with goals of the SCAG 2020-2045 RTP/SCS, as shown in Table 3.6-5. Furthermore, as previously discussed under Threshold GHG-1, the net GHG emissions of the near- and mid-term projects would not exceed the Campus-Specific Mass Emission Threshold of 2,936.47 MTCO2e per year. As the near- and mid-term projects were evaluated as a part of the buildout of the Master Plan Update, the near- and mid-term projects included in the Master Plan Update would not impede the state's trajectory toward the above-described statewide GHG reduction goals for 2030 and 2040 and beyond; therefore, the project-level impacts would be less than significant.

3.6.5 Mitigation Measures

No mitigation measures are required.

3.6.6 Level of Significance After Mitigation

Development under the Master Plan Update would result in less than significant impacts related to GHG emissions.

3.6.7 Cumulative Impacts

Project-related GHG emissions are not confined to the air basin within which a project site is located; instead, GHG emissions are dispersed worldwide. GHG impacts are recognized as exclusively cumulative impacts, and there are no non-cumulative GHG emission impacts from a climate change perspective. No single project is large enough to result in a measurable increase in global concentrations of GHG emissions. Therefore, impacts identified under Threshold GHG-1 are not project-specific impacts to global climate change, but rather, the proposed project's contribution to this cumulative impact. As such, significant direct impacts associated with the project also serve as the project's cumulative impact.

As analyzed under Thresholds GHG-1 and GHG-2, implementation of the Master Plan Update would be consistent with applicable policies and guidance contained in the 2020-2045 RTP/SCS, CARB's 2022 Scoping Plan, the CSU Sustainability Policy, and the CSULB Sustainability Policy and CAAP.

The net emissions generated by implementation of the Master Plan Update, which would not exceed the project-related campus-specific mass emission threshold of 2,936.47 $MTCO_2e$ per year, are considered consistent with state/CARB 2045 net-zero targets. Thus, implementation of

the Master Plan Update would not result in a cumulatively considerable contribution to a significant cumulative GHG emissions impact, and the cumulative impact would be less than significant.