

3.8 GREENHOUSE GAS EMISSIONS

This section presents a summary of regulations applicable to greenhouse gas (GHG) emissions; a summary of climate change science and GHG sources in California; quantification of GHGs emitted from construction and operation of the 2035 Master Plan; and a discussion of their contribution to global climate change. Mitigation measures are recommended to reduce the project's contribution to climate change. Detailed calculations, modeling inputs, and results can be found in Appendix C.

No comments regarding GHG emissions or climate change were received in response to the Notice of Preparation (NOP).

3.8.1 Regulatory Setting

FEDERAL

Supreme Court Ruling

In *Massachusetts et al. v. Environmental Protection Agency et al.*, 549 U.S. 497 (2007), the Supreme Court of the United States ruled that carbon dioxide (CO₂) is an air pollutant as defined under the federal Clean Air Act and that the U.S. Environmental Protection Agency (EPA) has the authority to regulate GHG emissions.

In 2010, EPA started to address GHG emissions from stationary sources through its New Source Review permitting program, including operating permits for "major sources" issued under Title V of the federal Clean Air Act.

Regulations for Greenhouse Gas Emissions from Passenger Cars and Trucks and Corporate Average Fuel Economy Standards

In October 2012, EPA and the National Highway Traffic Safety Administration, on behalf of the U.S. Department of Transportation, issued final rules to further reduce GHG emissions and improve corporate average fuel economy standards for light-duty vehicles for model years 2017 and beyond (77 Federal Register [FR] 62624). These rules would increase fuel economy to the equivalent of 54.5 miles per gallon, limiting vehicle emissions to 163 grams of CO₂ per mile for the fleet of cars and light-duty trucks by model year 2025 (77 FR 62630). However, on April 2, 2018, the EPA administrator announced a final determination that the current standards are not appropriate and should be revised. It is not yet known what revisions will be adopted or when they will be implemented (EPA 2018).

Affordable Clean Energy Rule

In June 2019, EPA, under authority of the Clean Air Act Section 111(d), issued the Affordable Clean Energy rule which provides guidance to states on establishing emissions performance standards for coal-fired electric generating units (EGUs). Under this rule, states are required to submit plans to EPA that demonstrate the use of specifically listed retrofit technologies and operating practices to achieve CO₂ emission reductions through heat rate improvement (HRI). HRI is a measurement of power plant efficiency that EPA determined as part of this rulemaking to be the best system of emission reductions for CO₂ generated from coal-fired EGUs (EPA 2019).

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 is designed to improve vehicle fuel economy and help reduce U.S. dependence on oil. It represents a major step forward in expanding the production of renewable fuels, reducing dependence on oil, and confronting global climate change. The Energy Independence and Security Act of 2007 increases the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022, which represents a nearly fivefold increase over current levels, and reduces U.S. demand for oil by setting a national fuel economy standard of 35 miles per gallon by 2020—an increase in fuel economy standards of 40 percent.

STATE

The following plans, policies, regulations, and laws established by state agencies are generally presented in the order in which they were established.

Executive Order S-3-05

In 2005, Executive Order (EO) S-3-05 was signed into law and proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the EO established total GHG emission targets for the state. Specifically, statewide emissions are to be reduced to 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, the California Global Warming Solutions Act of 2006, Assembly Bill (AB) 32, was signed into law. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. AB 32 also requires that "(a) the statewide greenhouse gas emissions limit shall remain in effect unless otherwise amended or repealed. (b) It is the intent of the Legislature that the statewide greenhouse gas emissions limit continue in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020. (c) The state board [California Air Resources Board (CARB)] shall make recommendations to the Governor and the Legislature on how to continue reductions of greenhouse gas emissions beyond 2020" (California Health and Safety Code, Division 25.5, Part 3, Section 38551).

Senate Bill 375 of 2008

In September 2008, Senate Bill (SB) 375 was signed into law and aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy, showing prescribed land use allocation in each MPO's Regional Transportation Plan. CARB, in consultation with the MPOs, is to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks for 2020 and 2035. The San Luis Obispo Council of Governments (SLOCOG) serves as the MPO for San Luis Obispo County, where the project site is located. Under SB 375, SLOCOG adopted its most recent *2019 Regional Transportation Plan (RTP)* in June 2019. SLOCOG was tasked by CARB to achieve an 8-percent per capita reduction compared to 2005 emissions by 2020 and an 8-percent per capita reduction by 2035, both of which SLOCOG confirmed the region would achieve by implementing the 2014 RTP (SLOCOG 2019:13-1; CARB 2018a:1). In March 2018, CARB promulgated revised targets tasking SLOCOG to achieve a 3-percent and an 11-percent per capita reduction by 2020 and 2035, respectively (CARB 2018a:1).

CARB's Mobile Source Strategy (2016) described California's strategy for containing air pollutant emissions from vehicles and quantifies growth in vehicle miles traveled (VMT) that is compatible with achieving state climate targets.

Cap-and-Trade Program

In 2011, CARB adopted the cap-and-trade regulations and created the cap-and-trade program. The program covers GHG emission sources that emit more than 25,000 metric tons of carbon dioxide equivalent per year (MTCO₂e/year), such as refineries, power plants, and industrial facilities. The cap-and-trade program includes an enforceable statewide emissions cap that declines approximately 3 percent annually. CARB distributes allowances, which are tradable permits, equal to the emissions allowed under the cap. Sources that reduce emissions more than their limits can auction carbon allowances to other covered entities through the cap-and-trade market. Sources subject to the cap are required to surrender allowances and offsets equal to their emissions at the end of each compliance period (CARB 2012). The cap-and-trade program took effect in early 2012 with the enforceable compliance obligation beginning January 1, 2013. The cap-and-trade program was initially slated to sunset in 2020, but the passage of SB 398 in 2017 extended the program through 2030.

Cal Poly's energy use results in annual emissions exceeding 10,000 MTCO₂e/year, requiring annual reporting of those emissions to CARB; however, the University is not bound to mandatory reductions under cap-and-trade because emissions are below the regulatory threshold of 25,000 MTCO₂e/year.

Advanced Clean Cars Program

In January 2012, CARB approved the Advanced Clean Cars program, which combines the control of GHG emissions and criteria air pollutants, as well as requirements for greater numbers of zero-emission vehicles (ZEVs), into a single package of regulatory standards for vehicle model years 2017– 2025. The new regulations strengthen the GHG standards for 2017 models and beyond. This will be achieved through existing technologies, the use of stronger and lighter materials, and more efficient drivetrains and engines. The program's ZEV regulation requires battery, fuel cell, and plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025 (CARB 2016a:15). The program also includes a clean fuels outlet regulation designed to support the commercialization of zero-emission hydrogen fuel cell vehicles planned by vehicle manufacturers by 2015 by requiring increased numbers of hydrogen fueling stations throughout the state. The number of stations will grow as vehicle manufacturers sell more fuel cell vehicles. By 2025, when the rules will be fully implemented, GHG emissions from the statewide fleet of new cars and light-duty trucks will be reduced by 34 percent, and cars will emit 75 percent less smog-forming pollution than the statewide fleet in 2016 (CARB 2016b:1).

California Renewables Portfolio Standard

SB X1-2 of 2011 requires all California utilities to generate 33 percent of their electricity from renewables by 2020. SB 100 of 2018 sets a three-stage compliance period requiring all California utilities, including independently owned utilities, energy service providers, and community choice aggregators, to generate 52 percent of their electricity from renewables by December 31, 2027; 60 percent by December 31, 2030; and 100 percent carbon-free electricity by December 31, 2045.

Executive Order B-30-15

On April 20, 2015, EO B-30-15 was signed into law and established a California GHG reduction target of 40 percent below 1990 levels by 2030. The governor's EO aligns California's GHG reduction targets with those of leading international governments, such as the 28-nation European Union, which adopted the same target in October 2014. California is on track to meet or exceed the target of reducing GHG emissions to 1990 levels by 2020, as established in the California Global Warming Solutions Act of 2006 (AB 32, discussed above). California's new emission reduction target of 40 percent below 1990 levels by 2030 sets the next interim step in the state's continuing efforts to pursue the long-term target expressed under EO S-3-05 to reach the goal of reducing emissions 80 percent below 1990 levels by 2050. This is in line with the scientifically established levels needed in the United States to limit global warming below 2 degrees Celsius, the warming threshold at which major climate disruptions are projected, such as super droughts and rising sea levels.

Senate Bill 32 and Assembly Bill 197 of 2016

In August 2016, SB 32 and AB 197 were signed into law and serve to extend California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include Section 38566, which contains language to authorize CARB to achieve a statewide GHG emission reduction of at least 40 percent below 1990 levels by no later than December 31, 2030. SB 32 codified the targets established by EO B-30-15 for 2030, which set the next interim step in the state's continued efforts to pursue the long-term target expressed in EOs S-3-05 and B-30-15 of 80 percent below 1990 emissions levels by 2050.

Building Energy Efficiency Standards (Title 24, Part 6)

The energy consumption of new residential and nonresidential buildings in California is regulated by the state's Title 24, Part 6, Building Energy Efficiency Standards (California Energy Code). The California Energy Commission (CEC) updates the California Energy Code every 3 years with more stringent design requirements for reduced energy consumption, which results in the generation of fewer GHG emissions. The current California Energy Code (2016) is scheduled to be replaced by the 2019 standards on January 1, 2020. The 2019 California Energy Code will require

builders to use more energy-efficient building technologies for compliance with increased restrictions on allowable energy use. Additionally, new residential units will be required to include solar panels, sized to offset the estimated electrical requirements of each unit (CCR, Title 24, Part 6, Section 150.1[c]14). CEC estimates that the combination of required energy-efficiency features and mandatory solar panels in the 2019 California Energy Code will result in new residential buildings that use 53 percent less energy than those designed to meet the 2016 California Energy Code. The CEC also estimates that the 2019 California Energy Code will result in new commercial buildings that use 30 percent less energy than those designed to meet the 2016 standards, primarily through the transition to high-efficacy lighting (CEC 2018).

Low Carbon Fuel Standard

In January 2007, EO S-1-07 established a Low Carbon Fuel Standard (LCFS). The EO calls for a statewide goal to be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 and for an LCFS for transportation fuels to be established for California. The LCFS applies to all refiners, blenders, producers, or importers (providers) of transportation fuels in California, including fuels used by off-road construction equipment (Wade, pers. comm. 2017). The LCFS is measured on the total fuel cycle and may be met through market-based methods. For example, providers exceeding the performance required by an LCFS receive credits that may be applied to future obligations or traded to providers not meeting the LCFS.

In Jun 2007, CARB adopted the LCFS as a Discrete Early Action item under AB 32 pursuant to Health and Safety Code Section 38560.5, and in April 2009, CARB approved the new rules and carbon intensity reference values with new regulatory requirements taking effect in January 2011. The standards require providers of transportation fuels to report on the mix of fuels they provide and demonstrate they meet the LCFS intensity standards annually. This is accomplished by ensuring that the number of "credits" earned by providing fuels with a lower carbon intensity than the established baseline (or obtained from another party) is equal to or greater than the "deficits" earned from selling higher-intensity fuels.

After some disputes in the courts, CARB readopted the LCFS regulation in September 2015, and the LCFS went into effect on January 1, 2016.

Climate Change Scoping Plan

In December 2008, CARB adopted its first version of its *Climate Change Scoping Plan*, which contained the main strategies California will implement to achieve the mandate of AB 32 (2006) to reduce statewide GHG emissions to 1990 levels by 2020. In May 2014, CARB released and subsequently adopted the *First Update to the Climate Change Scoping Plan* to identify the next steps in reaching the goals of AB 32 (2006) and evaluate the progress made between 2000 and 2012 (CARB 2014a). After releasing multiple versions of proposed updates in 2017, CARB adopted the final version titled *California's 2017 Climate Change Scoping Plan* (2017 Scoping Plan) in December (CARB 2017). The 2017 Scoping Plan indicates that California is on track to achieve the 2020 statewide GHG target mandated by AB 32 of 2006 (CARB 2017:9). It also lays out the framework for achieving the mandate of SB 32 of 2016 to reduce statewide GHG emissions to at least 40 percent below 1990 levels by the end of 2030 (CARB 2017). The 2017 Scoping Plan identifies the GHG reductions needed by each emissions sector.

Senate Bill 743 of 2013

SB 743 of 2013 required that the Governor's Office of Planning and Research (OPR) propose changes to the State CEQA Guidelines to address transportation impacts in transit priority areas and other areas of the state. In response, Section 15064.3 was added to CEQA in December 2018, requiring that transportation impacts no longer consider congestion but instead focus on the impacts of VMT. Agencies have until July 1, 2020, to implement these changes but can also choose to implement these changes immediately. In support of these changes, OPR published its *Technical Advisory on Evaluating Transportation Impacts in CEQA*, which recommends that the transportation impact of a project be based on whether the project would generate a level of VMT per capita (or VMT per employee or some other metric) that is 15 percent lower than that of existing development in the region (OPR 2017:12–13), or that a different threshold is used based on substantial evidence. OPR's technical advisory explains that this criterion is consistent with PRC Section 21099, which states that the criteria for determining significance must "promote the

reduction in greenhouse gas emissions" (OPR 2017:18). This metric is intended to replace the use of delay and level of service to measure transportation-related impacts. More detail about SB 743 is provided in the "Regulatory Setting" section of Section 3.13, "Transportation."

Executive Order B-48-18: Zero-Emission Vehicles

In January 2018, EO B-48-18 was signed into law and requires all state entities to work with the private sector to have at least 5 million ZEVs on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 electric vehicle charging stations by 2025. It specifies that 10,000 of the electric vehicle charging stations should be direct current fast chargers. This EO also requires all state entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development is required to publish a *Plug-in Charging Station Design Guidebook* and update the *2015 Hydrogen Station Permitting Guidebook* (Eckerle and Jones 2015) to aid in these efforts. All state entities are required to participate in updating the *2016 Zero-Emissions Vehicle Action Plan* (Governor's Interagency Working Group on Zero-Emission Vehicles 2016) to help expand private investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities. Additionally, all state entities are to support and recommend policies and actions to expand ZEV infrastructure at residential land uses, through the LCFS program, and to recommend how to ensure affordability and accessibility for all drivers.

CALIFORNIA STATE UNIVERSITY

California State University Sustainability Policy

In May 2014, the Board adopted the first CSU system-wide Sustainability Policy. The policy aims to reduce the environmental impact of construction and operation of buildings and to integrate sustainability across the curriculum. The CSU Sustainability Policy established the following goals:

- ▶ Reduce GHG emissions to 1990 levels by 2020.
- ▶ Reduce GHG emissions 80 percent below 1990 levels by 2040.
- ▶ Procure 33 percent of energy supply from renewable sources by 2020.
- ▶ Increase on-site energy generation from 44 to 80 megawatts by 2020.
- ▶ Reduce per-capita landfill waste by 50 percent by 2016 and 80 percent by 2020.
- ▶ Reduce water use 10 percent by 2016 and 20 percent by 2020.
- ▶ Promote use of alternative fuels and transportation programs.
- ▶ Procure goods that are recycled, recyclable, or reusable.
- ▶ Procure 20 percent local/organic/free trade food by 2020.
- ▶ Integrate sustainability across the curriculum.

Under the CSU Sustainability Policy, campuses are responsible for quantifying and reducing their Scope 1 and 2 emissions to reach the 2020 and 2040 goals. Scope 1 emissions are direct emissions (e.g., combustion of fossil fuels, fleet vehicles, agriculture operations, use of refrigerants). Scope 2 emissions are emissions from purchased utilities (e.g., electricity, water).

CSU Executive Order 987

EO 987 is the CSU Policy Statement on Energy Conservation, Sustainable Building Practices, and Physical Plant Management. Cal Poly operates under this EO, which sets minimum efficiency standards for new construction and renovations, and establishes operating practices intended to ensure CSU buildings are used in the most energy efficient and sustainable manner possible while still meeting the programmatic needs of the University.

Association for the Advancement of Sustainability in Higher Education

In March 2016, Cal Poly adopted the Association for the Advancement of Sustainability in Higher Education Sustainability Tracking, Assessment, and Rating System (STARS) as a framework for implementation, measurement, and improvement of sustainable practices across the entire University. The voluntary point-based rating system measures sustainability performance in the areas of Curriculum and Research, Campus and Community Engagement, Operations, and Planning and Administration. As of 2019, Cal Poly has earned a STARS Gold Rating in recognition of its sustainability achievements.

Second Nature Climate Leadership Commitment

In 2016, Cal Poly became a Charter Signatory to the Climate Leadership Commitment, establishing a goal for Cal Poly to achieve net zero emissions from all sources (Scope 1, 2, and 3) by 2050. Scope 3 emissions are emissions not under direct control (e.g., commuting, business travel, solid waste). Campuses that have signed the Second Nature Climate Leadership Commitment are also responsible for reducing Scope 3 emissions as part of climate action plans to achieve neutrality as soon as possible. The Climate Commitment also requires Cal Poly to collaborate with local governments to achieve climate resilience.

Cal Poly San Luis Obispo Policies

Cal Poly's Campus Administrative Policies include the following policies that address GHG emissions:

- ▶ 151.2[5] Sustainability: Practice Institutional Ecology – Use a wide array of sustainable practices, related to water conservation, energy conservation, alternative transportation, and new building construction.
- ▶ 362.1 Environmental Compliance Program: The University shall comply with applicable federal, state, and local laws and regulations related to environmental protection and pollution control.

Cal Poly Climate Action Plan

The Cal Poly Climate Action Plan (PolyCAP) was prepared during the 2015-2016 academic year as a collaborative effort between Facilities Management and Development and Cal Poly's City and Regional Planning Department. The goal of the PolyCAP is to reduce Cal Poly's GHG emissions and to adapt the campus to a changing climate. The PolyCAP aims to exceed the CSU mandate and achieve net zero GHG emissions by 2050 (City & Regional Planning 410/411 Studio 2016:3). The following goals, objectives, and strategies related to the 2035 Master Plan are outlined in the CAP to reduce GHG emissions associated with campus operation:

- ▶ **Building (BDG) Goal 1: Net zero structures and operations**
 - **BDG Objective 1.1:** All new and retrofitted buildings reduce annual energy demand per gross square feet by at least 50 percent from that of the former building or similar type of building.
 - **BDG Strategy 1.1.1:** Require all new and retrofitted buildings to exceed Title 24 standards by 30 percent or meet LEED [Leadership in Energy and Environmental Design] Platinum certification requirements.
 - **BDG Strategy 1.1.3:** Require all new and retrofitted buildings to use efficient electric appliances.
 - **BDG Objective 1.2:** Monitoring and energy-efficient behavior reduces energy use by 25-50 percent.
 - **BDG Strategy 1.2.1:** Implement comprehensive metering in all new and retrofitted buildings.
 - **BDG Strategy 1.2.2:** Increase and educate staff to operate and monitor buildings efficiently.
 - **BDG Objective 1.3:** Reduce 100 percent of emissions associated with building operations (after implementation of all other BDG strategies).
 - **BDG Strategy 1.3.1:** Require all new and retrofitted buildings to include rooftop solar panels with the largest feasible array.
 - **BDG Strategy 1.3.2:** Require all buildings to offset emissions from natural gas consumption.

- **BDG Strategy 1.3.3:** Produce enough energy to meet remaining demand from buildings not slated for replacement or retrofit.
- ▶ **BDG Goal 2:** Structures that withstand or are easily adapted to the impacts of climate change
 - **BDG Objective 2.1:** Reduce the impact of heat waves/temperature increase on existing cooling/ventilation systems by 2035.
 - **BDG Strategy 2.1.2:** Prioritize envelope improvements and energy efficiency in building renovations. Add air conditioning where critically needed and provide central plant chilled water where possible.
- ▶ **Transportation (TRN) Goal 1:** Low GHG Emissions Commute
 - **TRN Objective 1.1:** Adjust parking permit policy to reduce the number of cars on campus.
 - **TRN Strategy 1.1.1:** Increase the number of housing units for students on campus and eliminate residential parking permits for freshmen and sophomores living on campus.
- ▶ **TRN Goal 2:** Low Emissions on Campus
 - **TRN Objective 2.1:** Decrease the use of campus owned vehicles.
 - **TRN Strategy 2.1.1:** Phase out the existing vehicle fleet as departments begin to rely on car share and car rental programs.
- ▶ **TRN Goal 3:** Low Emissions Long Distance Travel
 - **TRN Objective 3.1:** Eliminating unnecessary long distance trips.
 - **TRN Strategy 3.1.1:** Offer carbon offsets for long distance travel.
- ▶ **Water (WTR) Goal 1:** Responsible stewardship of campus water serving landscaping, agricultural, and domestic uses
 - **WTR Objective 1.1:** Reduce landscaping water emissions by 95 percent by 2040.
 - **WTR Strategy 1.1.1:** Remove 40 acres of turf on campus.
 - **WTR Strategy 1.1.2:** Install infrastructure for conveying untreated water for landscaping.
 - **WTR Strategy 1.1.3:** Plant water efficient landscapes.
 - **WTR Objective 1.3:** Reduce domestic water emissions by 40 percent by 2040.
 - **WTR Strategy 1.3.1:** Prepare a water efficiency plan for structures on campus.
- ▶ **WTR Goal 2:** Resilient and prepared for variable precipitation and weather patterns.
 - **WTR Objective 2.2:** Prepare for increased droughts by 2030.
 - **WTR Strategy 2.2.3:** Improve water fixtures to reduce consumption.
- ▶ **Solid Waste (SW) Goal 1:** Cal Poly is a Zero Waste Campus
 - **SW Objective 1.1:** Establish a campus culture of responsible waste disposal and divert 80 percent of waste to recycling by 2020.
- ▶ **Campus Life (CL) Goal 2:** Climate Smart Campus Culture
 - **CL Objective 2.1:** Reduce energy usage of student residents by 20 percent by 2025.
 - **CL Strategy 2.1.2:** Keep utility usage 10 percent less than baseline.
- ▶ **Renewable Energy (RE) Goal 1:** Renewable energy sources efficiently power campus needs
 - **RE Objective 1.1:** Balance energy produced on campus and energy provided by PG&E to be Net Zero by 2050.

- **RE Objective 1.2:** Increase the capacity and efficiency of the grid.
 - **RE Strategy 1.2.2:** Install a microgrid on campus.
- ▶ **RE Goal 2:** Implemented renewable energy practices on both campus land and buildings
 - **RE Objective 2.1:** Increase implementation of solar energy panels on existing infrastructure.
 - **RE Strategy 2.1.1:** Outfit parking structures with solar arrays on the top level.
 - **RE Strategy 2.1.3:** Install rooftop solar arrays on identified buildings.
 - **RE Objective 2.2:** Build renewable energy infrastructure on campus-owned land.
 - **RE Strategy 2.2.1:** Maximize the solar energy implementation effort to ensure a 5 megawatt array.
 - **RE Strategy 2.2.2:** Implement the Cal Poly Wind Farm.
 - **RE Strategy 2.2.3:** Research and implement new energy storage strategies.
- ▶ **Public-Private Partnership (PPP) Goal 2:** Energy efficient buildings
 - **PPP Objective 2.1:** Establish Net Zero structures.
 - **PPP Strategy 2.1.1:** Incorporate the use of photovoltaic systems.
 - **PPP Objective 2.2:** Exceed Title 24 energy efficiency requirements by 20 percent.
 - **PPP Strategy 2.2.1:** Orient workforce housing buildings to maximize passive cooling and heating.
 - **PPP Objective 2.3:** Increase the efficiency of building use by 25 percent.
 - **PPP Strategy 2.3.2:** Require energy efficient appliances.
- ▶ **PPP Goal 3:** Adapt to climate change impacts
 - **PPP Objective 3.1:** Design energy-efficient buildings to foster resilience.

LOCAL

Cal Poly is an entity of the CSU, which is a constitutionally created state agency, and is therefore not subject to local government planning and land use plans, policies, or regulations. Cal Poly may consider, for informational purposes, aspects of local plans and policies for the communities surrounding the campus when it is appropriate. The proposed project would be subject to state and federal agency planning documents described herein but would not be bound by local or regional planning regulations or documents such as the City's General Plan or municipal code.

County of San Luis Obispo General Plan

The County of San Luis Obispo General Plan was adopted in 2010, amended in 2015, and includes the following goals and policies related to GHG emissions and climate change (County of San Luis Obispo 2010):

GOAL AQ 1: Per capita vehicle miles traveled countywide will be reduced consistent with statewide targets.

- ▶ **Policy AQ 1.1:** Encourage compact land development by concentrating new growth within existing communities and ensuring complete services to meet local needs.
- ▶ **Policy AQ 1.3:** Require new development to provide safe and convenient access to alternative transportation within the project area and safe access to public transportation as feasible.
- ▶ **Policy AQ 1.5:** Improve the operating efficiency of the transportation system by reducing vehicle travel demand and expanding opportunities for multi-modal travel.
- ▶ **Policy AQ 1.7:** Encourage bicycle and pedestrian use by supporting the policies found in the Regional Transportation Plan, County Bikeways Plan, Land Use and Circulation Element, and County Parks and Recreation Element. In addition, support public and private efforts to facilitate bicycling and walking for transportation and recreation.

GOAL AQ 4: Greenhouse gas emissions from County operations and community-wide sources will be reduced from baseline levels by a minimum of 15 percent by 2020.

- ▶ **Policy AQ 4.1:** Implement and enforce State legislative or regulatory standards, policies, and programs designed to reduce greenhouse gas emissions.
- ▶ **Policy AQ 4.2:** Quantify, reduce, and mitigate greenhouse gas emissions.
- ▶ **Policy AQ 4.4:** Reduce greenhouse gas emissions from development projects and other land use activities.
- ▶ **Policy AQ 4.5:** Reduce net carbon emissions through the preservation, protection, and enhancement, as appropriate, of the county's terrestrial and aquatic carbon sequestration resources, including the county's lakes, soils, and native forests, trees, and plants.
- ▶ **Policy AQ 4.6:** Collaborate and coordinate with regional organizations and local jurisdictions to reduce greenhouse gas emissions.

GOAL AQ 5: The County will adapt to adverse climate change.

- ▶ **Policy AQ 5.1:** Identify the needs and strategies to monitor, prepare for, and adapt to a changing climate.
- ▶ **Policy AQ 5.2:** Increase public awareness about climate change and lifestyle changes that will reduce greenhouse gas emissions.

GOAL E 1: The County will have an environmentally sustainable supply of energy for all county residents.

- ▶ **Policy E 1.1:** Meet our electricity needs through the following prioritized measures:
 - Increased conservation and efficiency in all sectors of energy use.
 - Development and use of locally appropriate sources of renewable resources from both distributed and large-scale projects.
 - Development of non-renewable sources of energy.
- ▶ **Policy E 1.4:** Increase the use of methane as an energy source from wastewater treatment plants and active and inactive, closed landfills.
- ▶ **Policy E 1.5:** Encourage waste-burning biomass facilities and conversion technologies as methods of producing electrical energy without endangering resource recovery programs where environmental and air quality are protect and the facility is compatible with adjoining uses.

GOAL E 3: Energy efficiency and conservation will be promoted in both new and existing development.

- ▶ **Policy E 3.1:** Ensure that new and existing development incorporates renewable energy sources such as solar, passive building, wind, and thermal energy. Reduce reliance on non-sustainable energy sources to the extent possible using available technology and sustainable design techniques, materials, and resources.
- ▶ **Policy E 3.2:** Require the use of energy-efficient equipment in all new development, including but not limited to Energy Star appliances, high-energy efficiency equipment, heat recovery equipment, and building energy management systems.
- ▶ **Policy E 3.3:** Promote the use of renewable energy systems to pump and treat water and wastewater.

GOAL E 4: Green building practices will be integrated into all development.

- ▶ **Policy E 4.1:** Integrate green building practices into the design, construction, management renovation, operations, and demolition of buildings, including publicly funded affordable housing projects, through the development review and building permitting process.
- ▶ **Policy E 4.4:** Orient new buildings to maximize solar resources, shading, ventilation, and lighting.

GOAL E 5: Recycling, waste diversion, and reuse programs will achieve as close to zero waste as possible.

- ▶ **Policy E 5.1:** Encourage source reduction and diversion of solid waste generated to as near zero waste as possible, in order to reduce energy consumption.
- ▶ **Policy E 5.3:** Encourage biomass, green waste, and food waste composting facilities (agricultural, residential, food service, commercial, industrial sources) for the proper disposal of locally generated waste in locations where land use conflicts can be minimized.
- ▶ **Policy E 5.4:** Continue to reduce construction and demolition waste in accordance with the County's Construction and Demolition Debris Recycling Ordinance. Support increase diversion rates over time.

GOAL E 6: The use of renewable energy resources will be increased.

- ▶ **Policy E 6.1:** Promote the development of sustainable energy sources and renewable energy projects through streamlined planning and development rules, codes, processing, and other incentives.
- ▶ **Policy E 6.2:** Encourage and support the development of solar and wind power and other renewable energy systems as commercial energy enterprises.
- ▶ **Policy E 6.3:** Develop renewable energy resources in the county, include the safe, effective, and efficient use of small wind energy systems, solar power systems, passive solar buildings, and other renewable energy systems designed for onsite home, farm, and commercial use.
- ▶ **Policy E 6.6:** Encourage distributed energy resources to increase the efficiency of the power and transmission system and use of local renewable fuel sources.
- ▶ **Policy E 6.7:** Encourage cogeneration facilities as a method of reducing overall energy use.
- ▶ **Policy E 6.8:** Designate and protect areas that contain renewable energy resources such as wind, solar, geothermal, and small hydroelectric. Continue to explore and encourage the development of renewable energy resources through further streamlining actions.
- ▶ **Policy E 6.9:** Renewable energy is developed most effectively where sufficient renewable energy resources exist (e.g., solar energy requires a certain amount of sunlight to be efficient and wind energy requires a certain amount of wind). In areas where renewable energy resources have been identified and mapped pursuant to Policy E 6.8, renewable energy development is dependent on the mapped resource and shall be given high priority while balancing the protection of other environmental resources.

GOAL WR 4: Per capita potable water use in the county will decline by 20 percent by 2020.

- ▶ **Policy WR 4.1:** Employ water conservation programs to achieve an overall 20 percent reduction in per capita residential and commercial water use in the unincorporated area by 2020.
- ▶ **Policy WR 4.5:** Promote the use of supplemental water such as reclaimed sewage effluent and water from existing impoundments to prevent overdraft of groundwater. Consider new ways to recharge underground basins and to expand the use of reclaimed water. Encourage the eventual abandonment of ocean outfalls.
- ▶ **Policy WR 4.6:** Encourage the use of graywater systems, rainwater catchments, and other water reuse methods in new development and renovation projects, consistent with state and local water quality regulations.
- ▶ **Policy WR 4.8:** Support efforts of the resource conservation districts, Cal Poly, the University of California Cooperative Extension, and others to research, develop, and implement more efficient irrigation techniques.

EnergyWise Plan

The EnergyWise Plan was adopted by the County of San Luis Obispo in 2011, and updated in 2016, to implement the goals established by the Conservation and Open Space Element of the County's General Plan (County of San Luis Obispo 2016).

City of San Luis Obispo General Plan

The City of San Luis Obispo's General Plan includes the following goals and policies related to GHG emissions (City of San Luis Obispo 2014):

GOAL 4.2: Increase use of sustainable energy sources such as solar, wind and thermal energy, and reduce reliance on non-sustainable energy sources to the extent possible with available technology and resources.

- ▶ **Policy 4.3.1:** The City will employ the best available practices in energy conservation, procurements, use and production, and will encourage individuals, organizations and other agencies to do likewise. "Best available practices" means behavior and technologies that reflect recommendations of specialists and that use the least energy for a desired outcome, considering available equipment, life-cycle costs, social and environmental side effects, and the regulations of other agencies. Best available practices include use of sustainable sources. Sustainable sources are naturally renewed in a relatively short time and avoid substantial undesirable side effects.
- ▶ **Policy 4.3.4:** The City will promote the use of cost effective, renewable, non-depleting energy sources wherever possible, both in new construction projects and in existing buildings and facilities.
- ▶ **Policy 4.3.5:** The City will cooperate with Federal, State and local governments and other appropriate entities to accomplish energy conservation objectives throughout the state, and inform employees, its contractors, staff and the general public of the need for and methods of energy conservation.
- ▶ **Policy 4.3.6:** The City shall encourage energy-efficient "green buildings" as certified by the U.S. Green Building Council's Leadership in Energy and Environmental Design Program or equivalent certification.
- ▶ **Policy 4.3.7:** The City's form will support energy efficiency and the use of sustainable energy sources.
- ▶ **Policy 4.4.1:** Residences, work places and facilities for all other activities will be located and designed to promote travel by pedestrians and bicyclists.
- ▶ **Policy 4.4.2:** The City's transportation and circulation systems shall foster travel by modes other than motor vehicles, including walking, bicycles and public transit.

GOAL 4.5: Encourage the provision for and protection of solar access.

- ▶ **Policy 4.5.1:** To encourage use of solar energy, reasonable solar access shall be provided and protected. The City will protect reasonable solar exposure for existing collectors and likely locations of future collectors, both active and passive.
- ▶ **Policy 4.5.4:** When solar collectors are proposed as part of a development, the development plan will locate solar collectors and include features to assure adequate solar access.
- ▶ **Policy 4.5.7:** Sites and buildings should be designed to avoid unwanted heat gain from solar exposure. Features that provide shading at suitable times of the day and year and generally should be "passive" or automatic, avoiding the need for occupants to regularly monitor or adjust them.

GOAL 5.2: The City will use materials efficiently in its buildings and facilities, services and operations, and encourage other to do the same.

- ▶ **Policy 5.4.1:** The City will employ the best available practices in materials procurement, use and recycling, and will encourage individuals, organizations and other agencies to do likewise. "Best available practices" means behavior and technologies that, considering available equipment, life-cycle costs, social and environmental side effects, and the regulations of other agencies.
- ▶ **Policy 5.4.3:** The City will promote waste diversion and material recycling in private development, business and operations, and will encourage businesses or nonprofit entities to provide building materials recycling and source reduction services.

City of San Luis Obispo Climate Action Plan

The City adopted its Climate Action Plan in August 2012 and is currently updating its plan for 2035. The 2012 Climate Action Plan includes community strategies for reducing GHG emissions through six sectors: buildings, renewable energy, transportation and land use, water, solid waste, and parks and open space to achieve an overall reduction target for the year 2020 (City of San Luis Obispo 2012).

3.8.2 Environmental Setting

THE PHYSICAL SCIENTIFIC BASIS OF GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

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 absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are CO₂, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are found to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forcing (IPCC 2014:5).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas most pollutants with localized air quality effects have relatively short atmospheric lifetimes (approximately 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere long enough to be dispersed around the globe. Although the lifetime of any GHG molecule depends on multiple variables and cannot be determined with any certainty, it is understood that more CO₂ is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO₂ emissions, approximately 55 percent are estimated to be sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO₂ emissions remain stored in the atmosphere (IPCC 2013:467).

The quantity of GHGs in the atmosphere responsible for climate change is not precisely known, but it is enormous. No single project alone would measurably contribute to an incremental change in the global average temperature or to global or local climates or microclimates. From the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative.

GREENHOUSE GAS EMISSION SOURCES

Statewide

As discussed previously, GHG emissions are attributable in large part to human activities. The total GHG inventory for California in 2016 was 429 million metric tons of carbon dioxide equivalent (MMTCO_{2e}) (CARB 2018b). This is less than the 2020 target of 431 MMTCO_{2e} (CARB 2018c:1). Table 3.8-1 summarizes the statewide GHG inventory for California.

Table 3.8-1 Statewide GHG Emissions by Economic Sector

Sector	Percent
Transportation	41
Industrial	23
Electricity generation (in state)	10
Electricity generation (imports)	6
Agriculture	8
Residential	7
Commercial	5
Not specified	<1

Source: CARB 2018b

Cal Poly

As part of the PolyCAP, Cal Poly conducted a GHG emissions inventory for a baseline year of 2015, from which future growth and anticipated legislative actions were forecasted, as well as a backcasted 1990 baseline to align with adopted policies. The inventory separates GHG emissions into three categories: Scope 1, Scope 2, and Scope 3 emissions.

GHG accounting protocols recognize that the Scope 2 emissions reported by one entity may also be reported as Scope 1 emissions by another entity. For example, the Scope 2 emissions from electricity use reported by a local government may also be reported as Scope 1 emissions by the regionally serving utility that produced the electricity. This dual reporting does not constitute double counting of emissions, as the entities report the emissions associated with the electricity production and use in different scopes (Scope 1 for the regionally serving utility and Scope 2 for the local government). Emissions can only be aggregated meaningfully within a scope, not across scopes.

This also applies to Scope 3 emissions, as one entity's Scope 3 emissions are also another entity's Scope 1 or Scope 2 emissions. Thus, all scopes should be accounted for separately. The PolyCAP divides the campus's GHG emissions into the three scopes. Table 3.8-2 shows Cal Poly's GHG emissions by scope for 1990 and 2015.

Table 3.8-2 Cal Poly San Luis Obispo Greenhouse Gas Emissions Inventories for 1990 and 2015 (MTCO_{2e})

Emissions Sector	1990	2015
Scope 1		
Fleet	1,036	790
Landscaping	4	4
Stationary Sources	14,142	12,401
Fugitive ¹	2,311	1,344
Water	210	171
Scope 2		
Electricity (Purchased)	7,260	8,358
Total Scope 1 and 2 Emissions	24,963	23,138
Scope 3		
Air Travel	682	682
Commuting	19,952	23,138
Solid Waste	1,418	227
Total Scope 1, 2, and 3 Emissions	47,015	47,115

Note: MTCO_{2e} = metric tons of carbon dioxide equivalent.¹ Fugitive emissions include wastewater lagoons, composting operations, and agricultural uses.

Source: PolyCAP Team 2015

The GHG emissions inventory shows that Cal Poly has already reduced its Scope 1 and 2 emissions below 1990 levels, 5 years before the policy mandate, even with 100-percent growth in buildings and on-campus housing over that period. The inventory also shows that over 50 percent of Cal Poly's emissions are generated from vehicle commute.

EFFECTS OF CLIMATE CHANGE ON THE ENVIRONMENT

According to the Intergovernmental Panel on Climate Change, which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature will increase by 3.7 to 4.8 degrees Celsius (°C) (6.7 to 8.6 degrees Fahrenheit [°F]) by the end of the century unless additional efforts to reduce GHG emissions are made (IPCC 2014:10). According to CEC, temperatures in California will warm by approximately 2.7°F above 2000 averages by 2050 and by 4.1°F to 8.6°F by 2100, depending on emission levels (CEC 2012:2).

Other environmental resources could be indirectly affected by the accumulation of GHG emissions and the resulting rise in global average temperature. In recent years, California has been marked by extreme weather and its effects. According to CNRA's *Safeguarding California Plan: 2018 Update*, California experienced the driest 4-year statewide precipitation on record from 2012 through 2015; the warmest years on average in 2014, 2015, and 2016; and the smallest and second smallest Sierra snowpack on record in 2015 and 2014 (CNRA 2018:55). In contrast, the northern Sierra Nevada experienced its wettest year on record during the 2016-2017 water year (CNRA 2018:64). The changes in precipitation exacerbate wildfires throughout California, increasing their frequency, size, and devastation. As temperatures increase, the amount of precipitation falling as rain rather than snow also increases, which could lead to increased flooding because water that would normally be held in the snowpack of the Sierra Nevada and Cascade Range until spring would flow into the Central Valley during winter rainstorm events. This scenario would place more pressure on California's levee/flood control system (CNRA 2018:190–192). Furthermore, in the extreme scenario involving the rapid loss of the Antarctic ice sheet, the sea level along California's coastline could rise up to 10 feet by 2100, which is approximately 30–40 times faster than the sea-level rise experienced over the last century (CNRA 2017:102). Changes in temperature, precipitation patterns, extreme weather events, wildfires, and sea-level rise have the potential to threaten transportation and energy infrastructure and crop production (CNRA 2018:64, 116–117, 127).

The California Department of Transportation (Caltrans) owns and operates more than 51,000 miles along 265 highways, as well as three of the busiest passenger rail lines in the nation. Sea level rise, storm surge, and coastal erosion are imminent threats to highway, roads, bridge supports, airports, transit systems, and rail lines near sea level and seaports. Shifting precipitation patterns, increased temperatures, wildfires, and increased frequency in extreme weather events also threaten transportation systems across the state. Temperature extremes and increased precipitation can increase the risk of road and railroad track failure, decreased transportation safety, and increased maintenance costs (CNRA 2017). Water availability and changing temperatures, which affect the prevalence of pests, disease, and species, directly affect crop development and livestock production. Other environmental concerns include decline in water quality, groundwater security, and soil health (CNRA 2017). Vulnerabilities of water resources also include risks to degradation of watersheds, alteration of ecosystems and loss of habitat, impacts to coastal areas, and ocean acidification (CNRA 2017). The ocean absorbs approximately a third of the CO₂ released into the atmosphere every year from industrial and agricultural activities, changing the chemistry of the ocean by decreasing the pH of seawater. This ocean acidification is harmful to marine organisms, especially calcifying species such as oysters, clams, sea urchins, and corals (CNRA 2017).

Cal-Adapt is a climate change scenario planning tool developed by CEC that downscales global climate model data to local and regional resolution under two emissions scenarios. The Representative Concentration Pathway (RCP) 8.5 scenario represents a business-as-usual future emissions scenario, and the RCP 4.5 scenario represents a future with reduced GHG emissions. According to Cal-Adapt, annual average temperatures in the project area are projected to rise by 4.1°F to 6.1°F by 2099, with the low and high ends of the range reflecting the lower and higher emissions increase scenarios (CEC 2019).

San Luis Obispo County experienced an annual average high temperature of 70.5°F between 1950 and 2005. Under the RCP 4.5 scenario, the county's annual average high temperature is projected to increase by 2.5°F to 73.0°F by

2050 and increase an additional 4.1°F to 74.6°F by 2099 (CEC 2019). Under the RCP 8.5 scenario, the county's annual average high temperature is projected to increase by 2.8°F to 73.3°F by 2050 and increase an additional 6.1°F to 76.6°F by 2099 (CEC 2019).

San Luis Obispo County experienced an average precipitation of 20.8 inches per year between 1950 and 2005. Under the RCP 4.5 scenario, the county is projected to experience an increase of 0.5 inches to 21.3 inches per year by 2050 and increase to 24.1 inches per year by 2099 (CEC 2019). Under the RCP 8.5 scenario, the county is projected to experience an increase of 1.5 inches to 22.3 inches per year by 2050 and increase by 3.2 inches to 24.0 inches per year by 2099 (CEC 2019).

3.8.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

GHG emissions associated with the project would be generated during project construction and during operation after the project is built. Methods used to estimate levels of construction- and operation-related GHGs are described below.

Construction-Related Greenhouse Gas Emissions

Short-term construction-generated GHG emissions were estimated using the California Emissions Estimator Model (CalEEMod), Version 2016.3.2 (CAPCOA 2016), as recommended by the San Luis Obispo County Air Pollution Control District (APCD) and other air districts in California. Modeling was based on project-specific information (e.g., land use type, building square footage, energy information) where available; assumptions based on typical construction activities; and default values in CalEEMod that are based on the project location and land use types. Construction was assumed to begin in ~~2020-2021~~. ~~Although the actual construction schedule is unknown at this time, near-term projects were spread out over the first 9 years and long-term projects over the last 6 years, with and long-term projects have been identified. Near-term projects were estimated to begin construction in 2020 and assumed to last for 9 years, with the University-Based Retirement Community and the Slack and Grand neighborhood beginning construction in 2020 along with the academic and student housing short-term projects. Long-term projects were estimated to begin construction in 2029 and~~ the project's full buildout would occurring in 2035. Total GHG emissions associated with construction over 15 years were summed and then amortized over 25 years, in accordance with APCD guidance (APCD 2012:2-2).

Operation-Related Greenhouse Gas Emissions

Operation-related emissions of GHGs were estimated for area sources (e.g., landscape maintenance equipment), energy use (i.e., electricity and natural gas consumption), water use, wastewater generation, solid waste generation, and mobile sources. Operation-related mobile-source GHG emissions were modeled based on the estimated level of VMT generated by residents, students, employees and visitors. VMT estimates were derived from data generated during the traffic impact analysis conducted for the project (see Section 3.13, "Transportation"). Mobile-source emissions were calculated using CalEEMod. Daily VMT were adjusted to annual VMT using a conversion factor of 267 days per year, which accounts for Cal Poly's academic schedule, holidays, and enrollment levels during summer and regular academic quarters. See Appendix C for details.

Indirect emissions associated with electricity and natural gas consumption were estimated using adjusted GHG emissions factors for Pacific Gas and Electric Company based on compliance with Renewable Portfolio Standard targets. The project's level of electricity and natural gas use was based on 2019 Title 24-adjusted consumption rates for each land use type. Sustainable design features such as water-efficient plumbing fixtures, improved lighting efficiency, and waste diversion rates were accounted for in the emissions estimates, in compliance with CSU and Cal Poly sustainability goals and policies. Operational area source GHG emissions from landscaping equipment were estimated using CalEEMod based on model defaults for the applied land uses.

The 2035 Master Plan includes the development of an on-site water reclamation facility (WRF) to treat campus-generated effluent. The WRF would emit process-based GHG emissions. CalEEMod estimates GHG emissions associated with water and wastewater treatment, conveyance, and delivery and reports them together as “water” emissions. Water-related methane and nitrous oxide emissions estimated by CalEEMod, attributed to the new population under the 2035 Master Plan, are assumed to reflect the process-based GHG emissions associated with the WRF. The project was anticipated to have an annual water demand of 400 acre-feet, as discussed in Chapter 2, “Project Description,” which was used in the emissions modeling conducted in CalEEMod. Detailed model assumptions and inputs for these calculations are presented in Appendix C.

Consistency with Applicable Plans, Policies, Regulations

The project was also evaluated for its consistency with adopted regulations, plans, and policies aimed at reducing GHG emissions. These include the 2017 Scoping Plan, CSU Sustainability Policy, Second Nature Climate Leadership Commitment, and PolyCAP. The analysis was generally qualitative in nature and considered proposed GHG-reduction design features as GHG emissions reduction targets set by CSU and Cal Poly.

Cal Poly 2035 Master Plan

The following “Guiding Principles” were developed early on in the process by the 2035 Master Plan professional team with input from campus leadership, including the college deans, and considered continuity with the 2001 Master Plan. Guiding Principles can be thought of both as starting points for the plan process and as overarching directives relevant to all or most Master Plan topics. The following principles are relevant to GHG emissions:

- ▶ **General Principle (GP) 11:** Cal Poly should be sustainable with regard to its land and resource planning, as well as site and building design, and operations. Cal Poly should meet or exceed all state and system-wide sustainability policies.
- ▶ **GP 13:** Access to and around campus should be safe, efficient and effective for all modes, while shift to an active transportation system that gives priority to walking, bicycles, emerging mobility technologies, and transit over cars.
- ▶ **Implementation Program (IP) 05:** Cal Poly should continue its program of identifying areas for solar and other forms of renewable energy.
- ▶ **IP 06:** Cal Poly should continue its program of retrofitting older buildings for energy and water efficiency.
- ▶ **IP 07:** Cal Poly should investigate the use of reclaimed water and the use of grey water systems; and turf should be limited to high use areas only.
- ▶ **IP 08:** Cal Poly should investigate the potential of becoming a climate action reserve.
- ▶ **IP 12:** Cal Poly should incorporate pedestrian, bicycle and transit plans into a comprehensive and updated multi-modal active transportation plan designed consistent with leading standards.
- ▶ **IP 14:** As a regional leader in fostering active transportation, Cal Poly should partner with local, regional and national public and private organizations (including but not limited to the City, County, Caltrans, SLOCOG, RTA [San Luis Obispo Regional Transit Authority], Amtrak, and Union Pacific Railroad) to make San Luis Obispo a model for modal shift from single occupancy autos to a complete active transportation system.
- ▶ **IP 20:** Cal Poly should partner with the City to help develop off-campus bicycle improvements as prescribed in the City’s bike plan and that improve connections between the campus and community.
- ▶ **IP 21:** Convenient bicycle routes throughout the campus, as well as bike parking located as near as practical to campus origins and destinations, should be provided to encourage bicycle use.
- ▶ **IP 23:** Cal Poly should continue to work with the City and RTA to make public transportation more convenient than automobile use through such improvements as shorter headways, increased evening and weekend services, and greater convenience for on-campus residents.
- ▶ **IP 27:** Any future or renovated parking facility should meet the certification standards of the Green Parking Council or similar organization.

- ▶ **IP 28:** Where activities are located beyond walking distance from the Academic Core, alternative transportation options should be provided.
- ▶ **IP 29:** If intra-campus shuttles or similar future services are provided, they should be low or zero emission (such as electric, CNG [compressed natural gas] or gas hybrid).
- ▶ **Other Recommendation (OR) 13:** Infrastructure development should maximize resource conservation, leverage current policy and practice in support of sustainable design, consider long-term return on energy investment, and establish a foundation for future revenue potential.
- ▶ **OR 14:** Cal Poly should strive to be a net zero campus by investing in renewable power and prioritizing on-campus generation.
- ▶ **OR 15:** Cal Poly should continue to exceed Title 24 CALGreen [California Green Building Standards Code] requirements in new construction.
- ▶ **OR 16:** Cal Poly should plan for solid waste management, and in particular for recyclables, in all future development.
- ▶ **OR 17:** Cal Poly should be the model for Low Impact Design principles.
- ▶ **Transportation and Circulation (TC) 01:** Existing roads in the Academic Core, including North Perimeter, should be re-designed and managed to reflect mode priorities.
- ▶ **TC 02:** Single occupancy vehicle trips to campus should be reduced by increasing ride sharing and by substituting cars with active transportation options.
- ▶ **TC 04:** On-campus residential neighborhoods should have convenient access to public transportation.
- ▶ **TC 07:** Cal Poly should give higher priority to committing resources to active transportation and trip reduction measures over providing more parking on campus.
- ▶ **TC 08:** Conflicts among circulation modes should be avoided through such methods as separated routes, grade separated paths, traffic calming and intersection controls.
- ▶ **TC 09:** A multimodal transportation center should be planned and funded on the campus.

THRESHOLDS OF SIGNIFICANCE

Global climate change is inherently cumulative because the GHG emissions of individual projects cannot be shown to have any material effect on global climate. Thus, the project's impact on climate change is addressed only as a cumulative impact.

State CEQA Guidelines Section 15064 and relevant portions of Appendix G recommend that a lead agency consider a project's consistency with relevant, adopted plans and discuss any inconsistencies with applicable regional plans, including plans to reduce GHG emissions. Under Appendix G of the State CEQA Guidelines, implementing a project would result in a cumulatively considerable contribution to climate change if it would:

- ▶ generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or
- ▶ conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

The buildout year of the project is 2035, for which neither the APCD nor CSU has developed GHG emission thresholds. Thus, to evaluate the project in light of the 2030 statewide GHG reduction target codified by SB 32 (i.e., 40 percent below 1990 levels), and the 2050 long-term statewide goal identified in EO B-30-15 (i.e., 80 percent below 1990 levels), a project-specific mass emissions threshold was derived. The method is briefly described below, and detailed calculations are provided in Appendix C.

The state's 2015 emissions inventory was adjusted to match the inventory sectors included in the PolyCAP to derive the percent reduction that the state would need to achieve the 2030 and 2050 emissions reduction targets set forth in SB 32 and EO B-30-15. A percent reduction from 2015 levels for 2035 was established using a straight-line regression between 2030 and 2050 emissions reduction targets. Based on this calculation, the state would need to reduce emissions by 49 percent by 2035 to be in line with 2050 target. The needed percent reduction was applied to Cal Poly's 2015 emissions inventory to determine the 2035 mass emissions limit for Cal Poly that would be in line with the state's 2030 and 2050 emissions limits. Using the established mass emissions limit for Cal Poly for 2035 (i.e., 24,086 MTCO_{2e}) and the total anticipated student plus faculty/staff population for Cal Poly in 2035 (i.e., 27,411), a per capita emissions limit of 0.88 MTCO_{2e} was established for Cal Poly. This per capita emissions limit is based on the state's established emissions reductions needed to achieve 2030 and 2050 mandated targets. Therefore, emissions associated with Cal Poly operations that meet this limit would be consistent with state targets.

It important to note that the PolyCAP covers the entire Cal Poly campus through the year 2050. The mass emission limit developed for the 2035 Master Plan applies only to the development anticipated under the 2035 Master Plan because it does match the projections included in the PolyCAP. The PolyCAP was adopted to address the remaining GHG emissions associated with existing campus operations. As discussed in the regulatory setting section, the PolyCAP aims to exceed the CSU mandate and achieve net zero GHG emissions by 2050.

To evaluate the significance of project-generated GHGs, the anticipated net increase in students and faculty/staff (i.e., 4,843) was multiplied by the per capita emissions limit to obtain a mass emissions threshold of 4,255 MTCO_{2e}/year. Detailed calculations for the threshold determination can be found in Appendix C. Thus, the project would result in a cumulatively considerable contribution to climate change if it would:

- ▶ exceed the mass emissions threshold of 4,255 MTCO_{2e}/year or
- ▶ conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

ISSUES NOT DISCUSSED FURTHER

All issues applicable to GHG emissions listed under the significance criteria above are addressed in this section.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.8-1: Generate GHG Emissions That May Have a Significant Impact on the Environment

Construction activity associated with development of the project is estimated to generate a total of ~~20,819~~14,079 MTCO_{2e}. Operation of the project would result in GHG emissions associated with mobile sources, area sources, building energy, water consumption, and wastewater and solid waste generation. After full buildout, the project would generate approximately ~~15,025~~14,537 MTCO_{2e}/year, including the total construction emissions amortized over 25 years. This would exceed the identified threshold of 4,255 MTCO_{2e}/year. This impact would be **significant**.

GHG emissions associated with the project would be generated during construction and operation. Project-related construction activities would result in the generation of GHG emissions from the use of heavy-duty off-road construction equipment, delivery trucks associated with materials transport, and vehicle use during worker commute.

Operation of the project would result in mobile-source GHG emissions from vehicle trips (i.e., project-generated VMT), area-source emissions from the operation of landscape maintenance equipment, energy use emissions from consumption of electricity and natural gas, water-related energy consumption associated with water use and the conveyance and treatment of wastewater, and waste-generated emissions from the transport and disposal of solid waste. Emissions are summarized in Table 3.8-3 below by source for the buildout year of 2035.

As shown in Table 3.8-3 below, annual operational GHG emissions associated with the project would be 15,025,14,537 MTCO₂e/year. This exceeds the mass emissions threshold established for this project of 4,255 MTCO₂e/year and the project would need to reduce its emissions by 10,770,10,282 MTCO₂e/year to align with both statewide and Cal Poly's GHG targets. This impact would be **significant**.

Table 3.8-3 Unmitigated GHG Emissions Associated with Construction and Operation in 2035 (MTCO₂e)

Emissions Source	GHG Emissions
Area	<u>6462</u>
Building Energy	<u>4,2103,993</u>
Mobile (Vehicular)	9,154
Water-Related	215
Solid Waste	550
Amortized Construction ¹	<u>833563</u>
Total	<u>15,02514,537</u>
Mass Emissions Threshold	4,255

Notes: GHG = greenhouse gas; MTCO₂e = metric tons of carbon dioxide equivalent.

¹ Construction emissions were amortized over 25 years per San Luis Obispo County Air Pollution Control District guidance. Total construction emissions were calculated to be 20,81914,079 MTCO₂e.

Source: Modeling conducted by Ascent Environmental in 201920

Mitigation Measures

Mitigation Measure 3.8-1: Implement On-Site GHG Reduction Measures

Cal Poly shall implement the following GHG reduction measures:

- ▶ Design all new and renovated buildings to achieve a 30-percent or greater reduction in energy use compared to a standard 2019 California Energy Code-compliant building or other best practices as defined by CSU Sustainability Policy. Reductions in energy shall be achieved through energy efficiency measures consistent with Tier 2 of the California Green Building Energy Code Section A5.203.1.2.2.
- ▶ Design all new and renovated buildings to include Cool Roofs in accordance with the requirements set forth in Tier 2 of the 2019 California Green Building Energy Code, Sections A5.106.11.2.
- ▶ Install rooftop solar photovoltaics on all new and renovated buildings, including parking structures, where specific site parameters and constraints allow for adequate rooftop space. The amount of megawatt-hours that would be installed to offset electricity consumption would be based on the feasibility at each building site.
- ▶ Ensure that all new and renovated buildings comply with requirements for water efficiency and conservation as described in the 2019 California Green Building Standards Code, Division 5.3.
- ▶ Ensure that all new parking structures include preferential parking spaces to vehicles with more than one occupant and ZEVs. The number of dedicated spaces will be no less than 5 percent of the total parking spaces. These dedicated spaces shall be in preferential locations, such as near the entrance to the parking structure. ZEV spaces shall also include campus-standard electric vehicle charging stations, with electrical infrastructure capacity to expand charging stations by a factor of four as the number of electric vehicle drivers grows. These spaces shall be clearly marked with signs and pavement markings. This measure shall not be implemented in a way that prevents compliance with requirements in the California Vehicle Code regarding parking spaces for disabled persons or disabled veterans.
- ▶ Include multiple electrical receptacles on the exterior of all new and renovated buildings and accessible for purposes of charging or powering electric landscaping equipment and providing an alternative to using fossil fuel-powered generators. The electrical receptacles shall have an electric potential of 120 volts. There should be a

minimum of one electrical receptacle on each building and one receptacle every 100 linear feet around the perimeter of the building.

- ▶ Ensure that all appliances and fixtures installed in project buildings are EnergyStar®-certified if an EnergyStar®-certified model of the appliance is available. Types of EnergyStar®-certified appliances include boilers, ceiling fans, central and room air conditioners, clothes washers, compact fluorescent light bulbs, computer monitors, copiers, consumer electronics, dehumidifiers, dishwashers, external power adapters, furnaces, geothermal heat pumps, programmable thermostats, refrigerators and freezers, room air cleaners, transformers, televisions, vending machines, ventilating fans, and windows (EPA 2018). If EPA's EnergyStar® program is discontinued and not replaced with a comparable certification program before appliances and fixtures are selected, then similar measures which exceed the 2019 California Green Building Standards Code may be used.
- ▶ Ensure that all space and water heating is solar- or electric-powered.
- ▶ Install high-efficacy lighting (e.g., light emitting diodes) in all streetlights, security lighting, and all other exterior lighting applications.
- ▶ Accomplish a waste diversion rate of 90 percent by and strive for 100 percent by 2040.
- ▶ Plant water-efficient and drought tolerant landscapes at all project buildings.

In addition to the quantifiable onsite measures presented above, the following additional measures would reduce GHG emissions, although the extent to which they would reduce GHG emissions is not quantifiable. Nonetheless, Cal Poly shall implement the following measures as part of implementation of the 2035 Master Plan and the Cal Poly Climate Action Plan to the extent feasible.

- ▶ At the time of contract renegotiation, work with current car share companies (e.g., ZIP car) to increase the use of fully electric vehicles or consider partnerships with other similar services that do use electric vehicles.
- ▶ Where appropriate site conditions exist, install solar photovoltaics on available land throughout the Cal Poly campus to offset the use of nonrenewable energy for existing and future facilities and buildings.
- ▶ Cal Poly shall work with San Luis Obispo County, the City of San Luis Obispo, Tri-County Regional Energy Network (3C-REN), and other local agencies to determine if Cal Poly can fund and take GHG reduction credit for energy efficiency retrofits of local existing housing stock, commercial spaces, and other land uses.
- ▶ Accelerate the expansion of Cal Poly's fleet vehicles to electric.
- ▶ Accelerate the expansion of Level 2 EV chargers on campus to meet the anticipated demand at Cal Poly.
- ▶ Implement energy efficiency retrofits for existing buildings on campus that will remain.
- ▶ Work with SLO Regional Rideshare to refine Cal Poly's use of the iRideshare trip reporting/incentive platform to help VMT and emission reduction goals.
- ▶ To help commute incentives more effectively change commute behavior to benefit VMT, emissions, and the modal hierarchy:
 - Expand faculty and staff daily benefits for using alternative transportation modes to an effective amount.
 - Consider reducing the frequency between parking permit purchasing (e.g. weekly, monthly)
 - Consider increasing faculty and staff parking permit costs over time.

Anticipated GHG emissions reductions resulting from the above mitigation measures were quantified and summarized below in Table 3.8-4.

Table 3.8-4 Summary of GHG Emissions Reduction from Mitigation Measure 3.8-1

Emissions Source	GHG Emissions (MTCO ₂ e/year)
Area	6443
Building Energy	1,7842,205
Mobile	9,1547,323
Water-Related	172
Solid Waste	325 ¹
Amortized Construction	833563
Total	12,33410,631
Mass Emission Threshold	4,255

Notes: GHG = greenhouse gas; MTCO₂e = metric tons of carbon dioxide equivalent.

¹ Emissions reduction related to the mitigation measure recommending zero waste by 2040 was not calculated owing to the uncertainty in available strategies for achieving the target. Rather, it was assumed that Cal Poly would continue to achieve, at a minimum, a diversion rate of 86 percent, a rate achieved in 2017. Thus, mitigated emissions were reduced consistent with current levels of waste diversion.

Source: Modeling conducted by Ascent Environmental in 2019²⁰

As shown in Table 3.8-4, implementation of Mitigation Measure 3.8-1 would reduce GHG emissions associated with the 2035 Master Plan to 12,33410,631 MTCO₂e/year, reducing the project's operational emissions by 2,694 3,906 MTCO₂e/year. Most of these emissions would come from mobile sources. To meet the established threshold of significance, additional reductions of 8,0766,376 MTCO₂e/year would be required.

Mitigation Measure 3.8-2: Purchase GHG Offsets

Annual project-generated GHG emissions would exceed the established threshold by 8,0766,376 MTCO₂e/year after incorporation of Mitigation Measure 3.8-1. Additional GHG emissions reductions could be achieved from the development of a local (i.e., campus) offset program or direct investments in existing local programs such as financing installation of regional electric vehicle-charging stations or investing in local urban forests.

Where development or investments in local programs are not feasible or available, Cal Poly may choose to mitigate additional GHG emissions through the purchase of carbon credits available through any one of the following verifiable entities/registries: CARB, Climate Action Reserve, California Air Pollution Control Officers Association, the APCD, or any other equivalent or verifiable registry. Such offsets, either established by Cal Poly or purchased, will meet the requirements of CEQA Guidelines Section 15126.4(C)(3), and meet the following criteria:

- ▶ **Real**—They represent reductions actually achieved (not based on maximum permit levels).
- ▶ **Additional/surplus**—They are not already planned or required by regulation or policy (i.e., not double counted).
- ▶ **Quantifiable**—They are readily accounted for through process information and other reliable data.
- ▶ **Enforceable**—They are acquired through legally binding commitments/agreements.
- ▶ **Validated**—They are verified through the accurate means by a reliable third party.
- ▶ **Permanent**—They will remain as GHG reductions in perpetuity.

Carbon offset credits must be purchased prior to occupancy of individual structures developed under the Master Plan up to 201,900159,400 MTCO₂e of credits (i.e., 25 years multiplied by 8,0766,376 MTCO₂e) for the entire campus. The amount to be purchased for each development under the Master Plan can either be calculated based on the percentage share of the development as it relates to overall development under the Master Plan or based on updated modeling at the time the development is considered for approval. The price per MT of CO₂e varies depending on the availability of credits on the market, the number of credits purchased at one time, and the type and location of carbon offset being purchased. Current pricing estimates range from \$0.85 to \$8.5 per MTCO₂e.

Significance after Mitigation

Mitigation Measures 3.8-1 and 3.8-2 would achieve PolyCAP BDG Goal 1 of net zero energy buildings, through the exceedance of the California Energy Code, on-site renewable energy generation to match electricity consumption, installation of energy-efficient appliances and lighting, and the purchase of carbon offset credits. This also aligns with Appendix B of the 2017 Scoping Plan, Local Action, which recommends the use of on-site renewables, LEED certification or CALGreen achievement, cool roofs, and net zero energy buildings (CARB 2017). Note that Mitigation Measure 3.13-1, detailed in Section 3.13, "Transportation," includes preparation and implementation of a Traffic Demand Management Plan that would provide substantial reductions in VMT and vehicle trips, resulting in approximately 20 percent reductions in mobile-source exhaust GHG emissions.

The 2035 GHG significance threshold would be met through implementation of Mitigation Measures 3.8-1 and 3.8-2. It is speculative at this time to determine consistency with long-term GHG reduction goals for the year 2050 due to uncertainty in future technology and regulations. The scale of reductions required to achieve 2050 goals of Cal Poly or the state would require improvements in the availability and/or cost of near-zero and zero-emissions technology, as well as additional GHG reductions from ongoing CSU, state, and federal legislative actions that are currently unknown. By achieving the identified significance threshold for 2035, Cal Poly would be on a trajectory toward attaining 2050 targets. For these reasons, the project would not conflict with Cal Poly's long-term carbon neutrality goal, the 2017 Scoping Plan, or established statewide GHG reduction targets. Therefore, the project would be consistent with statewide targets and would support a variety of other state plans, policies, and regulations designed to reduce GHG emissions. This impact would be **less than significant**.

Impact 3.8-2: Conflict with an Applicable Plan, Policy or Regulation of an Agency Adopted for the Purpose of Reducing the Emissions of GHGs

Both construction and operation of the project would include GHG efficiency measures consistent with all state and Cal Poly policies and plans adopted for the purpose of reducing GHG emissions and enabling the achievement of the statewide reduction target of SB 32 of 2016. The project would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions. Therefore, this impact would be **less than significant**.

The 2035 Master Plan was evaluated, qualitatively, for consistency with applicable local and state plans that were developed with the intent of reducing GHG emissions. Each applicable plan is discussed separately below.

Consistency with the 2017 Scoping Plan

The 2017 Scoping Plan lays out the framework for achieving the 2030 statewide GHG reduction target of 40 percent below 1990 levels and progress toward additional reductions. Appendix B of the 2017 Scoping Plan includes detailed GHG reduction measures and local actions that land use development projects can implement to support the statewide goal. For CEQA analyses, the 2017 Scoping Plan states that projects should implement feasible mitigation, preferably measures that can be implemented on-site. The project would include many GHG reduction features that would be consistent with the measures listed in Appendix B of the 2017 Scoping Plan. These include implementation of the Guiding Principles of the 2035 Master Plan, such as GP 13, IP 12, IP 21, and IP 23, which all seek to reduce VMT and increase the use of alternative modes of transportation throughout the campus. Additionally, OR 14 calls for zero net energy buildings and an increase in on-site renewable energy generation. These are consistent with the local measures of Appendix B of the 2017 Scoping Plan. Because the project would achieve the GHG emissions limit detailed in Impact 3.8-1, above, the project would not conflict with the state's ability to meet the 2030 GHG reduction target. Project design features (such as those required by the Master Plan Guiding Principles) and actions under Mitigation Measure 3.8-1 would be consistent with Appendix B of the 2017 Scoping Plan. For these reasons, the project would not conflict with the 2017 Scoping Plan.

Consistency with the CSU Sustainability Policy

The CSU Sustainability Policy aims to reduce the environmental impact of construction and operation of buildings and to integrate sustainability across the curriculum. Most of the goals of the policy have a target year of 2020. Because the 2035 Master Plan is not anticipated to be built out until 2035, only one of these policies applies: reduce

GHG emissions 80 percent below 1990 levels by 2040. This emissions reduction target applies to only Scope 1 and 2 emissions. The GHG emissions limit developed for the 2035 Master Plan is an interpolated target specific to Cal Poly's baseline 2015 GHG emissions. The 2035 GHG emissions limit would reduce the GHG emissions associated with the development under the 2035 Master Plan to 49 percent below 2015 levels by 2035. This target includes all three emission scopes, which is more robust than the CSU Sustainability Policy. As shown in Impact 3.8-1, above, the project would comply with this target and would put the University on a trajectory to meet both statewide and CSU emission reduction targets. The project would be consistent with the CSU Sustainability Policy.

Consistency with the Second Nature Climate Leadership Commitment

In 2016, Cal Poly became a Charter Signatory to the Climate Leadership Commitment, establishing a goal for Cal Poly to achieve net zero emissions from all sources (Scope 1, 2, and 3) by 2050. As discussed above, the emissions limit developed for the 2035 Master Plan includes all emission scopes and would reduce the project's emissions to 49 percent below 2015 levels by 2035. Achievement of this target would put the University on a trajectory toward net zero emissions by 2050. The project would be consistent with the Climate Leadership Commitment.

Consistency with the PolyCAP

The PolyCAP aims to exceed the CSU Sustainability and achieve net zero GHG emissions by 2050, as is included in the Second Nature Climate Leadership Commitment. For the same reasons that the project would be consistent with the Climate Leadership Commitment through achieving the 49 percent GHG reduction target by 2035, the project would put the University on a trajectory toward meeting the PolyCAP goals. Additionally, many of GHG reduction measures detailed in the PolyCAP are included as project design features or as part of Mitigation Measure 3.8-1. These include achieving CALGreen Tier 2 standards for buildings, increasing renewable energy generation, striving to meet zero waste goals, and reducing water consumption. For these reasons, the project would be consistent with the PolyCAP.

Summary

As discussed under Impact 3.8-1, the project would achieve the GHG emissions limit of 4,255 MTCO₂e/year, which represents a 49 percent reduction below 2015 levels by 2035, which is aligned with the state's GHG reduction targets as discussed in the 2017 Scoping Plan. The achievement of this reduction would put Cal Poly on a trajectory toward attaining 2040 and 2050 targets, including those set forth in the CSU Sustainability Policy, Climate Leadership Commitment, and PolyCAP. The project would include design features that would be consistent with local actions included in Appendix B of the 2017 Scoping Plan. For these reasons, the project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reduction GHG emissions. This impact would be **less than significant**.

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